WESTERN AUSTRALIA
TURTLE RESEARCH: DEPT. CALM

NEWSLETTER

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(PROJECT SUPPORTED BY AUSTRALIAN NATIONAL PARKS AND WILDLIFE SERVICE)

Seasonal Factors

The 1991/92 season was notable for the increase in green turtle nesting activity relative to 1990/91 - in the case of the Lacepede Islands rookery, nesting activity in December 1991 was the greatest yet observed, with approximately 1 000 - 1 500 females beaching each night (about 10 times the minimum use observed in the 1990/91 season). Nesting activity of green turtles at the Barrow Island, and Ningaloo - Muiron Islands (Exmouth Gulf area) rookeries also reverted to higher levels, but usage was only similar to that of the 1989/90 season, well below the peak that was observed in 1988/89.

A concerted attempt was made to increase tagging of nesting female loggerheads. This work was focussed on the Muiron Islands as a result of the assessment work reported for the 1990/91 season (Newsletter #3), and succeeded as expected.

More intensive tagging effort was also focussed on hawksbill turtles using Rosemary Island in the Dampier Archipelago, and on flatbacks at our Pilbara mainland study site.

Increased participation in our volunteers program was largely responsible for success in this additional work.

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).

CALM operations staff also continued their participation in the Exmouth Gulf area and Pilbara work programs. This included increased assistance with the volunteer work in the Pilbara region. Further assessment of the Cape Domett flatback turtle rookery was also undertaken by the Kimberley region staff with volunteer assistance.

Aboriginal community participation in the west Kimberley work program was continued, although major problems in maintaining

funding support for this work became apparent. Feeding ground sampling at the Montgomery Islands reef was started in August 1991, and rookery based work at the Lacepede Islands was continued in December 1991.

Green turtle

The increased attendance of nesting female green turtles at the Lacepede Islands, Barrow Island, and Ningaloo Marine Park and Muiron Islands rookeries during 1991/92 has been noted above.

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

	Progress 91/92	Previous Total	Progress Total
Lacepede Islands	526	3 434	3 960
Barrow Island	224	2 019	2 243
Exmouth Gulf area			
Muiron Islands	234	191	425
Ningaloo Marine Park	454	1 013	1 467
TOTAL	1 438	6 657	8 095

With expansion of off-rookery based work, greater numbers of green turtles have now been tagged at other locations. These include 317 off Sandalwood Peninsula at the bottom of Exmouth Gulf, 89 around the Montgomery Islands reef, and *c.* 30 to 50 individuals at four other sites. Many of these turtles are juveniles. Progress Total (greens, all sites) = 8 725.

Other Species

As noted under 'Seasonal Factors', our effort focussed on nesting loggerhead, hawksbill, and flatback turtles was increased during the 1991/92 season.

The work focussed on loggerheads at South Muiron Island fully met our expectations, with 124 nesting females being tagged - Progress Total = 170.

On the adjacent mainland beaches of the Ningaloo Marine Park, a further 13 turtles were tagged - Progress Total = 57.

A number of non-nesting adult and juvenile loggerheads were also tagged - Progress Total (all sites and turtles) = 255.

Flatback turtles were tagged at six main locations during 1991/92, with the major effort directed at the Pilbara mainland study site near Cape Thouin where 172 new turtles were tagged - Progress Total = 285. Twenty new individuals

were also tagged at Barrow Island, 21 at Rosemary Island plus 12 at Delambre Island in the Dampier Archipelago, 3 at Varanus Island, and 6 at the Lacepedes;- Season Total (these sites) = 62; Progress Total (all sites) = 523.

The ongoing hawksbill work focussed on Varanus Island in the Lowendal group was continued, and the rookery at Rosemary Island in the Dampier Archipelago was subject to increased attention. Season totals for new turtles tagged at these rookeries were:- 25 at Varanus Island, and 46 at Rosemary Island. Small numbers of hawksbills were tagged elsewhere. Season Total (all sites) = 90; and Progress Total (all sites) = 409. Of these turtles, 245 have been tagged at Varanus Island over the past five years (six seasons; 106 from 1988/89 season), and 120 at Rosemary Island (most during the past two seasons).

To date, some 9 925 turtles of all species mentioned above have been tagged and released.

Dispersal of Tagged Turtles

A further 9 reports of green turtles were received over the past year - eight from around the northern Australian coast, and one from the Western Australian west coast south of Shark Bay. This latter report is the first unequivocal record of dispersal southward from any rookery at which we have tagged nesting green turtles.

Six reports were for turtles originally tagged at the Lacepede Islands rookery, and the other three for turtles tagged at Barrow Island.

The six additional recoveries of Lacepede Islands turtles included the second report received from Mornington Island, being the third from a Gulf of Carpentaria (GoC) location. Like the first two, this last turtle was also tagged in the 1987/88 season. In fact, the four easternmost dispersal records we now have for green turtles are of Lacepede Islands nesters tagged in the 1987/88 season. Two of the remaining five reports were from Northern Territory north coast locations - one from 1986/87 season, the other from 1987/88.

As previously noted (Newsletter #3), all of the green turtles now reported recovered outside of Western Australian coastal waters are still restricted to those within groups tagged at the Lacepede Islands in the 1986/87 and 1987/88 seasons only - latest reports, May 1992.

The other three Lacepede recoveries reported from Western Australian Kimberley waters include one from 1988/89, one from 1989/90, and the third awaiting confirmation.

In total, 36 Lacepede Island nesting green turtles have now been reported; 58% of reports from Western Australian coastal locations, and the remaining 42% from northern coastal locations in the Northern Territory and Queensland (GoC). Five turtles have now been reported by the Croker Island community

in the NT, with two having been released alive, although carrying harpoon wounds. One of these individuals was seen as a remigrant this season at the Lacepedes - four years since the previous visit, and 20 months since its capture and release at Croker Island. Recovery reports for the 1986/87 and 1987/88 year groups to date are *c.* 1.5% of the turtles originally tagged; also, just under 1% of the 1988/89 group has now been reported.

The three new Barrow Island origin turtles reported include another two from the west Kimberley coast, as was the only previous report. All three of these west Kimberley reports are for turtles tagged during the 1987/88 season. The fourth Barrow Island origin turtle was from the 1988/89 group. This turtle was found dead near Kalbarri in November 1991.

No further recovery reports were made for turtles tagged at the Exmouth Gulf area rookeries. However, one turtle tagged at the Montgomery Islands feeding ground location in August 1991 did visit the Muiron Islands in the first instance, and, subsequently, mainland beaches on North West Cape during the 1991/92 nesting season.

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 continued restriction of NT and Queensland recoveries to turtles from only two year groups further suggests that nesting aggregations attending a rookery in different years probably do include different proportions of individuals from different feeding ground populations. However, there are still substantial gaps in our information bearing on this matter that require further investigation at sea. The dispersal data relating to the southern rookeries are even less comprehensive.

Remigrants (turtles returning to nest at known rookery)

Green Turtle

Nearly 200 remigrant green turtles were seen at the Lacepede Islands this season. Thirty-seven of these were apparently returning after a 5 year absence. These 5-year remigrants were in fact more numerous than the combined total of 3- and 4-year remigrants previously recorded from the 1986/87 nesting group. There were also 101 4-year remigrants from the 1987/88 nesting group, and a further 53 3-year remigrants from the 1988/89 group. Without making adjustment for recoveries, and probable tag loss from some turtles in each group since tagging, we have now seen *c.* 15% of the 1986/87 season nesters as remigrants, *c.* 10% of the 1987/88 season group, and *c.* 6% of the 1988/89 group.

Fifteen remigrant greens were also seen at Barrow Island. These comprised five 5-year , and ten 4-year remigrants, bringing the cumulative totals of remigrants from the relevant year groups to 7 from 1986/87, and 11 from 1987/88.

A few remigrant greens were also seen at the Exmouth Gulf area rookeries. These were:- three 5-year remigrants (of 32 tagged) and one 4-year remigrant (of 21 tagged) at the Muiron Islands. One other apparent remigrant was seen, judged from tag scar only, so the interval could not be determined. Another green turtle carrying what appeared to be a 1986/87 season tag was also seen at the Muirons in 1990/91, but the tag number was not read.

One 2-year remigrant green was seen at Ningaloo this season. Only six green turtles were tagged on Ningaloo beaches prior to the 1988/89 season.

The increasing abundance of longer term remigrants being encountered in this sixth 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 1991/92 season. The first 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 data being presented (see below) are not directly comparable, but, generally, a higher proportion of the flatback turtles tagged in previous years have since been seen as remigrants.

The preliminary loggerhead data available also suggest a higher proportion of biennial renesting in this species, in comparison with the greens and hawksbills.

Flatback Turtle

Sixteen remigrant flatbacks were seen at the Pilbara mainland study site, and six at Varanus Island. These latter included one 5-year, one 4-year, two 2-year, and two 1-year intervals. In total, 10 individuals from 47 previously tagged here have contributed 14 observations - 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, 0 x 3-years, 5 x 2-years, and 6 x 1-year. The comparable data for the Pilbara mainland site are - 1 x 4-years, 2 x 3-years, 6 x 2-years, and 11 x 1-year, plus 2 indeterminate intervals.

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 suggested for this species.

Hawksbill Turtle

One 4-year remigrant (of 10 tagged) was seen at Rosemary Island.

Remigrants seen at Varanus Island included one 5-year, two 4-year, and four 3-year remigrants. The observed frequency of different remigrant intervals observed at Varanus Island to date is:- 2 x 5-years, 3 x 4-years, 9 x 3-years, and 1 x 2 years. Fourteen turtles of 220 previously tagged have provided these data.

Loggerhead Turtle

The first remigrant loggerheads were observed this season at the Exmouth Gulf rookeries. These included one 2-year remigrant (of 2 tagged) at the Muiron Islands, and two 2-year remigrants (of 17 tagged) and one 3-year remigrant (of 4 tagged) at Ningaloo.

Seasonal Variation in Nesting Intensity, etc

Nesting Activity

The seasonal increase in 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 four seasons prior to 1991/92 have seen much smaller numbers attending - perhaps only 25-30% or less of the numbers seen in 1988/89 in each year. The 1991/92 season nesting activity was similarly restricted, with cyclonic storms severely eroding the available nesting beaches on 3 March 1992.

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 Muiron Islands may be used by 8-10 times as many turtles.

Observations of flatback turtle nesting patterns show that the Pilbara locations are being used over summer only. Further observations at Cape Domett strongly suggest that this northern-most rookery has major use during the mid-year dry season, and very little during the summer wet season. Some west Kimberley locations appear to have more seasonally dispersed activity.

Other

A further attempt to monitor the developmental environment and sex ratio of young produced from hawksbill turtle nests laid at Varanus Island was planned. Unfortunately the scarcity of nesting turtles and the extreme dryness of beaches high above the HWS tide level generally thwarted this work. One clutch of 122 eggs laid below HWS level was immediately translocated and instrumented in late October 1991. Temperature data were obtained, but the hatchlings emerged undetected while the observer was absent from the island. No other suitable opportunities occurred this season.

Genetic Studies

The first samples for continuing mtDNA studies were obtained from nesting green turtles at Browse Island, and at Sandy Island on Scott Reef, mid-November 1991. Samples from six juvenile green turtles were also obtained at Imperieuse Reef in the Rowley Shoals at this time. The feeding ground population of juvenile and adult green turtles at the Montgomery Islands reef was sampled in August 1991.

Further hawksbill turtle samples were taken at Rosemary Island, and at Varanus Island, in November 1991.

A small number of samples from nesting loggerheads was taken at Ningaloo in January 1992. Samples were also obtained from among the group of loggerhead 0^{+} juveniles which stranded on the lower west coast of Western Australia through July - September 1991 (inviable animals only).

Growth Studies

Patterns of growth in captivity of surviving juvenile loggerheads (as mentioned above) are being documented. The extensive tagging work being done at Sandalwood Peninsula in Exmouth Gulf over the past several years is now providing some growth increment data for juvenile green turtles in the wild.

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, with a view to 'stock identification' and later reporting of sightings on rookery visits that might subsequently occur after release.

Bioaccumulation of Heavy Metals in Marine Turtles

This subject is being studied, taking advantage of material available from stranded carcases of leatherback, loggerhead, and green turtles. Data for three leatherback, two loggerhead, and one green turtle are to hand.

Recovery of Tagged Turtles from Other Rookeries in WA

No further observations of turtles from non-Western Australian rookeries were reported this past year. We are continuing our efforts to obtain more detailed information on the one leatherback and one green turtle from Indonesian locations previously observed/taken in WA.

Extension Work

Efforts to establish working contacts with Indonesian colleagues were continued. 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.

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. Expansion of the field work program to include an important loggerhead rookery within the project, and the increased attention given to hawksbill and flatback turtle rookeries in the Pilbara region did increase the load placed on the project management team with respect to coordination and active encouragement of the efforts of the volunteer workers through 1991/92. Need for further assistance in this regard must be considered.

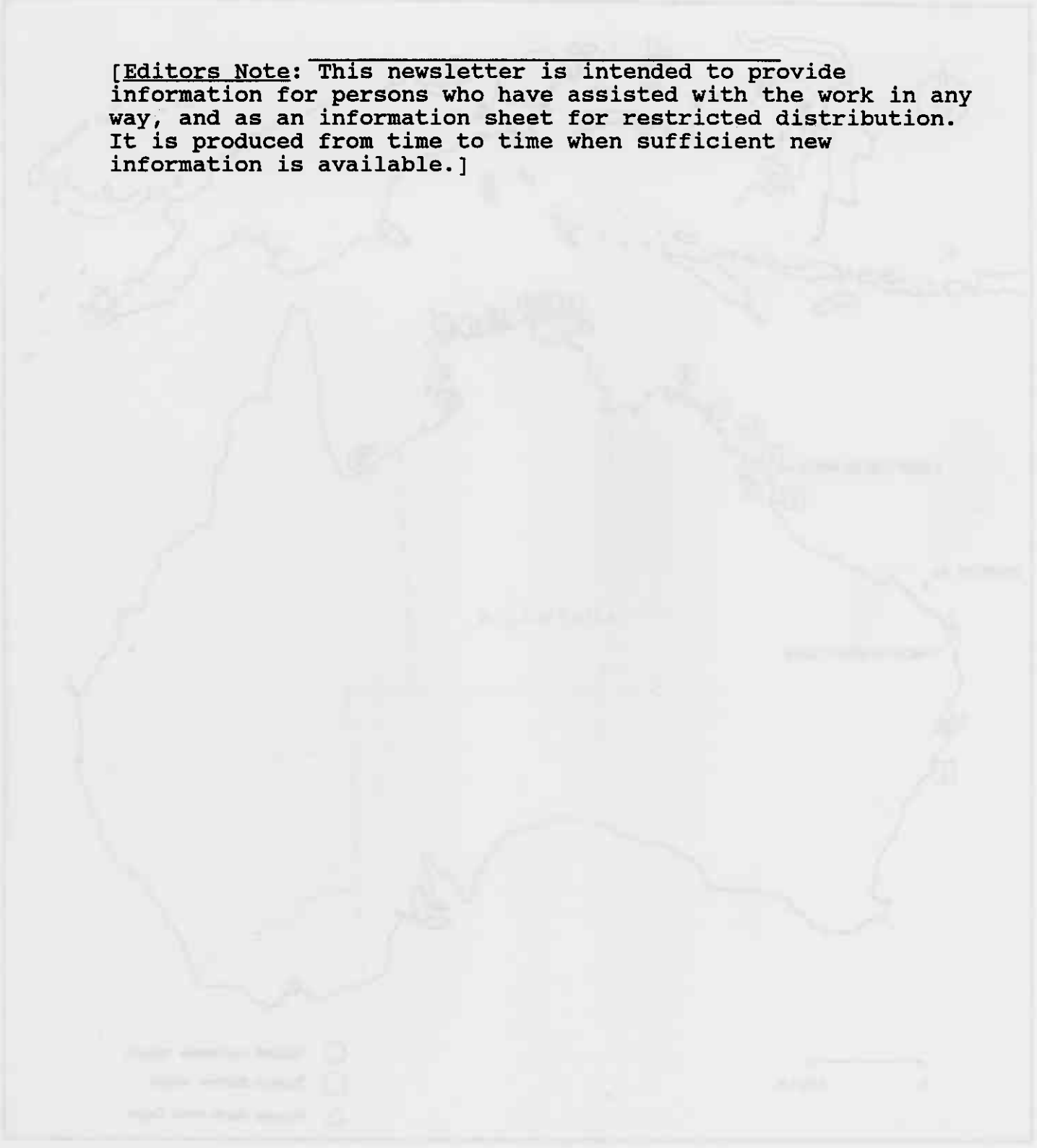
Necessary expansion of work to feeding ground investigations aimed at filling the substantial gaps being identified in our dispersal data for green turtles as revealed by tag recovery reports, and the continuing failure to obtain any comparable dispersal data for the other nesting species being studied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

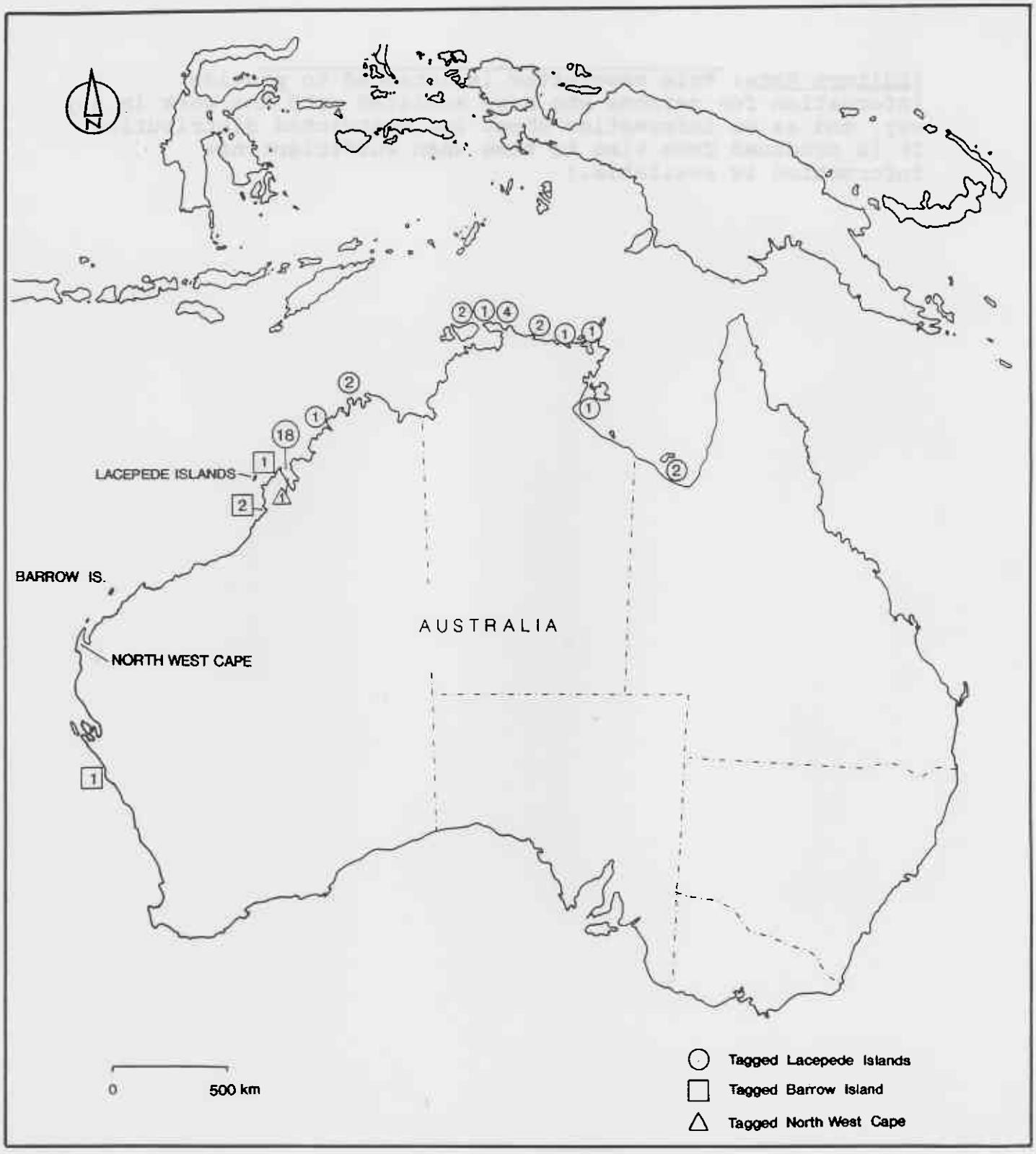
Maintenance of core project work at the more accessible rookeries in particular provides opportunities for student project and other collaborative work. Now is perhaps the time to actively seek more collaborative involvement from researchers with independent support. This matter will be pursued further 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.

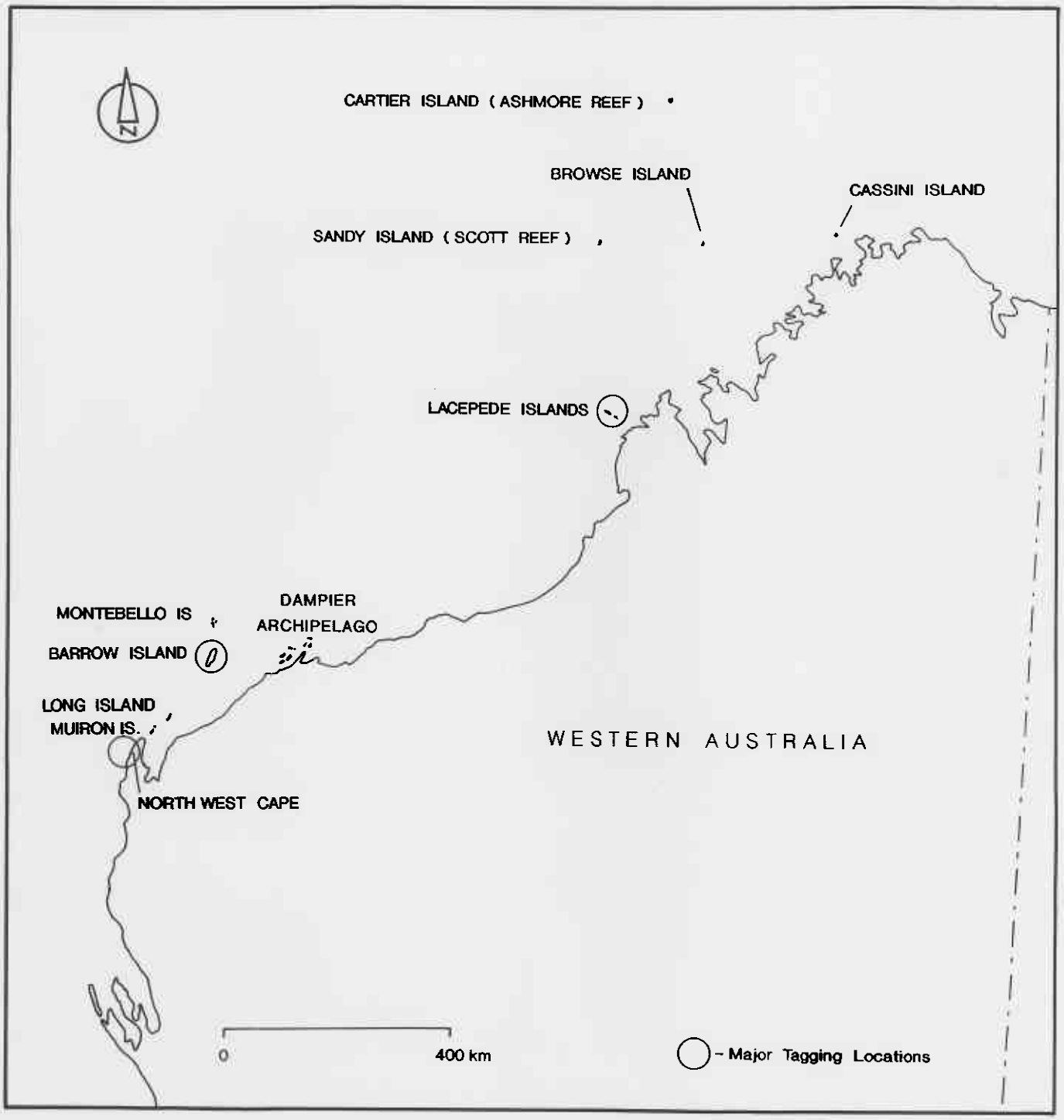
[Editors Note: This newsletter is intended to provide information for persons who have assisted with the work in any way, and as an information sheet for restricted distribution. It is produced from time to time when sufficient new information is available.]





GREEN TURTLE RECOVERIES FROM WESTERN AUSTRALIAN ROOKERIES

TO JUNE 1992



GREEN TURTLE ROOKERIES IN WESTERN AUSTRALIA