

Green Turtle Nesting at Pulau Sangalaki, (East Kalimantan, Indonesia)
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This paper reports some of the data gathered from November 2000 through December 2001 on green turtle (*Chelonia mydas*) nesting activity and hatch success rates at Pulau Sangalaki, East Kalimantan, Indonesia. The data was gathered somewhat informally, and has not been analyzed, but nevertheless may be of value to those interested in GreenTurtle nesting in this region.

Pulau Sangalaki, or Sangalaki Island, is located about 60 km east off the coast of Berau, Indonesia, on the island of Borneo. The center of this small, 0.15 km² island is densely forested. The majority of the perimeter is sand beach well suited to turtle nesting. Sangalaki and the other Berau islands are part of the “Coral Triangle”, characterized by some of the highest marine species biodiversity in the world (Ismuranty, 2003). It is home to one of the largest nesting populations of Green Turtles in Southeast Asia. Turtles nest here year-round. Despite the fact that Indonesia is a signatory to CITES, and green turtles are protected under this as well as Indonesian national law, a local government concession allowing egg harvesting on Sangalaki and four other islands in the Berau region has existed almost uninterrupted since the 1950’s.

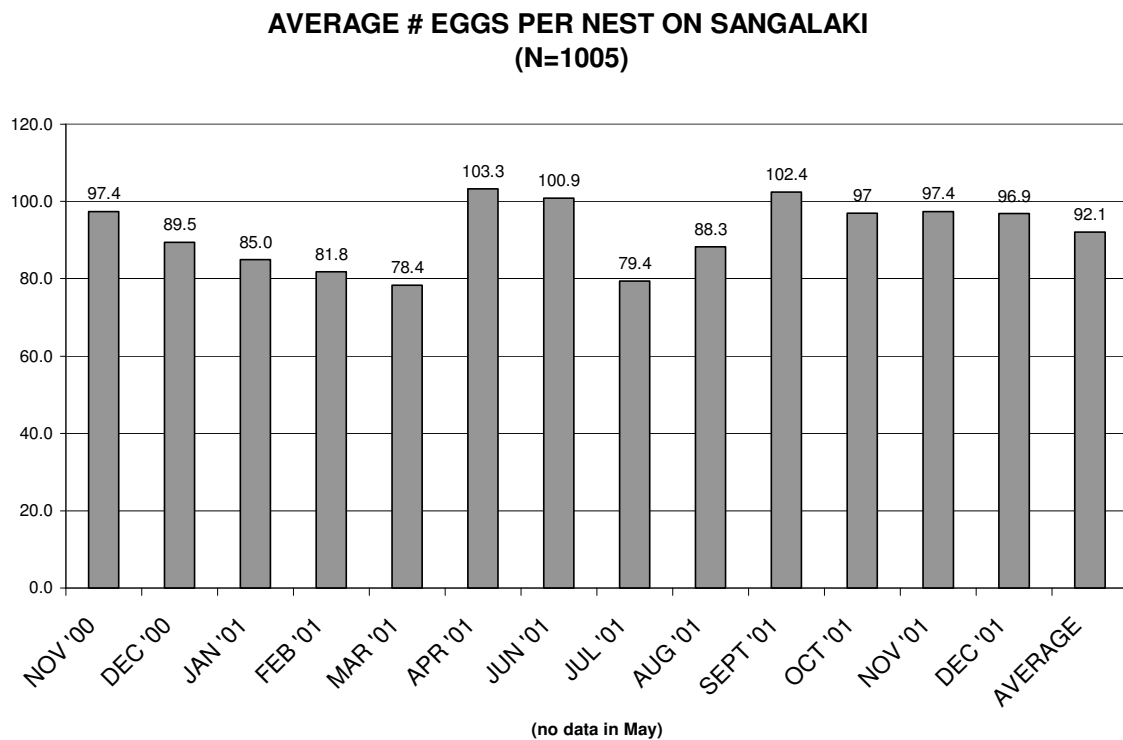
The Turtle Foundation began as a German NGO formed in 1999 by some dedicated filmmakers and divers, who had witnessed the harvesting of green sea turtle eggs on Pulau Sangalaki, in east Kalimantan. Research indicated that the number of nests laid on this tiny island had dropped from around 200 nests per night in the late 1930’s (Lindsay & Watson, 1995) to 20–50 nests per night in 1993/94 (Graham Taylor in Tomascik, 1997). In the face of this rapid decline of one of Indonesia’s largest green turtle nesting populations, the Turtle Foundation’s goal was to implement a conservation and monitoring program on the island.

In November of 2000, two field personnel arrived on Pulau Sangalaki to implement a monitoring program. When personnel arrived, the only conservation observed was a nest adoption program run by the dive resort, where resort guests “bought” a nest from the egg collectors and the nest was allowed to hatch in situ. Between November 2000 and January 2001, no additional conservation was allowed, but data was collected on the number of nests laid each night, and the number of eggs in each nest (counted as the collectors dug up the eggs). In January of 2001, permission was granted to conserve 20% of the nests laid. A hatchery was completed in March of 2001, and a portion of the conserved nests were moved to the hatchery, primarily those judged to be in danger of inundation at high tide. Nests left to hatch in situ were also monitored. Between January 2001 and January 2002, data was collected by various Turtle Foundation personnel on numbers of nests laid, average number of unsuccessful emergences, hatch success data in

situ and in the hatchery, hatch success of nests moved within 2 hours versus within 12 hours of deposition, number of days to hatch, and percent cover over nests laid.

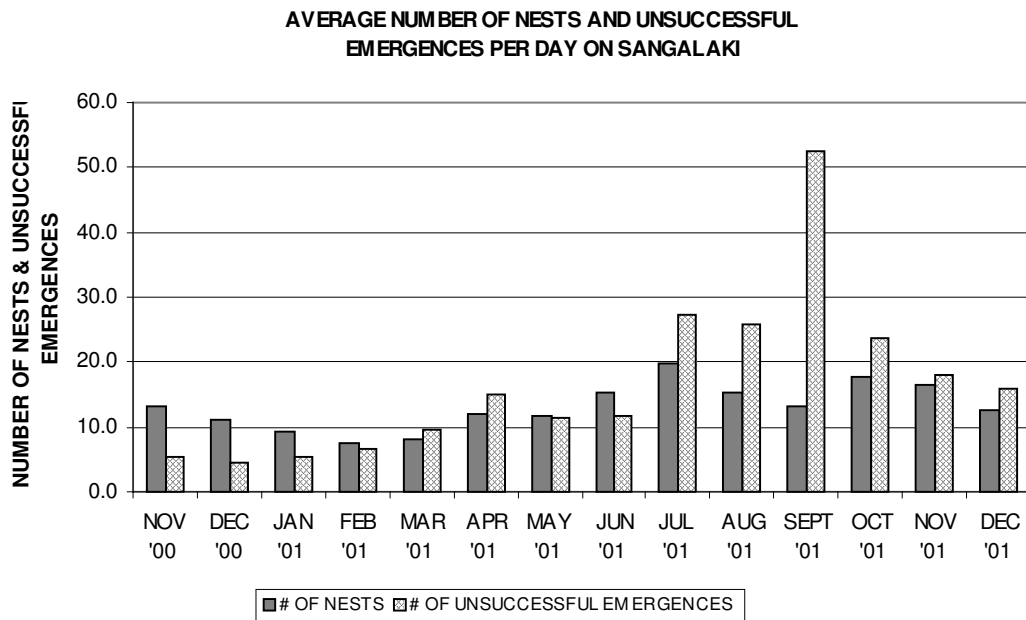
Numbers of eggs per nest were counted from all nests collected from November and December 2000. After January 2001, eggs were counted from conserved nests only. Figure 1 shows the average number of eggs per nest. There is no data for May, 2001.

FIGURE 1:



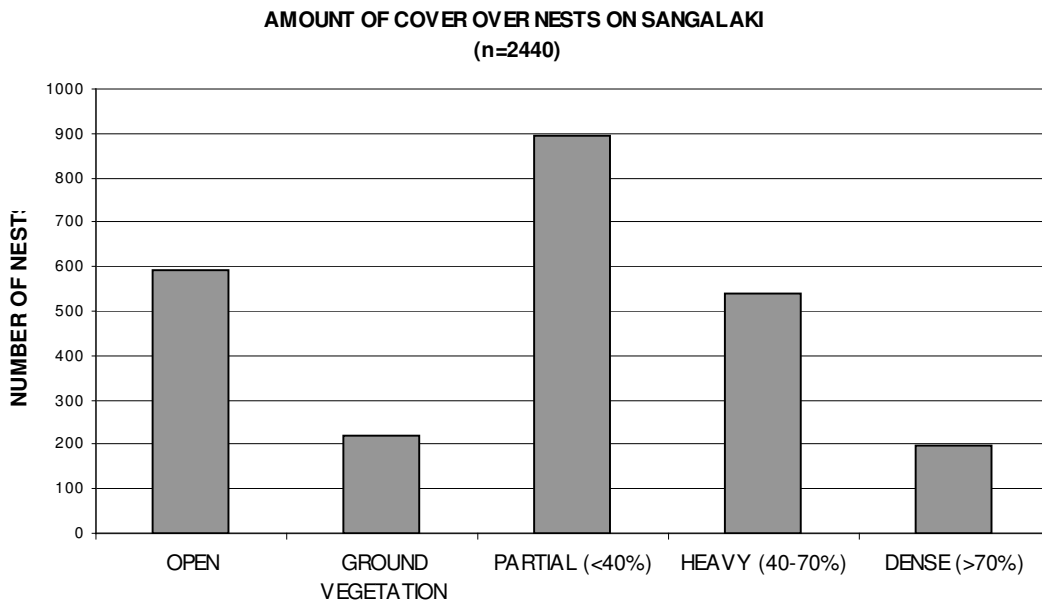
Numbers of nests were counted while accompanying the collectors each morning. Unsuccessful emergences were defined as a crawl that did not result in successful nesting. Figure 2 shows the average number of nests and unsuccessful emergences. The increase in unsuccessful emergences in the fall of 2001 may be at least partially explained as the result of human disturbance and misinformation on the part of the collectors. The government had declared that collecting on Sangalaki would stop as of Jan 2002. The collectors learned this in the fall of 2001 and immediately began going out at night to collect additional nests to increase their egg take. This activity undoubtedly disturbed turtles coming ashore to nest. It also resulted in successful nestings sometimes being counted as unsuccessful, as the contents had already been removed, but they would not admit to this. (If it was clear to us that this had happened, it was counted as a nest for the purposes of this data.)

FIGURE 2:



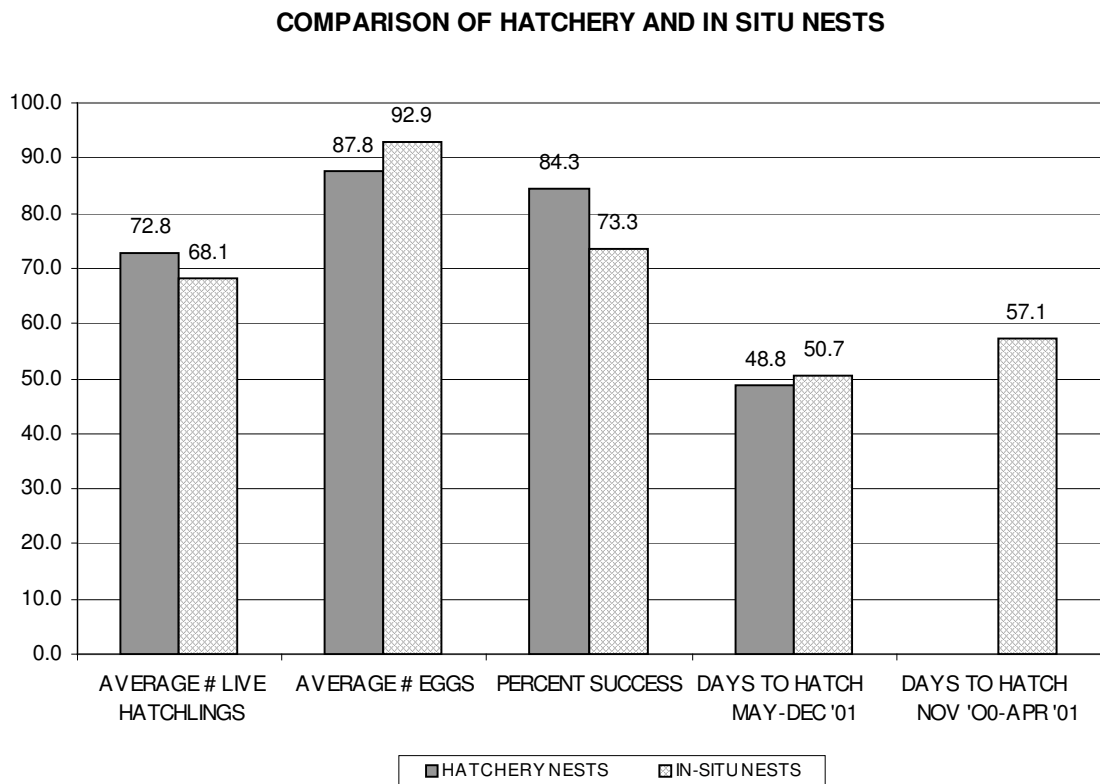
Data was collected on the percentage of vegetative shade over the turtle nests when laid. Categories were open (no shade), ground vegetation (low lying vine-type plants), partial, heavy, and dense cover, which could be from bushes or trees. The determination was, of course, somewhat subjective. Figure 3 shows the results.

FIGURE 3:



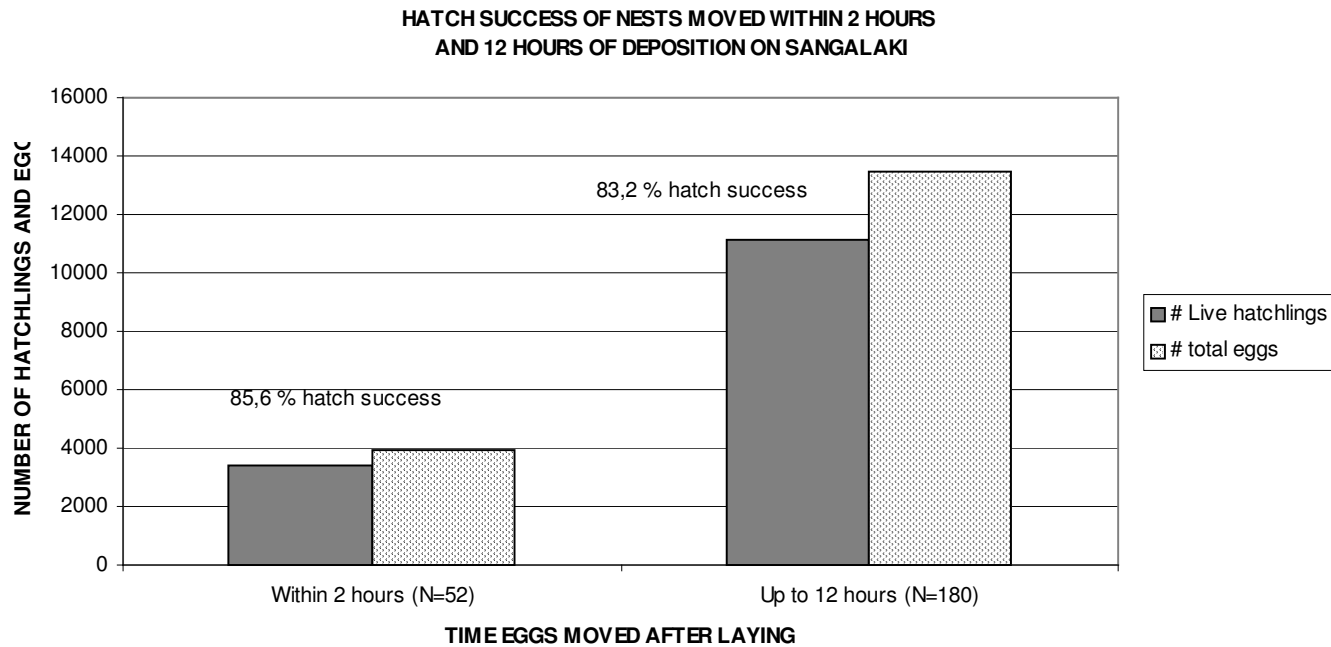
Between March 2001 and January 2002, data was collected from 232 nests that were moved to the hatchery. Conditions in the hatchery matched natural conditions as closely as possible. Parts of the hatchery were heavily and partially shaded, and part left open. Nests were buried to a depth that as closely as possible corresponded to the original nest depth (45-80 cm, usually, for the nest bottom depth). Data was also collected from 177 in situ nests. These nests included conservation nests that were thought to be in a good spot (not in danger of inundation) and nests adopted by resort guests. Figure 4 shows some comparison data between the hatchery nests and in situ nests. Please note that the average number of eggs for the hatchery data reflects that some very large nests were split into 2 smaller nests, and also does not include any eggs broken during the nest locating procedure. Note the high hatch success rate for the hatchery nests.

FIGURE 4:



Generally, nests that were relocated to the hatchery were moved in the morning between 6 and 8 a.m., which was up to 12 hours after egg deposition. For a period of time, we were allowed to relocate nests at night, and were thus able to move the eggs within 2 hours of deposition. Figure 5 shows the relative hatch success of nests moved within 2 hours or up to 12 hours after deposition.

FIGURE 5:



Additional notes:

For the year 2001, the average number of nests laid was 13, with a monthly average ranging from 7.6 to 19.8. Even allowing for large interyear variations, this seems to confirm a continual drop in the numbers of nesting turtles in this area. Other factors besides egg harvesting probably affect the decline of this population:

1. There are a significant number of large logs that wash ashore from logging operations upriver in Berau that impede the turtles' access to nesting areas.
2. Although turtle meat is not consumed in the Berau area, vessels have been caught turtle fishing there to supply the Balinese market. Hawksbill turtles, which nest infrequently on the beaches but use the area as foraging grounds, are also killed for their decorative shells.
3. Predation by monitor lizards, ghost crabs, and predatory birds may be very high. The presence of food scraps at the resort may be increasing the monitor lizard populations. Rats were a problem until 2003 (Meier, 2004).
4. Reef bombing, though illegal, is practiced nearby by local fishermen, destroying habitat, as well as killing turtles.
5. The presence of the resort has introduced artificial lights onto the island, and the lights disorient the hatchlings, often preventing them from finding their way to the ocean.

In January 2002, the Berau government announced a ban on egg collecting on Sangalaki Island. Turtle Foundation is training, supplying and supporting local rangers to monitor and enforce the ban.

In 2003, Turtle Foundation funded a rat eradication program on the island to get rid of ship rats that infested the island and were preying on both eggs and hatchlings. In 2004 a return trip to the island confirmed no rats had survived on Sangalaki. (Meier and Varnham, 2004).

Turtle Foundation is a non-profit organization and currently has offices in Germany, Switzerland, the United States, and Indonesia.

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