WESTERN AUSTRALIA TURTLE RESEARCH: DEPT. CALM

NEWSLETTER

NUMBER 6 MONTH SEPTEMBER YEAR 1994

c/- DR R.I.T. PRINCE ▲ WILDLIFE RESEARCH CENTRE ▲ CALM ▲ PO BOX 51
WANNEROO ▲ WESTERN AUSTRALIA ▲ 6065 ▲ TELEPHONE (09) 405 5115
INTERNET: <bobp@wood.calm.wa.gov.au>

(PROJECT SUPPORTED BY AUSTRALIAN NATURE CONSERVATION AGENCY)
~~(PROJECT SUPPORTED BY AUSTRALIAN NATIONAL PARKS AND WILDLIFE SERVICE)~~

Seasonal Factors

The 1993/94 season saw only low level green turtle nesting activity at the North West Cape/Muiron Islands and Barrow Island rookeries, with attendances reduced to around 30% of the 1992/93 level.

Green turtle nesting activity at the Lacepede Islands rookery on arrival for the seasons work in December 1993 appeared to be at a higher intensity (350 to 550 turtles per night) than that concurrently being observed at the southern rookeries, and similar to the 1992/93 Lacepedes level(400 to 500 turtles per night), but many of the turtles observed were making repeat visits. Stormy weather, and then the close passage of Tropical Cyclone Naomi, which substantially eroded the beach front while keeping turtles offshore, confounded these observations. Only a handful of turtles came ashore immediately after the storm peak, and numbers had only lifted to *ca.* 120 on the last night of the island work before premature withdrawal.

Nesting female loggerheads at the Muiron Islands were also fewer in number than during the 1992/93 season. The 1993/94 work intensity was maintained similar to that for the 1992/93 season.

The hawksbill turtle rookery at Rosemary Island in the Dampier Archipelago was able to be worked more effectively through the 1993/94 season, leading to a further improvement in on-site results, in comparison with 1991/92 and 1992/93. This best result to date was due to better seasonal distribution of effort relative to hawksbill activity. The work was greatly assisted by new supplementary support provided by Woodside Offshore Petroleum, but substantial gaps in seasonal coverage still occurred.

Flatback work at our Pilbara mainland study site initially suffered the same restrictions as for the 1992/93 season. The work program implemented was also terminated prematurely due to threat from TC Naomi, although this eventually did not pass. The availability of World Heritage Area funding for planning investigations at Shark Bay for the 1993/94 season also permitted the first on-site work at the Dirk Hartog Island loggerhead turtle rookery. This work produced the most pleasantly surprising result we have obtained

from the project to date, with loggerheads being much more abundant here than anticipated.

Once again through 1993/94, participants in our general volunteer program made substantial contributions to the project achievements noted.

WAPET, and their staff participants in our volunteers program, continued their support of our work on the Barrow Island oilfield study site. Unfortunately, a new pre-season arrangement made to overcome previous difficulties in matching island volunteer availability with turtle activity could not be fully implemented, but a better seasonal result was obtained.

Hadson Energy also continued their support for work on Varanus Island. The early retirement of long standing volunteer contributor to this work, Mr E A `Tanny' Robinson, in October 1993, did leave a big gap that was not readily filled. Program work here was retrieved later with assistance from Hadson, and the effort of another long standing general program volunteer, Mr Roy Teale.

CALM operations staff continued their assistance with parts of the Exmouth Gulf area and Pilbara work programs.

Regrettably, the lack of special funding assistance to aid Aboriginal community involvement in the west Kimberley work segment this season lead to collapse of this connection. New transport arrangements had to be made to access the Lacepede Islands study site, and other volunteer involvement had to be substituted at the last moment to fill this gap.

The volunteer feeding ground sampling work in Exmouth Gulf was continued.

Green Turtle

The general changes in seasonal nesting attendances at the three main green turtle study sites through 1993/94 have been mentioned above. Results this season at the Lacepede Islands and Barrow Island rookeries were restricted below desirable targets by external factors. The low return at the Ningaloo Marine Park and Muiron Islands rookeries more closely reflected the much reduced nesting turtle abundance. Progress totals for turtles tagged from these rookeries are listed below.

In addition to the major rookery work, green turtles have been tagged and released in course of other sampling work for genetics studies, and the feeding ground/growth study in Exmouth Gulf (now 470 greens all size classes tagged here). The Progress Total for all green turtles from all sites now = 11 040.

Summary of the numbers of green turtles tagged at the major study rookeries of the WAMTP 1993/94 as follows:

	Progress 93/94	Previous Total	Progress Total
Lacepede Islands	315	4 520	4 835
Barrow Island	81	2 296	2 377
Exmouth Gulf area			
Muiron Islands	122	552	674
Ningaloo Marine Park	183	2 108	2 291
TOTALS	701	9 476	10 171

Other Species

As noted previously, loggerhead, flatback, and hawksbill turtle work was continued through 1993/94, with some variations relative to 1992/93.

Loggerhead work at the Muiron Islands was continued similarly to 1992/93. 174 new nesting females tagged here - Progress total = 590.

Another 16 new turtles were tagged on the adjacent mainland beaches of the Ningaloo Marine Park, - Progress Total = 79.

Expansion of the work to Dirk Hartog Island in January 1994 resulted in tagging of 430 new nesting loggerheads.

Small numbers of non-nesting adult and juvenile loggerheads were also tagged at other locations - Progress Total (all sites and turtles) = 1 160.

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 89 new turtles were tagged - Progress Total = 492. 53 new individuals were also tagged at Barrow Island, 46 at Rosemary Island, 23 at Varanus Island, and 14 at Cape Domett. Season Total (all five sites) = 225; Progress Total (all sites) = 925.

Some initial difficulty was experienced in maintaining the established hawksbill work focussed on Varanus Island in the Lowendal group, but this was able to be continued later in the season. The rookery work at Rosemary Island in the Dampier Archipelago produced the best result to date. Season totals for new turtles tagged at these two rookeries were:- 23 at Varanus Island, and 272 at Rosemary Island. Small numbers of hawksbills were tagged elsewhere. Season Total (all sites) = 305; and Progress Total (all sites) = 982. 612 hawksbills have now been tagged at Rosemary Island (mainly during the past four seasons).

To date, some 14 134 turtles of all species mentioned above have been tagged and released.

Dispersal of Tagged Turtles

Only six new reports of green turtle captures were received over the past year: four for turtles ex Lacepede Islands, with three from locations outside Western Australia; and one each from the Barrow Island and North West Cape rookeries reported from the same part of the west Kimberley coast.

The three extra-territorial recoveries of Lacepede Island tagged turtles included another one from a Gulf of Carpentaria (GoC) location, and the second and third reports of turtles captured in the Aru Islands area (Indonesia). The general dispersal patterns previously reported for turtles using the Lacepede Islands rookery are not altered by these further data. However, the fourth 1993/94 Lacepede Island recovery report is also the most intriguing, being from a location off Exmouth Gulf. This is the first Lacepede Islands nesting turtle reported from a more southerly Western Australian location than the rookery itself.

The four Lacepede turtles noted were representatives of three different nesting cohorts: 1986/87 = Aru Islands, the first international report for a turtle from this group; 1987/88 = Mornington Island (GoC); and 1988/89 = second now reported from this nesting group at Aru, and the Exmouth Gulf area capture.

Like the previous seven fully documented reports of the easternmost Australian coastal (Milingimbi to GoC locations) dispersal records we now have for Western Australian nesting green turtles, the latest Mornington Island capture was from among the Lacepede Islands nesters tagged in the 1987/88 season. The Aru location for the 1986/87 nester extends the range of dispersal of animals from this group; the majority of previous capture reports being from the Melville Island to Croker Island sector of the Northern Territory coast (7), and two from inside King Sound, WA

In total, dispersal reports for 50 Lacepede Island nesting green turtles have now been received; 56% of reports from Western Australian coastal locations, 38% from northern Australian coastal locations in the Northern Territory and Queensland (GoC), and 6% (three individuals) from the Aru Islands. We have now received multiple capture reports from five Australian Aboriginal communities outside Western Australia, plus multiple captures at the Aru Islands, Indonesia.

Recovery reports for the 1986/87, 1987/88, and 1988/89 Lacepede season tagged groups to date account for *c.* 2.4% down to 1.4% in year order of the turtles originally tagged. Approximately 0.6% down to 0.4% of the 1989/90 through 1992/93 groups have now been reported.

The two new southern rookery turtles were captured around Cape Borda, WA. The Barrow Island nester was from the 1989/90 nesting group - second of this group taken same area. The North West Cape nester was from the 1992/93 nesting group - sole report so far.

Five of the now seven Barrow Island origin turtles reported have been taken from west Kimberley locations. These turtles include three tagged during the 1987/88 season, and two from the 1989/90 season. Both of the two other Barrow Island origin turtles were from the 1988/89 nesting group, and were from more southerly locations. The first turtle was found dead near Kalbarri in November 1991. The second was captured at East Lewis I in the Dampier Archipelago in September 1993.

The Barrow Island capture reports only account for 0.3 to 0.7% of the green turtles in the nesting groups represented. We also have no reports of turtles at sea from either of the 1986/87 or 1991/92 groups. Other year groups not represented here include 1990/91 when practically no green turtles nested at the southern Western Australian green turtle rookeries, and the three most recent seasons when very small numbers only could be tagged at Barrow Island.

We now have six at sea captures reported for green turtles tagged at the Exmouth Gulf area rookeries: five for North West Cape users and one from South Muiron Island. All six reports are from western Kimberley locations. The turtles reported include two each from North West Cape nesters in the 1989/90 and 1991/92 seasons, one from the very few visiting in the 1990/91 season ex South Muiron Island, and another one from the 1992/93 season group ex North West Cape. We have no reports at sea of any of the numerous 1988/89 North West Cape and Muiron Island nesters. 1990/91 nesting attendance at North West Cape was minimal.

The green turtle dispersal data relating to the southern rookeries are much less comprehensive than those for the Lacepedes nesting groups, but it is quite clear that there are still substantial gaps in our post-nesting dispersal information for the green turtle in both instances.

Four other dispersal reports were received through 1993/94; three for loggerheads tagged during the 1993/94 nesting season, and the first for a flatback tagged 1992/93 season.

Two of the loggerhead reports were for Dirk Island nesters taken and released within Shark Bay mid-1994 in course of trawl fisheries for scallops and prawns (shrimp). The third loggerhead report was for a Muiron Island nesting animal, also taken and released within Shark Bay. This latter report is the third received for Muiron Islands nesting loggerheads: the three dispersal points are Shark Bay, WA, Maningrida, NT, and Pulau Masalembo, mid-Java Sea in Indonesia.

The single flatback report was for a Cape Thouin (Mundabullangana) nester from near the De Grey River mouth, also taken and released by prawn trawl fishery late 1993. This turtle survived and renested in the 1993/94 season.

These few new loggerhead and flatback turtle reports are not unexpected, but again highlight a continuing sampling problem that is also relevant with the continuing absence of any reports for hawksbills, and still applies to the green turtle. Gathering adequate data needed to relate nesting sites to associated feeding grounds will require directed sampling at sea in the future.

Remigrants (turtles returning to nest at known rookery)

Green Turtle

Sixty-nine apparent first-time remigrant green turtles were seen at the Lacepede Islands this season. Five of these were returning after a 7 year absence, another 26 after a 6 year absence, 23 after a 5 year absence, 9 at 4 years, and 6 at 3 years. Another three probable remigrants were noted, as they appeared to have lost tags.

There were no second time remigrants.

Without making adjustment for recoveries, and probable tag loss from some turtles in each group since tagging, we have now seen *c.* 19.5% of the 1986/87 season nesters as remigrants, *c.* 18.8% of the 1987/88 season group, *c.* 11.3% of the 1988/89 group, *c.* 5.6% of the 1989/90 group, and 2.8% of the 1990/91 group.

Six new remigrant greens were seen at Barrow Island. These included 3 x 7 year, 1 x 5 year, and 2 x 4 year remigrants. Cumulative totals of remigrants from the relevant year groups now are 11 from 1986/87, 11 from 1987/88, 1 from 1988/89, and 2 from 1989/90. There have been no multiple remigrant observations.

Fifteen remigrant greens were also seen at the Exmouth Gulf area rookeries. These were:- 1 x 7 year remigrant at the Muiron Islands, and 1 x 5 year, 12 x 4 year, and 1 x 1 year remigrants at North West Cape. Cumulative numbers of remigrants combined for the relevant year groups now are 5 from 1986/87 (all Muirons), 2 from 1987/88, 2 from 1988/89, 16 from from 1989/90 (all North West Cape), and one each from the 1990/91 and 1992/93 seasons. These latter two represent 1 year remigrants.

The continued increase in abundance of longer term remigrants being encountered through this eighth 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.]