

SEA TURTLES OF THE PHOENIX ISLANDS, 2000-2002

BY

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INTRODUCTION

Balazs (1973) has written the only recent report on marine turtles of the Phoenix Islands, summarizing a small literature from observations in the 19th and 20th Century, his own observations on a 7-day trip to Kanton atoll in 1973 and anecdotal information from residents on Kanton Island. At that time only green turtles (listed as *Chelonia* sp.) were confirmed to be present in the Phoenix Islands with additional reports of a turtle “with distinct ridges on the carapace” which Balazs did not venture to name. Balazs notes that reviews at the time did not list the Phoenix Islands within the distribution records of turtles across the Pacific.

Balazs summarized that marine turtles were seen commonly throughout the year in the Phoenix Islands, listed for various different islands by different references and observers including Enderbury, Orona, Manra, Nikumaroro, Birnie. He cited no reported turtle activity on Rawaki (Phoenix) and McKean. Nesting was noted to occur throughout the year with a peak of nesting in October and November and particularly high nesting activity was noted for November 1972 on Kanton. He documented old and new turtle tracks and nest pits and observed two females digging nests on one site on Kanton. In a week on Kanton, he identified four areas around the outer perimeter of the atoll rim between 0.5 to 2.2 km in length where nesting was concentrated. Not all apparently suitable beaches showed nesting activity tentatively related to surface alteration and construction during the Second World War. Suitable beaches had moderate-to-steep slopes and vegetation on the beach top (*Portulaca*, *Lepturus*, *Boerhavia* and *Scaevola*) under which nests were dug. No nesting activity was noted for beaches facing the lagoon.

With respect to marine turtles, our objectives were to document turtle activity on the beaches and in the water and identify any clearly significant islands, locations or habitats in which turtles might be concentrated. In addition, we were particularly keen to document the presence of turtles on Rawaki and McKean and species other than the green turtle (*Chelonia mydas*).

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METHODS

Observations were made on land and in the sea. Beach surveys for evidence of nest pits and tracks were conducted by walking along the beaches and by observation from small boats on the way to and from dives. The number of nest pits and tracks at each location was counted. For the small islands, the entire island perimeter was covered while on the larger islands spot-surveys were made. From boats, tracks were counted in pairs with a pair of tracks counting for one nest. On land, individual nest pits were counted attempting not to count “attempted nests” as real ones by observing the tracks to and from each pit and counting only one pit as evidence of a nest.

In the sea all turtle sightings were recorded while at the surface and in the water, by all divers. Each day the sightings were verified to exclude likely double counts where multiple divers might have recorded the same individual. Records were collected during 42 SCUBA dives in 2000 and 87 in 2002 (with 6-10 divers in the water on each dive). Observations were made in May of 2000 and June of 2002.

RESULTS

Turtles were observed at all islands visited both in 2000 and 2002 (Table 1). Green turtles (*Chelonia mydas*) outnumbered hawksbill turtles (*Eretmochyles imbricata*) by a factor of 20. The total number of turtles seen in 2000 and 2002 were, respectively, 86 and 65 green turtles and 3 and 5 hawksbill turtles over 11 and 21 days. Corrected for the amount of observation time at each island in 2002, on average 2.0 green turtles and 0.1 hawksbill turtles were observed per dive, respectively. The maximum number of turtles observed during a single dive was 6 at the northern tip of Manra Island.

Table 1. Number of turtles seen per dive.

Island	# of samples		Green turtles			Hawksbill turtles		
	2000	2002	2000 m	2002 m	sd	2000 m	2002 m	sd
Manra	3	5	5.7	2.0	2.9	-	0.2	0.5
Birnie	0	3	-	1.7	1.5	-	-	-
Enderbury	3	7	1.7	1.0	1.4	-	-	-
Phoenix	3	3	1.0	0.7	0.9	-	0.3	0.7
Nikumaroro	11	10	1.1	0.7	1.0	0.1	0.2	0.4
Kanton	9	32	3.8	0.9	1.1	0.1	-	-
Orona	6	8	2.2	0.8	0.7	-	0.1	0.4
McKean	3	0	0.7	-		0.3	-	
Total	38	68	2.0	1.0	1.5	0.1	0.1	0.3

Comparison of green turtle abundance between 2000 and 2002 showed lower numbers in 2002 at all islands with a significant difference at the two largest, and the only populated, islands Kanton and Orona (Fig. 1). Mating green turtles (Fig. 2) were observed at Nikumaroro, Manra and Enderbury in 2002. In the latter case one male was successfully mating with the female while another was attempting to dislodge him.

Most islands showed signs of turtle nesting (Table 2) shown by old depressions in the sand, without recent tracks, and recent tracks with fresh nest depressions. All tracks observed appeared to be green sea turtle tracks determined by distinctive opposite flipper marks. Enderbury had the highest density of old nests concentrated at the top of the leeward beach.

During the 2002 survey, several green turtle shells were observed on the beach near the settlement village on Orona. Otherwise, little evidence of mortality was seen of turtles.

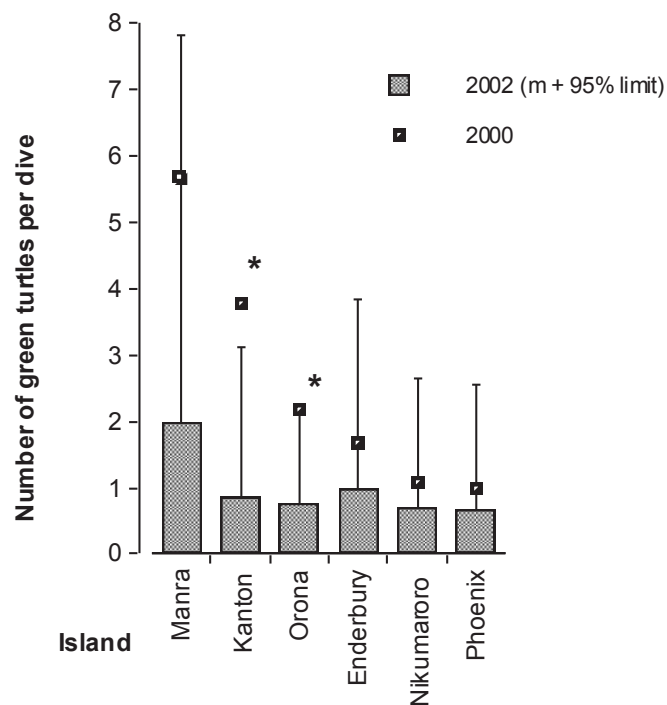


Figure 1. Comparison of 2000 and 2002 abundance of green turtle in the Phoenix Islands. Error bar shows the 95% upper confidence limit for 2002. For Kanton and Orona, the density documented in 2000 was significantly higher than that recorded in 2002, shown by the asterisks. Islands are ordered by decreasing green turtle abundance in 2000.

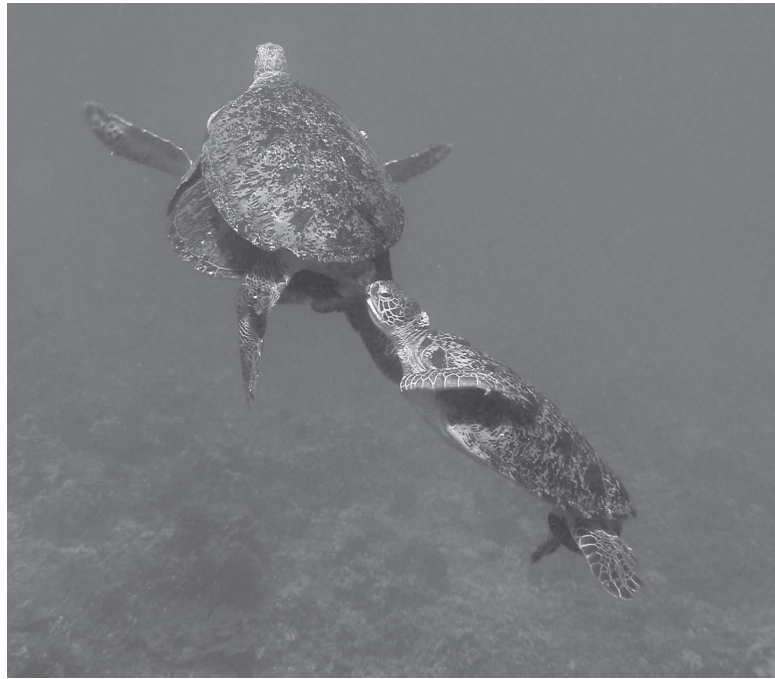


Figure 2. Green turtles mating at Enderbury, in 2002.

Table 2. Number of turtle nests observed on beaches of the Phoenix Islands in 2002. Separate counts are given for old nests (without tracks) and recent nests with tracks in the sand. All turtle tracks appeared to be those of green sea (*Chelonia mydas*) turtles. Surveys were done of all beaches on the small islands (Birnie, Phoenix, Enderbury), but not on the larger islands (Manra, Nikumaroro, Orona, Kanton).

Island	Old nests	New nests	Total
Enderbury	160		160
Nikumaroro	41	18	69
Kanton	30	5	35
Orona		8	8
Phoenix		6	6
Birnie	2	3	5
Manra		2	2
TOTALS	233	34	267

DISCUSSION

This paper confirms the presence of green turtles at all islands in the Phoenix Group, both feeding and nesting. Though hawksbill turtles were not seen on all islands it is likely that they do occur on all of them. Similarly, nesting activity of green turtles was seen on all islands. No evidence was seen of a third turtle species matching Balazs (1973) description “with ridges on its carapace.”

The most significant locations for turtles were Manra for abundance of turtles in the water, but Enderbury, Nikumaroro and Kanton for nesting activity. As noted by Balazs, nesting activity was patchy with dense concentrations in some locations and long stretches of apparently suitable beach without nests immediately adjacent. The lack of significant human activity on most of the islands precludes artificial alteration to the habitat as being a reason for this, as was the case on Kanton (Balazs 1973).

The most striking result documented here is the significant decline in turtle populations from 2000 to 2002. This was most evident on Kanton and Orona where the abundances recorded in 2000 were above the 95% confidence limits of the more quantitative samples in 2002. Marked declines were also noted for Manra and Enderbury, and less so for Nikumaroro and Rawaki islands. Birnie and McKean were only visited in one year so no comparison was possible.

Potential causes of the decline in turtle abundances include capture on the populated islands and bycatch by offshore commercial fisheries. Kanton and Orona Islands were the only islands in the group to have any resident human populations in the period covered by the surveys. Kanton has an administrative population of ≈ 30 people who undertake subsistence fishing for local needs. The population is serviced by a supply ship every 3-4 months enabling minor trade in durable marine products occurs, including dried sharkfin and possibly also turtle shells. The Phoenix Islands Kakai (settlement) Scheme (PIKS) had placed about 140 villagers on Orona Island from 2001 to 2003 to harvest marine resources such as sharkfin and reef fish, and coconuts. Harvest of sea turtles for their meat and shells was also likely evidenced by the turtle shells seen near the village. In conversation with villagers it was learned that an unknown number of turtles are caught on long lines and eaten.

Second, a commercial shark fishing vessel passed through the Phoenix Islands en route between Hawaii, Kiritimati Island and American Samoa, spending about 6 months in the islands in 2001. According to reports from residents of Kanton and Orona, the boat fished at Kanton, Orona, Enderbury and Manra Islands. These are the four islands that showed the most significant decline of sea turtles (Fig. 1). Since 2001 other boats have been reported visiting Kanton and longline fishing for tuna is licensed from 12 km out from the islands. The depredation of sea turtles by longlining and other hook-based fisheries is well documented in the Pacific (Ovetz, 2005) and it is very likely that both targeted and bycatch of turtles occurs sporadically around the Phoenix Islands.

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