

Marine Turtle Newsletter

Marine Turtle Hunting in the Ha'apai Group, Tonga

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The Kingdom of Tonga in the South Pacific is composed of at least 170 islands of which 36 are inhabited. These islands are grouped into three main scattered groups of Islands: Tongatapu (where the capital and International airport are located), Ha'apai and Vava'u located within latitudes 15-23°S and longitudes 173-177°W (Figure 1). Two main species of marine turtles are present in inshore waters: the hawksbill *Eretmochelys imbricata*, and green *Chelonia mydas* although fishermen do recognize loggerheads (*Carretta caretta*). In the Tongan language *Fonu Koloa* is hawksbill, greens are often called *Tu'a'uuli* but there are a number of different names depending on sex and size and variation on colour. Males are called *Ika ta'ane* or *Hulemui*, while females and immature may be called *Tu'a polata*, *Tu'a kula* (redish shell), *Aleifua*, or *Tufonu* (Pritchard 1981). Loggerheads are called *Tungange* but can also be referred to as *Tufonu*.

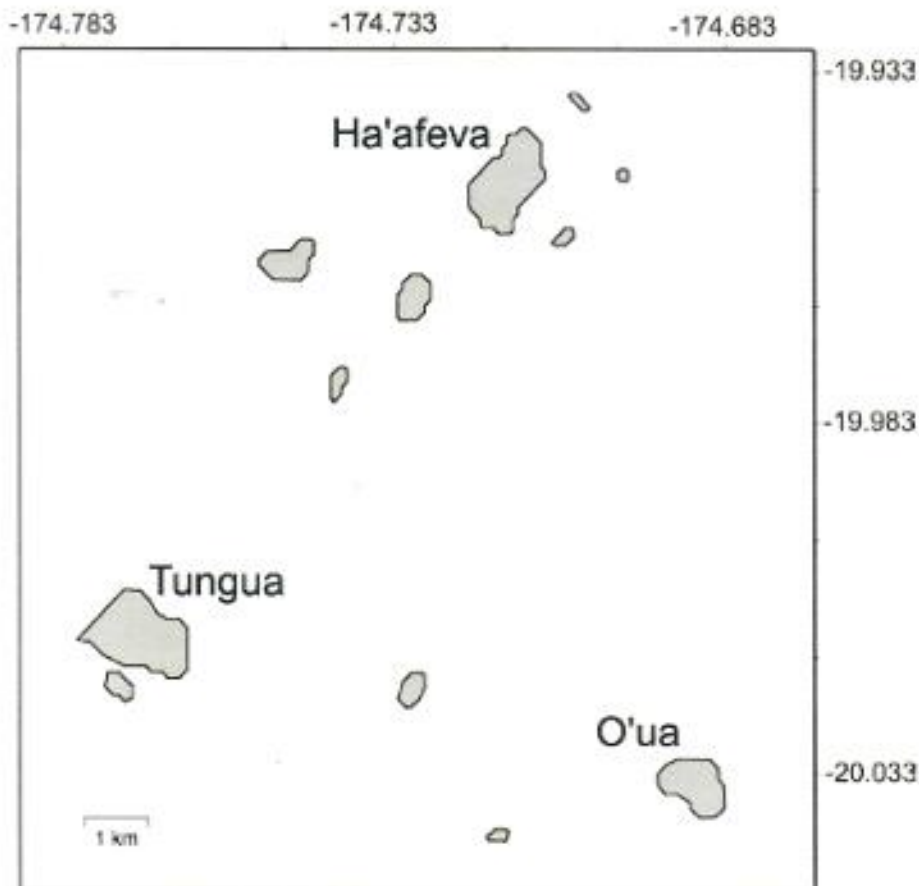


Figure 1. Map of Tonga showing study sites in the Ha'apai Group.

There has been limited research on marine turtles in Tonga. There are unpublished Tonga Fisheries Division reports from the 1970s (Koloa 1972, Braley 1974) that have been summarized in Bell *et al.* (1994) but there

appears to be no recent surveys. Based on the 1970s surveys, nesting takes place for both greens and hawksbills from October to February, with peak nesting occurring in December. Most of the nesting occurs in the Haʻapai Group, with hawksbills predominating. The 1973 survey (Braley 1974) found signs of nests and nesters on eight of the 13 islands visited in Haʻapai while green turtles nests or nesters were found on only two or three uninhabited Islands that included Nukulei and Luanamo Islands. However, almost all sites showed signs of egg collection and disturbed nests, and reports were also received of nesting turtles being taken, in addition some former nesting areas were no longer receive nesting turtles. In this paper we summarise results of a one month survey of turtle hunting and nesting in the Haʻapai group by the principal author, a Tongan speaker with family ties to Haʻapai.

The survey was conducted during December 2007-January 2008) in three islands in Haʻapai, each with one village: Oua, Haʻafeva and Tungua Islands (Figure 1). These islands were selected because they had been identified in earlier surveys as communities involved in turtle hunting (Bell *et al* 1994). In addition Oua is involved in a pilot Special Management Area with the Department of Fisheries. Semi structured interviews based on a detailed prepared questionnaires were carried out with 50 fishermen: 22 from Oʻua, 14 from both Tungua and Haʻafeva. Key fishermen were selected based on their experience and knowledge of marine turtles, in order to obtain the most complete data. Numbers of fishermen interviewed varied from island to island as some of the younger men were on temporary work (seasonal fruit picking) in New Zealand. Nevertheless, it was estimated that 90% of the active fishermen were interviewed. Fishermen were asked to estimate the number of turtles they had caught during the current year (2007) and queried on fishing methods, traditional and subsistence catch, disposition of the catch, and perception of the stock status.

There were 608 marine turtles reported caught during 2007, with hawksbills being captured twice as often as green turtles (Table 1). Fishermen in Oʻua caught turtles for home consumption and some local sales or barter. In Haʻafeva, turtles were caught for home consumption, some local sale, and also traditional occasions particularly for the quarterly meeting of the Siasi Tonga Houʻeiki (Church of Tonga). Fishermen in Tungua, with the largest catch, use some for local subsistence but is primarily used for a commercial market with a local middleman buying the turtles and arranging for transport and sale mainly to the main island of Tongatapu. There may also be a smaller shipment of turtles to Tongatapu from other villages; Fonua (2005) provides a photo of 5 turtles being shipped to Tongatapu from Haʻafeva for distribution to relatives. The price of turtles supplied by local informants was US\$3.50 (7 Tonga Paʻanga or TOP)/kg for sale in the local village and US\$5 (10 TOP)/kg for the commercial market. Large turtles could bring \$US150 (300 TOP).

Island	Fishermen surveyed	Species caught (%)		Total Turtles Caught (%)	Mean (\pm SD) caught per fishermen
		Hawksbill	Green		
Oʻua	22	111 (27.1)	56 (28.3)	167 (27.5)	7.6 (21.70)
Haʻafeva	14	84 (20.5)	23 (11.6)	107 (17.6)	7.6 (9.46)
Tungua	14	215 (52.4)	119 (60.1)	334 (54.9)	23.9 (30.37)
Total	50	410 (67.4)	198 (32.6)	608 (100)	

Table 1. Turtle catch by fisherman from three villages in the Haʻapai Group, Tonga in 2007.

In both Oʻua and Haʻafeva the average catch was 7.6 turtles per fisherman while in Tungua they captured an average of 23.9 turtles per fisherman with 4 fishermen catching from 30 to 100 turtles per year (Table 1). These large catch rates would appear to be the result of the recently developed commercial fishery and may be putting considerable pressure on the sustainability of the turtle harvest.

As most of the turtles that are consumed locally were cooked in the shell in an earthen oven (*Umu*), following which the shells are discarded, it was not possible to measure shells to determine sizes. However, the survey responses suggested that turtles were of medium size, probably in the 50-70 cm size range. This may be the result of the Tongan Fisheries regulation that sets a minimum shell width of 45 cm for captured turtles. A few large adult turtles, including occasional nesting turtles, were also reported caught.

Islands	Diving n=12	Spearing n=10	Spear- fishing n=21	Net n=4	Others n=3
O'ua	18%	18%	50%	9%	5%
Tungua	43%	21%	29%	-	7%
Ha'afeva	14%	21%	43%	14%	7%
Overall Percentage	24%	20%	42%	8%	6%

Table 2. Methods used to capture turtles in three villages in the Ha'apai Group, Tonga.

Turtles were captured in a variety of ways (Table 2). Free diving is done by expert divers who know where turtles rest or sleep. Spearing is a targeted turtle hunting activity normally conducted from a boat but the fishermen may also jump in the water and chase the turtle in order to spear it. Spear-fishing is an incidental capture of turtles when fishermen are targeting coral reef fish but spear turtles when they find them, particularly if the turtles are resting. Nets are used traditionally for capturing large turtles for traditional events and tend to target green turtles. These nets called *kafafonu* previously were made from twine spun from coconut husks (*kafa*). Previous reports (Fuka 1979 quoted in Bell *et al* 1994) suggest these nets had a mesh size of 41 cm (16 in). New materials such as cotton multifilament and monofilament appear to have replaced the traditional nets, and a monofilament net was observed being made in Ha'afeva during this survey. The mesh size was not measured but the fishermen indicated it was 91cm (36 in). This large mesh size would only catch large adult green turtles. In Ha'afeva, the fishermen also used a traditional fence (weir) to hold the turtles captured for cultural activities. Other capture methods included *tuli* (chasing after the turtle until it tires) and capture of nesting turtles.

Overall 62% of fishermen used spearing and spear-fishing. In O'ua and Ha'afeva, the largest number of fishermen used spear-fishing. In Tungua, 43% of the fishermen used free diving alone. These fishermen are renowned for their free diving skills and knowledge of turtle feeding or resting areas. Fishermen in O'ua and Ha'afeva also occasionally used the more traditional method of net fishing, and although they catch large turtles, they usually catch less than 10 turtles per year in the nets.

Fishermen were asked if the turtle populations were increasing or decreasing (Figure 2). It is interesting that in spite of previous reports and an apparent decline in nesting turtles, <50% of fishermen reported that turtle stocks are declining and almost 40% indicated stocks were increasing. In O'ua, almost 60% of respondents suggested a decline in stocks, possibly because of increased awareness of turtle conservation related to the implementation of the Coastal Community Management Plan in 2005.

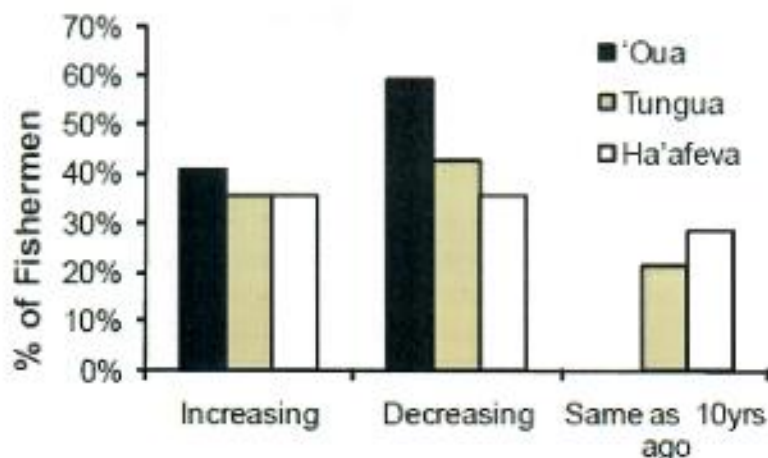


Figure 2. Stock status based on 50 fishermen interviewed in three villages in Ha'apia, Tonga Coastal.

As indicated previously, there is little recent information on turtle nesting in Tonga. The researcher visited two uninhabited Islands, Fonuaika and Nukulei, searching for nesting turtles, tracks or nests. A nesting survey in December 1971 (Koloa 1972) found 12 nests (no species listed) on Fonuaika, while a survey in December 1973 (Braley 1974) found 5 nests (probably green) and one green nesting female on Nukulei. In our study, we did not observe nesting turtles but on Fonuaika Island, six recent hawksbill nests were observed, and on Nukulei Island seven hawksbill nests were found above the beach in the vegetation.

Overall, our survey estimated that 608 marine turtles were captured in the three villages in the Ha'apai Group in 2007. Although not all fishermen in each village were surveyed it appears most of the fishermen were interviewed particularly those that captured the most. It is not clear how representative these three villages are of others in Ha'apai, but Koloa (1973) identified 10 islands and villages in Ha'apai, including these three, where turtle hunting was practised in 1972. Thus the 608 turtles may represent a lower limit of the number of turtles captured in the Ha'apai Group. It is unknown whether this catch is sustainable, although many fishermen perceived that the catches were not declining or were stable. However, the recent increased catch rates in Tungua for the commercial market gives cause for concern. The limited data on nesting suggest the levels are similar to the 1970s but there may be a decline in green turtle nests. It is important that long term monitoring of nesting beaches and turtle catches be implemented to address the question of sustainability.

The Tonga Conservation and Management Regulation 1994 (after Bell *et al.* 1994) states that: *No person shall: (a) disturb, take, have in his possession, sell or purchase any turtle eggs; (b) interfere with or disturb in any turtle nest; (c) sell, purchase or export any turtle or shell thereof of the species Eretmochelys imbricata, known as the hawksbill turtle; (d) use a spear or spear gun for the purpose of capturing, destroying or taking any species of turtles; (e) closed seasons: All species except leatherback November to 31 January; Leatherback January to 31 December.* There was also a ban in Tonga on killing turtles but that was lifted in early 2005. There is a minimum size limit such that: the width of the turtle shell not be less than 45cm (Fonua 2005). It is obvious from this study that a number of the regulations are not being adhered to, including the sale and purchase of hawksbill turtles. Catching undersize marine turtles was reported by a few fishermen. Spears and spear-fishing are used by 62% of fishermen and the closed season is only partially respected, as in Tungua where fishermen stop commercial fishing but continue to fish for subsistence use during this period. There were also reports of nesting turtles and eggs being taken.

The challenge of effective enforcement is compounded by the remoteness and isolation of nesting islands and turtle catching areas. There are few fisheries officers located near turtle hunting areas. There is also a lack of awareness and appreciation for the need for a more sustainable approach. Unlike elsewhere in the Pacific, there is little recognition of traditional marine tenure, and the Tongan Kingdom claims authority over all marine waters below high tide. This situation is not conducive to the development of community-based management and conservation in Tonga, unlike what has occurred in other Pacific Island countries (MacKay 2004). There are, however, encouraging signs, particularly the introduction of the Coastal Community Management Plan in O'ua. The implementation of this plan has led to the establishment of village-based fisheries officers who can check the catches, monitor and report illegal fishing. They also have the power to confiscate fish caught illegally within the village fishing territory. The involvement of local fishermen and officers is a milestone and it will help with the enforcement of the regulations. This is also enlightening other communities.

Acknowledgements: This research forms part of the Master of Arts research at the University of the South Pacific by the senior author. This work was funded by the Faculty of Islands and Oceans, USP Research Committee. We acknowledge the fishermen and villagers of Oua, Ha'afeva and Tungua Islands for their hospitality and sharing of information that was critical to this survey. Lui Bell, SPREP Marine Species Officer commented on the research proposal and offered additional advice and information. Officers from the Tonga Departments of Fisheries and Department of Environment facilitated field surveys and shared information. Staff of the School of Geography Dr Randy Thaman advised on the questionnaire and the analysis and Dr G Gennady assisted in the preparation of the maps. Additional assistance in the map preparation was received from Jonathan MacKay and MTN editor Matthew H. Godfrey. We offer a special thanks to the Havea family for their encouragement and patience. We also thank Matthew H. Godfrey and the anonymous reviewer for their encouragement and useful comments.

BELL, L.A.J., U. FAANUNU & T. KOLOA. 1994. Fisheries resources profiles: Kingdom of Tonga. Forum Fisheries Association Report 94/5, Honiara, Solomon Islands. Available from .

BRALEY, R. 1974. The present marine turtle situation in Tonga. Unpublished Report, Fisheries Division, Department of Agriculture, Forests and Fisheries, Kingdom of Tonga.

FONUA, P. 2005. Tongan eats turtle meat again after killing ban lifted. Matangi Tonga Online, accessed 14 April 2006 from: <<http://www.matangitonga.to/>>.

FUKA, S.T. 1979. Recommendations for improvement of traditional fishing gears and methods and ways of assistance local fishermen financially in Tonga. Grimsby College of Technology, Department of Maritime Studies and Fisheries, South Humberside.

KOLOA, T. 1972. Tonga turtle survey. Unpublished Report, Fisheries Division, Department of Agriculture, Forests and Fisheries, Kingdom of Tonga.

MACKAY, K.T. 2003. Community managed Marine Protected Areas in the Pacific Islands: case studies from four small island states of the Pacific. Presented at the Second International Tropical Marine Ecosystem Management Symposium, Manila Philippines, 25- 29 March 2003.

PRITCHARD, P.C.H. 1981. Marine turtles of the South Pacific. In: Bjorndal, K.A (Ed), Biology and Conservation of Sea Turtles. Smithsonian Press, Washington, D.C. pp. 258-260.