# Fiji's strategic role as a turtle foraging area in the central South Pacific region

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Most stocks of the green turtle *Chelonia mydas* in the US-affiliated Pacific islands (except Hawaii) have seriously declined and should probably be classified as 'endangered' rather than 'threatened' under the Endangered Species Act. This species is also listed by IUCN as "endangered". To protect these stocks, it is clearly essential to determine where they migrate during different stages of their life cycle.

It is well established that sea turtles often migrate great distances between nesting and feeding areas, but such information in the South Pacific is rudimentary because the region is geographically large and contains thousands of islands. In this paper I review the migration patterns of post-nesting greens tagged in the central South Pacific region.

The available tag recovery data demonstrate a common pattern of turtle movements in the region. To date, 28 post-nesting turtles tagged at French Polynesia, Cook Islands, American Samoa and Tonga have been recaptured and their migrations were similar in both direction and destination: 96% traveled westward after nesting and 61% went to Fiji (Table 1).

Table 1. Recaptures of post-nesting green sea turtles in the central South Pacific region.

| | Recaptures | | | |
|---|---|---|---|---|
| Tag site | total | to west | to Fiji | Reference |
| Rose Atoll, American Samoa | 10 | 9 | 8 | Craig et al. 2003 |
| Scilly Atoll, French Polynesia | 14 | 14 | 6 | Balazs et al., 1995 |
| Rangiroa, French Polynesia | 1 | 1 | 0 | SPREP, 1993 |
| Tongatapu, Tonga | 2 | 2 | 2 | SPREP, 1998 |
| Palmerston Atoll, Cook Is. | 1 | 1 | 1 | Balazs, unpubl. data |
| | 28 | 96% | 61% | |

A plausible explanation for this pattern is that, after nesting, the turtles migrate westward to better feeding opportunities. The rationale for this hypothesis is that, in the central South Pacific, large areas of shallow water habitat required for expansive growths of seagrass and algae become less common as one proceeds eastward from Fiji. A sharp demarcation line occurs between Fiji and Samoa where the submarine Tongan Trench separates two of the earth's tectonic plates, the

Pacific Plate and Indo-Australian Plate. To the east of the trench, the Pacific Plate can be characterized as a deep (4-5 km) seafloor punctuated by a relatively low number of small, steeply sloping islands. To the west of the trench, the Indo-Australian Plate is generally less deep and has more and larger islands with considerable areas of shallow-water habitat suitable for seagrass and algal growth.

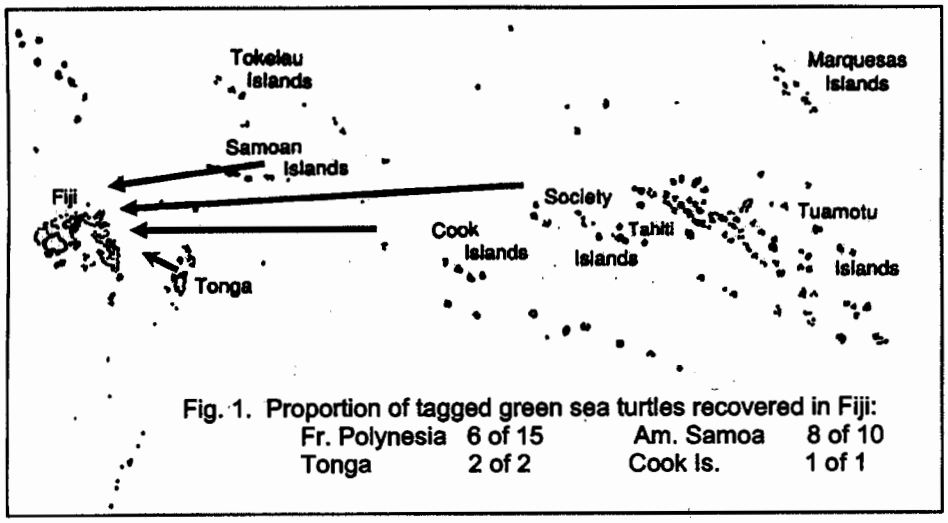


Fig. 1. Proportion of tagged green sea turtles recovered in Fiji:

| | | | |
|---|---|---|---|
| Fr. Polynesia | 6 of 15 | Am. Samoa | 8 of 10 |
| Tonga | 2 of 2 | Cook Is. | 1 of 1 |

Adding to this geographical difference in suitable habitat is the well-known decrease in species diversity as one proceeds from the Indo-Pacific region eastward into the Pacific Ocean. Seagrass diversity, in particular, declines from 14 species in the western Indo-Pacific region to only two species in French Polynesia. While this does not automatically imply that seagrass biomass declines as well, we are not aware of any significant concentrations of seagrass east of Fiji in the central South Pacific. In contrast, Fiji has extensive pastures of seagrass.

It is recognized that this hypothesis may be an over-simplification for several reasons. (1) It is likely that additional islands west of Fiji, such as Vanuatu and New Caledonia, are also important foraging areas for turtles from central Pacific islands. (2) Green turtles also eat certain marine algae, sometimes exclusively, but the distribution of algal biomass in the region is not known; however, algae also require shallow waters and thus may be similarly less abundant east of Fiji. (3) Not all green turtles vacate eastern areas -- some juveniles, for example, reside year-round in the Samoan Archipelago and thus must be able to find food there.

Despite these caveats, the hypothesis is best considered as a population response to gain access to sufficient food resources so that the turtles can recover from migrating great distances to and from nesting beaches and also obtain food reserves so that they can reproduce again at a later date. That this reproductive recovery may take 4-5 years to accomplish (based on the internesting interval of green turtles in Australia) emphasizes the need to go where food resources are greatest. This lengthy internesting interval would also indicate that the Rose Atoll turtles spend most of their adult life in Fiji. For example, if we estimate (from satellite tagging data) that a round-trip migration to nest at Rose Atoll takes approximately five months, and that a trip occurs once every four years on average, then fully 90% of the turtles' adult life would be spent in Fijian waters.

Consequently, the seagrass and algae beds of Fiji should be viewed as a regionally significant resource for over half of the adult green turtles in the central South Pacific. These foraging areas are vital to the reproductive success of turtles that nest in many other island nations in the region, and the need to protect such foraging areas is a critical part of sea turtle conservation.

There is a need to identify, map and protect foraging areas in Fiji, and to determine any threats to these habitats (eg, water quality). Foraging turtles in Fiji should be censused and monitored, and their home ranges and movement patterns determined by tagging. Additionally, there is a need to assess turtle survival and growth on the foraging grounds, examine diets, monitor remaining nesting areas for both greens (and hawksbills), conduct genetic sampling for population analyses, determine bycatch in fisheries, and support local educational efforts to protect turtles.

Balazs, G., Siu, P., Landret, J-P., 1995. Ecological aspects of green turtles nesting at Scilly Atoll in French Polynesia. In Proceedings 12th Annual Workshop on Sea Turtle Biology and Conservation, 1992, eds. J. Richardson, T. Richardson, pp. 7--10, National Atmospheric and Oceanic Administration Tech. Memo. NMFS-SEFSC-361, 41p.

Craig, P., Parker, D., Brainard, R., Balazs, G. 2003. Regional migration patterns of green turtles in the central South Pacific

SPREP. 1993. Report of the 3rd meeting of the Regional Marine Turtle Conservation Programme. Apia, Samoa. 39p.

SPREP. 1998. Regional Marine Turtle Conservation Programme (RMTCP) turtle tagging database report, 1997 & 1998. Apia, Samoa. 32p.