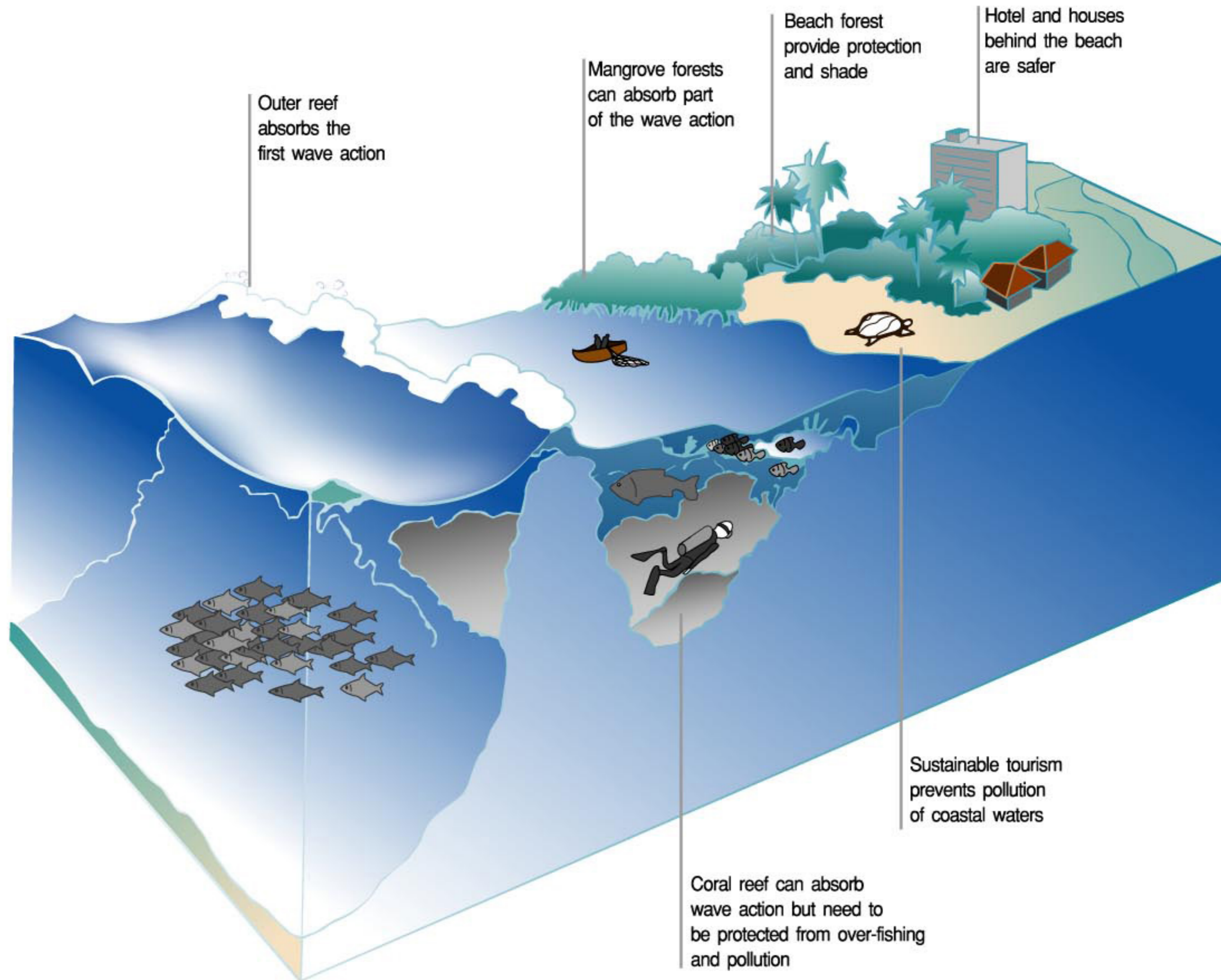




## Assessing the Damage: Above the waterline



It is almost one year since the unprecedented destruction of the Asian Tsunami Disaster took place. One year in which to grieve and mourn the loss of so many lives, one year in which to assess the extent of the destruction and, most importantly, one year in which to regroup, rebuild and restore.

In Thailand the environmental destruction associated with the tsunami occurred in one of its most important ecological regions - the Andaman Sea,- an area so rich in biodiversity that it was identified by WWF International as one of its' "Global 200" Ecoregions vital for saving life on Earth.

The devastation to beach resorts, hotels, national park facilities, fishing villages and other man-made structures has been widely reported.

Less obvious is the destruction wreaked on the environment.

### Beach Ecosystems

- Unlike coral reefs, no extensive surveys have been carried out on beach environments with the exception of sea grass beds.
- The wave caused serious erosion damage to many beaches along the Andaman coastline including important turtle nesting sites.

- Some nesting beaches lost 30-70cm of their sand layer, greatly reducing the area above the high tide mark,- vital for turtle egg-laying.
- Beach damage has been worsened by destructive post-tsunami building works -for example, the concrete sea-wall being constructed just south of Had Tay Muang National Park.



## Sea Grass Beds

- Sea grass beds are widely recognised as important nursery grounds for marine life notably dugongs and green turtles.
- Evidence has shown that the presence of sea grass beds prevented the erosion of beaches during the Tsunami; this is particularly evident at Kuraburi, Phang-nga Province.
- A DMCR survey of approximately 70% of sea grass beds along the Andaman coast (80 sq.km in total) revealed that only 5% of the beds were damaged with only 1.5% suffering total habitat loss.

## Mangroves

- Mangroves are a habitat for a wide array of marine life supplying an important source of livelihood for many local people.
- There is evidence that healthy mangroves and coral reefs reduced the impact from the wave on the coastline (UNEP Report: After the Tsunami: Rapid Environmental Assessment)
- Only 300 hectares (or less than 0.2%) of the mangrove forests were damaged by the Tsunami, almost all in Phang-nga Province. All damaged mangrove areas have been replanted.
- While intact mangrove forests clearly withstood the Tsunami, they have faced a harder time withstanding the onslaught of road construction, coastal settlement, tourism development and the rapid expansion of coastal aquaculture.

## Beach Forests

- Beach forests were significantly affected and continue to be an area of concern.
- Many areas of beach forest were lost due to the impact of the wave itself.
- Salination resulting from seawater intrusion has subsequently become a primary reason for further dying-off of beach forest. This dying-off is particularly apparent in Phra Thong and other coastal areas of Phang-nga Province.

- The loss of beach forest has a negative effect on other ecosystems as they act as a stabilising presence preventing further beach erosion and the consequent sedimentation of mangroves and sea grass beds.
- Although almost all impacted beach forests have now been replanted, they may take many decades to recover due to the low fertility and high salt-content of the soil.
- Only a small percentage of the newly planted trees will survive. Often, as is the case at Laem Pakarang, these replanted forests are not properly maintained after the publicity of planting has faded.

## Saltwater Intrusion

- Freshwater systems such as swamp and marsh ecosystems are a haven for small fish and bird species.
- They are usually located behind protective bands of sand dune and beach forest: the sudden influx of saltwater into these sensitive ecosystems had an immediate impact on their biodiversity.
- Even though most of these systems have subsequently been cleaned and restored, salt left behind will delay their recovery period indefinitely.
- In some cases wells have needed to be re-drilled to provide fresh water supply for local consumption.

## Infrastructure

- Damage to the infrastructure of the 13 marine national parks and the numerous research stations and hatcheries in this region, added up to over US\$5 million.
- The turtle breeding and conservation center at Tap Lamu Naval Base in Phang-nga was totally destroyed, with the loss of over 2,000 turtle eggs and hatchlings.
- The turtle hatchery at Had Tay Muang National Park- the only location in Thailand where four species of marine turtle nest side by side was seriously damaged.
- The Naucrates Turtle Conservation project on Phra Thong Island, and the Wild Animal Reserve project in Ranong were both also badly damaged.



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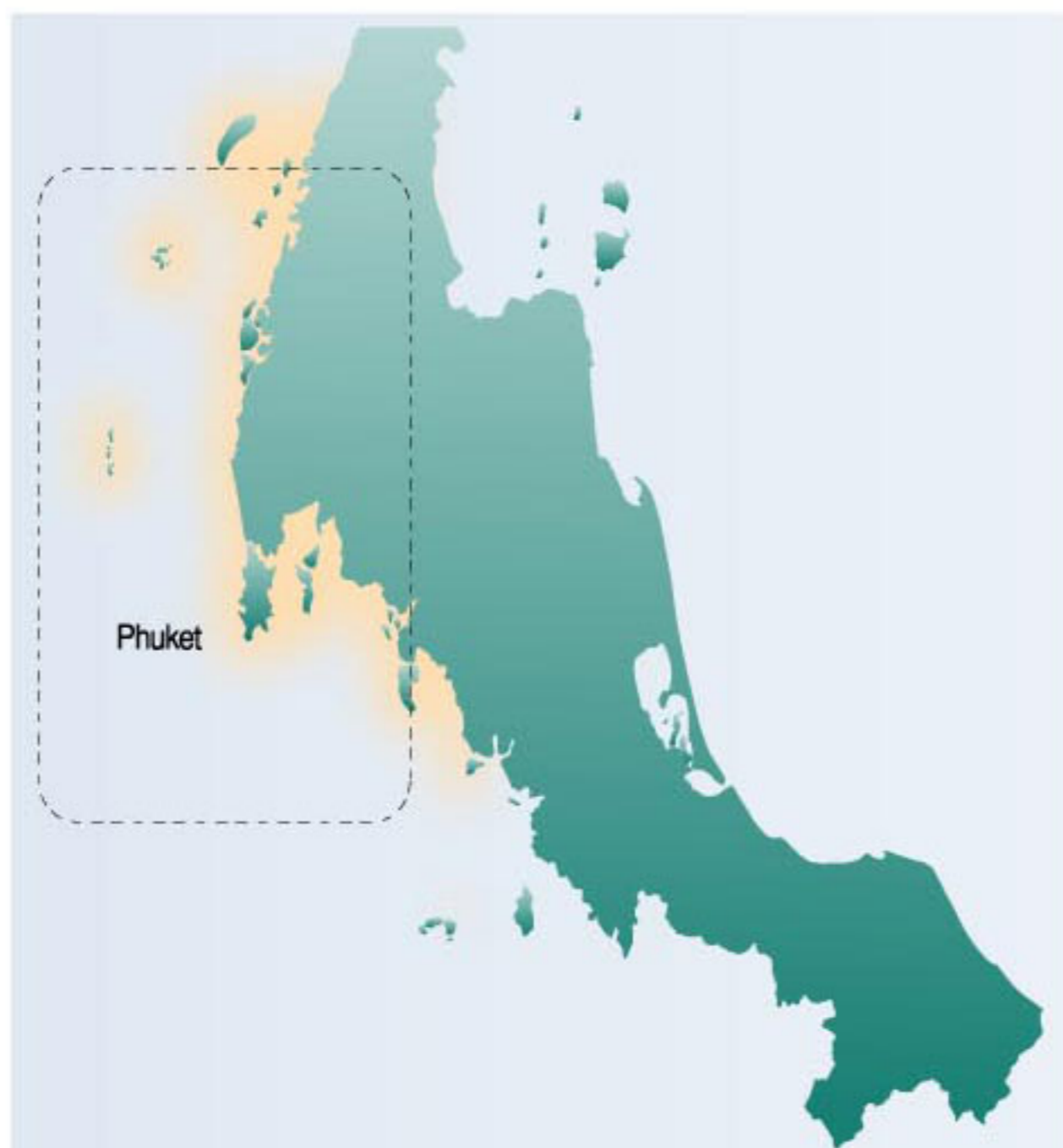
# Assessing the Damage Below the waterline



The Andaman Sea is one of WWF's global 200 Ecoregions - special places selected from around the world that are the most important areas for nature conservation on our planet.

In Thailand, "Jewels of the Andaman" such as the Similan Islands, the Surin Islands and Phra Thong Island, include Thailand's largest and most pristine reef systems, and vital marine turtle habitat.

Extensive mangroves, sandy coastlines, sea grass beds and deep sea valleys make the Andaman Sea a haven for a spectacular array of marine animals including four varieties sea turtles (all endangered or threatened), dugongs, Irrawaddy dolphins, several species of whales and home to at least 600 species of reef fish.



### Marine Life

Fish and other marine life appears generally unscathed, apart from benthic (bottom dwelling) organisms that have disappeared along with fine sand exposing rubble. The wave did affect some of the larger marine animals:

- At least 37 marine turtles were found stranded ashore. Of these 6 perished but 26 were rescued and released. Another 5 were so badly injured that they needed to be transferred to the Phuket Marine Biological Center, for long term care.
- A number of turtle projects were impacted including the Royal Thai Navy Base at Thap Lamu (completely destroyed with the loss of 2000 turtles); the turtle hatchery Had Tay Muang National Park; the Naucrates Project on Phra Thong and the Wild Animal Rescue (WAR) Turtle Project in Ranong.
- Three dolphins were washed ashore, including a 120 kg female humpback dolphin (*Sousa chinensis*) that was released back into the wild. The two other two dolphins; a bottlenose (*Tursiops aduncus*) from Phang Nga, and an unidentified small-sized toothed dolphin from Phuket both perished.
- At Thap Lamu in Phang-nga, a large male dugong weighing 310 kg and 2.75 meters in length was found over 1km inland, a clear indication of the force of the wave. The sea cow was released back into the wild, but washed ashore less than 3 weeks later close to its release location



## Coral Reefs

Although the Andaman Sea region contains only one third of Thailand's coastline it accounts for over half of its coral reefs. In terms of coral species alone it is richer than the Great Barrier Reef.

These reefs are home to a huge array of coral and reef fish species, contributing significantly to the Thai economy through tourism activities including world famous dive sites such as Richelieu Rock.

Two major surveys of coral damage were undertaken immediately following the Tsunami. The first is an informal set conducted by members of the Dive Operators Club of Thailand (DOCT); the second is a set of formal surveys coordinated by the Department of Marine and Coastal Resources (DMCR).

The two surveys defined damage categories differently but the end result show a very close correspondence. According to the DOCT survey 27% of coral sites showed moderate to heavy damage. The DMCR survey found that 22% of coral sites showed medium to heavy damage.

### Overall Findings:

- Strong wave current caused immediate physical damage to corals including fragmentation and overturning.
- Sedimentation and the loosening of marine debris caused further destruction including the relocation of a coral head at Similan where steep reef slopes resulted in the underwater avalanche of the sandy substrate.

- Overall reef damage however, was considerably less than might have been expected given the extent of coastal damage.
- As on land, significant damage is extremely localized, with exposed shallow fringing reef suffering most.
- Damage otherwise followed no discernible pattern, often being counter-intuitive (e.g. even though the wave struck the Similan Islands from the South-West, most coral damage occurred on the North of the Islands.
- Similan Island 9, Surin Island and Phi Phi Island suffered the most serious damage.
- Damage to coral reefs south of Krabi towards Satun was fairly low.

## Coral Reefs Recovery

The recovery capacity of corals is fairly high under ideal conditions, in particular fragmented or upturned corals stand a good chance of survival if returned to their former positions.

Some of the underwater damage has been countered through diver-assisted rehabilitation, including the upturning of fallen corals and the removal of marine debris.

Monitoring programs such as the "Reef Check Program", under the technical supervision of the DMCR are being widely undertaken by many dive operators.

Before the Tsunami, Andaman Sea coral reefs had already suffered degradation from over-fishing, dynamite fishing, coastal erosion, pollution and coral bleaching. Compared to this ongoing destruction the impact of the Tsunami begins to appear almost negligible.



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# Post-Tsunami Recovery and WWF Thailand

Fact Sheet  
The Asian Tsunami one year after



The Tsunami of December 26, 2004 not only devastated people's lives and livelihoods but also left its mark on the environment. A thriving tourism industry that benefited from the proximity of picturesque islands, white beaches, and coral reefs was badly hit.

The economic (especially tourism) reconstruction offers an opportunity to safeguard the natural systems on which it so completely depends.

WWF's vision builds on the guiding principle that human well-being is dependent on the conservation and sustainable use of ecosystems.

The WWF responses to the Tsunami attempt to provide a more secure future for the local people through:

- A healthier more intact natural resource base
- Better security from damaging storm and flood events
- Increased potential for economic development (particularly tourism)
- Stronger involvement in natural resource management by local communities

## WWF Thailand's post-Tsunami Initiatives

### The Green Coast Project:

This project ([www.wetlands.org/tsunami](http://www.wetlands.org/tsunami)) being run in partnership with Wetlands International, International Union for the Conservation of Nature (IUCN) and Both Ends; was specifically developed for areas hit by the Tsunami to assist in protecting unique coastal ecosystems while restoring livelihoods to local people.

WWF Thailand is focusing on communications in Thailand, and on policy issues such as land-use planning, land tenure, institutional arrangements for the recognition and support of community involvement in natural resource management, marine protected areas, provincial environment management, and sustainable tourism.

Wetlands International will manage a small grants facility (budget of 100,000 Euro), to fund small local projects for communities to rehabilitate their environments and livelihoods. The first phase of this project will last until 31 December 2006, with funding provided by NOVIB (Oxfam) Netherlands.

### The Had Tay Muang National Park Project:

Situated in the heart of the Andaman coastline, the 13 km long beachfront of this National Park is one of only nine turtle-nesting beaches still found along this coastline, and the only place in all Thailand where four species of turtle still nest on the same beach. Given the importance of this location to local marine turtle populations, WWF Thailand intends to improve the protection and management of coastal resources in and around the park through:

- Outreach campaigns to local communities
- Training of park management staff, park management board members and local community representatives (first course developed in November 2005).
- Strengthening turtle conservation through beach patrols, nest protection, and offshore patrolling to prevent illegal fishing during the turtle-breeding season (Turtle Action Plan).
- Mapping, monitoring and restoration of coral reefs (Coral Action Plan).
- Infrastructure development (Detailed architectural and design plans have already been developed for a visitor centre, nature trails and nature interpretation materials - including posters, brochures and booklets).



Project implementation follows discussions with the Department of Marine and Coastal resources, and the Department of National Parks. With a budget in excess of US\$250,000 it relies on the financial support of UNEP, WWF Sweden, WWF Italy and NOVIB.

**Sustainable Coastal Development in Thailand:**

WWF Netherlands, WWF Thailand, and Both Ends have jointly formulated a proposal submitted to the EU ProEcho grant in October for a joint initiative aimed at developing sustainable nature-based tourism in Phang-nga Province. The total budget is for a maximum of 750,000 Euro with a possible start date in March 2006.

**Rehabilitation of Marine Parks and Support to Sustainable Tourism in Southern Thailand:**

Led by the Agence Francais de Development (AFD - French Development Agency) this initiative focusing on the Surin, Similan and Lanta Island Marine Protection Areas (MPAs), will be carried out with the collaboration of the Thai Department of National Parks (DNP), WWF Thailand, and the IUCN.

It aims to establish links between environmental protection and economic development that will enhance sustainable tourism through joint public-private commitments to biodiversity conservation. Implementation is expected to begin in the second half of 2006.

The initiative will provide over 1 million Euro in grants to Marine Parks for enhanced environmental infrastructure and management; and over 20 million Euro in soft-loans to the private sector to improve the environmental performance and ecological sustainability

of tourism activities through the use of alternative energy, better waste-water treatment, and higher standards of guide training etc.

**Collaboration with Tsunami Relief Agencies American Red Cross**

WWF Thailand is supporting WWF US's partnership with the American Red Cross (ARC) to reduce future community economic and ecological vulnerability in the tsunami affected areas by ensuring that environmentally sound policies and practices are adopted by local governments (e.g. the Green Reconstruction Implementation Guidelines, formulated by WWF Indonesia).

These measures will enhance the long-term conditions of local communities, by reconstructing sustainable livelihoods based on healthy ecosystems. Collaboration with other NGOs, international agencies and WWF offices in other tsunami-affected areas will also be involved.

**Mai Khao Marine Turtle Foundation**

WWF is also continuing work begun before the Tsunami, such as the collaboration with the J.W. Marriot Resort and Spa in Phuket, that established the Mai Khao Marine Turtle Foundation, to protect the Leatherback Turtles of Mai Khao Beach (the last nesting site on Phuket Island).

The Foundation is supported by a \$1 per night surcharge on all guest rooms as well as other fund raising activities organised by the hotel. It provides funds for local community activities, education of school children, as well as the protection of the beach and the nearby coral reef.

1986 Panda symbol WWF - World Wide Fund For Nature (Formerly World Wildlife Fund) WWF and living planet are Registered Trademarks WWF Indochina and WWF Thailand merged on 1 November 2005 to become the WWF Greater Mekong



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