REVIEW OF THE STATUS OF AVIFAUNA CONSERVATION – KIRITIMATI ATOLL KIRIBATI

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SUMMARY

Kiritimati Atoll's avifauna has regional and international significance. The Atoll provides nesting, roosting, feeding and migration sites for over 40 bird species, but it is 18 species of seabirds and their breeding numbers which are of particular significance.

The main purpose of the assignment reported here is to review current avifauna conservation management on Kiritimati; assess, to the extent possible, the status of bird species and populations; and, in the context of the current issues and projects planned for Kiritimati, provide recommendations for immediate and future conservation management.

Three weeks of the five week consultancy were spent on Kiritimati (July 7 -28th).

The Wildlife Conservation Unit (WCU) holds the conservation mandate, enabled by the 1975 Wildlife Conservation Ordinance. The WCU has no current management plan but continues to refer to a thorough plan which was drafted in 1983 and which still contains much valid information, following three years of very sound baseline ecological work. Since that time there has been little or no documented monitoring and observations by visiting specialists have been of short duration.

The WCU has eight staff, of which three are established. Major equipment is generally provided by donor agencies and it has great difficulty maintaining vehicles and boats in an operational mode. The Unit spends a considerable portion of its time on activities which are not directly related to wildlife conservation and essentially operates without a scientific framework. For instance, it currently undertakes no wildlife research or monitoring. One successful and important activity of the WCU is the schools education programme.

In 1997 the Government declared six new Closed Areas which comprise some 9,800 ha or approximately 15% of the island area. While this is a positive move in respect of providing enhanced protection for vulnerable breeding sites, it does not solve some of the basic anomalies of the current legislation. In addition, it is harsh on local communities and, as a result, may be unenforceable. The Closed Areas will need to be demarcated if they are to be respected by communities and have legal status, this will be a major undertaking given the approximately 88km of boundary.

The existing legislation whereby the whole of Kiritimati is a declared Wildlife Sanctuary is not consistent with the current clear intentions of the Kiribati Government which are to pursue vigorously economic development on the island.

To enable this, the principal recommendation of this report is that the wildlife conservation management be focused in the important wildlife localities, effectively releasing the remainder of the island for development purposes. In order to achieve this, the Wildlife Ordinance needs amending to:

1. Lift the island-wide Wildlife Sanctuary status;
2. Place stricter controls on people's activities within declared Wildlife Sanctuaries; and,
3. Declare the current Closed Areas (refer Table 4.1) as Wildlife Sanctuaries;

The Closed Area provision in the legislation should be retained to provide for the exclusion of people from very sensitive wildlife sites, this was its original intention and it is an important provision.

The current visit continues the recent trend (since 1983) of short visits by overseas specialists either for research or as consultants. Such visits can provide useful observations but in general pose as many questions relating to the status of Kiritimati's avifauna, as they answer. Short-duration visits will not provide unequivocal confirmation or otherwise of the widely perceived decline of Kiritimati's avifauna. Such visits also provide minimal training of WCU staff. They need to be replaced by long-term monitoring following a comprehensive survey. It is 20 years since the 1983 Management Plan's baseline ecological work was initiated, and it is long overdue for a similar initiative to be repeated.

What can be concluded on the basis of the current visit and recent reliable ornithological observations, is that:

- The full complement of Kiritimati's avifauna continues to breed on the island;
- All species observed breeding appeared to be doing so successfully;
- Sooty Terns had a successful to very successful breeding Season in mid-1999. A total of approximately 530,000 pairs bred on Kiritimati this year, less than half the numbers reported for 1980 and only 15% of the 1967 total. However, this year's breeding may be affected by 1997-98 El Nino and the accuracy of the estimate should be considered approximate;
- The loss of the `Turn of the Year' Sooty Tern Colony on Paris Peninsular is an unequivocal loss and serious precedent;
- Wedge-tailed Shearwater colonies were occupied but by low numbers in comparison with the burrows available;
- The number and variety of species nesting on the Closed Area islands - Cook Islet, Motu Tabu, Motu Upua and Frigate Island are comparable with those noted in 1964 and 1980, with the exception of Sooty Terns which now breed on Motu Tabu (since 1996);
- Nothing less than a full year of intensive ornithological survey and census is required with the objective of training at least two WCU staff in the relevant techniques and the setting up of an appropriate island-wide monitoring programme;
- The presence of more than one species of rat on the island requires confirmation;
- Feral pigs are still extant in the vulnerable south east of the island; and,
- Feral cat trapping techniques and reporting require improvement, while the whole issue of cat trapping needs to be re-analysed.

In line with the major recommendation of this report, that wildlife conservation needs to be more focused in the important wildlife sites, more active management measures also need to be considered. In response to the feral cat-restricted breeding distribution of eleven of Kiritimati's seabirds to islands, it would be possible in certain locations to greatly increase the area of `island' as opposed to `mainland', by the judicious severing of peninsulas and isthmuses to join lagoons. This would provide a major increase in potential breeding habitat, enable effective rat control, restrict vehicle movements and assist in controlling human access. The effects of such a proposal need detailed assessment.

The population of Kiritimati continues to grow at a very fast rate, principally through immigration. It has nearly doubled to just over 4,000 since 1993 when the consultant last visited the island. Along with population growth, mobility has increased greatly with a large number of vehicles and motorbikes. This poses major problems for the WCU whose own mobility is limited. Consequently poaching of wildlife still remains an issue.

Kiritimati faces considerable development constraints particularly its very limited agricultural potential and high drought risk, nonetheless, the Kiribati Government considers the economic development of Kiritimati an important cornerstone of national development. Several major projects are being considered, these include the Sea Launch Project – an offshore launching of space rockets, the HOPE-X Space Shuttle Landing Project and a 3-Star hotel. Currently conservation integrated development of the island's internationally famous and significant avifauna is not subject of any development proposal - indeed the island's avifaunal values appear to be diminishing both biologically and as a planning consideration. The current development proposals provide major opportunities as well as problems for conservation, but it is essential to appreciate that neither the wildlife legislation nor the technical or economic resources of the WCU are adequate for current needs, and certainly not for the challenges posed by the new projects. It is the opportunities which the Government needs to recognise and ensure that developers integrate in their project plans and activities.

There is no intrinsic reason why space-related activities and wildlife conservation should be incompatible on the island, however if they are considered as separte entities and not integrated in a common goal, then Kiritimati's wildlife is likely to decline rapidly. The Government needs to have a clear vision of the role and position of wildlife conservation in the island's development and to ensure that project developers take an appropriate share of the responsibilities for all the impacts of their projects. In particular, developers must accept responsibilities for the indirect impacts of their projects which are likely to be the most serious and which the government will be in danger of inheriting in totality.

In conclusion, Kiritimati faces a serious conservation challenge. All the indications are that Kiritimati's wildlife values – its bird populations and habitats, are diminishing or becoming degraded, only the rate is open to question. The WCU is clearly failing in its mandate and an internationally significant wildlife heritage is severely threatened. This will not be reversed by superficial additions of training and resources, fundamental changes to the relationship between conservation and development on Kiritimati are required. To enable this there are several requirements:

- Development of a clear vision and goal for wildlife conservation as an integral component of sustainable economic development;
- Amendment of the Wildlife Ordinance (as described above);
- Focus of wildlife conservation in important habitats and breeding sites;
- Re-appraising the responsibilities of the WCU vis-a-vis wildlife conservation and its other duties;
- Re-appraising the feral cat eradication programme;
- Consideration of increasing `island habitat' in the convoluted internal lagoon areas;
- A major technical upgrade of the WCU;
- A baseline survey, census and establishment of a monitoring programme for the bird populations;
- Expansion the Schools Education Wildlife Programme to the wider community;
- Development of a new relationship between the WCU and the local communities and,
- Preparation of a practical and achievable Management Plan for the WCU.

The international community has a major responsibility to assist the Kiribati Government in this endeavour.

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1 INTRODUCTION

1.1 BACKGROUND

Kiritimati Atoll's avifauna has regional and international significance. The Atoll provides nesting roosting, feeding, wintering and transit sites for over 40 bird species, but it is the 18 species of seabirds and the numbers involved which breed on the atoll that are of particular significance.

The management of Kiritimati Atolls' avifauna is the responsibility of the Wildlife Conservation Unit (WCU) of the Ministry of Line and Phoenix Development. Currently, the WCU works to no formal Management Plan or other document to indicate objectives and the range of activities to be implemented. Despite this, some major achievements have been made. For example, Cabinet recently passed by-laws recognising a number of Closed Areas.

The South Pacific Biodiversity Conservation Programme (SPBCP) is supporting the establishment and management of a Kiritimati Atoll Conservation Area Project (KACAP). The KACAP seeks to conserve the rich biodiversity of the Kiritimati Atoll by (a) establishing the Cook Islet National Marine Park that would encompass the current Cook Islet Closed Area, (b) establishing a network of Protected Areas based on the existing network of Bird Sanctuaries and Fishing Closed Areas, (c) developing sustainable development activities including the enhancement of terrestrial flora and the setting up of viable income generating activities; (d) building and strengthening the capacity of the WCU, other implementing agencies and members of the Community to implement the Project, and (e) raising public awareness and generating information to promote and support biodiversity conservation activities.

1.2 TERMS OF REFERENCE

The main purpose of the assignment is to review current avifauna conservation management on Kiritimati; assess, to the extent possible, the status of bird species and populations; and, in the context of the current issues and projects planned for Kiritimati, provide recommendations for immediate and future conservation management. The Terms of Reference for this study are appended as Attachment 1.

1.3 ACTIVITIES

Three weeks of the five week consultancy were spent on Kiritimati (July 7 -28th), travel, literature review and report writing occupied the remainder. An outline of field activities on Kiritimati are appended as Attachment 2.

Fieldwork on Kiritimati focused on an assessment, through rapid surveys, of the status of seabirds breeding on the island at the time of the visit when nesting colonies and closed areas were prioritised. The work of the Wildlife Unit was reviewed primarily through observations of and discussions with members during field visits or on the job activities.

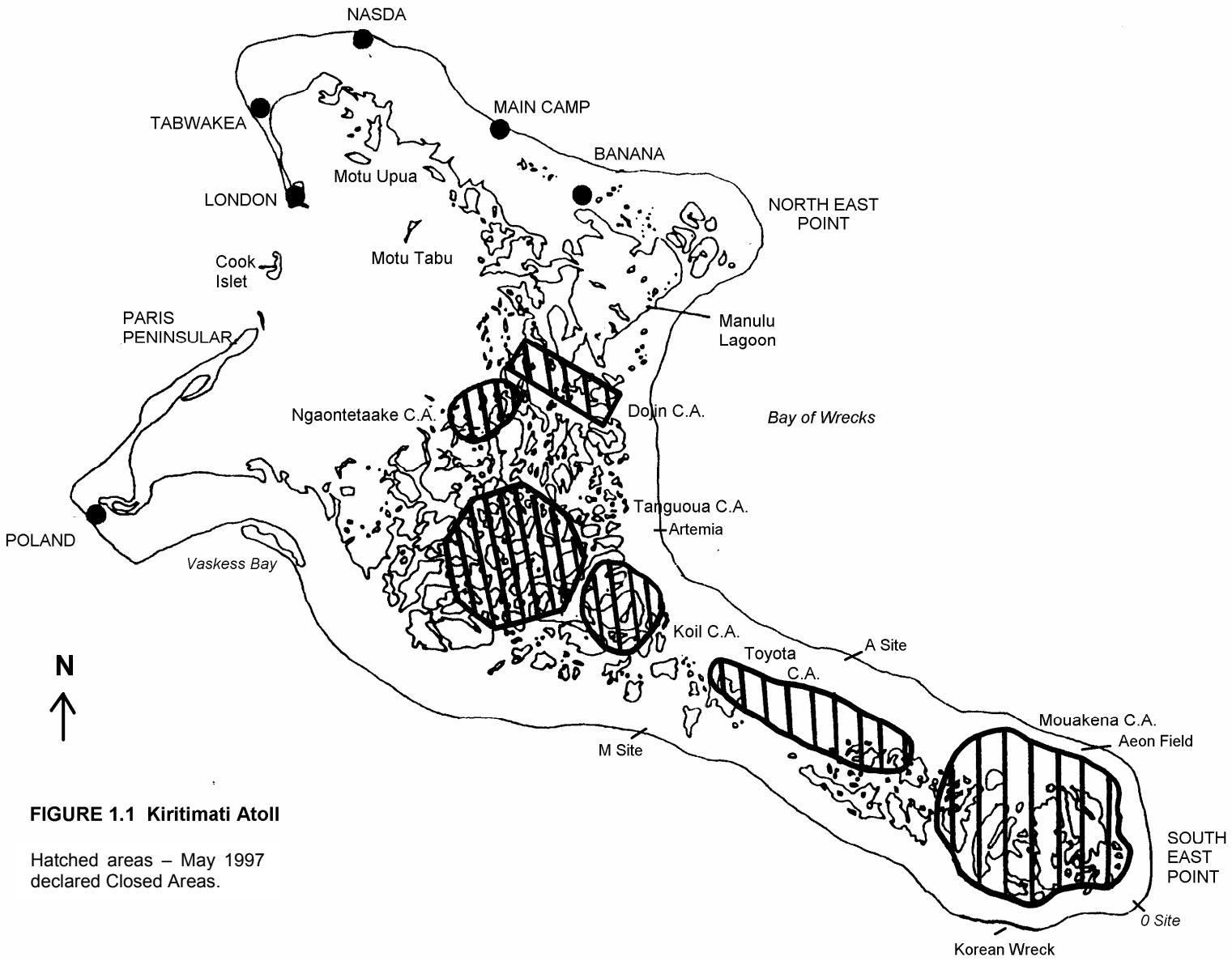

FIGURE 1.1 Kiritimati Atoll

Hatched areas – May 1997 declared Closed Areas.

2 HISTORICAL INFORMATION

2.1 GENERAL

The seabirds of Kiritimati are generally regarded as being well researched and this is certainly the case compared with those of other developing nations of the Pacific. Nonetheless, recent work has been of short duration and/or focused on individual species or small study areas and has not been commensurate with the international significance of Kiritimati's seabirds.

The pioneering work on Kiritimati's avifauna was undertaken initially by J.Gallagher from 1958 through 1959 during the armed forces' use of the island (Gallagher 1959; 1960), followed by P.Ashmole (periodically during 1963-64). The Smithsonian's Pacific Ocean Biological Survey Program made several visits between 1963-67, thereafter one of its members R.Schreiber initiated a long-lasting periodic research effort (1967, 1968, 1979, and nearly annually during the 1980's). Schreiber and Ashmole (1970) were the first to derive rough estimates of the total populations for most species. However, the focus of their research was breeding ecology and the accuracy of their population estimates has been questioned.

The most thorough and, to date, only comprehensive island-wide population studies were undertaken by R. Perry in 1978-79 (Perry 1980), followed by M.Garnett from 1979 through 1981 (Garnett 1983; unpubl.). It is Garnett's estimates (Garnett 1983) which provide the only realistic baseline data for future comparative purposes. However, currently the WCU has no file records or data from that era, the only data available are the population figures and grid occupancies in the Management Plan (Garnett 1983). R. and E. Schreiber published widely on their short duration visits to Kiritimati in the 1980s which encompassed a major El Nino event in 1982 (Schreiber & Schreiber 1983,1984;1985;1986;1987).

More recent documented surveys of Kiritimati's wildlife and/or conservation were undertaken by J. Clark (Clark 1991), D. Watling in 1993 (AGRICO 1993) and L. Jones in 1996 (MBA 1997). Jones (*loc. cit.)* provides useful species summaries (Attachment 3).

2.2 THE 1983 MANAGEMENT PLAN

2.2.1 Content and Recommendations

Building on the work of R. Perry 198-79, followed by an intensive two year period of his own field investigation, M. Garnett drew up a comprehensive management for Kiritimati and the other Line and Phoenix Islands (Garnett 1983).

The Management Plan provides brief documentation on the status and numbers of the breeding birds on Kiritimati, together with a distribution map based on a kilometre square grid.

In addition, volume two of the plan, provided a policy setting including an evaluation of the national and international significance of species, together with recommendations for changes to the legislation. A section on conservation management included annual and five year work programmes. Important among the recommendations were those relating to the legislation. In particular Garnett pointed out that while species were protected, their habitat was not and thus it had little long-term conservation meaning in the modern context as it was then (and as it is today).

The Management Plan recommended:

- The whole-island sanctuary status of Kiritimati be abandoned so that the development plans of the Kiribati government could proceed;
- Five Wildlife Sanctuaries be gazetted:
  - All sltes (ie areas separated from the main island by water at low tide)
  - Central Lagoons Wildlife Sanctuary
  - North-west point Wildlife Sanctuary
  - Paris Peninsular Wildlife Sanctuary
  - South-east Peninsular Wildlife Sanctuary
- Stricter controls be placed on people's activities in Wildlife Sanctuaries
- Within the proposed Wildlife Sanctuaries, the following Closed Areas be declared:
  - Cook Island;
  - Motu Tabu;
  - Motu Upua;
  - Ngaon te Taake;
  - Frigatebird Island;
- All Sooty Tern Colonies be declared Closed Areas (wherever they are situated for the duration of the nesting season only).

2.2.2 Implementation

In respect of Kiritimati, the Management Plan has clearly been the most important document used by the WCU and appears to have provided the framework for the development of the WCU and conservation on Kiritimati in general. However, while the intent of the major recommendation in respect of providing strengthened protection for key breeding areas has been followed by the 1997 declaration of new Closed Areas, it differs significantly from the Management Plan's recommendations (refer section 4.2). The recommendations for Public Awareness/Schools and Feral Animal Eradication Programmes have been carried out.

2.3 THE FERAL ANIMAL ERADICATION PROJECT

2.3.1 Background

The Management Plan signals the problems caused by feral animals (cats and pigs) and in 1983 a New Zealand wildlife adviser, Mr Richard Anderson assisted the WCU in setting up a cat control/eradication program. In 1988 a detailed plan of feral animal control/eradication was drawn up (not viewed) and in 1989 funding was made available for a program. Clark (1991) reports on the progress of the program and stresses the importance of:

- The potential or actual destructive role of the kimoa, Polynesian Rat; and,
- The need to put the program in a wider perspective to gain the support of the community and the authorities.

2.4 THE AGRICO PLAN

2.4.1 Background

In 1993, at the request of the Kiribati Government, AGRICO undertook an Asian Development Bank funded Technical Assistance entitled `Integrated Development Plan for the Northern Line Islands'.

On Kiritimati which was then, as now, the focus of significant Kiritbati Government development plans, AGRICO's environmental scientist (D.Watling) found the conservation status of wildlife in a poor state and deteriorating with the Wildlife Conservation Unit under-resourced and poorly supported by the local and central Government. In addition there were serious resource allocation concerns with considerable conflicts between departments in accessing resources and these were likely to increase if tourism became a major industry as intended.

AGRICO recommended:

- The legislative amendments recommended by Garnett (1983) be implemented (refer 2.2);
- The Wildlife Conservation Unit remain within the MLPD administrative framework but its management policy, financial and technical needs become the responsibility of an appropriate Ministry based in Tarawa;
- To ensure that Kiritimati's development is based on principles of sustainable resource use and non-conflicting activities, a new land and coastal water management strategy be drawn up. The strategy should provide a physical, institutional and legislative framework and be overseen by a Resource Management Authority;
- The Kiribati Government reaffirm its commitment to nature conservation on Kiritimati by the publication of a new policy statement on the issue;
- The Kiribati Government consider acceding to appropriate international conventions and treaties such as the SPREP and Apia, Ramsar and World Heritage Conventions amongst others;
- Kiribati adopt EIA, based on legislation, as an integral component of standard planning procedures, in both the public and private sectors;
- The Kiribati Government press SPREP to provide environmental services and/or investigate the possibility of retaining a professional consulting practice at donor expense;
- A well interpreted natural history tourism package be developed as soon as possible and consideration be given to training guides from local villages on Kiritimati;
- Seek donor support to undertake a WCU technical assistance project which seeks to provide the WCU with the necessary skills, strategy and action plan to take it successfully into the next century; and,
- Settlement on Kiritimati be permitted only for assured wage-earners.

2.4.2 Implementation

In respect of Kiritimati, the AGRICO Plan appears to have had no discernible legacy.

2.5 NATIONAL ENVIRONMENT MANAGEMENT PROJECT

Four important documents concerning environmental management were produced by the ADB Technical Assistance (RETA) - National Environment Management Project (1992-94):

- State of the Environment Report (1994);
- National Environment Management Strategy (1994);
- Environmental Legislation Review (1994); and,
- Review of Environmental Education

Kiritimati received little specific attention in these reports, however, Programme 3.6.4 of the National Environment Management Strategy is entitled `Review and Improve the Conservation arrangements for the Phoenix Group and the Line Islands. This has not be undertaken to date, but the current assignment is clearly a component of this programme.

2.6 MPA INTERNATIONAL

Another Technical Assistance of the Asian Development Bank was undertaken by MPA International in 1997 entitled ` Institutional Strengthening of the Environment Unit'. One of the team members, L.Jones, visited Kiritimati 3-12 April 1996.

Appendix F of the CZP/RM Specialist Report records observations made on the visit and provides recommendations. The paper provides a very useful summary of the results of previous observers based on the literature together with Jones' own observations.

Jones concluded that although his visit was too short to generate data on the status of bird populations, based on extensive interviews `the conclusion that bird populations have declined significantly in recent years is inescapable'.

Jones recommended:

- Continuation of the educational program in schools;
- A comprehensive survey should be conducted over at least a one year period;
- WCU requires greater support both financial and moral;
- WCU staff be increased from four to six;
- The WCU be transferred from MLPD to MESD, so that it can be administered by an agency with an environmental rather than a development mandate (also a recommendation of the main MPA report);
- Follow the development of an oral sterilisation vaccine for cats currently under review by the US Food and Drug Administration.

Of the above recommendations, the educational programme has been continued and the WCU staffing has increased, however, the MLPD has not moved its institutional setting and does not appear to receive adequate financial or moral support.

3 WILDLIFE CONSERVATION UNIT

3.1 MANDATE AND ADMINISTRATIVE SETTING.

The Wildlife Conservation Ordinance (1975) makes provision for the appointment of Wardens (section 3(4)) and provides for powers of the wildlife wardens including search and arrest (section 11 (1-5)).

The WCU is a department of the Ministry of Line & Phoenix Island Development and answers solely to this Ministry which is located on Kiritimati. Formerly it was administered by the Ministry of Natural Resources based in Tarawa.

WCU has a conservation mandate and its institutional position within the MLPD appears incompatible because of MLPD's clear development mandate. This anomaly has bee discussed and recommendations made by both AGRICO (1993) and MPA (1997).

3.2 PERSONNEL

3.2.1 Current Staff

The WCU currently has three established personnel and five unestablished staff, a total of eight.

The three established staff have long term experience in the unit, over ten years each, while the Acting Wildlife Warden, Utimawa Bukaireiti has about twenty years experience.

3.2.2 Katino Teeb'aki

Katino Teeb'aki, the late Wildlife Warden who died suddenly in 1998, had been a counterpart of Martin Garnett (1979-81) following which he had overseas training. His passing is a particularly tragic loss, since Katino had a wealth of knowledge about the wildlife of Kiritimati and was an articulate and committed advocate for the conservation of Kiritimati's Natural Heritage. Katino was more than an administrator, he had sound technical knowledge and had been responsible for refining, advocating and achieving recommendations of the 1983 Management Plan, in particular the establishment of the six Closed Areas (refer section 4.2.1).

3.3 RESPONSIBILITIES OF THE CONSERVATION UNIT

The current responsibilities of the WCU include:

1. Enforcement of the Wildlife Conservation Ordinance, necessitating patrolling, apprehension of violators and prosecution;
2. Feral animal control (cats, pigs, dogs);
3. Wildlife Monitoring and Research;
4. Import/export control of wildlife and products;
5. School Programme - including biology, wildlife and conservation;
6. Nature Tourism - providing guides to tourists;
7. Monitoring activities of researchers;
8. Permitting (and accompanying) fishermen etc. who want to enter Closed Areas;

9. Wildlife Conservation in all other islands of the Line and Phoenix Groups;
10. Participation in development control/advice to Government;
11. Registration and regulation of all dogs on Kiritimati (only males allowed);
12. Control of stray pigs, cats and dogs around villages; and,
13. Control and monitoring of the Kakai (villagers who are permitted to camp for up to three months in remote coconut areas to collect copra - WCU is the permitting authority).

These responsibilities are not confined solely to wildlife conservation, responsibilities 11-13 as listed above have little or nothing to do with wildlife conservation per se.

3.4 EQUIPMENT

3.4.1 Field Equipment

The WCU is currently reasonably resourced in respect of mobility, however, keeping equipment operational is a major problem and vehicles etc. may be unoperational for several months awaiting repairs and spare parts. Two problems of equipment provision and use on Kiritimati are best illustrated by the state of art Speed Boat recently donated by AusAid. This boat has not been used by the WCU more than two or three times but is now out of service and would appear to be `too hi-tech' for use by the Unit. The Canadian Aid Trail Bike is ideally suited for use on Kiritimati but is considered too large too handle by the WCU personnel - there appears to be no effort to repair it now that it has a mechanical problem.

Major WCU equipment is summarised in Table 3.1.

Table 3.1 Equipment of the Wildlife Conservation Unit (Source: WCU)

EQUIPMENT	ORIGIN (reported)	CONDITION
4-Wheel Drive TwinCab Toyota Hilux	AusAid	Operational - fair
Trail Bike	Canada Fund(2 years old - 2nd Hand when presented)	Out of Service
Moped - Motorbike	Kiribati Government	Operational – poor
Speed boat	AusAid (6 months old)	Out of Service
Longboat + Outboard Engine	Kiribati Government	Out of Service (not sighted)
1 - 12 Bore Shotgun	Kiribati Government	With Police (not sighted)
60 Gin Traps (Lane's Ace)	N Z Government	Operational
Assorted Tools and Office Furniture	Kiribati Government	Very Basic

3.4.2 Office Equipment

The WCU has an adequate to good office with a store room as a part of the MLPD complex, however, it has only basic furniture. Although elsewhere in MLPD computers appear commonplace, the WCU is without one or any other office equipment such as photocopier etc.

3.5 OBSERVATIONS AND DISCUSSION

3.5.1 Non-wildlife Conservation Duties of the Wildlife Conservation Unit.

During this assignment observation and enquiry of the WCU's activities were restricted to those concerning wildlife on Kiritimati. This is not to say that Activities 7-

10 (refer section 3.3) are not important - they indeed are and it is quite clear, that they consume a lot of the WCU's time and effort, in particular the permitting and monitoring of the Kakai. They do not, however, have any direct bearing on wildlife management and can be considered a distraction in respect of what should be the WCU's `core business'. However, it can be argued that in a small administration such as MLPD, it may be pragmatic for agencies to be `generalist' in nature. On the other hand, Kiribati has the responsibility of managing an internationally important wildlife site and to do this requires a professional organisation with a clear focus. At the moment the non-wildlife activities of the WCU occupy a good proportion of their time and place them in a policing role, this probably contributes greatly to the apparent `poor relationship' between the WCU and local communities.

3.5.2 Closed Areas, Patrolling and Enforcement

Observations and reports in 1993 indicated that poaching (egg collecting and/or killing of wildlife) was widespread (Watling pers. obs.) and this is supported by information supplied to L.Jones (MBA International 1997). Jones (*loc.cit*) believed that the situation in 1996 was better, based partly on the information of K.Teeb'aki, the Wildlife Warden. He was of the opinion that the relaxation of the ban on frozen chicken products into Kiritimati which allowed the communities to vary the protein component of their diet was largely responsible for this.

Observations during this study gave no reason to believe that poaching was any less widespread than in 1993. Two piles of heads and wings (boobies and frigatebirds) were found on Motu Upua and other remains were noted in Tanguoua and Mouakena Closed Areas.

Patrolling is reported to be one of WCU's principal activities but there are no patrol reports on record and there was no evidence of a patrolling roster or schedule.

In the past three years, there have been only five poaching cases brought to court, four were given conditional discharges and the other a $50 fine (WCU *in litt*.). If poaching is the problem which the WCU and many community members indicate and which is supported by field observations, then this apprehension and prosecution rate clearly demonstrates both ineffectiveness in the field and lack of institutional support from MPLD and from the judiciary. The WCU is aware of the latter and is endeavouring to get training in evidence documentation and presentation in court.

3.5.3 Feral Animal Control

3.5.3.1 Cats and Pigs

Assistance for a Feral Animal Eradication Programme was given by the NZ Government between 1989-91 (Clark 1991). Cat traps used for that programme are still being used today, but the numbers have dwindled from 180 to about 60.

Clearly cat trapping takes a considerable amount of the WCU's time and resources - no overnighting or base camping is undertaken and so the sole vehicle travels great distances.

Observation of cat trapping in the field was not encouraging with lax practices and a lack of professionalism, and with four or five wildlife officers participating in the setting of 50-60 traps.

The current cat trapping program has all the appearances of a completely automatic activity with very little success (refer section 5.4.8.1) and without any evaluation or justification.

Advice from the WCU indicated that feral pigs were probably all controlled `except for a few escapees near villages', however, during the current study, visiting bonefishermen related how their truck had hit a `massive boar' standing on the road at SE Point. This was confirmed by the Chief Bonefishing Guide.

3.5.3.2 Dogs and Goats

The absence of feral goats and dogs should be noted and attributed to the policies set in place by the Kiribati Government, both these animals could be major problems on Kiritimati. The all male dog program which is enforced by the WCU is successful.

3.5.4 Wildlife Research and Monitoring

Currently, the WCU is not undertaking any research or wildlife monitoring. The Acting Warden expressed strongly the desire and need for training in this sector. Other than the data on trapped cats (refer 5.4.8.1), there appear to be no wildlife data in the office and the six-monthly Wildlife Reports are discontinued though there are reports of visits to other islands. All expertise in scientific method and monitoring appears to have died with the late Katino Teeb'aki. No literature or records, no scientific publications on this `well-researched island', not even back-copies of the six monthly Wildlife Reports (noted on Watling's previous visit) were held in the WCU office. The only reports noted were the 1983 Management Plan and Clark (1991).

3.5.5 School's Programme

The WCU runs a school's programme and this appears to be going well – the current schedule is appended as Attachment 4. The Assistant Wildlife Warden in charge of the programme reports that transport to the schools remains a problem, although the programme is considered important and arrangements are usually made. Current information base and course material is adequate but there are insufficient materials for distribution to students. An introduction to the wildlife and habitats of Kiritimati was produced in english and the vernacular by Birdlife International in the mid-1980s. This has been unavailable for many years but has just been reprinted in attractive format, with a new translation by the Canada Fund.

The school's programme is of great importance. It will be very difficult to curb the current adult generation's wildlife harvesting tendencies, and so the emphasis must be on the younger generation and developing an awareness based on a sound knowledge of the significance of the Kiritimati natural heritage. Expanding the programme into the wider community requires active consideration.

3.5.6 Tourist Guiding

The WCU permits and guides tourists in the Closed Areas and it charges a fee of $10/head. Several tourists who were guided during the visit indicated how impressed they were with the knowledge and enthusiasm of the guides. Very few tourists currently visit Kiritimati, those visiting the Closed Areas are mainly Bonefishermen or their dependents.

The major potential for Bird Tours to Kiritimati which was first recommended in the 1983 Management Plan and further emphasised by AGRICO (1993) has not materialised. Nonetheless developing bird tourism must remain a priority. Not until

such a programme is in place and `the birds' are generating some revenue will the government, and to an extent the local community, be convinced that they are worth protecting. However, the potential for such tours now faces stiff local competition. Recently, Midway Island has been handed over to the US Fish & Wildlife Service which now runs a very well organised nature tourist operation. Midway has 16 species of breeding sea bird as opposed to Kiritimati's 18, however it boasts two species of albatross and, in addition, it has turtles and seals, two hotels and two flights a week from Honolulu. (Attachment 5).

3.5.7 Income Generation

It is apparent that the WCU is looking for opportunities for income generation – guiding tourists is one and another currently being applied for overseas visitors and contemplated for local community members is a fee for entering Closed Areas for fishing[1]. Pressure to raise income stems from being a department in a development oriented Ministry (MPLD- refer section 2.6) and this is likely to have serious consequences which will interfere with the conservation mandate. There is no compelling reason why the WCU should be income-generating at all. Guiding tourists could be a community activity (bonefishing guides are from the community) and charging tourists or community members to enter Closed Areas demeans the intent of Closed Areas which should be for areas which are safe from any human disturbance whatsoever or at least, very strictly controlled. The current situation stems from confusion in respect of the legislation (refer sections 4.4 and 6.2.3)

3.6 CONCLUSIONS AND RECOMMENDATIONS

The WCU has the responsibility of managing the conservation of Kiritimati's wildlife which is of outstanding international interest. Currently the WCU has neither the technical nor the economic resources to fulfil this mandate and much of its time and resources are spent on duties which have little bearing on wildlife conservation. If the WCU is to fulfil its conservation mandate, it will require a significant upgrading of technical ability, a focusing of its responsibilities and greater support from the authorities and community. The importance of the schools' programme needs to be further emphasised and supported.

[1] The legality of this is questionable since the issue of a professional survey and demarcation remains open (refer section 4.3).

4 CLOSED AREAS

4.1 BACKGROUND

The 1983 Management Plan recommended that the `whole-island' sanctuary status of Kiritimati be abandoned in favour of five well-defined sanctuaries which it was calculated would conserve `the vast majority of all seabirds nesting on the island as well as representative areas of all natural habitats'. Five Closed Areas were to be declared within those Sanctuaries. The rationale behind this was to open up most of Kiritimati for alternative development which was, and still is, the intention of the government but would be inappropriate within a Wildlife Sanctuary (as interpreted internationally – IUCN Category 4).

Under the present legislation, a Closed Area can be declared only within a declared Wildlife Sanctuary.

4.2 NEW CLOSED AREAS

4.2.1 Establishment

In May 1997, the Cabinet of the Kiribati Government approved a supplement to the Wildlife Conservation Ordinance which declared six Closed Areas (Table 4.1; Figure 4.1).

The consequences of this action in relation to former recommendations are:

- The Government has not abandoned the `whole-island' sanctuary status of Kiritimati and replaced it by smaller better chosen sites as Wildlife Sanctuaries, even though development intentions are conspicuously contrary to the intention or concept of a Wildlife Sanctuary;
- The Government has not amended the Wildlife Sanctuary legislation with upgraded provisions for the protection of habitats;
- The Government has declared six new Closed Areas which are significantly smaller than the five Sanctuaries recommended by the Management Plan, they focus solely on nesting sites, not habitats;
- Whereas community access into a Wildlife Sanctuary is not restricted (only their activities to a limited extent), free access is completely prohibited in a Closed Area and so this action denies access to approximately 15% of the island to the community, including important fishing lagoons.
- Access into the Closed Areas is now by permit from the WCU on payment of a $10 fee. The legality of this is still under scrutiny but it is certainly further grounds for alienating the WCU from the community.

It may be concluded that the Government has moved to provide the highest protection possible for the most important bird nesting sites on the island, and thereby enabled other developments to proceed outside the Closed Areas. There can be no argument that the nesting seabirds require greater protection than is currently afforded but whether the current action, which is clearly draconian in respect of the community, will be the most effective, remains to be seen.

The action clearly affects adversely the community and also places the WCU in an unenviable policing role. If the WCU continues in its belief that entry into the Closed

Areas is permissible but only on payment of a fee[2], then this seriously undermines the efficacy of a Closed Area because it becomes an income-generating device. It is also largely unenforceable given the current resources of the WCU and there is little incentive to enforce it if without administrative and judicial support.

This situation clearly requires more thought and it is unlikely that visiting consultants will provide the most appropriate advice.

Table 4.1 Approximate Areas of the Closed Areas

Area Name	Area (ha)
Gazetted in 1997	
Dojin	539
Ngaontetaake	400
Mouakena	4,446
Toyota	1,148
Koil	857
Tanguoua	2,356
Gazetted in Original Legislation 1975	
Cook Island	c 23
Motu Tapu	c 3
Motu Upua	c 10
Northwest Point (No longer recognised ??)	??
Total	**9,782**

Source: Consultant's calculations based on 1:50,000 Map in WCU Office.

4.3 BOUNDARIES OF CLOSED AREAS

The new Closed Areas have been superimposed on at least two 1:50,000 maps on Kiritimati (WCU Office, Captain Cook Hotel), it is presumed but not confirmed that these are the gazetted areas[3].

Currently some of the boundaries have been demarcated in the field (Plates 1,2,3), however no survey has been undertaken to position these. In the field, hand-held GPS fixes (Garmin 12) of the northern and southern boundaries of the Dojin CA (where they intersect with the road), are both over 1 km from the position indicated on the 1:50,000 maps (a GPS correction factor for the map was included in these calculations). One `boundary' site on Tanguoua CA is also over 1 km from the nearest boundary as marked on the 1:50,000 map.

Clearly before the Closed Areas become `official' and have legislative status, their boundaries need to be surveyed and demarcated in the field.

WCU reports that there was no survey prior to submission of the Closed Areas as marked up on a map for the Cabinet Decision. If this is the case, certain important breeding sites may have been inadvertently excluded in the drawing of the boundaries

[2] The origin of the fee appears to be the entry of tourists to the Cook Island `National Park' which is a gazetted Closed Area. Bonefishermen also enter the waters of the Ngao Te Taake Closed Area and pay a fee which they greatly resent.

[3] The original legislative amendment was not viewed in any form by the consultant as it was not available in the WCU or MLPD office.

on the map, since the WCU has never had a GPS. Thus to follow exactly what is drawn up on the 1:50,000 maps may exclude some important sites.

What is required is to demarcate the boundaries in the field first and so ensure that all important sites are included and then survey these sites as the basis for the proclamation. This is a major undertaking as the length of the boundaries of the Closed Areas is approximately 88 km (includes coastal and water boundaries (Ngaontetaake CA).

4.4 CONCLUSIONS

Provision for Closed Areas in the 1975 Act enabled certain wildlife sites to be completely free of any human disturbance. This remains an important biological need and an integral component of any effective legislation for wildlife conservation. In contrast the Wildlife Sanctuary provision has little meaning for the avifauna of Kiritimati as disturbance to their breeding areas is not covered in the act, while all the birds have protected status anyway.

The recent declaration of six Closed Areas ostensibly provides enhanced protection for many of the important bird breeding sites, but it will be difficult, if not impossible, to enforce. It is a serious imposition on the community and the intention and value to sensitive wildlife sites of the Closed Area Provision will be negated, if entry is permitted on a payment basis.

Plate 1. Northern boundary of Dojin Closed Area at intersection with track, looking east

Plate 2. Northern boundary of Dojin Closed Area at intersection with track, looking west

Plate 3 Tanguoua Closed Area Boundary Marker

Plate 4 Tanguoua Closed Area Boundary

5 STATUS OF THE AVIFAUNA

5.1 PROBLEMS WITH POPULATION ESTIMATES

Although the avifauna of Kiritimati is considered quite well researched (refer section 2.1), it is important to appreciate that reaching definitive conclusions on the status of the bird populations is not possible on the basis of short duration visits. Contributing greatly to the inherent problems is:

- different species breed at different times of the year;
- the lack of any monitoring data since the baseline work of Garnett;
- the lack of any raw data which forms the basis of Garnett's distribution and population estimates; and,
- the lack of knowledge of the `natural' fluctuation of seabird populations on Kiritimati.

The work of the Schreiber's provides much better long-term data, but it is restricted to relatively small study areas. What is very difficult to understand is why the WCU currently has no records or institutional knowledge of this long-term research. Following the 1982-83 El Nino event, work by the Schreibers on the profound consequences for Kiritimati's seabird populations was published widely including the prestigious international journal *Science*. (Schreiber & Schreiber 1983, 1984, 1985, 1986, 1987). Yet neither the WCU (or anybody else interviewed on Kiritmati) was aware that in 1999, following an El Nino event of similar magnitude (1997-98), the bird populations may have been similarly disrupted.

Both Jones (1997) and this study found that perceptions in the Kiritimati community are that bird populations have declined, possibly greatly, and the principal reasons are poaching, egg-collecting and feral cats. Great reliance tends to be placed by short-stay visitors on the opinions of local residents including the WCU in respect of the status of bird populations, without due critical analysis. It should be appreciated that few local residents will have an `island-wide' appreciation and knowledge of all species and the majority will focus on highly visible issues – i.e. cat predation, egg collecting or poaching while `invisible' impacts such as rat predation and food-supply (i.e. climatic factors) will be overlooked.

What is incontrovertible is that the human population of Kiritimati has risen greatly in recent years and has become much more mobile (refer Figure 6.1 and section 6.3), and that poaching – the removal of nesting adults – will have a much more profound impact on bird populations than the removal of eggs or nestlings. These seabirds are mainly, if not all, long-lived species with protracted juvenile periods, as such the impacts of poaching of the nesting adults may take a long time (decade(s)) to manifest at the population level.

All of these factors may pale in significance by comparison with the major changes to food supply caused by climatic factors, such as an El Nino as has been internationally emphasised by the publications of the Schreibers (Schreiber and Schreiber 1983, 1984, 1985, 1986, 1987).

5.2 THE EFFECTS OF EL NINO

It is perhaps only natural that land-based impacts on seabird populations tend to be the focus of most attention and study. Yet seabirds feed at sea and rely on the uppermost levels of the marine food chain which we now know are subject to significant atmospheric and oceanic perturbations. El Nino is one of these and its effect on seabirds' breeding on Kiritimati has been brought to international attention by the Schreibers following the El Nino of 1982-83, (Schreiber & Schreiber 1983, 1984, 1985, 1986, 1987).

Both the Schreibers and Teeb'aki (1994) describe the major impact of the El Nino event on nearly all breeding seabirds during the event with the Sooty Terns failing completely to turn up for their breeding season in December 1982, while other species were almost completely unsuccessful in any attempts at breeding.

After the El Nino there is some confusion. Schreiber & Schreiber (1984) indicate that most species quickly recovered, however Schreiber & Schreiber (1987) gives an entirely different account based on visits in 1984,1985 and 1986.

> *"……allow us to state that the populations of Phoenix Petrels, Christmas Shearwaters, Brown and Black Noddies, Sooty Terns, and White Terns have declined drastically. Numbers of Crested Terns do not appear to have changed appreciably. Petrels, shearwaters, and Black Noddies were present in the hundreds and 200-300 pairs of White Terns used the three islets*. Fewer than 50-125 nests of each species have been present recently. An estimated 100,000 pairs of Sooty Terns nested on Cook Islet every six months in the past (130,000 in June 1980, Garnett, pers. comm.) but since 1982 fewer than 3,000-8,000 adults have been present each nesting season. Sooty Terns have undergone the greatest population decline of all species on the atoll. In addition, the reproductive success of those birds present in 1983-1986 has been minimal because of predation by cats and especially Great Frigatebirds which are eating virtually all chicks as they hatch. Since 1982 fewer than 20,000 young have fledged in each breeding period.*
>
> *For other species which nest in more scattered situations on the huge atoll, comparable data are more difficult to summarise. White-throated Storm Petrels are found nesting consistently on one islet in the Manulu Lagoon. In March 19?9 we found 9 adults, 4 eggs, and 10 nestlings present, and in August 1979, 20 adults and 11 eggs. This same islet in 1985 had no more than 5 nests but in 1986, 8 eggs and 6 nestlings in February. The extended nesting season of this species makes interpretation difficult but the population is only somewhat lower now than prior to 1982. Red-tailed Tropicbirds had approximately 100 nests in our study area in August 1985 and 1986, but in August 1979 and June 1980 it contained about 120 nests, a decline of 17%. Additionally, our general impression is that tropicbirds, once conspicuous around the atoll because of their aerial courtship, are now rather uncommon.*
>
> *Masked Boobles In our study area are present in the same numbers as in previous years but the total number found around the island is about one half found In previous years.*
>
> *……. By late 1983 a few adult birds of most species had returned to the atoll and some young were being raised, although many chicks died of starvation in 1983 and 1984, especially Black Noddies, Sooty Terns, and Whlte Terns. The most noticeable occurrence during 1984-1986 was that, while numbers of individuals of most species remain very low (15-25% of pre-982 population levels), essentially all adults which are present are reproducing successfully, at least in 1985. This is especially true for the larger species. In fact, in general, the pelecaniformes have shown the most rapid recovery in numbers. Numbers of adult terns (with the exception of Crested Terns) and all procellariids (except for White-throated Storm Petrels) continued to remain very low through 1986. Sooty Terns and Black Noddies continued to experience reproductive failures during 1985; but Black Noddies were successful in 1986."*
>
> *(* Motu Upua, Motu Tabu and Cook Islet).*

In contrast to the Schreibers, Teeb'aki (1984) indicated what would appear to be a `normal' number of Sooty Terns breeding in late 1983 (refer Table 5.2).

If the Schreibers' observations indicate real declines in population (rather than just the number of birds breeding with other members of the population staying offshore and not breeding), then these events surely dwarf the impacts of poaching, cat predation etc. As these are `natural' events, they are a normal environmental variable to which Kiritimati's seabirds are adapted. However, it can be speculated that it is in the recovery phase following such events that poaching, cat predation and egg collecting may have an acute effect on seabird numbers.

Based on the above account, Watling's visit in 1999, approximately one year after the completion of an El Nino event of similar magnitude to 1982-83, should have coincided with very low numbers of most species but breeding successfully. There is no evidence of this from the populations of birds breeding on Cook Isand, Motu Upua or Motu Tabu. Observations and data for the Sooty Tern and Wedge-tailed Shearwater are equivocal.

5.3 METHODS

Although both of Kiritimati's most numerous seabirds (Sooty Terns and Wedge-tailed Shearwater) were nesting at the time of the visit, neither could be censused. It was too late for Sooty Terns where all the colonies had hatched and the young were mobile, censusing has to be done during incubation – as close to hatching as possible. However, rough censuses were undertaken by estimating the area of colonies (a combination of eye or by pace-mapping) and then using egg densities obtained from those colonies by Teeb'aki (1984). Wedge-tailed Shearwaters were in late incubation or hatching at the time of visit, (censusing should take place when the nestlings are large). It should be noted, too, that a complete census of the seven Sooty Tern colonies on the island would take most if not all of a three week visit and it would take much longer to locate and census all the Shearwater colonies[4].

What was attempted was to cover as much ground as possible and record what was seen. Motu Tabu, Motu Upua and Cook Islet were surveyed in some detail because there was reasonable data from these islets from both the 1960s and 1980s. Visits were made to all the Closed Areas with the exception of Totoya CA. Roosting and dawn flights were observed in a variety of places.

5.4 RESULTS

Jones (1997) provides a useful summary of his observations and those of previous observers for each of Kiritimati's 19 breeding species. This information is repeated with my observations added (Attachment 3).

Summarised below are observations made at important islands and for other species including the four species whose status is of heightened international significance. For the Phoenix Petrel and the Polynesian Storm Petrel Kiritimati is believed to support the largest breeding colonies of the species and is considered critical to the survival of both species. The Sooty Tern colonies are (or were) amongst the largest in world,

[4] Other than the distribution on the 1km square grid map, there are no records or data on Garnett's observations and so Wedge-tailed Shearwater colonies will need to be all found and mapped again – a considerable job.

while the colony of Wedge-tailed Shearwater is reported to be the largest colony in the world .

5.4.1 Sooty Terns

The Sooty Terns are Kiritimati's most numerous breeding species. It is believed that two sets of birds nest on the island, one at mid year and another at the turn of the year and that for every pair nesting there are two non-breeders or juveniles in the air (Jones 1997). Thus the population at one nesting time is approximately four times the number of eggs laid. Not enough has been recorded to indicate to what degree the populations nesting at both times of the year differ, but it could be considerable as shown in Table 5.1. However, formerly the Paris Flats colony was used at both times of the year, however, today it is only used at the turn of the year. Since 1996 a new colony has started on Motu Tabu (and sporadic attempts have been made in nearby mainland locations), during the midyear season. The loss of the Paris Peninsular colony which in 1967 was estimated at 700,000 pairs (Schreiber & Ashmole, 1970) is an unequivocal loss and an important warning of the decline of Kiritimati's avifauna. The new colony on Motu Tabu is much smaller, approximately 8,500 pairs.

Table 5.1 Area of Sooty Tern Nesting Colonies

Colony	Date	Area (ha)	Reference:
Cook Island	June 1982	10.25	Teebaki 1983
	December 1983	7.26	Teebaki 1984
N-West Point	June 1982	9.81	Teebaki 1983
	December 1983	20.36	Teebaki 1984
K Site	June 1982	3.2	Teebaki 1983
	December 1983	13	Teebaki 1984

The Terns were nearing the end of a successful breeding season during Watling's visit. Very large numbers of young had fledged from Cook Islet and were to be found in large camps around the island, similar success was apparent at Motu Tabu. The North West Point or Four Wells colony, was located at the Target Site, 5 km from Main Camp. Here very large numbers of young were on the verge of fledging – about ten days behind the Cook – Motu Tabu Islet populations. Four colonies were located in the SE Peninsula – all of these were a further ten days behind the Target Site. Whilst evidence of cat predation was high (it was low at the Target Site colony) in all these colonies – large numbers of fledglings were present but thicker vegetation here made it more difficult to judge the overall success.

Table 5.2 summarises the numbers of Sooty Terns recorded from Kiritimati by other observers and rough estimates made during the current visit.

There is an apparent substantial decline between the 1967 estimate and Garnett's in the 1980, although Schreiber's comment, that numbers in all colonies except the North-west Point appeared similar is noteworthy (refer Table 5.2 – Note B). There is an apparent further drop to the rough estimate of the current visit, though this should be viewed with great caution because no detailed census could be undertaken. If such a decline was real it might be expected in the light of a post El Nino nesting drop, as reported by the Schreibers (refer section 5.2), however, Teeb'aki's and the Schreibers' estimates in 1984 differ totally in this respect and so no conclusions can be drawn.

5.4.2 Wedge-tailed Shearwaters

Garnett (1983) estimated Kiritimati's population at approximately 500,000 pairs which makes it, perhaps, the largest colony in the world. During the current visit, occupied colonies were recorded in many parts of the island. Breeding was well under way with eggs or hatchlings most commonly observed. No attempt was made to census any colonies, because this should be done later in the breeding season. However, occupancy in general appeared rather low with less than half the burrows apparently occupied. At least two colonies were completely unoccupied but it was not possible to record whether this was recent or of long standing. Teeb'aki (*in litt.*) records a massive die-off in 1994 and reported `100s' being found dead on a daily basis, washing up on lagoon shorelines. This `disease incident' was referred to the South Pacific Commission and widely discussed by world authorities, however, the cause was not resolved as specimens due for autopsy were held up in transit and perished (P.Saville *pers.comm*.). Teeb'aki *(in litt*.) noted that numbers rebounded substantially in 1995.

5.4.3 Phoenix Petrel

The Phoenix Petrel breeds on the Phoenix and Line islands and on the Marquesas Islands. Kiritimati is believed to be home to the largest colony of Phoenix Petrels in the world. In 1967 Schreiber estimated 6,500 adults and 2,100 nests during the peak season, but Garnett and Perry estimated 20-25,000 in the 1978-81 period.

Phoenix Petrels were seen commonly either singly or in loose groups, everywhere except the south eastern part of the island. Birds flying in or out to sea may be seen at all times of the day, but especially in the early morning. Approximately 300 pairs were nesting on Motu Tabu during the visit with eggs and chicks noted. Fewer birds but much more aerial activity were recorded on Motu Upua. As with Watling (pers. obs. 1993) and Jones (1997) in 1996, no Phoenix Petrels were observed on Cook Islet.

5.4.4 Polynesian Storm-Petrel

The Polynesian Storm-Petrel breeds widely in the Line and Phoenix Islands, and the Austral, Society, Gambier and Marquesas islands (French Polynesia) and perhaps in Fiji, Samoa and other parts of French Polynesia. Only on Kiritimati is it recorded in reasonably large numbers, with Garnett estimating more than 1,000 pairs. This small petrel was seen in small numbers (up to seven but usually one or two) on most roost flight observations (Main Camp to Artemia, Manulu Lagoon and Tanguoua CA) and rather less so at dawn. It was noted on two occasions during the day. No nests were found and no birds were disturbed on Cook Islet, Motu Upua or Motu Tabu.

5.4.5 Frigatebirds

Nesting appeared to be vigorous for both species of frigatebird during the current visit. Over 50 nesting pairs of Great Frigatebird were counted on transects in the Dojin CA and others were noted at many other sites. The Lesser Frigatebird colony on the islet(s) in the Koil CA appeared very crowded with many recently hatched nestlings. Because of this no visit was made to the island itself, it was only observed from several sites on the mainland. It was estimated at the time that there may be over 6,000 pairs but this high by comparison with previous surveys (2,500-4,500 pairs) and should not be taken as a true figure.

5.4.6 Bokikokiko

The Bokikokiko *Acrocephalus aequinoctialis* Kiritimati's sole terrestrial bird can be quite commonly seen except in the South East Peninsula, its status appears secure despite the large population of feral and domestic cats. The species is also found on Teraina. However, it should be noted that the Tabuaeran sub-species of the Bokikokiko (*A.a.pistor*) became extinct sometime between 1924 and 1963 and that it seems most likely that the introduced Ship Rat *Rattus rattus* was responsible for its demise. A similar fate awaits the Kiritimati Bokikokiko should this rat become established on the island.

5.4.7 Cook Islet, Motu Tabu and Motu Upua

Observations on Cook Islet, Motu Tabu and Motu Upua made during the current visit and at a comparable times of the year in 1967 and 1980 are summarised in Table 5.3.

With one and perhaps two exceptions, species and numbers recorded in 1999 are comparable to previous records though there is considerable variation. The major exception is the establishment of a new Sooty Tern Colony on Motu Tabu. Nesting was first recorded here in June 1996 (WCU file data) and has continued each year since that time. There is no reliable information to confirm whether or not there is a turn of the year nesting on the island.

Whether this new colony is connected with the loss of the mid-year Paris Flats nesting is not known, but seems possible, especially if there is no turn of the year nesting cohort on Motu Tabu, because the Paris Flats nesting at the turn of the year does persist (WCU information).

Table 5.2 Sooty Tern Census Data - Pairs of Breeding Adults. (Years marked with an asterisk are immediate post El Nino years.)

	MID YEAR NESTING				TURN OF THE YEAR NESTING		
Colony	**1967**	**1980**	**1982**	**1984***	**1999***	**1983-4***	
North-west Point	600,000	150,000	108,000	20,000	45,500	224,500	
Cook Island	100,000	130,000	60,000		76,500	42,500	
Paris Peninsular	700,000	80,000				133,000	Mid year colony has ceased (mid 80's) ?? Turn of the year continues
Motu Tabu					8,500		Colony Started in June 1996
Artemia Corner	600,000						
M Site		170,000				???	In 1983-4 considered the largest colony but could not be censused
Aeon Field	700,000				17,500	127,000	
A Site		400,000				25,500	
K Site	800,000	200,000	69,000	30,000		17,000	
0 Site					333,500		
Mouakena					50,000		
Total	3,500,000	1,130,000		50,000	531,500	(569,500)	Note: 1983-4 `Total' excludes largest colony at M Site
% decline since 1967		-68%		-99%	-85%		
Source	A	B	C	D	E	F	

Notes - Sources:

A Schreiber, R.W. and N.P. Ashmole 1970. (cited in Garnett 1980)

B Garnett, M. 1980. In this report, Garnett states "Whether this represents a real reduction of numbers nesting since 1967, it is difficult to say, due to the problems of making a reliable census. Dr Schreiber who carried out the surveys in 1967 visited the island in July. He thought that there had been a noticeable reduction in the size of the colony at North-West Point, but that elsewhere numbers were very approximately of the same order as in 1967." In the Management Plan, Garnett (1983), again qualifies the population estimates but uses them to indicate a decline in numbers.

C Teebaki, K. 1983. 10th Report of the Wildlife Conservation Unit (Unpublished). Teebaki reports the area of these three colonies. He makes no population estimate but for the purposes of this table I have used the egg densities he calculated for the same colonies in 1983 (Teebaki 1984).

D Schreiber, R.W. and E.A.Schreiber (1986).

E This study – rough censuses were undertaken by estimating the area of colonies (a combination of eye or by pace-mapping) and then using egg densities obtained from those colonies by Teeb'aki (1984)

F Teebaki, K. 1984. Witht the exception of M Site (the largest colony!), this was a complete census the details of which are fully reported. These results are completely at variance with the publications of Schreiber and Schreiber 1986, 1987 which report that considerably fewer than 50,000 pairs of Sooty Terns bred at any one time from 1983 through 1986

Table 5.3 Observations on Cook Islet, Motu Tabu and Motu Upua during the current visit with comparable previous visits from Schreiber & Schreiber (1987).

	Cook Islet			Motu Upua			Motu Tabu		
English Name	July 1999	June 1980	June 1964	July 1999	June 1980	June 1964	July 1999	June 1980	June 1964
Wedge-tailed Shearwater	nil			colony active but relatively few			colony active		
Christmas Shearwater	nil			200-300 pairs; few chicks	500+ pairs	5000 adults:egss + chicks	250-300 pairs	300 pairs	1500 adults
Phoenix Petrel	nil			400 adults; much flight activity	300 pairs	3000; eggs+chicks	300 pairs; eggs + chicks	300 pairs	1500 adults
Red-footed Booby				c.15pairs nesting					
Red-tailed Tropicbird	<10 eggs?+chicks			150-250 pairs: eggs + chicks			250 pairs; eggs + chicks		
Crested Tern	300 prs	250 adults (no breeding)	150 adults (no breeding)						
Sooty Tern	75000 pairs;	130,000 pairs	nil	nil	nil	nil	8500 pairs	nil	nil
Brown Noddy	500-750 adults (no nests)	100 pairs	1000 adults; eggs + chicks	300-500 adults; eggs	500 adults	500 adults; eggs + chicks	250 adults; eggs + chicks	100 pairs	350 adults
Black Noddy	6-8000 (breeding mostly completed; a few chicks, some birds sitting)	4500 adults	>10,000 adults; eggs + chicks	c.500-1,000 adults & juv.; few chicks	3400 adults	2000 adults; eggs + chicks	3000 adults & juv; eggs + chicks	1800 adults	4000 adults; eggs + chicks
Blue-grey Noddy				1 pair				5 pairs	
White Tern	200 pairs	400 pairs	1000+ adults; eggs + chicks	200; eggs + chicks	150+ pairs	300;eggs + chicks	600 adults; few chicks + eggs	100 nests	200; eggs+ chicks

5.4.8 Feral Animal Predation

5.4.8.1 Feral Cats

Feral cat predation was observed around every Sooty Tern colony and in most occupied Wedge-tailed Shearwater colonies. Predation was least around the Target Area (Main Camp) colony and heaviest at the small Aeon field colony where over 100 carcases of variable age were counted on the periphery of the colony; note the observations of 50-75 carcases each morning in a similar situation by Schreiber & Ashmole, 1970).

WCU's cat trapping data are sporadic and filed in a register but also on scattered pieces of paper in hanging files. Success has apparently declined from 59/month in 1989 (Clark 1991) to 3.7/month, 1995-99 (my summary of scattered data - it is almost certainly incomplete so the real figure could be higher). No useful cat data are collected ie it is impossible to calculate cats trapped per trap night or per $ spent (manpower-fuel) certainly nothing to relate it to Tern or Shearwater fledging success.

Feral cats have been on Kiritimati for over a century, perhaps two centuries. They have long since determined the current distribution of nesting colonies of the `vulnerable' species (eleven of the eighteen breeding seabirds) which are essentially confined to islands, is an adaptive response to feral cats of long-standing. Those species nesting on the mainland can clearly withstand the predation pressure – if not they would have gone a long time ago. The cat `problem' is, therefore, not a new problem coincidentally appearing at the time of the first visits of biologists, thirty years ago. In contrast, however, cats may be a more serious problem at the population level when in combination with increasing poaching as a result of the increasing human population and other factors (ie El Nino) or if they start swimming to islands on a regular basis.

Given the failure of attempts to control the domestic populations of cats in the villages with no real prospect of reversing this, the original and current WCU objective of cat eradication is considered to be wasted effort.

5.4.8.2 Alternative Approach to Feral Cat Eradication

Elsewhere in this report, it is suggested that wildlife conservation needs to be more focused in the important wildlife sites and here it is recommended that more active management measures need to be considered. Given the high density of irregularly shaped and sized lagoons in the central lagoon area and to a lesser degree in the centre of the south-east peninsula, it would be possible by judicious joining of lagoons through the severing of peninsulas and isthmuses to greatly increase the area of `island' as opposed to `mainland' (Plate 5.1). The WCU undertook one such `cutting' in 1981, but it has not since been evaluated (Garnett 1981).

This would have several advantages including:

- increasing the area of `safe' nesting sites for the majority of the bird species (cats have been known to swim to islands and so water is not an insurmountable obstacle, but island hopping is rare and cats would be easy to control on such islands)
- creating more rat-free islands, and the ability to eradicate rats when they do colonise such islands (rats get removed from islands during El Nino flood events and then take time to re-colonise);

- restrictions to the current `random' access of fishermen in vehicles and motorbikes, thus decreasing disturbance to birds and habitats;
- a reduction in the need for, and more easily demarcated and managed Closed Areas.

It is recommended that the response to feral cat predation be to:

- abandon any attempts to eradicate feral cats;
- increase the area of `islands' in the existing Closed Areas by carefully engineered landscaping after a full impact assessment;
- intensify trapping around selected Tern colonies in conjunction with a careful record of costs, trapping success and Tern fledging success – this will necessitate censusing the Tern colonies (a proven method already exists) and devising a practical indicator of fledging success; and,
- follow advances in an oral sterilisation vaccine for cats (Jones in MBA 1997) and review the policy should one become available.

5.4.8.3 Feral Pigs

Feral pigs still occur in at least the SE part of the island (refer 3.5.3.1). Spoor but without feeding sign was believed to have been seen in the Tonguoua CA, however, it was very indistinct and discounted by the WCU.

In contrast to recommendations on feral cats, feral pigs need to be completely eradicated.

5.4.8.4 Rats

Rats were not observed during the day except on Motu Upua where they were obviously abundant. Rat sign was, however, commonly seen. All rats seen were believed to be *R.exulans*.

WCU, community members and expatriates all insisted that there were `large' rats on the island, while Clark (1991) notes the small size of the resident *R. exulans* on Kiritimati - `more like a mouse'. Nothing other than *R. exulans* was trapped during this study and night observations at the Ronton and Main Camp rubbish dumps did not reveal any large rats. However, the local reports sound convincing that either *R. rattus* or *R.norvegicus* are present on the island. If this is correct, it may bring a whole new dimension to the conservation of breeding seabirds on Kiritimati (refer section 5.4.6).

5.5 CONCLUSIONS

The current visit continues the recent trend (since 1983) of short visits by overseas specialists either for research or as consultants. Such visits provide useful observations but in general pose as many questions relating to the status of Kiritimati's avifauna as they answer. Short-duration visits will not provide unequivocal confirmation or otherwise of the widely perceived decline of Kiritimati's avifauna. Such visits also provide minimal training of WCU staff and they need to be replaced by long-term monitoring following a comprehensive survey. It is 20 years since Garnett's baseline work was initiated and it is long overdue for a similar initiative to be repeated.

What can be concluded on the basis of the current visit, is that:

- The full complement of Kiritimati's avifauna continues to breed on the island;
- All species observed breeding appeared to be doing so successfully;

- Sooty Terns had a successful to very successful breeding Season in mid-1999;
- The reported loss of the `Turn of the Year' Sooty Tern Colony on Paris Peninsular is an unequivocal loss and serious precedent;
- Wedge-tailed Shearwater colonies were occupied, but by low numbers in comparison with the burrows available;
- The number and variety of species nesting on the Closed Area islets of Cook Islet, Motu Tabu, Motu Upua and Frigate Island are comparable with those noted in 1964 and 1980, with the exception of Sooty Terns which now breed on Motu Tabu;
- Nothing less than a two year period of intensive ornithological survey and census is required with the objective of training at least two WCU staff in the relevant techniques and the setting up of an appropriate island-wide monitoring programme;
- The presence of more than one species of rat on the island requires confirmation;
- Feral pigs are still extant in the vulnerable south east of the island; and,
- Feral cat trapping techniques require improvement and a new policy in respect of cat eradication be adopted.

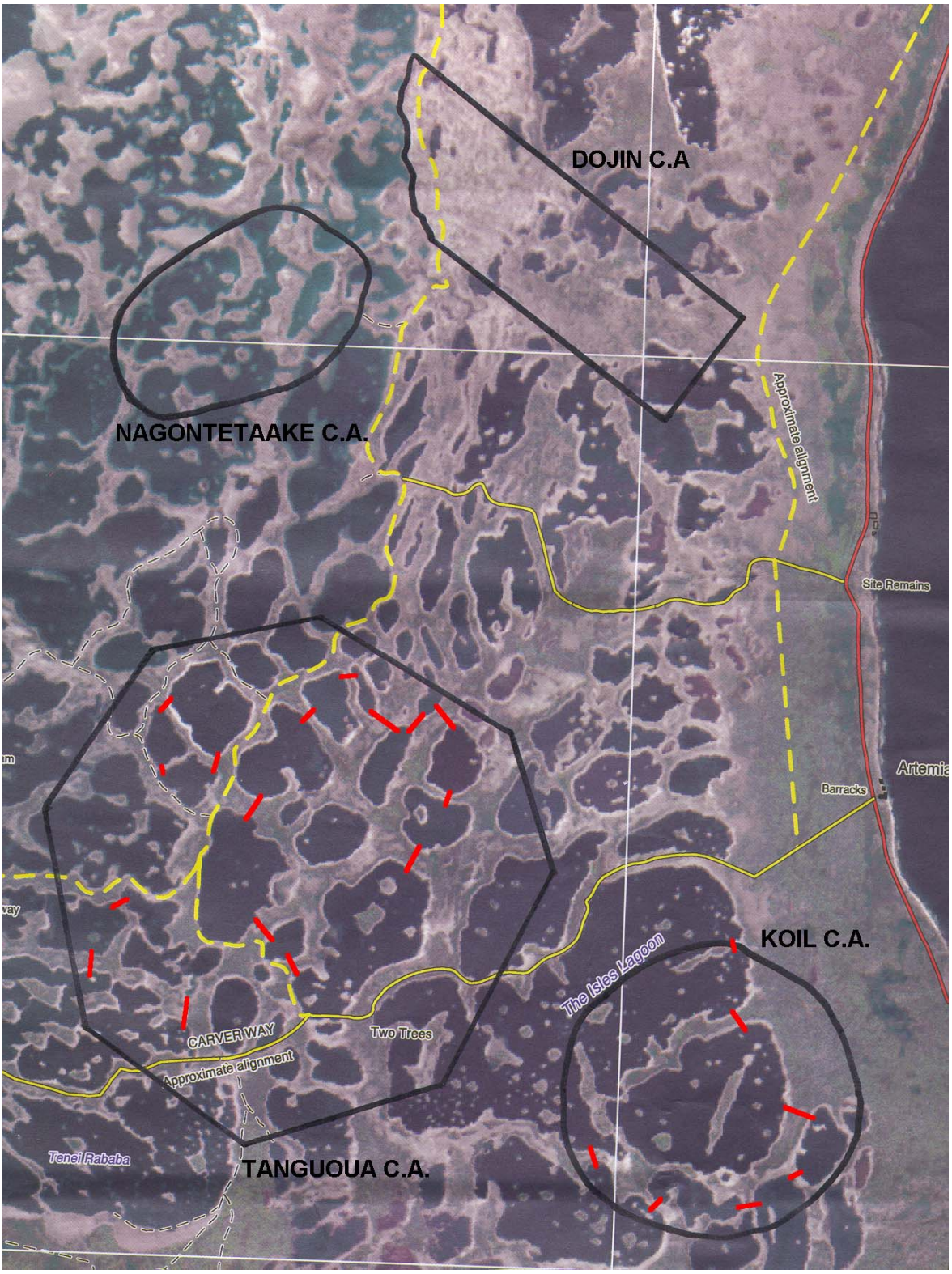

Plate 5 Central and Isles Lagoon Areas showing four of the 1997 declared Closed Areas – drawn off 1:50,000 map in Wildlife Conservation Office, London, and superimposed on OSD Satellite Image – OSD 6015. (Scale: Approx 1:60,000).

Red lines – possible channel locations to increase `island area' refer text – section 5.4.8.2 for explanation.

6 COMMUNITY ISSUES

6.1 SETTLEMENT HISTORY

6.1.1 No Indigenous Population

The settlement history of Kiritimati is well-documented by AGRICO (1993 – report of the Sociologist, Roger Lawrence) and it is not repeated here. Important points are that there is no indigenous Kiritimati population, the island was uninhabited when first discovered by Captain Cook in 1777. Until about the American occupation during the 2nd World War which lasted from 1941-48, the resident population consisted of less than 50 labourers. Thereafter immigration has increased to facilitate a variety of, to date, largely unsuccessful, certainly unsustainable Government and private sector-initiated ventures.

6.1.2 Population Increase

The population on Kiritimati continues to increase at an almost exponential rate principally through immigration. The current population is reported to be between 4-4,500. Figure 6.1 illustrates the rapid recent increase.

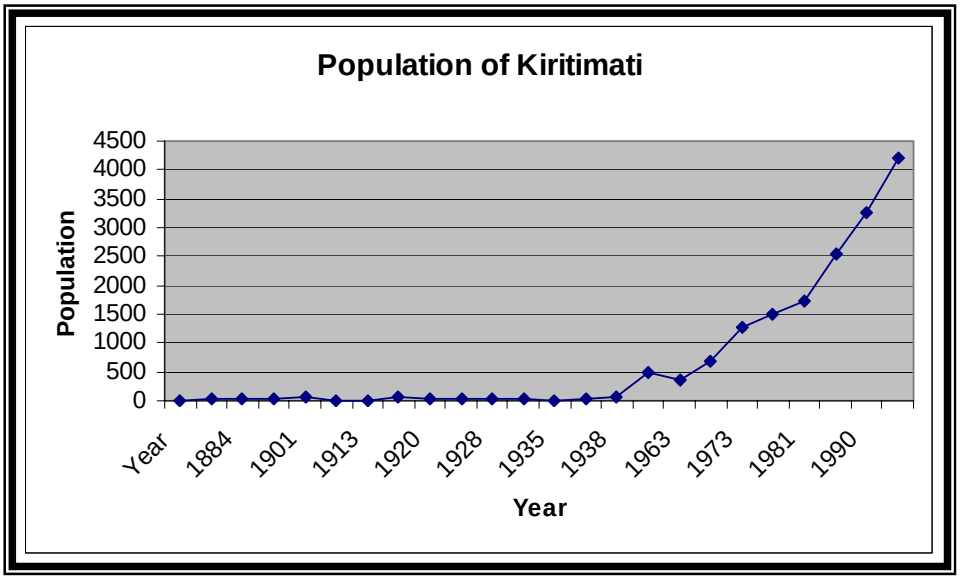

Figure 6.1 Population Increase on Kiritimati (Source: AGRICO 1993, with additional recent data from MLPD).

6.2 SETTLEMENT MANAGEMENT

6.2.1 Immigration

All the land on Kiritimati is owned by the Government which makes provisions only for leasehold land.

Although development of Kiritimati appears an important cornerstone of Kiribati's overall development, settlement on Kiritimati is, ostensibly, closely controlled through the Closed District Regulations and through the control of government housing and private leases. However, these have proved ineffective or impossible to administer

with the result that there are many squatters and the majority of leaseholders are years in arrears on their rents (AGRICO 1993).

Currently spontaneous drift or migration to Kiritimati is on-going and it is reported that an increasing number are recent resettlers to Tabuaeran or Teraina, having established their leases on those islands with family or relatives.

Because of its drought-prone nature Kiritimati does not provide a secure base for either commercial or subsistence agriculture. However, its marine resources, large land area in government ownership, and wildlife values provide opportunities for larger scale developments not available elsewhere in Kiribati. In response to this AGRICO (1993) recommended that the Government should:

> *Adopt a `commercial' model of development on Kiritimati with particular emphasis on job creation to generate an alternative employment centre to Tarawa. Settlement would be basically urban in nature and settlement should be restricted to assured wage earners.*

6.2.2 Resource Use

Kiritimati's status as a `Wildlife Sanctuary' (1975 Wildlife Conservation Ordinance) is a conspicuous signal to the international community of an intention to protect its internationally significant wildlife. However, in practice, Kiritimati is being exploited in the classical manner of a `frontier community', with a very heavy reliance on natural resources, no effective conservation management and no provision for sustainable use or rational resource partitioning.

In respect of the community, as noted above, there are no indigenous Kirimati communities, all are relatively recent and in most cases very recent immigrants. The majority of the current community know that they are transient and that they are due to return to the Gilberts or elsewhere on completion of government contracts. Very few of the community have secure tenure in any form.

In these circumstances it would be extraordinary, indeed impossible, to find an ethic of traditional resource management, knowledge or practice which is adapted to the unique Kiritimati environment. Furthermore given the status and tenure of most community members, it is foolhardy to believe that they will behave in any manner other than `frontiers people' ie exploit resources to the maximum, while still possible.

6.2.3 Physical Planning

As the Management Plan clearly pointed out in 1983, the Wildlife Ordinance legislation is inadequate, indeed confusing, in the context then and even more so now. The recommendation then and strongly endorsed by AGRICO (1993) was to abandon the island-wide `Wildlife Sanctuary' status of the island, strengthen the legislation and declare a number of smaller priority conservation sites and Wildlife Sanctuaries. This would enable the Government to make provisions for other land uses where there would be no conflict with wildlife conservation.

This land-planning exercise has gone ahead and a Land Use Plan for Kiritimati is widely circulated within MLPD.

The need to strengthen the legislation in respect of places where birds breed and people's activities in those places has been recognised since the 1983 Management Plan. So the recent declaration of six additional Closed Areas is, on the face of it, addressing this need as it provides strict protection for important conservation areas. However, it has serious shortfalls and in reality it appears to be a superficial and expedient measure. It is unnecessarily draconian to the local communities who are

now excluded from approximately 15% of the island unless a fee is paid. If, on the other hand, the law is relaxed and communities are allowed access (they already are in some cases because roads pass through the Closed Areas), then the whole notion of a Closed Area is likely to become meaningless. As it is, it is unlikely that this could ever be properly enforced and certainly not by the WCU as currently resourced. In addition, it will certainly make the task of the WCU more difficult as it accentuates their policing role when what is needed is assistance for their community support role.

The recommendations here are to:

- Abandon the island-wide Wildlife Sanctuary Status;
- Amend the Wildlife Ordinance to place stricter controls on people's activities in sanctuaries (refer Vol 2. Garnett 1983); and,
- Declare the current Closed Areas (refer Table 4.1) as Wildlife Sanctuaries;
- De-gazette the NWP Closed Area.
- Make legal provision for `moveable' Closed Areas for Sooty Tern Colonies.

6.3 MOBILITY

Since 1993, when the consultant last visited Kiritimati there has been a major increase in vehicles on the island and this would be expected from the increase in population. The resultant increased mobility of the communities makes poaching easier and much more difficult for the WCU to patrol, indeed with only one field vehicle operational, they must be considered very ineffective in this respect.

Evidence of poaching was noted in three locations, including on Motu Upua which is the nearest Closed Area to the WCU Office at Ronton and it is believed that poaching remains a fairly serious problem as maintained by the WCU.

Clearly the increased mobility of community members contributes to this problem and there is need for greater protection of nesting seabirds and important habitats. The Government's recent response in declaring six Closed Areas has potential problems (refer section 4.2) and unless the WCU is provided with adequate resources, they will be unable to enforce the Closed Area legislation.

7 CURRENT ISSUES

7.1 ECONOMIC DEVELOPMENT OF KIRITIMATI

The Kiribati Government considers the economic development of Kiritimati an important cornerstone of national development. However, as emphasised by AGRICO (1993) Kiritimati faces considerable development constraints particularly its very limited agricultural potential and high drought risk. It is these attributes which historically prevented settlement on Kiritimati and they will continue to make sustainable subsistence lifestyles unattainable. There are opportunities for economic development based on income-dependent lifestyles (a Commercially Oriented Strategy), however, unless well-controlled, such opportunities will have the tendency to be resource exploitative and unsustainable which is the current situation (AGRICO 1993).

Based on legislation drawn up at a time when Kiritimati was not seen to have any economic development potential, the whole island of Kiritimati is a declared Wildlife Sanctuary. This has little meaning in the current context of development and the future plans and aspirations of the Government. There is clearly a need for the Government to abandon the pretence of the `Sanctuary' status of the whole island and plan for wildlife conservation needs as one of several land uses which are required for the sustainable economic development of the island.

The Hon. Tim Taekiti, (Minister, MLPD) informed this consultant that the Kiribati Government expected the international community to fund conservation of Kiritimati's wildlife, if the international community believed it to be so important. This is a quite reasonable attitude, and one which most international donors would agree with. However, funding agencies are unlikely to provide assistance unless there is an appropriate institutional and legislative framework and government commitment to the overall objectives of the proposed assistance. The Government of Kiribati can best demonstrate this commitment to wildlife conservation by rationalising wildlife conservation in the overall framework of economic development. Important steps in this are to:

- Develop a clear vision and goal for wildlife conservation as an integral component of sustainable economic development;
- Remove the weaknesses and anomalies of the existing legislation in respect of Wildlife Sanctuaries by:
  - De-gazetting Kiritimati Island as a Sanctuary and declare all the current Closed Areas as Wildlife Sanctuaries;
- Provide the WCU with adequate institutional and financial support.

Currently there are several major development projects which the Government is considering for Kiritimati and these have profound implications for wildlife conservation. Currently neither the legislation nor the technical or economic resources of the WCU are adequate for current needs and certainly not for the challenges posed by the new projects.

The major projects planned for Kiritimati provide major opportunities as well as more problems for conservation. It is the opportunities which the Government needs to recognise and promote. AGRICO (1993) identified space-relatied activities as having

potential for the development of Kiritimati and there is no intrinsic reason why they should be incompatible with conservation objectives.

Given the international status and profile of Kiritimati's wildlife, it is most unlikely that any responsible developer will ignore the importance of the wildlife resources of the island. It is far more likely that they will ensure that their project not only minimises any impacts but actually enhances the current capacity and resources of wildlife conservation on the island. The Government needs to establish this at the outset and integrate wildlife protection as an on-going component of any such activities.

7.2 HOPE-X PROGRAM

7.2.1 Outline Project Description

The HOPE-X Program is a project of NASDA (the Japanese AeroSpace Development Agency) which initially proposes to use the existing Aeon Field Runway on Kiritimati to land unmanned space shuttles which had been launched from the Tanegashima Space Centre in Japan (a Mission Profile is illustrated in Plate 6).

The main components of the program include[5]:

Port Facilities Improvement at London

- Channel Dredging;
  - Channel Demarcation;
  - Wharf Loading Area Repair
  - Wharf Structural Repair
- Roadway Improvement
  - Artemia to Poland Road
  - Access Road to Aeon Field
- Aeon Runway Improvements
- Aeon Field Facilities, including:
  - Generator Building
  - Fuel Tank
  - Water Treatment Facility
  - Sewage Waste Plant
  - Meteorological Facility
  - Telemetry Receving System and Differential Global Positioning System
  - Personnel Shelter
- Poland Facilities
  - Lodging Facilities
  - Dining Facility
  - Generator building
  - Fuel Tank
  - Water Treatment Facility
  - Sewage Treatment Facility
- NASDA Down Range Station Improvements

[5] As per the project outline presented to the Kiribati Government on September 24, 1997 by NASDA and their environment consultants, Dames & Moore, Honolulu.

7.2.2 Project Status

No official statement on the status of the project was available to the consultant. Negotiations are continuing.

An Environmental Impact Assessment of the project had been completed by Dames & Moore, Honolulu. The consultant was requested to comment on this document during a period of negotiations between the Government and NASDA at the timed of his visit to Kiritimati. The consultant's comments have been reported separately, overall he found that the document was seriously deficient in certain important areas and an inadequate base on which to determine environmental protection and impact mitigation requirements, and allocation of responsibilities therin, between the Government and the project proponent.

7.3 SPACE LAUNCH PROJECT

No information was available on this project from MLPD.

7.4 HOTEL PROJECT

No information was available on this project from MLPD. However, it was learned that Mitsubishi Corporation (located in Tokyo) has been actively proposing to the Government of Kiribati to construct and operate a hotel on Kiritimati. The hotel is intended to be used by tourist and visiting space environment support staff for operation and maintenance of planned spaceport activities. Potential investment partners are being considered but undecided. The initial proposal considered a two phase 3-star type hotel plan – first phase consisting of 80 rooms followed by a second phase some years later for 70 rooms – totalling 150 rooms.

7.5 KRITIMATI ATOLL CONSERVATION AREA PROJECT

The objectives of the KACAP project are summarised in section 1.1.

No information on this project was available from MLPD during the visit, both the CASO and the Chairman of the KACAP committee were off-island during the consultant's visit.

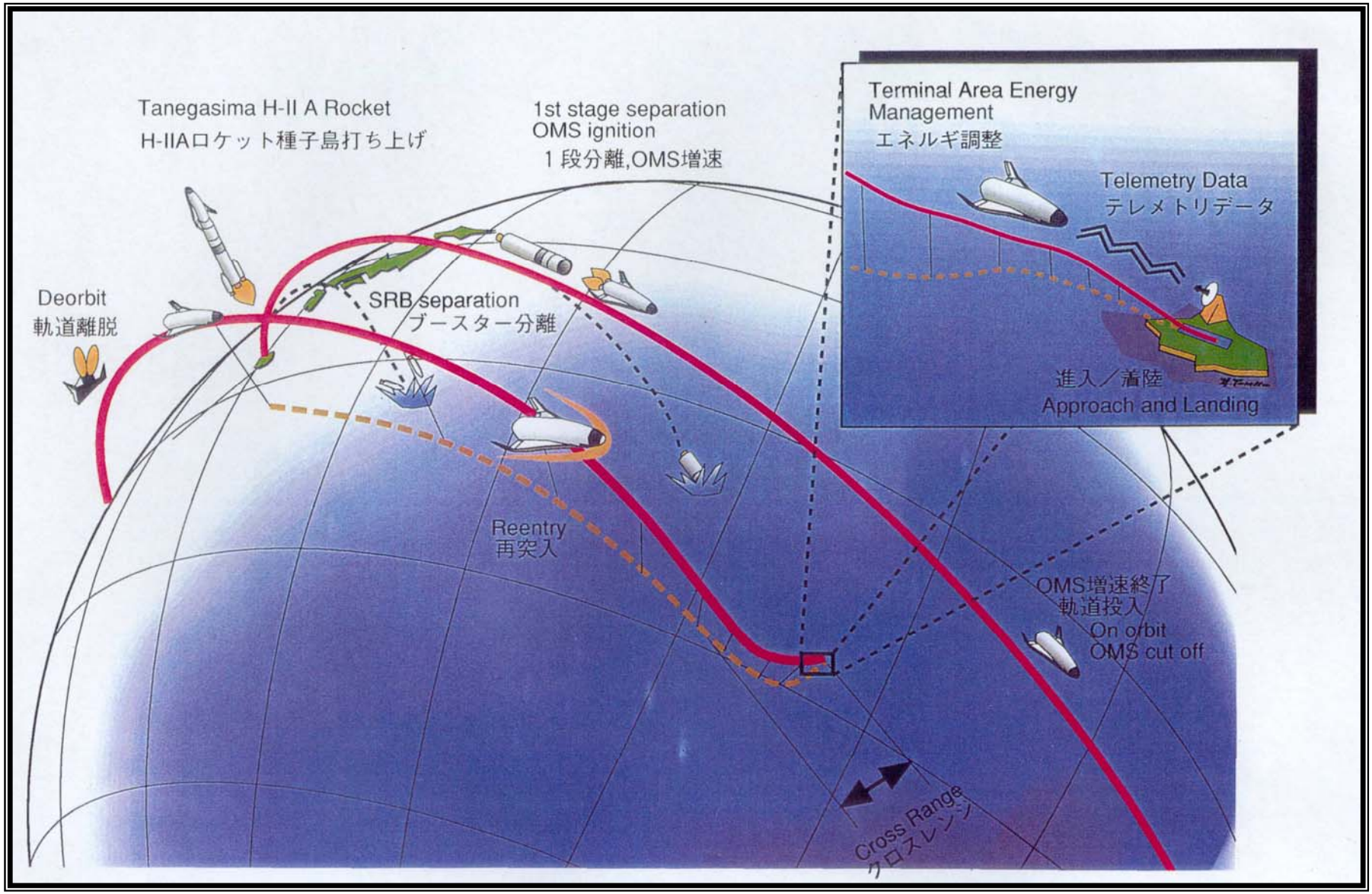

Plate 6: HOPE-X Mission Profile (Source: NASDA presentation at Ronton, 24/9/1997)

8 THE CHALLENGE – A NEW WILDLIFE CONSERVATION STRATEGY

All the indications are that Kiritimati's wildlife values – its bird populations and habitats, are diminishing or becoming degraded, only the rate is open to question. The WCU, as it has operated for the past 20 years, is failing in its mandate and an internationally significant natural heritage is acutely threatened. This will not be reversed by superficial additions of training and resources. Fundamental changes to the relationship between conservation and development on Kiritimati are required, accompanied by a major technical upgrade of the WCU, and the development of a new relationship with local communities. The international community has a major responsibility to assist the Kiribati Government in this endeavour. However, the international community is unlikely to assist fully if the Kiribati Government fails to provide a clear institutional and political framework and a commitment to ensure that future project developers accept full environmental responsibility for their project activities, especially indirect impacts.

To achieve this requires a new Wildlife Conservation Strategy, the principal elements of which are:

- Developing a clear vision and goal in respect of wildlife conservation and development;
- Focusing wildlife conservation in important habitats and breeding sites;
- Amending the wildlife legislation to provide for appropriate development, community and conservation needs;
- Re-appraising the responsibilities of the WCU *vis-a-vis* wildlife conservation and its other duties;
- Re-appraising the feral cat eradication programme;
- Consideration of increasing `island habitat' in the convoluted internal lagoon areas;
- Upgrading the skills and resources of the WCU;
- Survey, census and monitoring of bird populations over a two year period;
- Expanding the Schools Education Wildlife Programme to the wider community;
- Forging a new relationship between the WCU and the local communities and,
- Preparation of a practical and achievable Management Plan for the WCU.

To initiate this process, it is recommended that a Draft Strategy Document be prepared and then through a consultative process between SPREP and the Kiribati Government developed into an acceptable document.

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ATTACHMENT 1
TERMS OF REFERENCE

TERMS OF REFERENCE

FOR

CONSULTANCY AGREEMENT

General:

The South Pacific Biodiversity Conservation Programme (SPBCP) is supporting the establishment and management of a Kiritimati Atoll Conservation Area Project (KACAP). The KACAP seeks to conserve the rich biodiversity of the Kiritimati Atoll by (a) establishing the Cook Islet National Marine Park that would encompass the current Cook Islet Closed Area, (b) establishing a network of Protected Areas based on the existing network of Bird Sanctuaries and Fishing Closed Areas, © developing sustainable development activities including the enhancement of terrestrial flora and the setting up of viable income generating activities; (d) building and strengthening the capacity of the lead agency, other implementing agencies and members of the Community to implement the Project, and (e) raising public awareness and generating information to promote and support biodiversity conservation activities.

Kiritimati Atoll's avifauna is considered the more important component of its biodiversity from a conservation point of view. It is seen as having regional and international significance. Kiritimati Atoll provides nesting roosting, feeding, wintering and transit sites for over 40 bird species. But it is the 18 species of seabirds that breed/nest on the atoll that is of regional and international interest. It is the protection of these species that this Project hopes to contribute to.

The management of Kiritimati Atolls' avifauna is the responsibility of the Wildlife Unit of the Ministry of Line and Phoenix Development. Discussions with the Wildlife Unit staff during the preparatory phase of this project revealed little in terms of how this rich biodiversity is being managed. There are no formal management plans to indicate objectives and the range of activities to be implemented. Despite this, some major achievements have been made. For example, Cabinet recently passed by-laws recognizing a number of closed areas as Bird Sanctuaries Areas.

Past Studies and Plans

Following a request by the Kiribati government, a management plan for nature conservation in the Line and Phoenix Islands was prepared by Martin Garnett in 1983. Garnett's report included comprehensive population baseline data for all bird species of the Line and Phoenix group including Kiritimati. Specific management prescriptions for each known bird species were also recommended. To what extent this Plan was or is being implemented could not be ascertained during the Planning of this assignment. Likewise, a latter study titled "Integrated Development Plan for Kiritimati Atoll" (Dick Watling (1993)) proposed the setting aside of a network of areas for bird sanctuaries and fisheries spawning.

The Project Document for the Kiritimati Atoll Conservation Project also reviewed the various issues related to nature conservation in the Atoll and the need to strengthen the management of the areas' avifauna is identified as a key activity.

Current status of Avifauna conservation management

Recent consultations with officials of the Wildlife Management Unit of LINUX (Sesega, Feb 1999) show that current avifauna management is *ad hoc* and not following a systematic approach based on clearly formulated management plans. Current activities of the Wildlife Unit include a range of activities proposed by Garnett. Recommendations in Watling's Integrated Development Plan for Kiritimati Atoll for a network of closed areas for bird

sanctuaries can be seen in the network of closed areas Cabinet recognized by legislation in 1996.

Typical of many Pacific Island countries, formal management plans are replaced by yearly work plans submitted to Treasury Ministries for annual budget appropriation exercises. The key feature of these budgets and plans are the salaries and administrative costs for the Wildlife Management Unit which main preoccupation is the policing of closed areas against poachers.

Given this background, the main issue for the future of avifauna conservation management in Kiritimati Atoll is to systematize conservation management through the formulation of a proper and comprehensive management plans. The plan should promote the protection of key avifauna species, populations and habitats and should identify the key activities for the next five years.

Specific Assignment

The purpose of this consultancy is to address the need to strengthen the management of Kiritimati Atoll CAP's avifauna and to do so by

1. reviewing the two referenced studies and the extent to which elements of relevance to Kiritimati Atoll have been implemented;
2. reviewing present conservation activities of the Wildlife Unit and its capacity to effectively implement management actions necessary to ensure the protection of Kiritimati's avifauna;
3. reviewing current issues of relevance to avifauna conservation in Kiritimati including the potential impacts of major planned development activities such as the NASDA Project, the proposed Japanese funded Rocket launching Project and accompanying hotel development and others.
4. assessing, to the extent possible in the available time and the prevailing circumstances, the statuses of all key bird species and populations and their habitats including the collection of new bird data on the key bird species of Kiritimati Atoll;
5. collecting and analysing socio-economic data to determine the extent of hunting and egg harvesting.
6. Based on the results of the above reviews and assessments, formulate a draft Avifauna Management Action Plan for the protection of Kiritimati's avifauna for the next five years (2000 - 2005).

Methodology

The consultant is required to travel to Kiritimati Atoll and to consult as widely as possible within the Ministry of Line and Phoenix Development in particular the Wildlife Unit staff, the Fisheries Unit, the Project Manager of the KACAP and CASO, key players within the private sector and if necessary community representatives. Consultations with the CACC and community groups is considered vital in this exercise both in relations to gathering information related to human impacts on bird populations and habitats as well as in canvassing community views on relevant issues and in assessing the viability of options for managing avifauna populations. The options to be explored should include a possible community and CACC role in avifauna conservation.

The Consultant is also to undertake a desk review of the studies referred to and of similar studies done elsewhere.

Assessment of avifauna species population and habitats and the analyses of data are to be conducted using sound and accepted ornithological techniques and methods.

Duration:

Three weeks of field work is allowed with two weeks of planning, researching and report writing.

Outputs

Two specific outputs are expected from this assignment:

1. A consultancy report detailing the entire exercise - objectives, methods use in data collection, findings and recommendations. Findings should include the outcomes of the required reviews, issues identified through consultations, results of field bird counts and a species by species status update based on Garnett's baselines. Recommendations should reflect all actions to be taken including priority activities that may be reflected in the Management Plan referred to below; and
2. An draft Avifauna Management Action Plan for Kiritimati Atoll for year 2000 - 2004. The draft plan will be subjected to further review involving the Lead Agency, CACC, the Kiritimati community and the SPBCP Secretariat. This review and finalization will be carried out by the Project with the assistance of the SPBCP Secretariat.

Two ring-bound copies of the report and management plan should be submitted in draft form to the SPREP by no later than 30 September 1999.

(NOTE: Subsequent to the Field Survey and based on its findings, the TORs were modified. In place of a Management Plan – a Strategy Document – Funding Proposal for a TA was to be prepared.)

ATTACHMENT 2
PRINCIPAL ACTIVITIES OF THE CONSULTANT ON KIRITIMATI

Summary of Activities (Kiritimati dates)

Date	am	pm
6-Jul-99	Depart Suva for Nadi	Depart Nadi for Honolulu
7-Jul-99	Flight Honolulu to Kiritimati	Meet Wildlife Unit, London. Roost flights @ Main Camp
8-Jul-99	Discussions with Wildlife Unit, London. Orientation field visit with Ibeatabu - Dojin, Tanguoua and Koil Closed Areas. Roost Flights @ Main Camp	
9-Jul-99	Public Holiday.Dawn flights @ Main Camp. Review of literature	Review of literature. Roost flights @ Boating Lagoon
10-Jul-99	Dawn flights @ Main Camp. Dojin CA - preliminary survey for nesting Frigate Bird census. Roosting flights @ Boating Lagoon	
11-Jul-99	Sunday. Dawn flights @ Main Camp. Dojin CA transect counts. Roosting Flights @ Main Camp. Rats @ Main Camp Rubbish Dump	
12-Jul-99	Public Holiday. Dawn flights @ Main Camp. Survey of Target Area Sooty Tern Colony. Evening @ NE.Manulu Lagoon observing movement to islets	
13-Jul-99	Public Holiday. Tangoua CA survey - Wedge-tailed Shearwater Colonies.Roosting Flights @ North-east Point	
14-Jul-99	Public Holiday.Dawn flights @ Boating Lagoon. Tanguoua CA survey - Wedge-tailed Shearwater Colonies.Rats @ Ronton Rubbish Dump	
15-Jul-99	Discussions with Wildlife Unit, London. Meeting with Minister Tim Taekiti	Manulu Lagoon Islets. Roosting Flights @ North-east Beacon.Set Rat Traps London
16-Jul-99	Survey Motu Cook, Motu Tabu, Motu Upua. Set Rat Traps, London	
17-Jul-99	Inspect Cat Traps at Mouakena CA with WU and survey Sooty Tern Colony @ Mouakena, then view 0 Site colony. To Korean Wreck to view picnickers	
18-Jul-99	Sunday. Te Kura search - Banana.	Survey `O' Site Sooty Tern Colony
19-Jul-99	Dawn flight @ Main Camp. Car Break Down. Review Met.data @ Solar Salt Project	Discussions with WU, London. View equipment, vehicles etc. Roost flights @ Artemia
20-Jul-99	Survey Lesser Frigate Colony, Koil CA; survey Aeon Inland Site Sooty Tern Colony with Ibeatabu and then visit '0' Site Colony again	
21-Jul-99	Dawn flight @ Main Camp. Car Break Down. Recce SE Manulu Lagoon	Discussions with Utimawa, Warden WU. Review cat data, progress reports etc.Roosting Flights @ SE Manulu Lagoon
22-Jul-99	Car Break Down. Sooty Tern Census techniques with Utimawa - demo @ NWP colony	Discussions with Ausaid water project. Work up CA area data and Sooty Tern Census technique. Evening with Utimawa
23-Jul-99	Car Break Down. Tanguoua CA; recce Ngaontetaake & Cat Island with Aobure TeAtata. Met Office for data. Roost Flights @ Carver Way	
24-Jul-99	Line transect counts of Frigates and Booby's with Utimawa @ Dojin CA	Organise notes. Discussions with David James, Kiribati Solicitor General
25-Jul-99	Sunday. Dojin and Tangoua, boundary markers - GPS fixes.	Review and sorting notes.
26-Jul-99	Te Kura search - Banana. WU Office - data collection. Line Transect and CA area calculations with Utimawa.	Meetings - Perry Langdon, Paolo and Bonefish guides. PM - Review HOPE-X EIA
27-Jul-99	Survey Manulul Lagoon islets. Discussions with Utimawa	Report Writing Preparation
28-Jul-99	Flight Kiritimati to Honolulu, Sydney, Nadi and Suva	
29-Jul-99		Arrive Suva 1900 hrs
31-Jul-99	Submission of Pre-Report to SPREP	
10-Aug-99	Submission of Draft Report to SPREP	

ATTACHMENT 3

SPECIES SUMMARIES FOR THE BIRDS OF KIRITIMATI

BASED ON JONES (1997) WITH ADDITIONAL OBSERVATIONS MADE DURING THE CURRENT SURVEY

SPECIES SUMMARIES FOR KIRITIMATI BIRDS WITH ADDITIONAL OBSERVATIONS DURING THE CURRENT STUDY.

Reproduced below are the population summaries for each of the eighteen seabirds and one landbird that breed on the island as prepared by Jones (1997) together with the observations made during the present study between July 7th – 28th 1999 and including additional observations on two other species. Except for E. Schreiber's (1993), Jones's (1996) and Watling's (1999) observations, they are based on the published literature.

Wedge-tailed Shearwater *(Puffinus pacificus).* According to Schreiber and Ashmole, this species breeds only from May through November, with most eggs present in late June through July. Adults are present at the island year round. Although many active burrows were present, Jones found no eggs on his April visit. R. Schreiber, and others before him, found most burrows on Motu Tabu and Motu Upua, with other colonies scattered over the remainder of the island on both the main island and islets. Garnett, on the other hand, does not show it as occurring on Motu Tabu or Motu Upua (map, p. 69); however, this may be an error of omission.

The Pacific Ocean Biological Survey Program (POBSP) banded 3,400 birds between March 1964 and March 1967. They counted 800 active burrows on Motu Upua, 500 burrows on Motu Tabu, and approximately 1,000 burrows elsewhere on the island. R. Schreiber estimated a peak of 2,500 nests ±25% in July 1967, but found that only 35% of the burrows were active, suggesting higher numbers of nesting birds in the recent past. He estimated 6,000 ± 15% adults on the island at the height of the breeding season.

Garnett, on the other hand, estimated 500,000 pairs, or 1,000,000 adults present on the island in 19791981, an estimate many orders of magnitude higher than previous investigators. In his report, he did not explain the derivation of his estimate, but in talking with warden Teeb'aki, who assisted him, Jones suspects he extrapolated this number from counts of birds flying in to major nesting colonies from the sea at dusk. Garnett pointed out that several colonies on the main island had been recently extirpated by cats, suggesting that even higher numbers may have bred in the past.

Schreiber and Schreiber (1984, Table 1) give an estimate of 500,000 pairs as the "normal" breeding population; however, the numbers of most birds presented in this table closely parallel those of Garnett and may have been derived largely from his estimates for this same period. It is likely that earlier investigators grossly underestimated the total population on the island, as this species nests in burrows and is rarely seen above surface around the nesting colony in the daytime. The discrepancy between Garnett's estimates and those of prior researchers are far greater for this species than any of the others.

E. Schreiber found four chicks on Motu Upua and "lots of activity" on Motu Tabu in late August and early September 1993. She found unidentified poached adult shearwaters (presumably, this, *Puffinus nativitatis,* and *Pterodroma alba)* on Motu Upua.

Teeb'aki found thousands of dead and dying adults washed up on lagoon shores in 1995. He does not know the cause of their death, but said only wedge-tailed shearwaters were affected. He marveied at how quickly they had recovered, as numbers appear to be back to normal in 1996.

Jones found evidence of wedge-tailed shearwaters almost everywhere he went. He did not attempt to make counts of active burrows, as this would have taken much more time than he had available. Active burrows and birds were present on Motu Tabu, Motu Upua, the large island in Manulu Lagoon, and "Frigatebird" Island. Jones saw large numbers of birds at sea, both from the hotel and from South-east Point, and on 12 April, he saw large numbers flying inland from the ocean at dusk between Carver Way and Y-Site Road where they join the main highway. This, and Teeb'aki's comment that numbers appeared to have recovered well from last year's die-off, suggest that the population is reasonably healthy. Clearly, more than a few thousand birds are present, but whether their numbers approach one million, as Garnett estimated, is unknown.

Watling 1999. Very large numbers could be seen each evening flying eastwards along the northern coast and North East Point and then dispersing inland after the Bay of Wrecks area. Nearly all colonies examined were occupied, though some small ones in Tanguoua and Mouakena CAs were completely abandoned and had the appearance of long abandonment. Eggs and recently hatched chicks were the most common stage of breeding. No colonies examined appeared full, ie most burrows were occupied, the majority appeared to be a third to a half occupied. Censusing was not attempted. This should be done when the majority of chicks are large, approaching fledgling stage.

Christmas Shearwater *(Puffinus nativitatis).* Schreiber and Ashmole describe some breeding throughout the year, with peak numbers breeding from November through February and chicks present through May. Gallagher (1960), on the other hand, found nesting evidence throughout the year in 1958-1959, with no peak laying period. On Motu

Tabu, Jones saw chicks in all stages of development, but no eggs. As with the other shearwaters, petrels, and storm-petrels, no nesting occurs on the main island because these birds are easy prey to rats, feral cats. Principal breeding areas are the many islets, including Motu Tabu, Motu Upua, and at least sometimes (Garnett, E. Schreiber) Cook Island.

Ashmole counted 600 nests on Motu Tabu in December 1964, and POBSP banded 7,200 birds throughout the island in the three-year period from 1964 to 1967. R. Schreiber also had 600 nests on Motu Tabu, as well as 600 on Motu Upua, in December 1967. He described "many" nests on other islands scattered throughout the inner lagoon and estimated a total of 1,400 ±25% nests during peak nesting and 3,000 ±25% adults.

Garnett (1983) estimated 6,000 adults present in 1979-1981, and Perry (1980) estimated 15,000 adults during roughly the same period. Schreiber and Schreiber (1984) list in Table 1, 6,000 pairs as the "normal" breeding population.

E. Schreiber counted 200 adults and 3-4 eggs on Motu Upua, 40 nests on Motu Tabu, and 30-40 nests on Cook Island in late August and early September 1993; however, she was present at the time of year when the fewest numbers were likely to be breeding.

Jones found evidence of this species on most islands visited. On Motu Tabu, he had adults with chicks, and suspected chicks were also present on Motu Upua, although he did not visit the vegetated interior of this island. Christmas Shearwaters were also present on every other island he visited, including "Frigatebird" Island, the large islet in Manulu Lagoon, and several unnamed islets. He observed chicks on several islands.

Watling 1999. Christmas Shearwaters were actively breeding on Motu Tabu, Motu Upua, Ngaontetaake, Manulu Lagoon and Cat Island but not on Cook Islet. A few chicks were noted on Motu Upua, otherwise it was presumed but not confirmed that sitting birds were incubating eggs. Single birds were quite commonly noted flying out to the ocean during the early morning.

Audubons Shearwater *(Puffinus Iheminieri).* This species was not known to breed on the island before 1955, and the first confirmed breeding was by POBSP in 1965. Schreiber concluded that some nesting may occur throughout the year, but that the peak laying period is from June to November. He found it nesting on only one of over 125 islets he visited in 1967; however, Garnett found it on a number of islets, all within the Central Lagoons area.

R. Schreiber estimated a population of 75 ±5% adults and 25 ±5% nests. Garnett estimated 1,000 breeding pairs (= 2,000 adults) over a much broader range than the one islet where Schreiber found it. Schreiber and Schreiber (1984) also give 1,000 pairs as the estimated norm. E. Schreiber did not comment on this species, and Jones did not see it during his brief visit.

Watling 1999. Single birds observed in the middle of the day on two occasions flying inland in the Carver Way area and on one occasion at dusk flying across the Manulu Lagoon.

Phoenix Petrel (*Pterodroma alba).* Breeding occurs throughout the year, however, with two distinct egg laying peaks roughly from November to February and April to July. Motu Tabu and Motu Upua apparently support the largest colonies (Schreiber and Ashmole), but colonies also occur on islets throughout the Central Lagoons area and on Cook Island.

R. Schreiber estimated 6,500 ±25% adults and 2,100 ± 15% nests during the peak nesting period, but commented that the actual number must be much higher on an annual basis. He considered this to be the most common tubenose (shearwaters, petrels, and storm-petrels) on Kiritimati Island.

Garnett estimated 20,000, and Perry 25,000 adult Phoenix petrels present during the 1979-1981 period, considerably higher than Schreiber and Ashmole's estimate, but 40-50 times lower than Garnett's estimate of wedge-tailed shearwaters.

The fact that Schreiber and Ashmole considered Phoenix petrels to be more abundant than wedge-tailed shearwaters is not surprising in that the former would *appear* to be more plentiful because they nest on the surface and fly about the colony during daylight hours, in contrast with the much less conspicuous wedge-tailed shearwaters.

Garnett considered the Phoenix petrel colony on Kiritimati to be "much the largest population known from anywhere in the world."

Schreiber and Schreiber (1984) give 12,000 pairs as the estimated normal breeding population, more in line with Garnett's and Perry's estimates.

E. Schreiber counted 50 pairs on Motu Tabu and 40 nests (20 with eggs, 20 with young) on Motu Upua in late August and early September 1993.

Jones found Phoenix petrels to be conspicuous, but not obviously common throughout the island away from the South-east Peninsula where they apparently do not occur. He found this species on Motu Tabu, and they may have been present on Motu Upua as well, although he did not visit the interior of this island. Jones did not see this species on Cook Island.

Watling 1999. Phoenix Petrels were noted at all times of the day, on daily basis, flying between the ocean and inland areas but never in large numbers. These petrels were absent from Cook Island but breeding on Motu Tabu and Motu Upua. On Motu Upua, there was a great deal of noisy aerial activity taking place.

Polynesian Storm-Petrel (*Nesotregetta fuliginosa).* Schreiber and Ashmole determined the peak egglaying period to be from July or August to January, with some breeding throughout the year. They and others have found most breeding birds on islets in Manulu Lagoon, with a few present on Motu Tabu, Motu Upua, and islets in Isles Lagoon. Garnett also found it on several islands in the Central Lagoons area, but apparently not on Motu Upua.

Gallagher found 20 nests on islets in Manulu Lagoon in January 1959. Ashmole did not visit Isles Lagoon, but saw as many as 12 adults at a time on Motu Tabu in August 1963. POBSP banded 39 birds on islets in Manulu Lagoon in October 1965. They had 49 adults and 31 nests in November 1964, 30 nests in March 1965, and 50 nests in October 1965, all apparently in Isles Lagoon. R. Schreiber banded 121 adults and 34 chicks in 1967, presumably on Motu Tabu and Motu Upua as well as islets in Isies Lagoon, but could not make an exact nest count. He estimated a total of 350 to 450 adults and 60 ± 5% nests throughout the island. Garnett estimated a minimum of 1,000 pairs (2,000 adult birds) in 1979-1981, and Schreiber and Schreiber (1984) gave the "normal" number of pairs as 500.

E. Schreiber found evidence of nests on islets in Manulu Lagoon in 1993, but saw few adults. She found two on eggs.

Jones saw this species once at dusk, an individual flying inland from sea at the Captain Cook Hotel. The fact that he did not see more is not surprising, as he was not present during its peak breeding season. Like most storm-petrels, this species moves from nesting areas to feeding areas at sea only during or after dusk and at or before dawn. Therefore, it is usually not conspicuous away from immediate nesting areas, and then only at dawn and dusk.

Watling 1999. This small petrel was seen in small numbers (up to seven but usually one or two) on most roost flight observations (Main Camp to Artemia, Manulu Lagoon and Tanguoua CA) and rather less so at dawn. It was noted on two occasions during the day. No nests were found and no birds were recorded on Cook Islet, Motu Upua or Motu Tabu.

Red-tailed Tropicbird *(Phaethon rubricauda).* .This species breeds mostly from June to December, but a few may be breeding at any time of the year. It nests on both the mainland and islands, with the majority of the population nesting on islands in the Central Lagoons area according to Schreiber and Ashmole. Garnett, however, indicates a number of nesting sites on mainland areas throughout the Central Lagoons area as well as in the interior of the South-east Peninsula.

R. Schreiber estimated 3,000 ± 15% nests and 8,000 ± 15% adult birds present annually as of 1967. This is somewhat similar to Garnett's estimate of 8,000 to 9,000 adults in 1979-1981. Since most of Garnett's estimates are much higher than Schreiber's, and are based on more thorough coverage, it is tempting to suggest that tropicbirds may have actually declined significantly between 1967 and 1979-1981. Schreiber and Schreiber (1984) estimated 4,000 pairs on average.

E. Schreiber found 60 nests in a principal breeding colony at Y-Site in late August and early September 1993, an area where she said there use to be about 200 nests. She found piles of 6-7 recently poached adults and some piles of bones from previous poaching. She also found piles of bones from poached birds on Motu Tabu and Motu Upua, where she found only 5 and 6 active nests, respectively.

Jones found no definite evidence of nesting in April 1996, but did see more than a dozen birds sitting under vegetation on presumed nests. He did not attempt to determine the contents. He saw two.birds on presumed nests on Motu Tabu, 8-10 on the large islet in Manulu Lagoon, and several on "Frigatebird" Island. Jones also saw a congregation of about 100 birds over an island in the southern Central Lagoons area and several other smaller congregations. He did not see evidence of any poached birds, but he was present at the very beginning of the breeding season and did not visit the historically large colony at Ngaon te Taake near Y-site.

Watling 1999. Red-tailed Tropicbirds were nesting in small numbers scattered throughout the Dojin, Tanguoua, Koil, and Mouakena CAs. Nesting was also in progress on Cook Islet (<10 prs), Motu Tabu (250 pairs) and Motu Upua (150-200 pairs) with eggs and chicks, in a few cases large chicks near fledging.

Masked Booby *(Sula dactylatra).* This species breeds throughout the year with a slight peak egg-laying period from April or May until October. Schreiber and Ashmole found most Masked Boobies breeding on South-east Peninsuia between A-Site and M-Site. Garnett shows roughly an equal breeding distribution in the Central Lagoons area and the South-east Peninsula but does not indicate relative abundance in the two areas. Jones found them far more numerous on South-east Peninsula, but with a few scattered throughout the Central Lagoons area.

R. Schreiber estimated a total breeding population of "not more than 500 pairs" in 1967, with 500-600 birds roosting each night. Since 500-600 birds is fewer than 500 pairs, it must be assumed that the 500 pairs was an estimated annual total. Schreiber estimated a maximum of 175 nests ± 10% at any one time.

Garnett estimated 1,500 or more pairs in 1979-1981, three times Schreiber and Ashmole's estimate, but Schreiber and Schreiber (1984) also gave 1,500 pairs as a representative number.

E. Schreiber, on the other hand, saw few birds in 1993, including only two immatures. Because of the near lack of immatures, she concluded that little successful nesting had occurred in the past few years.

She did not find any breeding evidence at the colony near the road at South-east Point, only poached bones. She did find about 25 nests and 50 roosting birds farther inland, but no birds with chicks. She found only eight nests, four with eggs and four with chicks, elsewhere.

In stark contrast to E. Schreiber's findings, Jones found a few paired birds in the colony near the road at South-east Point and a number of paired birds inland from the point. He estimated about 600-700 birds altogether, about two-thirds of which were groups of roosting birds. He did not flush any paired birds to determine if they had eggs, and he saw no chicks. Jones only saw about five immature birds, but most immatures may not roost on the island. Harrison (1990) stated on p. 156 that "[a]s adult red-footed and masked boobies tend to remain close to the colonies, most birds observed far offshore are immatures or subadults." On p. 158, however, he stated that "[c]lubs of unemployed boobies may form on breeding and nonbreeding islands at any time of the year. They can include juveniles and adults...." These statements are not necessarily contradictory, but they do not shed light on whether the near absence of immature masked boobies in the roosts on Kiritimati Island suggest recent nest failures.

Jones found one instance of likely attempted poaching of this species, an immature bird that was missing its right wing. This bird had lost its wing very recently, since it could not fly (and therefore feed), yet it did not appear weak or frail.

Watling 1999. Over 40 pairs or sitting individual Masked Boobies were noted in the Motunkena CA and many were also observed scattered through the Tanguoua and Koil CAs. Several recently hatched young were recorded but otherwise only eggs were recorded. Several groups of roosting birds were also noted and in all at least 500 Masked Boobies were recorded ashore.

Brown Booby *(Sula leucogaster).* Although information is scant, brown boobies appear to have two distinct laying periods, April to May and September to October; however, the laying season could vary from year to year. A few birds may be nesting at any time of year. Brown boobies have nested at South-east Point, on islets in Manulu Lagoon, and on both the mainland and islands in the Central Lagoons area. The most productive site appears to be the one at South-east Point.

R. Schreiber estimated a total breeding population of 80 ± 10% birds in 1967, with no more than 25 nests at any one time.

Garnett, however, estimated 300 pairs on the island in 1979-1981, and Schreiber and Schreiber (1984) also give 300 pairs as the norm.

E. Schreiber found 13 nests at South-east Point and two nests elsewhere in 1993. As with masked booby, she found evidence of poaching and only two immatures, and she concluded that little reproductive success had occurred in the past year.

Jones found about eight nesting pairs at South-east Point, at least one of which had an egg. A few brown boobies were present elsewhere throughout most of the island, but he saw no paired birds at nest sites anywhere else. He did find a pair of recently poached birds at South-east Point. This was within 300 m of where he found the masked booby that was missing a wing.

Watling 1999. A total of seventeen nesting pairs or individuals were recorded in Mouakena CA or elsewhere on the South-east peninsula. Individuals, mostly immatures were noted elsewhere on the island including in the Manulu Lagoon and around Frigate Island in Koil CA.

Red-footed Booby *(Sula sula).* Red-footed boobies nest throughout the year at Kiritimati with peak laying periods averaged over several years in December to January and April to June. There is some seasonal variation from year to year. This species breeds in many areas throughout most of the island, and is without question the most widely distributed and common booby.

R. Schreiber estimated 2,500 ±15% nests and 8,000 ± 15% adults present during the peak nesting period in 1967.

Garnett estimated 12,000 adults present in 1979-1981, a number that is reasonably comparable to Schreiber's estimates. Schreiber and Schreiber (1984) gave 6,000 pairs as the normal colony size.

E. Schreiber estimated only 400 to 450 nests at the sites she visited in late August and early September 1993. She found evidence of recent poaching at most sites, including two poached fledglings on Motu Tabu. She gave no estimate of totals for the entire island.

Jones found a few nesting red-footed boobies at nearly every locale he visited, but was not able to derive an estimate for the island as a whole during his short stay. Some nests had small chicks but most had unknown contents, probably eggs, as April is generally early in the breeding season. He did not find evidence of poaching.

Watling 1999. Identical observations to Jones', eggs, small nestlings and young about to fledge were all observed.

Great Frigatebird *(Fregata minor).* Great frigatebirds have a distinct breeding season, with egg laying generally commencing no earlier than March or early April and continuing through July and occasionally September. Fledglings are generally present from May until December. Juveniles are dependent on their parents until past the beginning of the next annual breeding cycle, thus females that successfully raise young in one year do not nest in the following year. Great frigatebirds nest throughout most of the interior of the island on both the mainland and islets.

R. Schreiber estimated 2,500 ±10% nests in 1967 and a total of 10,000 ±15% adults present. The population at the island remained fairly constant throughout the year.

Garnett estimated the annual breeding population to be about 12,000 birds, and Schreiber and Schreiber (1984) estimated 6,000 pairs.

E. Schreiber estimated about 300 to 350 nests at Ngaon te Taake and another 500 to 600 nests in the interior of the island. She found much evidence of poaching, especially near inhabited areas.

Jones found a number of great frigatebirds on nests in the Central Lagoons area, with the greatest concentration on "Frigatebird" Island at the base of South-east Peninsula where he estimated a few hundred to close to a thousand nests. Most nests had eggs or were empty. None had chicks.

Watling (1999). Several hundred Great Frigatebirds were nesting in the Dojin CA, both eggs and young nestlings were present. Other nests were noted on Ngaontetaake, Cat island and on islands in the Tanguoua CA.

Lesser Frigatebird (*Fregata ariel).* Although about as common as the great frigatebird, this species nests in only one colony. It nests at the same time of year, but with apparent closer synchrony of egg laying. Eggs are laid from late April until June and fledglings are present from June until September. This species leaves the island when it is not breeding.

Lesser frigatebirds were first discovered breeding on the island by Gallagher in June 1959 in a colony south of Isles Lagoon. He found about 500 nests. Ashmole found about 100 nests in September 1963 and 1,000 nests in June the following year. R. Schreiber determined that only 80-100 eggs were laid in 1967. A minimum of 56 young hatched, but cats ate most or all of them, with probably no young fledgling that year. He predicted that the species may soon be extirpated on the island.

Garnett found this colony had been abandoned by 1980, but found a new colony on an island in a landlocked lagoon just to the north that year, which he dubbed 'Frigatebird" Island. He estimated that between 2,500 and 4,500 pairs bred on the island during his tenure and that the total population was about 14,000 (including immatures). Schreiber and Schreiber (1984) gave a figure of 4,500 breeding pairs.

E. Schreiber did not comment on this species. Jones found several hundred nesting pairs of both this and great frigatebird on this same island in 1996. No chicks were present.

Watling (1999). Lesser Frigatebirds were seen irregularly around the island, but always feeding around the borrow ponds near Cassidy Airport. The Lesser Frigatebird colony on the islet(s) in the Koil CA appeared very crowded with many recently hatched nestlings. Because of this no visit was made to the island itself, it was only observed from several sites on the mainland. It was estimated at the time that there may be about 6,000 pairs but this high by comparison with previous surveys (2,500-4,500 pairs) and should not be taken as a true figure.

Great Crested-Tern (*Sterna bergii).* This species nests only on Cook Island and its breeding season generally falls between late December and May. R. Schreiber estimated 200 or more nests and 500 ±10% adults in 1967. Garnett estimated a breeding population of about 700 birds in 1979-1981, and Schreiber and Schreiber (1984) gave 350 pairs as the normal breeding number.

E. Schreiber did not comment on this species but was not present during the breeding season. Jones estimated a total of several hundred birds on the island in April 1996, but found no evidence of breeding. All birds seen were in molt.

Watling (1999). Crested Terns were seen in small numbers – pairs, threes etc. in isolated locations all over the island. The colony on Cook Islet was breeding during his visit with eggs present, an estimate of 300 pairs was made.

Gray-backed Tern *(Stema lunata).* This species generally breeds from February or March to August or September on islets in Manulu Lagoon and the Central Lagoons area. The entire population leaves the island in the fall and returns again in December.

Ashmole found about 300 pairs in Manulu Lagoon from March to May 1964. R. Schreiber estimated a population of approximately 2,500 ±15% adults and juveniles in May and June 1967, primarily in the Manulu Lagoon and Isles Lagoon areas, and about 400 pairs in the Central Lagoons area in August.

Perry estimated only 1,500 birds in 1980, but Garnett estimated a total population in excess of 10,000 birds in 1979-1981 based on "more recent surveys." He also observed birds attempting to nest on the mainland in March 1982, but this colony was destroyed by cats. Schreiber and Schreiber (1984) gave 3,000 pairs as the estimated norm.

E. Schreiber counted 250 eggs and 15 chicks on the big islet in Manulu Lagoon in late August and early September 1993 at the tail end of what would be their normal nesting season.

Jones saw the main Manulu Lagoon colony in April 1996 and estimated 500 birds present, many with eggs.

Watling (1999). A small number of Grey-backed Terns were nesting in the Manulu Lagoon (<20). More were seen in the Tanuoua CA and Koil C.A. but no large colonies were noted. A small, possibly nesting colony, was noted in Mouakena CA.

Sooty Tern *(Sterna fuscata).* This is by far the most abundant seabird on Kiritimati Island. It has two distinct breeding seasons involving two sets of birds. One group lays eggs in May to July and another group lays in December and January after the first group has fledged young and mostly left the island. There are usually five or six distinct colonies. Schreiber and Ashmole describe six sites occupied in June 1967: Cook Island, Four-Wells (east of NASDA), Carver Way, Aeon Field, K-Site, and Poland. Garnett maps five sites: Cook island, Northwest Point (west of NASDA), variable locations between the base of South-east Peninsula and A-Site, K-Site, and the tip of Paris Peninsula. He does not show sites near Carver Way, Aeon Field (but variable locations between these two sites), or Poland.

R. Schreiber gave the following estimates of eggs in June 1967: Cook-100,000; Four-Welis-600,000; Carver-600,000; Aeon-700,000; K-Site-800,000; Poland-700,000. Based on 3.5 million eggs and studies that show at least four birds use the breeding island for every egg that is laid (the breeding pair and two non-breeders), Schreiber and Ashmole estimated 14 million birds present in June 1967. Since two separate sets of birds breed on the island, the total number of adult birds using the island in a year would be an estimated 28 million.

Schreiber and Ashmole describe the almost complete failure of the Four-Wells colony that year. Egg gathering by residents was the principal reason, with an estimated 250,000 eggs collected. Great frigatebirds also destroyed a number of chicks, and feral cats killed large numbers of adults. They found 50-75 fresh cat-eaten carcasses each morning. In all, only 25 chicks survived from 600,000 eggs laid.

Garnett commented on this species' apparent decline since 1967. He estimated a population of only 4-6 million per season during the 1979-1981 period. Although, he did not give figures for each colony, he especially noticed a decline in the colony near NASDA on Northwest Point, which he also attributed primarily to the illegal gathering of eggs by local residents. In addition to egg collecting and feral cats, he identified feral pigs as an additional problem. (*Note – DW – In fact Garnett did provide colony numbers – Vol 2 of the Management Plan – pg 90, reproduced in Table 5.2 in main text this report)*

Schreiber and Schreiber (1984) gave 3 to 4 million pairs as the estimated size of the combined colonies.

E. Schreiber visited three colonies in late August and early September 1993. At Four-Wells, about 90% of the eggs were lost to poaching, and of an estimated 100,000 eggs laid, only about 200-400 chicks survived. In a letter to Jones she describes the following:

I was astounded at the low numbers of sooty terns present in the summer of 1993, particularly since the colony which decreased the most was the one at 4-Wells, nearest to human habitation. Several people in London talked to us of huge coolers full of eggs being seen around town that summer, being offered eggs, and of women passing out eggs to kids in front of the Post Office-open consumption of thousands of eggs with no evident worry about the legality.

The South-east Point (K-Site) colony had moved away from the road and was now 150-300 m distant. This colony successfully raised 10-20,000 chicks. In 1967, this was the largest colony with 800,000 eggs laid. Although this colony is 60 km from the nearest village, many islanders now have trucks and frequently fish at South-east Point. It is less than an hour's drive from Banana.

At Cook Island, E. Schreiber found 5,000 large chicks and 100 dead large chicks. She did not know the reason they had died. Although it is not known how many eggs were laid in 1993, this colony had 100,000 eggs in June 1967. There are no feral cats or pigs on Cook Island, but it is a ten minute boat ride from London and easily accessed by potential poachers.

When Jones visited the island in April 1996, sooty terns were not breeding, but the summer breeding group was staging in areas where they will likely breed. He found approximately 10,000 birds on Cook Island, an aggregation of about 20,000 birds 1 km west of Main Camp (which did not form until 16 April, the last full day of his visit), roughly 500,000 to 800,000 birds near A-Site, and two separate groups of several thousand each near South-east Point. The large congregation near A-Site was approximately 1 km inland from the road. He did not visit the Poland and Paris Peninsula area where sooty terns also traditionally nest.

Watling (1999). Notes on this species are given in the text, refer section 5.4.1.

Brown Noddy *(Anous stolidus).* Brown noddies breed throughout the year, with the majority laying eggs between December and June. They are distributed over most of the islets in the main and land-locked lagoons except for those on the South-east Peninsula (Garnett).

R. Schreiber estimated about 1,800 ±25% nests and 4,000 ±25% adults in August 1967. He estimated 800 nests total on Cook Island, Motu, Tabu, and Motu Upua, and 1,000 elsewhere.

Garnett estimated a total population of 10,000 birds, with most on Motu Upua, and Schreiber and Schreiber (1984) gave an estimate of 3,000 pairs.

E. Schreiber did not comment on Motu Upua, but found about 100 adults and 50-60 fledglings on Motu Tabu. She also had about 50-70 nests with chicks on Manulu Lagoon islets.

Jones found a few brown noddies nesting on most islands visited, most with eggs, but a few with chicks of all ages up to near fledgling. He found 200-300 nesting in the few areas he visited in Manulu Lagoon, and about 500 each on Cook Island, Motu Tabu, and Motu Upua.

Watling (1999). Dispersed nesting recorded in small numbers on several islands in Tanguoua C.A., Motukena C.A. and Manulu Lagoon, only eggs noted. Numbers observed on Cook Islet, Motu Upua and Motu Tabu are provided in Table 5.3 – main report.

Black Noddy *(Anous minutus).* Black Noddies have a distinct egg-laying peak in April and May, and many leave the island in late summer to early winter, returning again in late January. Black noddies nest primarily on Cook Island, Motu Tabu, and Motu Upua, with only a few small colonies on islands in the Central Lagoons area.

R. Schreiber estimated 2,800 ± 35% nests island-wide in 1967 and about 10,000 ± 20% adults. Other than on the three main islets he had colonies of 10 to 60 nests each on several islets in the Central Lagoons area.

Garnett estimated a total population of 10,000 breeding pairs or 20,000 individuals, and Schreiber and Schreiber (1984) also estimated a normal breeding population of 10,000 pairs. E. Schreiber visited Kiritimati at the end of the black noddy breeding season in 1993. She had 5-10 adults on Motu Upua, about 15 chicks and several hundred adults on Motu Tabu, and 500 nests, mostly with large chicks, but a few with eggs, on Cook Island.

Jones found black noddies to outnumber brown noddies by about 2:1 on Cook Island and 3:1 on Motu Tabu, and Motu Upua. Because the nests were in trees and high bushes, he could not determine contents. Jones also found a small colony on an islet in the southern portion of the Central Lagoons area. He saw no chicks.

Watling (1999). Numbers observed on Cook Islet, Motu Upua and Motu Tabu are provided in Table 5.3 – main report. On these islands, approximately a third of nests were apparently occupied, of the remainder all the appearances were of completed breeding. Apparently occupied nests were also noted in Tanguoua C.A. and Ngaontetaake C.A.

Blue grey Noddy *(Procelstema cerulea).* This species nests throughout much of the year, with laying occurring from May to December in most years. It nests on small barren islets sparsely vegetated portions of larger islets, with the largest concentration in Manulu Lagoon.

R. Schreiber estimated 2,200 ± 10% adults nesting on islets in Manulu Lagoon in August 1967, with an additional 200 adults present on Cook Island, Motu Tabu, and several islets in Isles Lagoon.

Garnett estimated a total population of about 5,000 birds, while acknowledging that this species is difficult to census. Schreiber and Schreiber (1984) gave 2,000 pairs as the "normal" number.

E. Schreiber found 40 eggs and 3-5 chicks on islets in Manulu Lagoon in late August and early September 1993, an apparent substantial decrease from earlier estimates.

Jones found blue-grey noddies most plentiful in Manulu Lagoon, where he counted about 100 birds. Although many appeared to be territorial, he could find no direct evidence of nesting. He did find three eggs on Motu Tabu, however.

Watling (1999). Blue-grey noddies were commonly seen in and around the Manulu Lagoon area. On Motu Tabu five pairs were recorded with one on Motu Upua. No direct evidence of breeding was noted.

Common White-Tern *(Gygis alga).* This species breeds throughout the year, with a slight peak in egg laying from April to August. Most white-terns nest on Cook Island, Motu Tabu, and Motu Upua, but a few nest on a number of other islets in the Central Lagoons area that have *Tournefortia* clumps.

R. Schreiber estimated 5,000 ±25% adults present in May 1967, primarily on Cook Island, Motu Tabu, and Motu Upua. He estimated small colonies of 5 to 25 pairs on various islets in the Central Lagoons area.

Garnett estimated a total population on 2,000 birds in 1979-1981, but Perry estimated 5,000 birds in 1980. Schreiber and Schreiber (1984) Dave 4,000 pairs as the estimated norm, about twice the number of other estimates.

E. Schreiber found 10-20 adults, but no nests, on Motu Upua, 10 adults on eggs and 10 chicks on Motu Tabu, and 150 or more nests on Cook Island, about two-thirds with eggs, in late August and early September 1993.

Jones found a combined 250 birds on Cook Island, Motu Tabu, and Motu Upua in April 1996, but only saw a few eggs and chicks. One or more pairs were also observed nesting on various other islets in the Central Lagoons area.

Watling (1999). Of the island sanctuaries, Motu Tabu appeared to have the largest number of White Terns (refer Table 5.3 – main report). Eggs and nestlings were noted on all three islands. Elsewhere White Terns were not commonly seen and no breeding was recorded although it was suspected on Ngaontetaake.

Bokikokiko *(Acrocephalus aequinoctialis).* No one has attempted to estimate the population of this land bird that is endemic to the northern Line Islands, but Garnett did map its range (1983, p. 91). He found it throughout the northern and southern peninsulas and in the Isles Lagoon area, but not on South-east Peninsula or in the central Lagoons area. Jones found it to be fairly common around the Captain Cook Hotel, and found one bird on an islet just offshore near the Boating Lagoon. E. Schreiber theorizes that feral cats may be a serious threat, but the fact that it is still fairly common around the hotel where there are numerous cats suggests otherwise. This species builds its nest at the base of a cluster of branches, usually rather high in *Toumefortia* trees. Jones found one very conspicuous nest about 4-5 m above the ground in a *Tournefortia* near the hotel. Any but the smallest of cats would have difficulty reaching this nest.

Watling (1999). Bokikokiko were noted quite commonly in the north-west Peninsula and as far as the Koil C.A. in the South East Peninsula. Also noted were a pair in the Dojin C.A. which is not an area where Garnett recorded them.

Additional species notes by Dick Watling

Te Kura, Kuhl's Lorikeet (*Vini kuhlii*). Kuhl's Lorikeet is regarded as an introduced species in the Line Islands (Watling 1995). Gallagher (1960) notes that six lorikeets were brought from Teraina and released on Kiritimati in December 1957. At least two were still alive in July 1958 and three in early 1959. Several Lorikeets were introduced in the early 1960s and more than one were free flying in 1982 (Garnett 1983). More recently, three Lorikeets were liberated in 1991 (J.Bryden, verbally 1993) and at least two were reported to survive in 1993 (K.Teeb'aki; T.Beai and J.Bryden, verbally 1993). In 1999, lorikeets are still reported from Banana (U. Bukaireiti and I. Katatanin, verbally 1999). Searches by Dick Watling in both 1993 and 1999 in the Banana district where all the reports of the lorikeet come from were unrewarded.

Bristle-thighed Curlew (*Numenius tahitiensis*) Seen on eight occasions, all single birds with the exception of one occasion when a group of four birds were observed. All observations were in lagoon-side between the Boating Lagoon and Tanguoua C.A. area.

ATTACHMENT 4

CURRENT SCHOOL'S EDUCATION PROGRAM OF THE WILDLIFE CONSERVATION UNIT

ATTACHMENT 5
NATURE TOURISM ON MIDWAY ISLAND