ABSTRACT

The life cycle of sea turtles is complex and is not yet fully understood. For most species, it involves at least three habitats: the pelagic, the demersal foraging and the nesting habitats. This study investigated the ecology of green and hawksbill sea turtles foraging on two dissimilar reefs in north-western Australia. Aspects of this study included: species, size and sex composition, population size, growth rates, health assessment, available food resources, diet, short-term movements, foraging behaviour and the analysis of blood chemistry. It focused on an assemblage of green and hawksbill turtles on an inshore terrigenous reef (Fog Bay) and a population of green turtles on a shelf-edge platform reef (Ashmore Reef) in north-western Australia. The two reefs were approximately 800 km apart. Turtles were captured by hand, individually tagged, measured and examined before release. The significant contributions to our knowledge of sea turtle biology are presented for each locality as well as those of a more universal application.

Fog Bay

- 1048 captures were made of 891 individuals
- Fog Bay contained 62% green and 38% hawksbill turtles
- Size structure was dominated by immature turtles: mean size of greens 48.1 cm ccl, mean size of hawksbills 48.7 cm ccl. At least 99.4 % of greens and 86.1% of hawksbills were under adult size
- Species and size composition varied over temporal and spatial scales
- Sex ratios of both species were biased toward females
- Both species occurred in high densities: 200 green/km^2 and 60 hawksbills/km^2
- Green turtles grew at approximately 1.5 cm ccl/year while hawksbills grew at 2.5 cm ccl/year
- Natural and anthropogenic factors impacted on the health of these turtles
- The foraging area was dominated by algae and sponges
- The diet of the green turtles was dominated by algae
- The diet of the hawksbill turtles comprised algae and sponge
- Both turtle species showed diet selection
- Overlap occurred between foraging niches
- Both species demonstrated short and long term fidelity to feeding sites
- Fog Bay is a critical developmental habitat for green and hawksbill turtles

Ashmore Reef

- 371 captures were made of 335 individuals

- Ashmore Reef contained 95% green, 3.5% loggerhead turtles and 1.5% hawksbill turtles
- Size structure was dominated by immature greens: Mean size 54.9 cm ccl. At least 93 % were under adult size
- Species and size composition showed temporal and spatial variability
- Green turtles occurred in a high density: 40 green/km^2
- Green turtles grew over more than twice as fast (4 cm ccl/year) as green turtles in Fog Bay
- Natural and anthropogenic factors impact on the health of these turtles
- The foraging area and the diet of green turtles was dominated by seagrass
- Green turtles showed both short and long term fidelity to feeding sites
- Ashmore Reef is a critical developmental habitat for green turtles

General

- The concept of developmental migration has been expanded to include oceanic islands, smaller scale movements into overlapping habitat, and habitats of mixed sized individuals
- Current methods of population estimates are insufficient to cope with large population sizes in homogenous habitat with high turnover rates
- Comparative study areas are useful to examine processes within foraging areas
- More than one capture technique is recommend to remove capture bias
- Blood chemistry has the potential for use in health and nutritional studies in sea turtles when the diet is known

Further studies in more geographically and ecologically diverse habitats are required to better understand the spatial and temporal variability of processes operating within developmental habitats. Such studies would provide valuable comparisons and would assist in population modelling and management of sea turtles.

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