

SECTION 4: ASSESSMENT OF POPULATION STATUS

Basic Biology

Although there is probably nesting in all months, the vast majority occurs between December and July each year, peaking in March. The technique most commonly used to assess nesting population size is to count the number of clutches laid in a particular season (Schroeder & Murphy 1999). Although seemingly straightforward, the task of counting nests is however far from trivial when a population lays clutches on many beaches and where the nesting season lasts for many months. In such cases, labour intensive surveys are required, and for this reason there are surprisingly few assessments of population size for some of the largest rookeries in the world.

Assessment of Status

In the first year of this current study all 32 beaches on the island were surveyed as per Mortimer and Carr 1987 (see figure 4). However, in later years some of the more remote nesting beaches hosting trivial proportions were not monitored regularly, instead efforts were concentrated on the more important beaches (Godley *et al.* 2001).

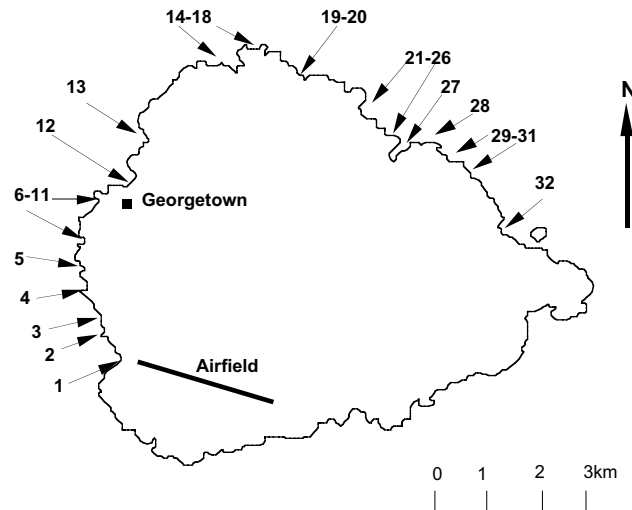


Figure 4. Map of Ascension Island showing 32 beaches (after Mortimer & Carr 1987)

In the 1998/1999 season it was estimated that 13,882 clutches were laid (Godley *et al.* 2001), with a further 13,053 in 1999/2000 and 6,704 in 2000/2001. These results are illustrated in figure 5.

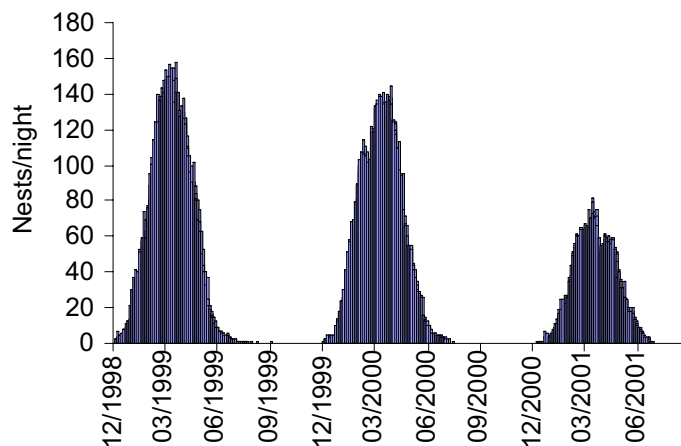


Figure 5. Number of nests recorded in 1998/1999, 1999/2000 and 2000/2001 seasons.

Such inter-annual fluctuations are common in green turtles. Being herbivores, the availability of the food of this species is linked closely to climatic conditions that can vary dramatically (Broderick *et al.* 2001). In addition, as most females of this species nest at variable intervals (often 3-4 years in this population), low nesting years are inevitable. This does reinforce the need however for continued monitoring of this endangered reptile. It will not be until we have data from several more years that we will have a full appreciation of the current status of this population. There is room however for cautious optimism, as all of these years show similar or greater nesting levels than was estimated in the first detailed studies in the 1970's (Mortimer & Carr 1987).

In table 1 we present data for the number of turtle nesting emergences (approximately one third result in nest laying) and the proportion of the total nesting that occurred on each beach for each of the five years that complete nesting surveys were conducted.

Beaches	1976/77	1977/78	1998/99	1999/00	2000/01
1	2793 (15.4)	2195 (18.2)	4500 (12.5)	4696 (13.8)	2378 (14.1)
2-5	1821 (10.0)	1569 (13.0)	5434 (15.1)	7258 (21.4)	2901 (17.2)
6-11	2453 (13.5)	1428 (11.8)	4599 (12.8)	4224 (12.5)	1641 (9.7)
12	3118 (17.1)	1760 (14.6)	9651 (26.8)	8763 (25.8)	5191 (30.7)
14-20	1341 (7.4)	783 (6.5)	2819 (7.8)	1975 (5.8)	918 (5.4)
21-26	976 (5.4)	822 (6.8)	1820 (5.1)	1229 (3.6)	850 (5.0)
27	2703 (14.9)	1469 (12.1)	3216 (8.9)	3088 (9.1)	1833 (10.9)
28	804 (4.4)	420 (3.5)	1172 (3.2)	593 (1.7)	230 (1.4)
29	1743 (9.6)	1191 (9.8)	1986 (5.5)	1324 (3.9)	710 (4.2)
30-32	440 (2.4)	456 (3.8)	839 (2.3)	774 (2.3)	210 (1.2)
Total	18192	12093	36036	33924	16862

Table 1. Estimated number of nesting emergences recorded (and the percentage of total nesting emergences) at each beach in the five years when full monitoring has occurred on Ascension Island. Data from the 1976/77 and 1977/78 seasons were taken from Mortimer and Carr (1987).

These results highlight the global importance of the green turtle nesting colony of Ascension Island; Long Beach, (number 12) Southwest Bay (number 1), and Northeast Bay (number 27) are the three major nesting beaches on the island, receiving between 45-55% of all clutches laid in any given season.

- Recommendation: Annual monitoring of all major nesting beaches should be continued indefinitely.** Prior to this current project, initiated in 1998, the previous complete survey of the nesting population took place in 1977/78. During the next 20 years only a brief survey was conducted in 1992. It appears that during this intervening period the population has remained stable, if not actually increasing. Without regular monitoring, however, the population might easily have slipped into unchecked decline as has occurred at many marine turtle breeding sites around the world. As green turtles typically exhibit a high degree of inter-annual variation in the nesting numbers there is a particular need for annual monitoring of this species. Such monitoring could be carried out by members of the Ascension Island Turtle Group/Ascension Island Conservation Officer in conjunction with turtle biologists and needs to address the following:
- Abundance of nesting turtles:** At the end of the fourth consecutive year (August 2002) of intensive monitoring as a result of Darwin Initiative and FCO funding, we will be able to suggest the minimum possible monitoring regime necessary to have meaningful nesting abundance estimates from the counting of tracks in future years. Wardening, funded as part of a developing ecotourism initiative has lead to the formation of the AITG (see **Section 6**) and will not only allow the collection of status monitoring data, but also facilitate the evaluation and amelioration of future potential threats. It is important to note that monitoring efforts should be so designed as that

temporal shifts in seasonality or changes in the relative importance of nesting beaches are assessed.

- **Reproductive success:** In addition to enumerating the number of tracks resulting from adult turtles on the nesting beaches, it is also important to calculate what proportion result in egg laying and whether a sufficient proportion of nests hatch with high success rates.
- **Incubation temperatures:** The phenomenon of Temperature-Dependent Sex Determination (TSD) occurs in all marine turtle species. At approximately 29 °C, a 1:1 male: female ratio is produced. At warmer temperatures more females are produced. Work has shown that there is significant inter-beach variation in temperature of nests (; Broderick *et al.* 2001; Hays *et al.* 1995, 1999, 2001) and it is estimated that the overall sex ratio of hatchling production at Ascension is 75% female (Godley *et al* 2002a). Thus, relatively minor changes in temperature as a result of global warming could yield male deficient sex ratios in the future. This mandates continued monitoring of the sand temperature throughout the season on the major nesting beaches and the timing of onset and duration of the nesting season so that prompt remedial action can be undertaken should male production fall below critical levels.