

# **IMPACTS OF THE RECENT TSUNAMI ON THE REKAWA PROPOSED COASTAL SANCTUARY AND TURTLE REFUGE**

by

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## **INTRODUCTION**

The Rekawa coastal stretch constitutes a section of the south-eastern Sri Lankan coastline, located in the Hambanthota District, about 200 km away from Colombo. The area contains an array of coastal, terrestrial and wetland habitats, including managed landscapes. Rekawa Lagoon lies in the narrow intermediate zone climatic belt, and hence receives an annual rainfall between 1270-1910mm. The average temperature in the area ranges between 26.6 to 27.2 °C (Ganewatte et al., 1995; CEA/Euroconsult,1995, IUCN Sri Lanka, 2004). The coastal wetlands in the area include the Rekawa lagoon (250 ha) and canal system which bring irrigated freshwater into the lagoon system and connects it to the sea with two outlets, one which is natural in Kapuhenwala and the other through a man made canal in Medilla. The brackish water environment provides an ideal habitat for Mangroves. Several sub types of Mangroves, based mainly on floristics, can be found in the Rekawa area. These include the *Lumnitzera* dominated stands (Rekawa), *Ceriops* dominated stands (Medilla), *Avicennia* dominated stands (Kapuhenwala) and Mixed stands (Rekawa).

The beaches of the Rekawa area are composed of a predominantly sandy coastline lying approximately in a “West South West - East-North Easterly” direction. The sandy beach is interspersed by a rocky headland at beliwinnegoda, supporting coral reefs in the Oruwella area.

The sub-tidal area is composed mainly of a long barrier beach and long ridges of sandstone running parallel to the coast. There are areas of good coral growth in this region and reef formation is associated with the rocky headland. The coastline is subjected to strong wave action and high turbidity for most part of the year. The diversity of life on these reefs appears to be lower than on major coral reefs elsewhere in the country. Corals are composed mainly of more robust growth types and sediment tolerant species.

The area is also an important nesting ground for sea turtles. All Five species of marine turtles, namely, Leatherback Turtle (*Dermochelys coriacea*), Green Turtle (*Chelonia mydas*), Olive Ridley Turtle (*Lepidochelys olivacea*), Loggerhead Turtle (*Caretta caretta*), and Hawksbill Turtle

*(Eretmochelys imbricata)* visit the Rekawa beach. Data collected from the on turtle nesting can be as follows;

The turtle landings and egg laying in the Rekawa beach for the year 2003, in ascending order of species abundance, with peak nesting months are summarised as follows:

1. Green Turtle – April, May, June (starting from March)
2. Olive Ridley Turtle – January, February, March
3. Leatherback Turtle – May, June, July (goes till August)
4. Logger-head Turtle – May, June, July
5. No data on the Hawksbill Turtle.

*Source: Kalametiya Range Office, Department of Wildlife Conservation.*

The Coastal stretch of Rekawa proposed sanctuary consists of two major bay segments

1. The beach stretch extending from Medilla to Turtle Point is a broad bay of approximately 6km in length and consists of several geomorphologic formations of beach. They are, from west to east, estuarine mangrove systems (in Medilla and Kapuhenwala areas), gently sloping, broad sandy beaches backed by coconut plantations and home gardens (the Rekawa beach) and rocky shores (about 500m in the Turtle point - near Beliwinnegoda). – See sketch map 1
2. Oruwella area - The western flank of a narrow bay extending towards east from the Turtle point – See sketch map 2

## **TSUNAMI RELATED IMPACTS ON THE REKAWA COASTAL STRETCH**

A rapid environmental assessment was conducted in the Rekawa coastal stretch on the 14<sup>th</sup> and 15<sup>th</sup> of January 2005, to gather information on the damage caused to the coastline and its biodiversity due to the Tsunami. Qualitative observations were made on the structural damage caused to the habitats/vegetation types of the area, and information was also gathered from (DWC) managers and the local communities living around the Sanctuary.

In general, the western flanks of the two major bay segments within the Rekawa coastal stretch and the adjoining villages have been damaged from the tsunami waves. The level of incursion of sea water resulting from the tsunami waves, including the affected areas in the Proposed Sanctuary is indicated in Figure 1.

The following observations were made in the Rekawa coastline, subsequent to the recent Tsunami.

## ***Beach segment 1***

### ***Medilla***

In Medilla, the broad, low stature beach, which is gently sloping and with occasional *Pandanus* stands was heavily disturbed due to constructions related to tourism industry. The beach was immediately backed by settled areas where a number of hotels and houses are located starting at 40m line from the high tide line. These hotels and settlements that were constructed destroying previous mangrove stands on the beach front, have been devastated.

The man-made lagoon outlet has been the main entry point for the destructive Tsunami wave. The mangrove strip of 10-20m width flanking the man-made canal has been badly affected for about 400m inland along the canal.

The mangrove stand found landwards from the above settled areas has buffered the impact of Tsunami waves and as a result, no significant damage was observed beyond the 200m line from the sea. The first 30m of the mangrove stand has absorbed the destructive force and has been badly affected. However, this absorption has reduced the force of the wave and water has flowed inland smoothly up to 700m causing minimal physical damage.

### ***Kapuhewala***

The natural estuary of the Rekawa lagoon is situated in Kapuhewala with a narrow strip of mangroves growing along the sides of the outlet and canal, on which the tsunami waves have had a major impact. The tsunami wave has funnelled in through the estuary.

The damage has extended inland up to about 500m from the estuary mouth as the narrow mangrove strip directly facing the wave could not withstand the force of it and was hence uprooted. In contrast the broad mangrove vegetation located about 200 m north of the mouth has successfully absorbed the destructive force by sacrificing its frontline strip.

The speed with which the water moved along the canal upwards has destroyed the concrete bridge located some 150m away from the estuary mouth and most of the mud previously accumulated at the bottom of the estuary and canal has flushed in to the lagoon increasing the depth of canal.

### ***Rekawa beach***

With the elevated sandy beach protected with a good fence of *Pandanus* vegetation and backed by a coconut plantation in the beach front, tsunami water has penetrated inland only up to about 100m causing little or no structural damage. The beach is broad (about 50m) with a gentle slope (25 degrees), and the beach crest is approximately 3.5 m elevated

The stand of *Pandanus* located on the beachfront of this area was affected and about 50% of the stand were damaged.

A small salt marsh behind the beach and the coconut plantation was affected by deposition of transported sand.

The coconut plantation slopes into a broad mangrove strip at the shore of the Rekawa lagoon running parallel to the coastline. No structural damage was observed in both coconut land and the mangrove.

The Turtle Point in the east most segment of the Rekawa beach is a rocky shore backed by a small cliff, which was not severely affected by tsunami waves, except for some erosion of soil and boulders.

### ***Beach segment 2***

#### ***Western Flank of the narrow bay from Oruwella to Kahanda estuary***

The coastal geomorphology of this stretch can be described as a narrow bay of which the western flank is more affected. It was observed that the currents have come inland with higher force in the western end of the narrow bay possibly as a result of trenches etc, in the sea bottom topography and/or the direction of the tsunami wave.

Only the western flank of this bay segment (i.e. Oruwella area) is included in the Rekawa proposed sanctuary due to the importance of the near shore coral reefs found in this area.

#### ***Oruwella***

The coastline of Oruwella area consists of a narrow (about 10m) and steep (50°) beach with very little *Pandanus* at the beachfront and without any other beach vegetation or sand dune formation. The area was moderately settled, and several houses and temporary huts constructed in the Oruwella fishery harbour, where the distance from the high tide line to the nearest building is as low as 20 to 30m. The beach backing vegetation is mainly coconut plantation and then further behind home garden and scrublands beyond.

There is a fringing coral reef starting about 50m away from the beach in this area. This coral reef was severely mined by the local community during the past decade. Destructive fishing practices such as bottom set netting was also practiced here.

The water has penetrated inland up to about 500m causing major damage to the vegetation, landscape and properties up to about 400m from the beachfront.

Most of the scrubland found in the area is severely damaged, uprooted and most of the buildings collapsed due to the higher force of suction from receding waves.

Coral debris could be found with the heavy deposition of transported sand in disturbed scrublands and home gardens even 30 to 40 m away from the beach.

This area clearly shows the negative impact of large-scale coral mining and beachfront clearance and constructions.

**Table 1: A qualitative analysis of the Tsunami water incursion at a few strategic locations within Rekawa coastal stretch in comparison to the pre tsunami situation**

| Location                         | Seaward/beach front features  | Level of modifications (Pre tsunami) | Tsunami incursion of sea water (m) |
|----------------------------------|---|--------------------------------------|------------------------------------|
| Segment 1<br>Medilla beach front | Artificial canal system and outlet, low stature sandy beach, beach front constructions (hotels etc), original beach scrub cleared                                     | High                                 | 700                                |
| Segment 1<br>Rekawa coconut land | High stature sandy beach (>2m in height with a moderate slope) and >5m tall broad sand dune with a mature coconut plantation established without exploiting the dune. | Moderate                             | 60                                 |
| Segment 2<br>Oruwella            | Narrow bay and low stature narrow sandy beach, and severely exploited near-shore coral reef   | High                                 | 500                                |

### ***Impacts on species***

Freshwater fish species inhabiting low-saline lagoons have died due to increased salinity. According to information gathered from fishermen, species of marine fish that were not previously documented in lagoon water are now found in the Rekawa lagoon.

Apart from fish, other dead vertebrate animals observed in the Rekawa area include two specimens of Mouse Deer (*Tragulus meminna*), and a Land monitor (*Varanus bengalensis*).

A large number of turtle nests in the Rekawa beach had been destroyed by the Tsunami waves. However, it has been observed that the Green Turtle (*Chelonia mydas*) and the Olive Ridley (*Lepidochelys olivaceae*) have gradually started to visit and lay eggs on these beach areas subsequent to the Tsunami. However, numbers are small compared to the pre-tsunami situation.

The invasive alien Prickly Pear Cactus (*Opuntia dillenii*) that occurred in beachfront habitats have got uprooted and transported to distant inland areas by the Tsunami waves, and these propagules have now started to colonize in new areas.

### **OBSERVATIONS AND REMARKS ON NATURAL RECOVERY OF AFFECTED HABITATS AND SPECIES**

The eroded beach stretches and damaged beach front vegetation of the Rekawa coastal segment would be able to recover naturally over a short period of time.

The gentle sea-shore vegetation including *Pandanus* stands on the affected beach is likely be able to recover naturally from the remaining vegetation, probably within 1-2 years.

The small area of slat marsh which was affected by the sand transported with the tsunami wave will need some removal of sand and restoration interventions for recovery.

Some of the destroyed mangrove stands especially in Medilla and Kapuhenwala will need some restoration interventions.

The impact on Marine turtle nesting in Rekawa is not very significant. Even though the nesting frequencies are somewhat decreased after the tsunami, they will recover over short time span.

The terrestrial habitats inundated by sea water may be threatened by rapid invasion of the invasive alien Prickly Pear Cactus (*Opuntia dillenii*), as they are transported and deposited in new locations.

## RECOMMENDATIONS FOR ACTION

- The man-made infrastructure (tourist hotels, residences etc.) located in coastal reservations and other highly sensitive areas, which have been subjected to severe devastation by the Tsunami, should be translocated into safe inland areas. This includes houses near Wellaodae and Oruwella fishery harbour, and the tourism areas in Medilla and Kahandamodara.
- Reconstruction activities in sensitive coastal reservation including low-lying beach front, and borders of estuaries and lagoon outlets should be prohibited.
- Propagules of the invasive alien Prickly-pear cactus (*Opuntia dillennii*) carried into interior areas by the Tsunami waves should be collected and burnt.
- The non-biodegradable material and concrete structures scattered on the beach and in other natural ecosystems should be collected and dumped in suitable locations.
- Measures should be taken to strictly protect the intact mangrove stands and coral reefs in the RUK area.
- Measures should be taken to expedite declaration of the proposed Rekawa coastal sanctuary and turtle refuge area.
- A permanent station of the Department of Wildlife Conservation should be established in the Rekawa turtle refuge area, in order to continue the turtle in-situ conservation activities.
- Implement an awareness programme for local communities in the in the Rekawa area, highlighting the importance of maintaining coastal natural ecosystems for protection against natural disasters such as Tsunamis, cyclones and hurricanes.
- Identify suitable areas (outside the biodiversity rich habitats and at least 200m away from the proposed sanctuary) for relocation of affected villagers.
- Areas that originally harboured intact mangrove stands, which were subsequently exploited, should be considered for ecosystem restoration.

- Measures should be taken to restore certain mangrove patches that were severely affected by the Tsunami (i.e., in Medilla, Kapuhenwala, Wellaodae,).
- The local community groups that were involved in tourism activities related to in-situ and ex-situ conservation of marine turtles that visit the Rekawa area should be supported to re-start their work, and best practice guidelines for hatchery management and in-situ conservation of turtles should be introduced.
- A monitoring programme should be implemented in the Rekawa area to document the following aspects
  - Regeneration of affected coastal habitats and ecosystems
  - Changes (if any) in the composition of fish species in the Rekawa lagoon, with the support of local fisheries societies.
  - Monitor the spread of invasive alien plant species Prickly pear cactus in areas affected by the Tsunami.
  - The population status of turtles visiting the beaches of the Rekawa area for nesting purposes
  - Monitor the coral mining and destructive fishing practices such as bottom set netting that affect coral reefs.



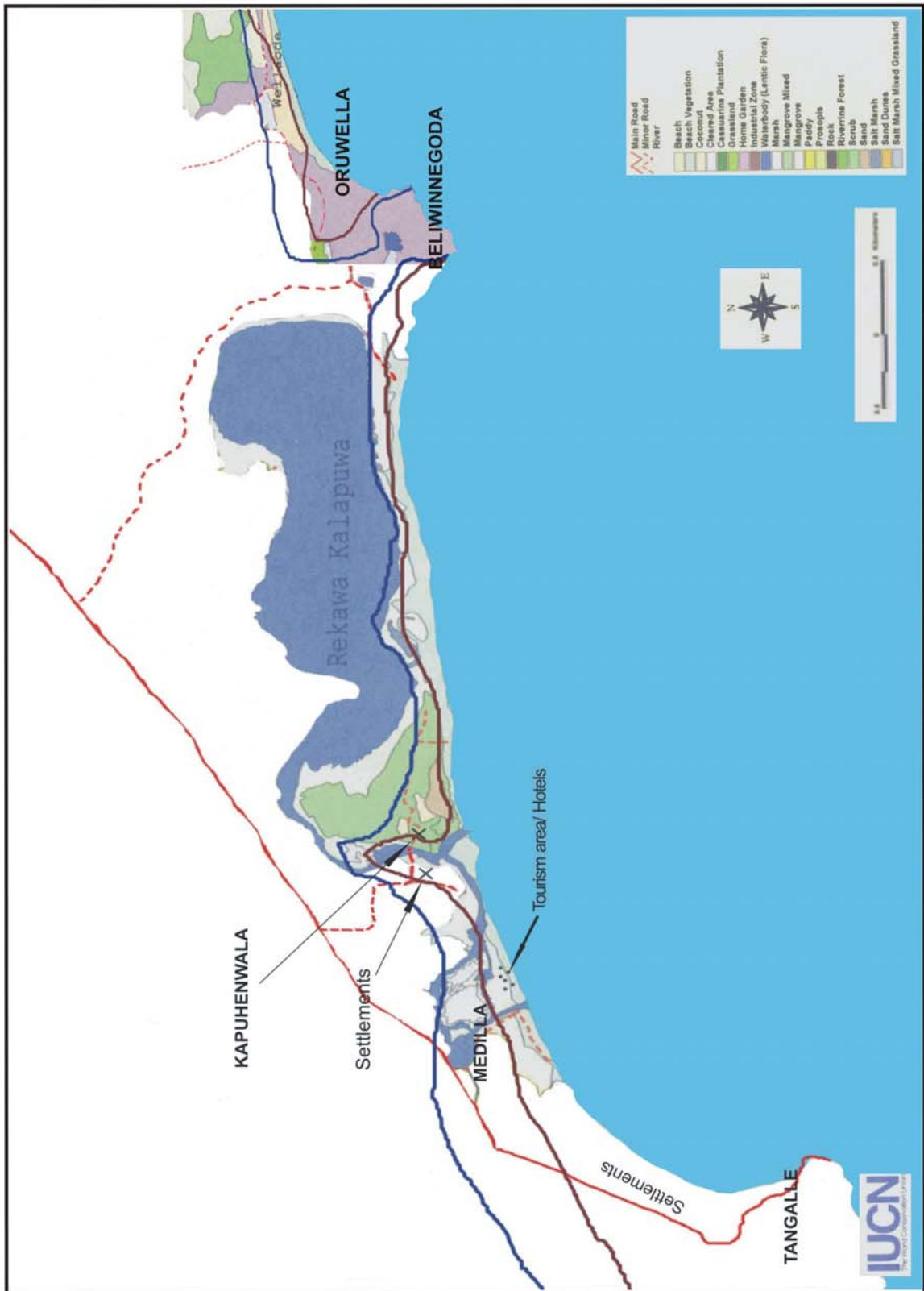


Figure1:- Tsunami affected areas in Rekawa proposed sanctuary

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