WESTERN AUSTRALIA TURTLE RESEARCH: DEPT. CALM

NEWSLETTER

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(PROJECT SUPPORTED BY AUSTRALIAN NATURE CONSERVATION AGENCY)

Seasonal Factors

The 1992/93 season saw a decrease in green turtle nesting activity relative to the 1991/92 peak at the Lacepede Islands rookery. Here, nesting density in December 1992 (400 to 500 turtles per night) was approximately 30-40% of that observed in December 1991 (approximately 1 000 - 1 500 females beaching each night). Nesting activity of green turtles at the Barrow Island, and Ningaloo - Muiron Islands (Exmouth Gulf area) rookeries continued at moderate levels not markedly different from other years, apart from the 1990/91 minimum, and well below the observed peak in 1988/89.

Concerted effort first focussed on the nesting female loggerheads at the Muiron Islands during the 1991/92 season (Newsletter #4) was maintained during 1992/93.

The more intensive tagging effort focussed on hawksbill turtles using Rosemary Island in the Dampier Archipelago during 1991/92 was further increased through 1992/93, but there were still substantial gaps in seasonal coverage.

Unfortunately, work on flatbacks at our Pilbara mainland study site could not be maintained at the 1991/92 season standard due to resource limitations.

Once again participants in our general volunteer program made substantial contributions to the project achievements through 1992/93.

WAPET, and Hadson Energy, and their staff participants in our volunteers program, continued their support of our work on the oilfield study sites (Barrow Island and Varanus Island). However, heavy work commitments severely limited the opportunities for the Barrow Island volunteers to engage in beach work over the 1992/93 summer. A satisfactory arrangement to overcome this difficulty could not be achieved mid-season, and cyclone activity precluded supplementary late-season work.

CALM operations staff also continued their participation in the Exmouth Gulf area and Pilbara work programs.

Aboriginal community participation in the west Kimberley work program was continued, although funding support for this project segment was significantly reduced, and only made available at the last moment. The feeding ground sampling at the Montgomery Islands reef started in August 1991 could not be repeated for 1992, due to shortage of funds, but the rookery based work at the Lacepede Islands was continued.

Green turtle

The attendance of nesting female green turtles at the Lacepede Islands, Barrow Island, and Ningaloo Marine Park and Muiron Islands rookeries during 1992/93 has been noted above.

To date, the numbers of green turtles tagged at these major study rookeries have been:

	Progress 92/93	Previous Total	Progress Total
Lacepede Islands	555	3 965	4 520
Barrow Island	49	2 247	2 296
Exmouth Gulf area			
Muiron Islands	126	426	552
Ningaloo Marine Park	622	1 486	2 108
TOTAL	1 352	8 124	9 476

With expansion of off-rookery based work, and additional sampling for the genetics work, greater numbers of green turtles have now been tagged at other locations. These include 441 off Sandalwood Peninsula at the bottom of Exmouth Gulf, 89 around the Montgomery Islands reef, and *c.* 40 to 60 individuals at five other sites (including Scott Reef). Many of these turtles are juveniles. Progress Total (greens, all sites) = 10 311.

Other Species

As noted under 'Seasonal Factors', our increased effort focussed on nesting loggerhead, hawksbill, and flatback turtles was generally maintained during the 1992/93 season.

Loggerhead work at the Muiron Islands was sustained over two months. 246 new nesting females were tagged - Progress Total = 416.

On the adjacent mainland beaches of the Ningaloo Marine Park, another five new turtles were tagged - Progress Total = 63.

A number of non-nesting adult and juvenile loggerheads were also tagged at other locations - Progress Total (all sites and turtles) = 532

Flatback turtles were tagged at five main locations during 1992/93, with the major effort again directed at the Pilbara mainland study site near Cape Thouin where 111 new turtles were tagged - Progress Total = 403. Seven new individuals were also tagged at Barrow Island, 58 at Rosemary Island, 6 at Varanus Island, and 4 at the Lacepedes. One flatback turtle nesting at North Muiron Island was also tagged , and photo documentation secured. - Season Total (these sites) = 76; Progress Total (all sites) = 710.

The established hawksbill work focussed on Varanus Island in the Lowendal group was continued. The rookery at Rosemary Island in the Dampier Archipelago was subject to greatly increased attention for 1992/93. Season totals for new turtles tagged at these rookeries were:- 38 at Varanus Island, and 223 at Rosemary Island. Small numbers of hawksbills were tagged elsewhere. Season Total (all sites) = 273; and Progress Total (all sites) = 680. 340 hawksbills have now been tagged at Rosemary Island (mainly during the past three seasons).

To date, some 12 233 turtles of all species mentioned above have been tagged and released.

Dispersal of Tagged Turtles

A further 16 reports of green turtles were received over the past year - four were from locations outside Western Australia on the northern Australian coast.

Eleven reports were for turtles originally tagged at the Lacepede Islands rookery, two for turtles tagged at Barrow Island, two for turtles tagged at North West Cape, and one from South Muiron Island.

The 11 additional recoveries of Lacepede Island tagged turtles included another two from a Gulf of Carpentaria (GoC) location. Like the previous reports, these last two turtles were also tagged in the 1987/88 season. The seven fully documented easternmost (Milingimbi to GoC locations) dispersal records we now have for Western Australian nesting green turtles are all for Lacepede Islands nesters tagged in the 1987/88 season. One other Western Australian tagged green turtle was snagged by recreational fishermen north of Weipa on 15 February 1993. Unfortunately, only the return address on the tag was noted as the turtle was untangled and released.

Of the remaining nine reports, two were from a Northern Territory north coast location (Melville I) - one turtle from the 1986/87 season, the second from 1991/92. This latter individual is the first Lacepedes nesting green turtle from among a group other than those tagged in the 1986/87 and 1987/88 seasons that has been reported from the NT coast. However, one original 1987/88 group turtle captured at Croker Island, NT, but later released, did

survive to remigrate to the Lacepedes for the 1991/92 season. It presumably made the return journey home. The Lacepedes tagged green turtle reported from the Aru Islands fishery in 1991 was from the 1988/89 season group.

The other seven Lacepede recoveries reported from Western Australian Kimberley waters included one from each of the 1986/87, 1987/88, 1988/89, 1990/91, and 1992/93 season groups, and two from the 1989/90 group. Developing eggs in ovaries of the turtles from the 1986/87 and 1988/89 groups suggested that they were preparing to renest over the 1992/93 summer. The 1986/87 group animal had remigrated previously for the 1989/90 season.

In total, dispersal reports for 45 Lacepede Island nesting green turtles have now been received; 58% of reports from Western Australian coastal locations, 40% from northern Australian coastal locations in the Northern Territory and Queensland (GoC), and one individual from the Aru Islands. We have now received multiple capture reports from five Aboriginal communities outside Western Australia. Recovery reports for the 1986/87, 1987/88, and 1988/89 Lacepede year groups to date account for *c.* 1.9% down to 1.2% in year order of the turtles originally tagged. Approximately 0.6% of the 1989/90 group has now been reported.

The two new Barrow Island origin turtles reported include one from the west Kimberley coast, and one from the Dampier Archipelago. Four of the six Barrow Island origin turtles now reported have come from west Kimberley locations. These turtles include three tagged during the 1987/88 season, and one from the 1989/90 season. The two other Barrow Island origin turtles were from the 1988/89 group; one turtle previously found dead near Kalbarri in November 1991, the latest captured at East Lewis I in the Dampier Archipelago.

Four further recovery reports were made for turtles tagged at the Exmouth Gulf area rookeries. These included three greens and one loggerhead. The latter is certainly the most important observation. The turtle was tagged at South Muiron Island 16 January 1992, and captured in a shark net set in the Java Sea late May 1993. This is only the second loggerhead dispersal record we have. The first record was for a turtle which was taken at Maningrida, NT.

The three greens reported include two from North West Cape and one from South Muiron Island; one animal from each of the 1989/90, 1990/91, and 1991/92 year groups. All locations as for previous reports are west Kimberley coast, WA.

The general dispersal patterns previously reported for turtles using the Lacepede Islands rookery are not altered by the further data received over the past year.

The dispersal data relating to the southern rookeries are less comprehensive, but there is a suggestion of some separation between year groups visiting Barrow Island.

To date, it is clear that there are still substantial gaps in our post-nesting dispersal information for the green turtle, which is the species best documented, that the loggerhead reports simply indicate the magnitude of the task ahead, and that the absence of any reports for hawksbills and flatbacks highlights a continuing

problem. Gathering needed data to relate nesting sites to associated feeding grounds will require further investigation at sea in the future.

Remigrants (turtles returning to nest at known rookery)

Green Turtle

Nearly 150 apparent first-time remigrant green turtles were seen at the Lacepede Islands this season. Fifteen of these were returning after a 6 year absence, another 73 after a 5 year absence, 29 at 4 years, 30 at 3 years, and 3 at 2 years

There were also X second remigrants.

Without making adjustment for recoveries, and probable tag loss from some turtles in each group since tagging, we have now seen *c.* 18.4% of the 1986/87 season nesters as remigrants, *c.* 16.6% of the 1987/88 season group, *c.* 9% of the 1988/89 group, and *c.* 4.3% of the 1989/90 group.

Only one new remigrant green was seen at Barrow Island. This was apparently a 6-year remigrant. Cumulative totals of remigrants from the relevant year groups now are 8 from 1986/87, and 11 from 1987/88.

Four remigrant greens were also seen at the Exmouth Gulf area rookeries. These were:- one 6-year and one 5-year remigrant at the Muiron Islands, and one 4-year and one 3-year remigrant at North West Cape.

The increasing abundance of longer term remigrants being encountered in this seventh season of work is consistent with results being obtained from the long-term Queensland study where titanium tags have been used (Limpus, pers. comm.).

Other Species

Observations of remigrant flatbacks and hawksbills further improved during the 1992/93 season. Greater numbers of loggerheads were seen at the Exmouth Gulf area rookeries.

Data to hand are suggesting that Western Australian green and hawksbill turtle populations have similar remigrant nesting patterns, with many individuals having extended intervals between successive nesting seasons. In contrast, there seems to be a much higher incidence of annual or biennial renesting of flatbacks. The early loggerhead data available also suggest a higher frequency of short remigration intervals.

Note qualification of the data being discussed below.

Flatback Turtle

Twenty-six first time remigrant flatbacks were seen at the Pilbara mainland study site. Twenty-two of these were consecutive year nesters; the other four were 2-year remigrants. Total Pilbara mainland site observations to date are - 1 x 4-years, 2 x 3-years,

11 x 2-years, and 33 x 1-year, plus 2 indeterminate intervals due to loss of tags.

Only one first time remigrant was seen at Varanus Island. This turtle returned after a 3 year absence. In total, 15 internesting intervals have been observed for 11 individuals at this rookery - one turtle has been seen four seasons out of five; another has been seen twice, first after 2 years and again 2 years later. Complete observations to date are - 1 x 5-years, 2 x 4-years, 1 x 3-years, 5 x 2-years, and 6 x 1-year.

Note that these remigrant summary data are not directly comparable, due to differences in the numbers of turtles tagged/year at each location, and the differences in monitoring effort through each season. Nevertheless, much less extensive data from other locations (eg, Barrow Island and Lacepede Islands) are consistent with the general remigrant pattern being suggested for this species.

Hawksbill Turtle

No remigrants were seen at Rosemary Island this season.

Thirty remigrants were seen at Varanus Island. These included 4 turtles on their second remigration. These multiple remigrants comprised patterns of 2 x(3 + 2), 1 x (2 + 3), and 1 x (2 + 2). Of the remaining 26 first time remigrants, intervals were 2 x 6 years, 4 x 5 years, 14 x 4 years, 5 x 3 years, and 1 x 2 years. The observed frequency of different remigrant intervals observed at Varanus Island to date is:- 2 x 6 years, 6 x 5 years, 18 x 4 years, 15 x 3 years, and 6 x 2 years. Forty-three turtles of 258 previously tagged have provided these data.

Loggerhead Turtle

Eight first time remigrant loggerheads were observed this season at the Exmouth Gulf rookeries. These included four x 1 year, 3 x 2 year, and 1 x 6 year remigrant at the Muiron Islands, and one x 3 year and one x 4 year remigrants at Ningaloo.

Seasonal Variation in Nesting Intensity, etc

Nesting Activity

The seasonal intensity of nesting activity of green turtles has been noted (see 'Seasonal Factors'; above).

The only extensive nesting activity data we have for any other species is for the hawksbills at Varanus Island. The best season observed so far remains 1988/89, when apparently some hundreds of hawksbills nested. The other five seasons prior to 1992/93 have seen much smaller numbers attending - perhaps only 25-30% or less of the numbers seen in 1988/89 in each year. The 1992/93 season nesting activity was again similar to the common pattern.

The loggerhead nesting pattern observed on the Ningaloo beaches to date suggests perhaps that no more than 20-50 turtles at the maximum may be nesting there from year to year. The increased number of turtles tagged at the Muiron Islands over the 1992/93 nesting season was a result of better site coverage. There was no

real indication of greater numbers in attendance. The previous conclusion that these islands may be used by 8-10 times as many turtles as the adjacent mainland is not altered.

Occasional nesting by flatbacks at the Muiron Islands was confirmed.

Other

Opportunities to successfully monitor developmental environment of naturally placed nests once again proved elusive. Two nests instrumented could not be followed through to completion of incubation.

Genetic Studies

Further analysis of genetic variation in green turtle samples taken from Western Australian rookeries was continued as part of the wider regional study being conducted under guidance of Dr Craig Moritz at University of Queensland.

A paper including initial results from hawksbill turtle samples taken at the Rosemary Island and at Varanus Island rookeries has now been submitted for publication.

Further sampling of loggerheads is in progress. Results are not yet available.

Growth Studies

Patterns of growth in captivity of a small group of juvenile loggerheads are being documented. The animals are now *c.* 2.5.years old.

The extensive tagging work continued at Sandalwood Peninsula in Exmouth Gulf over the past several years is now providing some good growth increment data for a range of juvenile green to adult turtles in the wild (maximum recapture interval now >900 days). The sample of loggerheads is too small yet to provide similar data.

Leatherback Turtles in WA Waters

Efforts to improve reportage of sightings and salvage of leatherback turtle carcasses that may become available are continuing. We have had some reasonable success in recent times in this endeavour, but have not yet been fortunate enough to secure, tag and sample any live entangled turtles; this with a view to 'stock identification' and later reporting of sightings on rookery visits that might subsequently occur after release of the migratory animals in WA waters.

Bioaccumulation of Heavy Metals in Marine Turtles

This study is continuing. Data for three leatherback, four loggerhead, and five green turtles are to hand. Samples from an additional leatherback and loggerhead turtle are being processed.

A preliminary paper on the arsenic compounds found in tissues of one of the leatherback turtles is being prepared in collaboration with Dr John Edmonds (WA Fisheries), and Japanese colleagues.

Recovery of Tagged Turtles from Other Rookeries in WA

One further observation of a green turtle apparently from a non-Western Australian rookery was reported this past year. Unfortunately this turtle had been tagged with a two-part plastic tag, of which only the spike and locking portions remained intact. It is believed that this turtle probably was tagged in Indonesia in the early part of the PPA work (early to mid- 1980s).

Persistence of enquiry finally answered the query we had for a monel-tagged green turtle taken in Western Australia in September 1989. This turtle was originally tagged at Pangumbahan, West Java in February 1989 (Ating Sumantri, pers. comm.). We are continuing our effort to obtain more detailed information on the one plastic-tagged leatherback observed in October 1986.

Extension Work

Efforts to establish working contacts with Indonesian colleagues were continued (note above). Liaison with commercial fisheries managers and fishermen was continued with a view to getting further consideration of, and solutions to potential by-catch problems that may adversely affect marine turtle populations in the western Australian region. Working liaison with other groups involved in marine turtle management and research is being maintained.

A paper summarizing progress of our project was published in January 1993 in the international Marine Turtle Newsletter #60.

An invitation to attend and present further information on our project at the 13th Annual Sea Turtle Symposium meeting at Jekyll Island, Georgia, USA, in late February 1993 was accepted.

Further Development of the Project

Beach work focussed on tagging and monitoring of nesting female turtles at selected rookeries provides the foundation for our project, with volunteer participation in this work continuing to provide essential support. Coordination and management of this effort is a substantial task. Reliable additional support for this function is required.

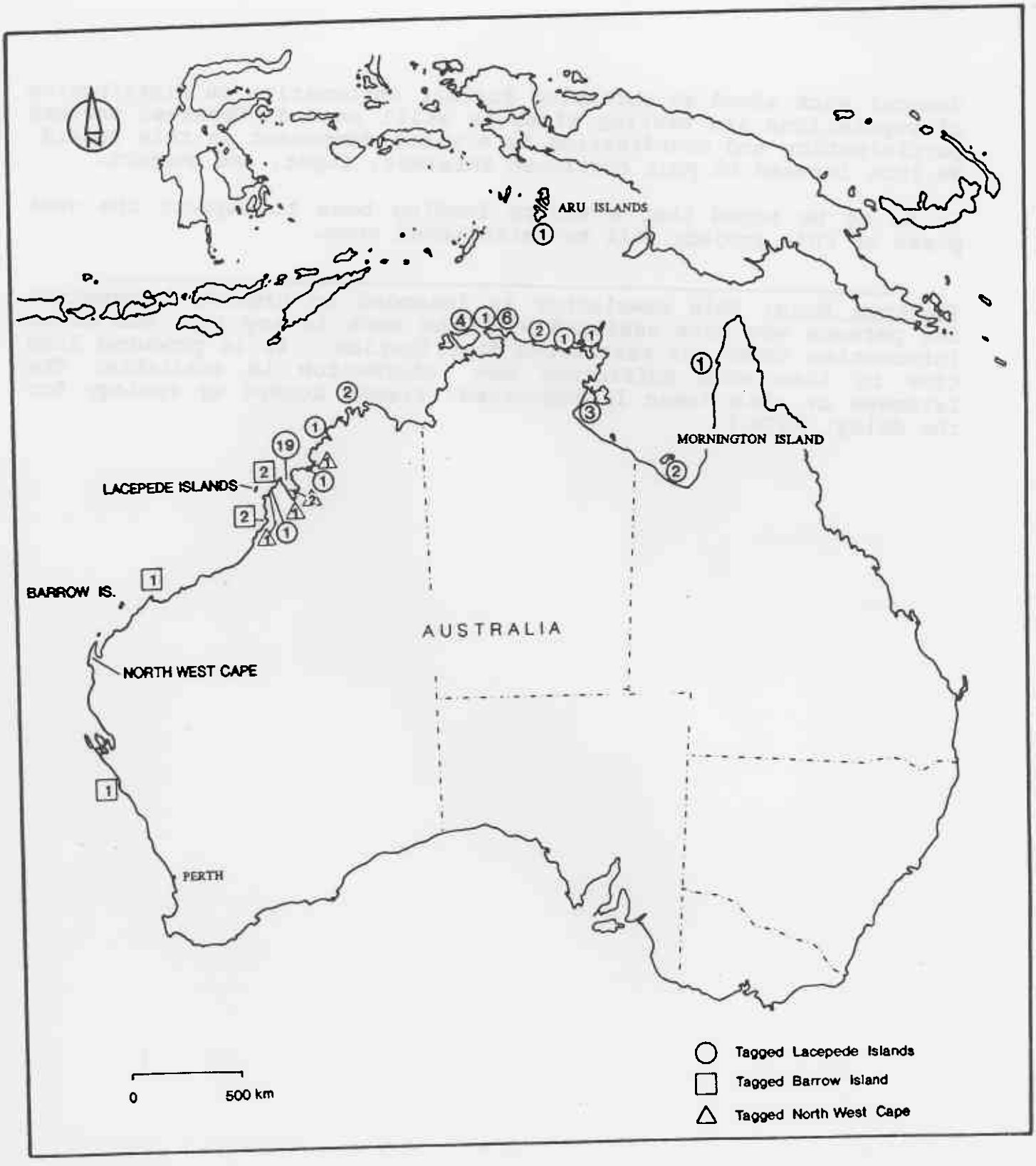
Necessary expansion of work to feeding ground investigations aimed at filling the substantial gaps being identified in our dispersal data for green turtles as revealed by tag recovery reports, and the continuing failure to obtain any comparable dispersal data for most other nesting species being studied in this region will require further resources. This deficiency in the project coverage must be addressed now.

Maintenance of core project work at the more accessible rookeries in particular provides opportunities for student project and other collaborative work. Expressions of interest have been sought from researchers with independent support. This matter needs to be pursued further in the near future.

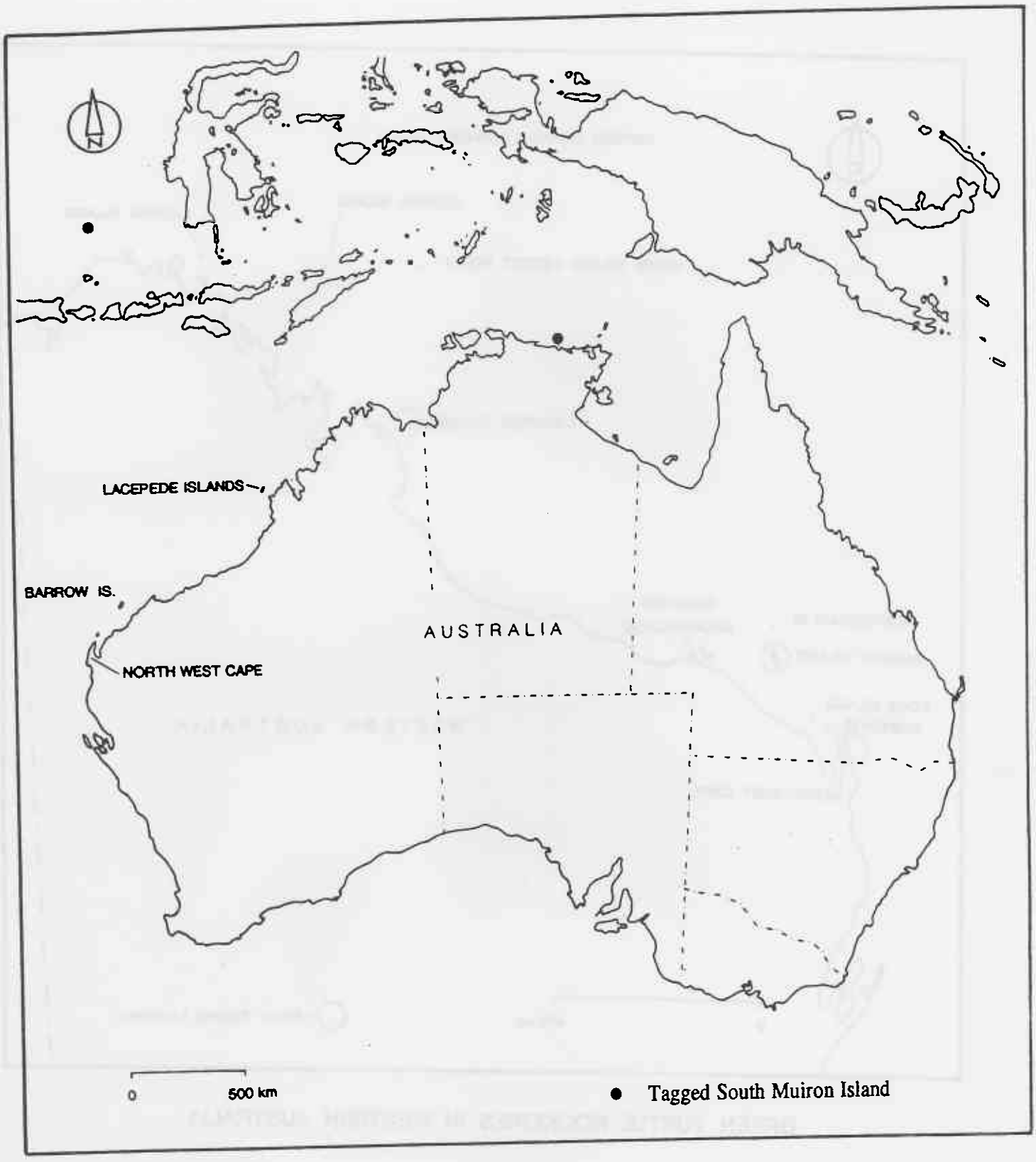
General work aimed at obtaining further information on distribution of populations and nesting sites is still needed. Observer network participation and coordination is a vital component in this regard. We look forward to your continued interest, input, and support.

It is to be hoped that a secure funding base to support the next phase of this project will be established soon.

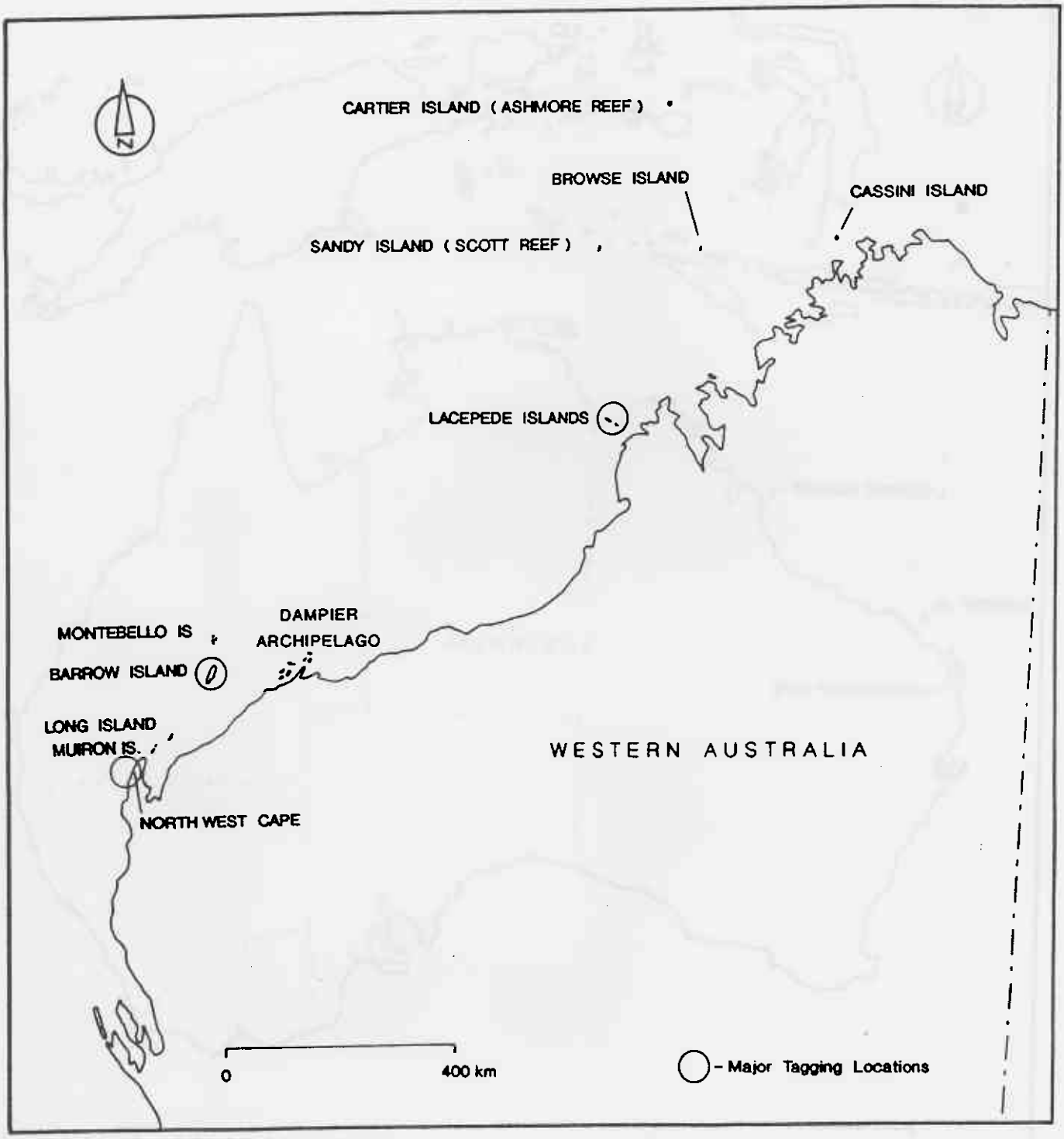
[Editors Note: This newsletter is intended to provide information for persons who have assisted with the work in any way, and as an information sheet for restricted distribution. It is produced from time to time when sufficient new information is available. The lateness of this issue is regretted. Please accept my apology for the delay. RITP.]



GREEN TURTLE DISPERSAL FROM WESTERN AUSTRALIAN ROOKERIES
TO OCTOBER 1993



LOGGERHEAD TURTLE DISPERSAL FROM WESTERN AUSTRALIAN ROOKERIES
TO OCTOBER 1993



GREEN TURTLE ROOKERIES IN WESTERN AUSTRALIA