

# Leatherback turtle synthesis

## Nesting areas

This study has confirmed that there are four main areas of leatherback turtle nesting in the Indian Ocean and South East Asian region. These probably represent separate large-scale management units.

### *1. Southwest Indian Ocean - South Africa and Mozambique*

The population nesting in South Africa has rarely averaged more than 100 females nesting annually within the index beach (56km of the 200km beach). Data from the index beach shows a rise from 10 to 20 nesting females per year in the 1960s, and up to approximately 100 nesting females per year in the 1990s, but in the last four years it has declined to approximately 20 to 40 nesting females per year visiting the index beach per year. The study in South Africa is one of the longest, continuous studies of leatherback turtle nesting in the world. The numbers nesting in Mozambique are not well documented, but based on data presented in this report from 1994 to 2004 it is likely that approximately 10 females nest per year in southern Mozambique (see Mozambique and South Africa sections). In addition, there does not appear to be an increase in the number of leatherback turtles nesting per year in southern Mozambique to offset the decline in South Africa.

### *2. Bay of Bengal and north-eastern Indian Ocean - Sri Lanka, Andaman & Nicobar Islands (India), Thailand and Sumatra – Java and other islands of southern Indonesia and Arnhem Land (Australia)*

There are few continuous long term data sets at any of these locations. Data from recent years, presented in this report, indicate that the nesting population in Sri Lanka might be in the order of 100 to 200 females per year (based on one year of data), for the Andaman and Nicobar Islands it is approximately 400 to 600 females per year and in Thailand fewer than 10 nests (that is probably not more than 3 or 4 females) are laid per year. An interesting pattern is emerging from two geographically close rookeries in Java. At Meru Betiri the number of leatherback turtles nesting each year has declined from approximately 20 females per year in the early 1980s down to less than five females per year in the early 2000s. In contrast, at a neighbouring beach, Alas Perwo, the very small nesting population may have doubled over the same time period (from approximately 500 eggs laid per year (1 or 2 females) up to 1000 eggs laid per year). Sightings of nesting in Arnhem Land (northern Australia) are irregular but the area has been incompletely surveyed.

### *3. Southwestern South China Sea – Malaysia, Viet Nam and other minor nesting out to Japan*

The Malaysian rookeries have undergone a well-documented decline from approximately 5000 nests per year in the 1960s down to less than 10 nests per year in the 2000s. This is one of the best-studied, most dramatic examples of decline in a nesting population of marine turtles. While there are no detailed data from Viet Nam, community surveys reveal that the population has declined from an estimated 500 females per year (equivalent to thousands of nests per year) prior to the 1960s down to less than 10 nests per year in recent years.

### *4. Western Pacific – Indonesia (northwest Papua), Papua New Guinea, eastern Australia*

The leatherback turtles nesting along the north coast of New Guinea (Indonesia and Papua New Guinea) are from the same genetic population as females nesting in the Solomon Islands. There are few long term data for either location (see Indonesian and Papua New Guinea sections). Data from recent surveys at both locations indicates that the total nesting population is approximately 1000 females per year. Surveys along the Papua coast are incomplete. The small eastern Australian population identified in the 1970s is approaching extinction, no nests have been recorded in eastern Australia since 1996, and track sightings in northern Australia are irregular.

## Foraging grounds and migratory corridors (non breeding areas)

This study has confirmed that there are few data on the foraging grounds and migratory corridors of leatherback turtles in the IOSEA region. The data presented in this report indicates that leatherback turtles have been reported from the waters of 32 of the 44 nations in the Indian Ocean and South East Asian region. However, in most of the countries that have no records of leatherback turtles, the main fisheries are shallow water artisanal fisheries, and in most cases there have been few efforts made to collect fisheries based bycatch information.

The use of satellite telemetry to track post-nesting leatherback turtles has revealed that turtles from nesting beaches within the IOSEA region use the southern Atlantic, Southern and Pacific Oceans (northern and southern). In particular, migration data from post nesting females in South Africa show that the leatherback turtles migrated south into the southern ocean, and in several cases over into the southern Atlantic Ocean. In addition, post nesting leatherback turtles tracked with satellite telemetry from West Papua swam northwards into the northern Pacific Ocean whereas those tracked from Papua New Guinea migrated into the southern Pacific Ocean. Aside from these data, and those collected from tag recoveries from peninsular Malaysia there is little known about the “at sea” components of leatherback turtle life history in the IOSEA region.

### **Gaps in the basic biological information**

*Population genetics* (Assessments of marine turtle population genetics are used to determine distinct breeding populations).

There are wide gaps in our understanding of leatherback turtle population genetic profiling within the IOSEA region. To address this gap, and determine the genetic structure of leatherback turtle populations the following rookeries need to be sampled and compared to each other, as well as to published genotypes from Malaysia, Indonesian West Papua and South Africa:

- Australia (northern and eastern)
- Andaman and Nicobar Islands
- Mozambique
- Sri Lanka
- Sumatra
- Java
- Thailand
- Viet Nam

Knowledge of these genotypes will facilitate identification of the origin (by breeding area) of leatherback turtles being captured throughout their dispersed foraging and migratory distribution of the IOSEA region.

### *Life history attributes*

#### *A. Nesting populations*

There are substantial gaps in our knowledge of life history attributes for several of the leatherback turtle nesting sites in the IOSEA region. The specific gaps vary between locations, and details can be found by referring to sections on India, Indonesia, Malaysia, Mozambique, Papua New Guinea, Sri Lanka, South Africa, Thailand and Viet Nam. Data on life history attributes are necessary for the development of accurate population models. It is preferential that life history parameters be collected from at least one rookery per management unit. The gaps in life history attributes include:

- The number of clutches per female per year/nesting season
- The number of years between breeding seasons
- The rate of recruitment into the breeding population
- Nest success and hatchling recruitment
- Internesting areas

Of the 10 nations with current leatherback turtle nesting five have included some of the leatherback turtle rookeries within protected areas.

#### *B. Non-nesting beach aspects*

Within the IOSEA region there are substantial gaps in our knowledge of leatherback turtle foraging areas, habitat use (oceanic and coastal), internesting area habitats, diet, growth, age and survivorship. While there have been substantial tracking and foraging area studies in eastern Pacific and western Atlantic leatherback turtle populations, few data exist for the Indian Ocean region, with the exception of the South Africa and the Papua region.

## Gaps in management

### *Bycatch and fisheries mortality*

Leatherback turtle fisheries bycatch was reported to occur at varying levels of intensity in 25 of the 44 nations in the IOSEA region, not recorded in 13 nations and undetermined in 6. This bycatch has not been quantified in most countries, and fewer bycatch data exist for the high seas fisheries. There are also gaps in the ecological, social and economical aspects of marine turtle bycatch. Bycatch and fisheries based mortality needs to be addressed by Fisheries and/or Government organizations. This will take a coordinated international effort similar to those undertaken in the Atlantic and Pacific Ocean fisheries.

### *Egg take*

The direct take of leatherback turtle eggs occurs in each of the leatherback turtle breeding areas to varying degrees (encompasses both legal and illegal take). However in most cases the level of exploitation in relation to the size of the population and the socio-economic and cultural factors related to the use of eggs are unknown. Improved knowledge of these factors will enable the level of exploitation to be assessed for sustainability and managed accordingly. Every effort must be made not to repeat what has happened at Rantau Abang.

### *Hatchling production*

Aside from data collected from the hatchery programme in Malaysia and South Africa, there have been no detailed assessments of the hatchling production at any of the rookeries in the IOSEA region. Without these data it is impossible to conduct meaningful population assessments and design management strategies. While natural (in situ) incubation is the preferred management option for egg incubation, hatcheries are used as a management tool in one nation (plus some of the commercial hatcheries in Sri Lanka occasionally incubate leatherback turtle eggs).

Rising beach temperatures associated with climate change can be expected to negatively impact on population sex ratio and incubation success of leatherback turtle eggs. No adequate monitoring appears to be in place in any of the IOSEA countries to guide rookery management in response to climate change.

### *Standard monitoring*

Monitoring of several of the rookeries in the IOSEA region has been initiated relatively recently. There is a need for managers in each location to develop standard monitoring protocols that remain consistent year to year, and complements existing projects. Mostly importantly, if whole season monitoring is not possible at all rookeries, index beaches and standard monitoring periods need to be determined and used annually. It is also preferable that tagging projects double tag turtles (PIT and flipper) to minimize problems of tag loss. The introduction of standard practices will substantially improve the ability to use the data effectively in the future.

## Additional issues for leatherback turtles in the IOSEA region

### *Direct harvest of turtles*

A traditional harvest of leatherback turtles occurs in the Kei Islands of Indonesia. While research addressing social, economical and cultural aspects of this harvest are underway (see Indonesian section), gaps exist with regard to understanding biological aspects of the harvest (size, age class, sex and maturity). The combination of biological, social, economic and cultural data can be assessed to determine ecological sustainability and help to manage any trade-offs (social, economical, cultural or ecological) that may occur as a result of management.

### *Predation of eggs*

Depredation of eggs by pigs and dogs presents a problem in at least several locations (Andman and Nicobar Islands Papua New Guinea and Indonesian West Papua). Turtle conservation groups in these regions would benefit from assistance in management of the problem e.g. by predator removal or nest protection programs.

### *Leatherback turtles nesting in South Africa*

The leatherback turtle nesting population in South Africa and Mozambique was rising and has recently undergone a marked decline in annual nesting numbers (based on data from the South African index beach). In addition, an increase in the proportion of recruits (identified as first time nesting turtles) to

the nesting population has occurred. Therefore, close attention should be paid to the assessment of current and future nesting leatherback turtle data so that management and remedial actions can be quickly taken if needed.

*Incomplete nesting distribution data*

There are gaps in our knowledge of the distribution and size of current and/or historical leatherback turtle rookeries along the Indian Ocean southern margin of Indonesian (Sumatra, Java and out to the east) and the islands on northern Indonesian Papua and southeastern Philippines. These data could be collected from a combination of ground based and aerial surveys in each of the respective areas.