



FIELD REPORT

We at Reef Check Thailand have recently completed our fifth field season. It went by so fast and we had countless great experiences with our volunteers on the magical seas and reefs of Thailand. Thanks so much to all of you who supported us and gave your valuable time to travel so far to help conserve reefs in Thailand. We were continuously impressed with the enthusiasm and flexibility of our volunteers in the face of challenging and sometimes frustrating conditions. That said, you almost all agreed that it wasn't that hard to spend your days snorkelling and diving in tropical water and eating delicious Thai food three times a day. Over the last five seasons we refined our study and continued to focus on topics that we decided were most important and timely. Initially we surveyed reefs all over Thailand and spent many hours searching new reefs and gathering baseline data. For the last few seasons we have focused our efforts on the Northern Andaman Sea coast, looking at the recovery from the tsunami and working with local communities and partners to manage reefs and the coastal zone in general.

In our last field season we were overjoyed to see a remarkable increase in the growth and percent cover of hard coral at our sites that were hardest hit by the 2005 tsunami. Reefs that were almost completely destroyed by the tsunami increased to 25% hard coral coverage in 2009. Sadly, as I write (May 2010) an intense bleaching event caused by sustained warm water and a late monsoon have once again set these reefs back to almost zero. We hope to continue the annual monitoring and once again record the recovery of these reefs in the coming years.

After our first field season in 2006, I wrote "recently Kim and Awe moved the project headquarters to the small town of Kuraburi in Phang Nga Province on the Andaman coast. Hopefully it's the first step in starting the "Center for Coastal Sustainability" (5 year plan). It's a beautiful area of mountains, mangroves and islands, the heart of our study area, and an area worth protecting". Since November 2008 that became a reality with the help of Earthwatch and our many volunteers. We started a unique venture to generate funding for the reef project and others by creating a research center/ecolodge where volunteers, fellow researchers and ecotourists could come to learn about ecology and conservation and contribute to our efforts.

With the opening of the Koh Ra Ecolodge on a remote island in our study area, we created a focal point for all our research and conservation work and a gateway for more people and organizations to get involved and help fund the work through ecotourism. Since opening it's been a huge success and has highlighted the need for such a model in a country with a wealth of natural resources but few opportunities for tourism to help conserve them. The Center for

Coastal Sustainability at the Koh Ra Ecolodge and Reef Check Thailand is a legacy that will continue.

I wish we had time to write all of you personally to thank you for all the help, fun, and inspiration you've given us. Please stay in touch and come to visit us again in southern Thailand.

Warm regards,

Kim, Awe, Tos, Jarod and the rest of the Reef Check Thailand project crew



SECTION ONE

Project Title: Coral Reefs of Thailand

Principal Investigators: Dr Georg Heiss; Kim Obermeyer

Research Area: Andaman Sea, Thailand, N 09 15.197' E 098 18.866'

Protected area status: National park; proposed national park

Date field report completed: May 30, 2010

Period covered by this report: Nov 2008- Dec 2009

Top Highlight from the Past Field Season

Five years after the Indian Ocean tsunami that hit Thailand, we saw a large increase in the growth and percent cover of live hard coral in our Northern Andaman Sea study area. After 4 years of slow, steady growth, 2009 saw an increase of at least 30% hard coral coverage at two sites that had only 7% hard coral coverage one year after the tsunami. The Koh Pling study site had a hard coral cover of only 1-2% immediately after the tsunami and 9% in late 2007, but increased in 2009 to 27%, indicating the ability of reefs to recover hard coral cover rapidly. Coral recruits at this site also increased from 2.5 recruits per 50 square cm to 7, mostly represented by one fast growing species of branching *Acropora* (a genus of stony coral). Koh Luk Kam Tai, also hit hard by the tsunami wave, increased to 35% in 2009; coral recruits also increased from 2.3 to 6. All other sites in the Northern Andaman showed relative stability in hard coral and other substrate types over the last season. Unfortunately, an intense bleaching event recently (May 2010) set all reefs in the area back, killing 90+% of hard coral with sustained warm water temperatures. We hope to continue monitoring and see another come back in the next five years.

Non-technical Overview of Results

Data was collected from 2008 to 2009 on habitat composition and important ecological and harvested indicator marine fish and invertebrate species. Fish taxa (Table 1) included in the surveys were butterfly fish (*Chaetodontidae*) groupers (*Serranidae*) parrot fishes (*Scaridae*), hump head wrasse (*Cheilinus undulatus*), bump head parrotfish (*Bolbometapon muricatum*), sweet lips (*Haemulidae*), snappers (*Lutjanidae*), barramundi cod (*Cromileptes altivelis*) and moray eels (*Muraenidae*). Invertebrate species included in the surveys were *Diadema* (sea urchins), pencil urchin (*Heterocentrotus mammillatus*), giant clams (*Tridacna*), sea cucumbers (*Holothurians*), crown-of-thorns starfish (*Acanthaster planci*) and lobsters (*Panulirus*).

Internationally recognised underwater visual survey methods were used to census the marine environment according to Reef Check protocol. By collecting data in a standardized format Reef Check is able to detect spatial and temporal trends in reef health across the globe and make

comparisons on the status of coral reefs all around the world, including Thailand. Underwater visual censuses of fish and invertebrate taxa were conducted using four 20 x 5 meter belt transects at each site. Transects were conducted at depths ranging from 3-12m. Habitat composition was determined using 4 replicate 20m line intercept transects, with substrate type (solid surface to which it is attached) noted under every 50cm increment.

Fish

Invertebrates

Fish	Invertebrates
Butterfly fish (<i>Chaetodontidae</i>)	Banded coral shrimp (<i>Stenopus hispidus</i>)
Sweetlips (<i>Haemulidae</i>)	Diadema urchins (<i>Diadema</i>)
Moray eel (<i>Muraenidae</i>)	Pencil urchins (<i>Heterocentrotus mammilatus</i>)
Snapper (<i>Lutjanidae</i>)	Sea cucumber (<i>Thelenota</i> and <i>Stichopus</i>)
Barramundi cod (<i>Cromileptes</i>)	Crown-of-thorns starfish (<i>Acanthaster planci</i>)
Grouper (<i>Serranidae</i>) >30 cm length	Giant clam (<i>Tridacna spp.</i>)
Parrotfish (<i>Scaridae</i>) > 20 cm length	Triton shell (<i>Charonia tritonis</i>)
Hump head wrasse (<i>Cheilinus undulates</i>)	Collector urchin (<i>Tripneustes spp.</i>)
Bump head parrot fish (<i>Bolbometopon muricatum</i>)	Reef lobster (<i>Malacostraca</i>)

Table 1: Fish and invertebrate taxa recorded in surveys

Reefs in the area are close to mainland activities and open for small scale, mostly unregulated fisheries. The tsunami of December 2004 had varying but locally strong effects on reefs in our study area (e.g. Koh Pling suffered perhaps 90% reduction in hard coral coverage; anecdotal information). National Park or proposed national park designation covers some of our study sites but have little monitoring or enforcement efforts.

Reef Substrate

Nineteen surveys were used for data analysis in the Northern Andaman Region. Reef substrate types (Figure 1) in our Northern Andaman study area were dominated by hard coral (mean 38%), followed by rock (mostly old dead coral; 31%), rubble (11%) and sand (6%), nutrient indicator algal cover was low (4%) and recently killed coral averaged 0%. Percent hard coral coverage ranged from a high of 70 to a low of 9. Of the nineteen reefs surveyed, 26% were considered in poor condition, 53% in fair condition, and 21% in good condition (following a commonly used categorization scheme of authors Gomez and Alcalá 1979). Sites in the northern part of our study area, least affected by the tsunami, had the highest mean coverage of live hard coral (63%). The area worst hit by the tsunami wave, Koh Pling had a hard coral cover of only 9% in 2007, and increased last year (from 2008 to 2009) to 35%, indicating the ability of reefs to recover hard coral cover rapidly. Coral recruits at this site also increased from 2.5 recruits per 50 square cm to 7, mostly represented by one fast growing species of branching *Acropora*. Koh Luk Kam Tai, also hit hard by the tsunami wave, had 23% hard coral cover in 2008 and 35% in 2009; coral recruits also increased from 2.3 to 6. All other sites in the Northern Andaman showed relative stability in hard coral and other substrate types over the study period.

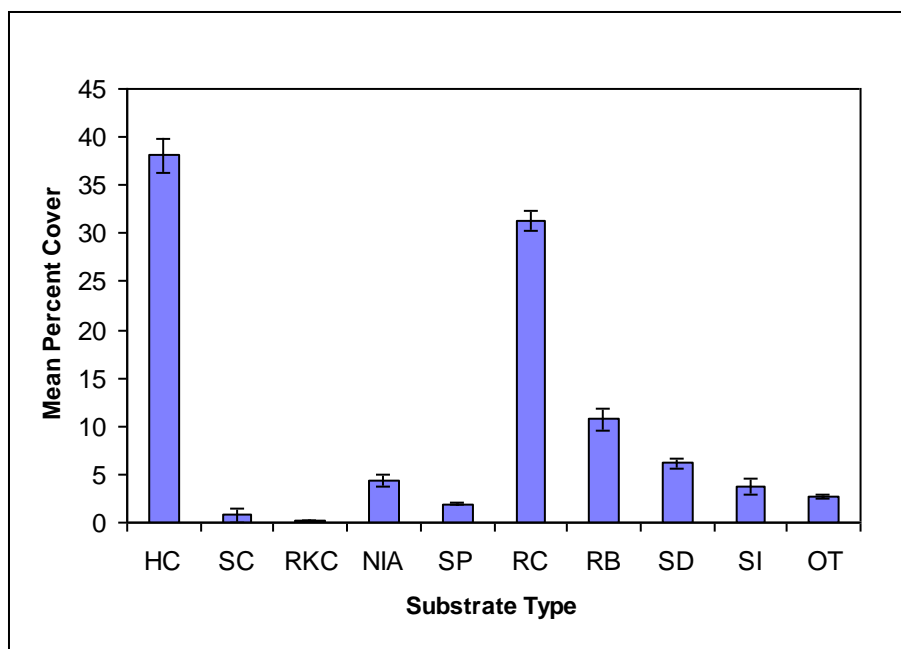


Figure 1: Mean Percent Substrate Cover for the Northern Andaman Sea 2008-2009

Invertebrates

Sites in the Northern Andaman region were characterized by relatively low density of most invertebrate indicators including *Diadema* urchins, which can be locally abundant in Thailand, with an average of 18 per 100 sq. m. Additionally, 95% of this abundance was represented by only three sites. In 2009, there was a significant decrease (from 24 to 0.25 per 100 sq. m transect; 2-tailed t-test $p=0.05$) in *Diadema* sea urchin abundance at Koh Pling. The project staff has been inquiring about urchin collection at Koh Pling to determine if this may be the cause. Rapidly changing reef succession associated with recovery from tsunami and coral regrowth likely play a role as well. Banded coral shrimp (*Stenopus hispidus*) were only found at one site and no triton shells (*Charonia tritonis*; the main predator of crown of thorns starfish) were found; both are commonly collected for aquaria and curio sales. Reef lobster (*Malacostraca*) which fetch a high price in the seafood market were not found except for at Northern Andaman sites, possibly indicating a lapse in fishing pressure since the tsunami. Other invertebrate indicator densities did not change during the study period.

Fish

All sites surveyed in the Andaman Sea showed signs of overfishing with low abundance of food fish (e.g. Grouper (*Serranidae*), sweet lips/grunts (*Haemulidae*), and parrotfish (*Scaridae*), Figure 2). Snapper (*Lutjanidae*) showed higher abundances that can be explained by the presence of several large schools of small individuals that were occasionally encountered on survey transects. Butterfly fish (*Chaetodontidae*) were relatively abundant, potentially indicating a low level of aquarium captures. All sites had low abundance and size of groupers. There was a complete absence of three highly sought after food fishes the Bump head parrotfish (*Bolbometopon muricatum*), the Baramundi cod (*Cromileptes*), and the Hump head wrasse (*Cheilinus undulates*). However, between December and February, 2009, we saw Bump head parrotfish off transect at three of our sites where they had never been seen before. They were seen on multiple occasions in schools of 8-15 individuals and perhaps indicate a recovery.

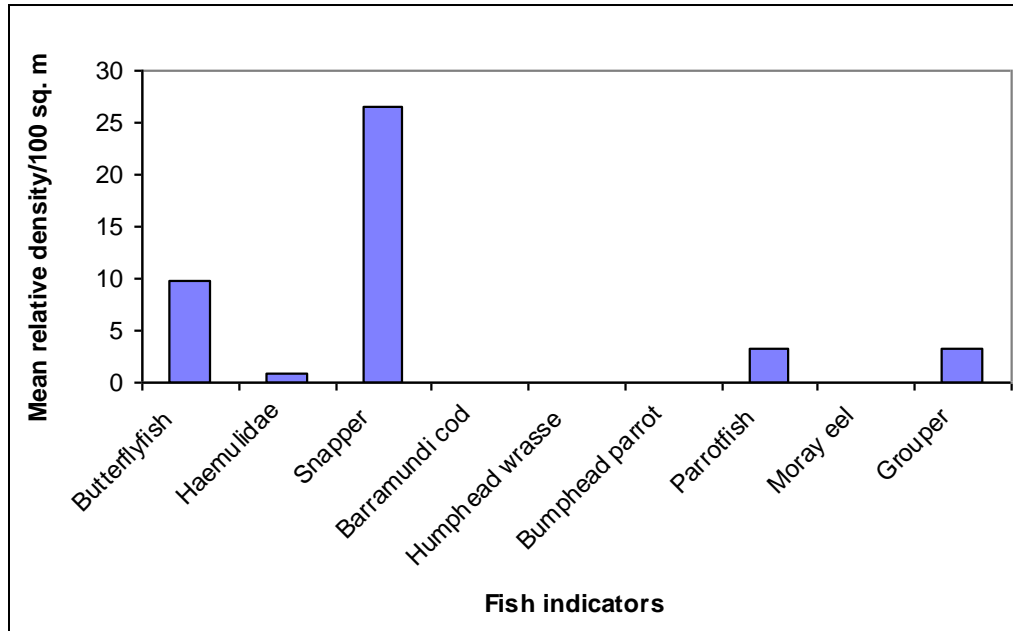


Figure 2: Mean relative density of fish indicators, Northern Andaman Sea 1998-2009

Conservation

Our goals of conservation and education were very successful during the last year since the transformation of our field research base into a full-fledged Research Center and income-generating ecotourism business, the Koh Ra Ecolodge. Since starting the venture in November, 2008 the Ecolodge has attracted 100's of ecologically-minded tourists and travellers who have come to join the Reef Check and other conservation activities and learn about local habitat values, wildlife, indigenous communities, island sustainability and conservation. Their payments for accommodations and activities have led to direct revenues that have funded Reef Check's conservation programs as well as several new habitat/wildlife projects and a community-based tourism and community development project with the local Sea Gypsy village. In addition, the Ecolodge has attracted several other researchers who have started ecological projects and school and university groups who have used the facility of a research base and natural classroom. Local people and schools are able to visit the Ecolodge to see a functioning model of "green accommodations" and technology (green building methods, solar power, composting, organic garden, bioswale grey water filtration) that are in use on-site. The Ecolodge has received much press coverage as a model of ecologically friendly and educational tourism in Thailand and Earthwatch was recognized as a supporter of our conservation program.

Acknowledgements

We would like to thank Earthwatch and all the volunteers who came to help, the International Union for the Conservation of Nature (IUCN) Thailand Program, Mangrove Action Project, Chulalongkorn University, and the Phuket Marine Biological Center.

SECTION TWO: TECHNICAL RESULTS

1. REPORTING ON RESEARCH OBJECTIVES

Objective 1

1. What is the condition of coral reefs in the Andaman Sea and Gulf of Thailand?
 - a. What is the health of corals?
2. What is the live coral coverage and recently killed coral coverage?
3. What percentage of the coral shows signs of disease?
4. What is the coverage of nutrient indicator algae?

Progress towards/against Objective

Reef substrate, coral

As per prior changes to research objectives in 2008, Gulf of Thailand sites were discontinued. Nineteen surveys were used for data analysis in the Northern Andaman Region. The sites are characterized and affected by their proximity to mainland anthropogenic effects, and large rivers carrying high silt loads and agricultural runoff. Commercial and local fisheries, with intense fishing pressure and destructive methods also impact these sites. Reef substrate types (Figure 1) in our Northern Andaman study area were dominated by hard coral (mean 38%), followed by rock (mostly old dead coral; 31%), rubble (11%), sand (6%), nutrient indicator algal cover was low (4%) and recently killed coral averaged 0%. Percent hard coral coverage ranged from a high of 70 to a low of 9. There were very few signs of coral disease and the mean percentage was zero. Of the nineteen reefs surveyed, 26% were considered in poor condition, 53% in fair condition, and 21% in good condition (following a commonly used categorization scheme of authors Gomez and Alcala 1979). Sites in the northern part of our study area, least affected by the tsunami, had the highest mean coverage of live hard coral (63%). The area worst hit by the tsunami wave, Koh Pling had a hard coral cover of only 9% in 2007, and increased last year (from 2008 to 2009) to 35%, indicating the ability of reefs to recover hard coral cover rapidly. Coral recruits at this site also increased from 2.5 recruits per 50 square cm to 7, mostly represented by one fast growing species of branching *Acropora*. Koh Luk Kam Tai, also hit hard by the tsunami wave, had 23% hard coral cover in 2008 and 35% in 2009; coral recruits also increased from 2.3 to 6. All other sites in the Northern Andaman showed relative stability in hard coral and other substrate types over the study period.

Objective 2

1. What is the health of the reef fish populations?
2. What is the relative density of fish species that indicate the presence of anthropogenic effects, such as over-fishing?

Progress towards/against Objective

Fish indicators

All sites surveyed, in both the Andaman Sea and Gulf of Thailand, showed signs of overfishing with low abundance of food fish (e.g. Grouper (*Serranidae*), sweet lips/grunts (*Haemulidae*), parrotfish (*Scaridae*), Figure 2). Snapper (*Lutjanidae*) showed higher abundances that can be explained by the presence of several large schools of small individuals that were occasionally encountered on survey transects. Butterfly fish (*Chaetodontidae*) were relatively abundant,

potentially indicating a low level of aquarium captures. All sites had low abundance and size of groupers. There was a complete absence of three highly sought after food fishes, the Bump head parrotfish (*Bolbometopon muricatum*), the Baramundi cod (*Cromileptes*), and the Hump head wrasse (*Cheilinus undulates*). However, between December and February, 2009, we saw Bump head parrotfish off transect at three of our sites where they had never been seen before. They were seen on multiple occasions in schools of 8-15 individuals and perhaps indicate a recovery.

Objective 3

1. What is the health of the invertebrate population?
2. What is the relative density of invertebrate species that indicate the presence of anthropogenic effects?

Progress towards/against Objective

Invertebrate indicators

Sites in the Northern Andaman region had were characterized by low relative density of most invertebrate indicators including *Diadema* urchins, which can be locally abundant in Thailand, with an average of 18 per 100 sq. m. Additionally, 95% of this abundance was represented by only three sites. In 2009, there was a significant decrease (from 24 to 0.25 per 100 sq. m transect; 2-tailed t-test $p=0.05$) in *Diadema* sea urchin abundance at Koh Pling. The project staff have been inquiring about urchin collection at Koh Pling to determine if this may be the cause. Rapidly changing reef succession associated with recovery from tsunami and coral regrowth likely play a role as well. Banded coral shrimp (*Stenopus hispidus*) were only found at one site and no triton shells (*Charonia tritonis*; the main predator of crown of thorns starfish) were found; both are commonly collected for aquaria and curio sales. Reef lobster (*Malacostraca*), which fetch a high price in the seafood market, were not found except for at Northern Andaman sites, possibly indicating a lapse in fishing pressure since the tsunami. Other invertebrate indicator densities did not change during the study period.

Objective 4

1. What is the correlation between coral reef health measures and anthropogenic factors including destructive fishing practices (dynamite and poison fishing), aquarium trade collections, invertebrate harvesting, recreational diving, sewage pollution, industrial pollution, commercial fishing, subsistence fishing

Progress towards/against Objective

As stated separately in the sections for Objective 1-3 above, our study sites are mainly impacted by mainland activities such as agriculture and shrimp farming and by the presence of several nearby river systems which carry high silt loads and other pollutants. Fish populations are heavily impacted by overfishing by both commercial and local fisheries. Invertebrates are heavily collected for food, aquaria and curio trade. As of May 2010 these effects have been compounded by a massive bleaching event brought on by sustained high water temperatures (31 degrees C for nearly 2 months).

Objective 5

1. Conduct reef surveys at Koh Chang Marine National Park for the purpose of monitoring.
2. Establish a long-term monitoring protocol that can be used by the National Park staff to assess :
 - a. the effectiveness of protection afforded by the MPA
 - b. changes in reef condition inside the MPA over time.

Progress towards/against Objective

As previously reported (see excerpt below), this objective was accomplished after training and turning the surveys over to a local group in 2008. It was subsequently removed from the continuing study.

"We trained national park staff, community members changing livelihoods from fishing to ecotourism, and local dive operators, who joined our survey teams and who have since taken over the surveys. Three seasons (March 2006, November 2006, November 2007) of Reef Check training and surveys, supported by Earthwatch teams developed the capacity of local operators to begin conducting monitoring surveys in 2008. After baseline surveys, a set of eight monitoring sites both inside and outside the active marine protected area at Koh Chang, were chosen for long-term monitoring. These sites were surveyed during each of three field seasons, for a total of 24 monitoring surveys. Based on those surveys it was found that increased protection measures were needed at sites frequented by recreation snorkelling and diving boats (damaged hard coral) and illegal fishing. Dive operator and national park staff have since repeated survey of the permanent transects and carry on the monitoring".

Objective 6

1. Increase local capacity to manage reefs on Koh Chang.
 - a. Provide Reef Check training with each Earthwatch volunteer team to local resource managers (National Park staff), local dive shop operators, recreational divers, and any interested members of the local communities.
 - b. Present findings of Reef Check surveys to the local community and resource managers. In collaboration with the UNEP/GEF project, we will take part in public meetings and informational sessions prior to the onset of the project in order to identify community concerns with regards to reef management, commercial and subsistence fisheries and species of concern.

Progress towards/against Objective

As previously reported (see excerpt below) this objective was accomplished, after training and turning the surveys over to a local group in 2008. It was subsequently removed from the continuing study.

"Reef Check training was given several times to various local groups within the Koh Chang National Park area, including National Park staff, local Thai and foreign dive operators, local ecotourism operators and school groups. We directly trained approximately 55 local community members from the above groups and also trained trainers that have since trained another 20 recreational divers in Reef Check in the Koh Chang area. We conducted joint surveys with teams from the UNEP/GEF funded Koh Chang Marine Protected Area Demonstration Site

project, as well as environmental education camps with local school children from the Saalak Phet School, the largest fishing community on the island. Reef Check survey data was included in the UNEP/GEF project results which were used to inform national park authorities of reef conditions inside the MPA. National Park staff and local dive operators joined Reef Check teams to survey reefs and received data from our project. Results and recommendations from our project helped lead national park authorities to implement a “no-boat” zone around key hard coral reef sites within the park, implemented with mooring ropes and buoys. This decreased boat-caused damage to reefs in the area. After several training sessions by our project, national park staff and local dive operators have formed Reef Check teams that have continued to carry out surveys and train more people to join teams. We have since decreased our focus on this site but continue to monitor survey teams there and provide guidance and training when required”.

2. PARTNERSHIPS

1. Chulalongkorn University- joined Chumpon and Northern Andaman surveys and trained our staff in line intercept transect reef survey methods
2. Kasetsart University, Ranong Coastal Resources Research Center- their staff joined our training and subsequently performed surveys. Jointly help educational activities for local youth groups, collaborated to start mangrove nursery at their center for use in our community mangrove restoration project at Baan Koh Ra
3. Rajapat University- When we were asked in our last field report, “Has your project helped lead to the completion of Masters' theses, or other educational research findings”, we could not answer “yes”. Because of this suggestion, we began collaboration with Rajapat University in Phuket and agreed to mentor a Thai Master's student in marine ecology. Ms. Naam was trained in Reef Check along with Earthwatch Team 10, 2007 (and further Team 4, 2009) and began her research on the condition of coral reefs on Phuket Island. We continue to mentor her progress and assist her and Rajapat University in their coral reef research.
4. Phuket Marine Biological Center- provided project guidance and support through site selection, local contacts, data analysis and more.
5. Department of Marine and Coastal Resources- collaborated with coral reef camps at Koh Chang and Northern Andaman, provided staff and educational material
6. Department of National Parks including specific national parks of Koh Surin, Laem Son, Koh Ra National Parks. We are currently making a schedule to train the other parks in collaboration with the WWF project (Strengthened Andaman Marine Protected Areas Network- SAMPAN)
7. Northern Andaman Tsunami Relief- Letter of agreement in place. Our main collaborator on community capacity building, education, and development in eight villages in the Northern Andaman region. Co-funded our ecotourism training in five communities.
8. Andaman Discoveries- Local community-based tourism operator; project started after tsunami and works with local communities doing ecotourism and traditional lifestyle participatory programs. Our project sends Earthwatch volunteers on their programs to experience village life and contribute to their programs and villages.
9. International Union for the Conservation of Nature- collaborator and funder on educational programs, receives our data and collaborates with our project on making policy recommendations to local government.

10. World Wildlife Fund Thailand- Formal Memorandum of Understanding (MOU) in preparation; collaborator and funder for national park training program.
11. PADI Project Aware- Formal MOU in place; co-promotes Reef Check as community monitoring program.
12. Green Fins- co-promotion of reef best practices in Thailand
13. Mangrove Action Project- Letter of agreement in place for collaboration on marine and coastal resources conservation and sustainability promotion.
14. Naucrates Foundation- Collaborator at the Andaman study sites for more than six years; we share tasks for sea turtle nesting surveys between our two neighboring islands
15. Ecotourism Training Center- MOU in place, Kim Obermeyer on board of directors, collaboration to train young Thai divers as dive professionals (dive masters, instructors); we have provided Reef Check training and support for dive training.
16. About 11 local coastal communities- received training, educational programs, volunteers as guests
17. About 10 local dive operators- trained as Reef Check EcoDiver instructors who can now train other EcoDivers

3. PROJECT DEVELOPMENT

3.1. Removed or Modified Objectives

We had proposed in the 2009 research renewal to begin monitoring water temperature and pH at our study sites to correlate with potential bleaching events and provide valuable on-site data regarding coral reefs as highly sensitive global warming indicators.

3.2. New Objectives

N/A

4. DISSEMINATION

Printed:

2008 Reef Check Annual report. <http://reefcheck.org/PDFs/ReefCheckAnnualReport2008.pdf>

Digital:

Koh Ra Ecolodge research base newsletter article on Earthwatch-Reef Check project. Available upon request: info@thai ecolodge.com.

Meetings and conferences:

EcoDiver training sessions 2008-2009, trained a total of 15 new divers in Reef Check survey methodology.

Educational resources

Created an Island Ecology and Sustainability Learning Center at our research base. This has served to educate all visitors to the Koh Ra Ecolodge including volunteers, guests, and local people about local habitat values, ecology, conservation, local indigenous communities, and sustainability.

5. CAPACITY DEVELOPMENT AND EDUCATION

Almost all project partners (about 30 people in total) have had been trained in Reef Check by our project (with the exception of #9 above and #5 which had already been trained) thereby learning about coral reef ecology, threats, solutions and survey methods. Some of these partners (#3, 12, 16, 18) received training allowing them to subsequently train other people as certified Reef Checkers, thus multiplying the capacity building impact (at least 60 additional divers have been trained in this way).

Educational programs:

Eleven coastal communities in four provinces (Baan Talay Nok, Laem Now, Bang Ben, Tung Nang Dam, Baan Koh Ra, Tung Rak, Bak Jok, Kuraburi, Klong Naga, Thai Mueng in Phang Nga and Ranong Provinces and Saalak Pet in Koh Chang) have been part of our project's educational programs consisting of coral reef camps, environmental leadership and networking camp, and ecotourism livelihood training. Approximately 200-300 local Thai community members have been involved in these programs.

Our project has provided SCUBA training opportunities to several local Thai people through the Ecotourism Training Center (ETC). In collaboration with ETC, we have developed a training program whereby young local Thai village members, can receive PADI SCUBA certification up to the Dive Master and Instructor level. Part of this training includes Reef Check training and Reef Check instructor training. We completed this training for 12 Thai people in 2007-2008.

The Koh Ra Ecolodge:

Reef Check research base, environmental learning center and coastal sustainability demonstration site. Since this project component is both substantial for the future direction of the project and in its relative infancy, we will consider it an important part of the project's future direction, but herein describe its origin and first few months of operation.

Initially used as a study site accommodation for Earthwatch volunteers and Reef Check research team members, the facility at Koh Ra was opened as the Koh Ra Ecolodge officially in November 2008 as a sustainable financing project for local conservation and community support projects as well as a learning center and demonstration site for coastal sustainability. The concept is to provide a venue for conservation and education projects and a model for sustainable island and coastal tourism development (alternative to mass-tourism resort development) that local Thai entrepreneurs and developers can visit to learn about energy and resource conservation and the "green tourism" niche. The sustainable financing aspect comes into play as the Ecolodge is open to guests interested in nature travel and ecotourism, a portion of their accommodation fees going towards Reef Check and other conservation and community projects.

Since opening in November 2008, the Ecolodge project has had over 100 guests (each receiving education about the local ecology and culture sustainability), visits from several local community groups to learn about sustainable technologies and permaculture (eg. solar power, bioswale waste water filtration, organic gardening, green building techniques, agroforestry, etc.), started a community-based tourism program with three neighboring communities (including a community fund for community improvement projects from guided tours to the village), and developed a learning center in English and Thai for guests, visitors and local school groups.

Through the capacity building and educational opportunities cited above (all our educational opportunities are sustainability-based), we have increased the capacity to between 400-500 people (including all stakeholder groups mentioned in this section) through direct Reef Check training, additional educational programs and the Koh Ra Ecolodge. Capacity now incorporates a diverse cross section of society including local community members, collaborating agencies and international travelers. All of these people have gained a better understanding of marine and coastal ecology, conservation and sustainability, and how Reef Check and Earthwatch have been working together towards this goal.

6.1. CONTRIBUTIONS TO INTERNATIONAL CONVENTIONS, AGENDAS, POLICIES, MANAGEMENT PLANS

N/A

6.2. CONTRIBUTIONS TO LOCAL, NATIONAL AND REGIONAL CONVENTIONS, AGENDAS, POLICIES, MANAGEMENT PLANS

N/A

7. ACTIONS OR ACTIVITIES THAT ENHANCE NATURAL AND SOCIAL CAPITAL

Created an Island Ecology and Sustainability Learning Center at our research base. This has served to educate all visitors to the Koh Ra Ecolodge including volunteers, guests, and local people about local habitat values, ecology, conservation, local indigenous communities, and sustainability.

1. Education and awareness
2. Earthwatch scientists, field staff, volunteers and local people
3. Southern Thailand lowland tropical rainforest islands.

Created a community-based tourism program with the local Moken community. This has empowered the local people about their cultural heritage and offered economic and livelihood benefits.

1. Livelihood, Economic and Other Incentives
2. Earthwatch scientists, field staff, volunteers and local people
3. Moken community on Koh Ra, southern Thailand.

8. LONG TERM IMPACT OF PROJECT

Cultural heritage enhanced, restored or maintained

Moken (Sea Gypsy) people of the Andaman Sea - Moken villages are present throughout the study site, including the Surin Islands, Koh Phra Thong, and Koh Ra, the location of our study site headquarters. As part of our project we created a community development fund and community-based tourism program with the village on Koh Ra. The tour program seeks to educate visitors about the Moken traditional lifestyle and provide an economic and cultural pride benefit to village members. Through training, economic return, and community development projects (eg. drinking water well) the community and members have benefited and hopefully the cultural heritage has been enhanced.

UNESCO has projects based in this area focusing on these indigenous peoples:

http://www.unesco.org/csi/act/thailand/summary_4.htm - Andaman Sea Project

<http://www.unesco.org/csi/act/thailand/surin.htm> - "A place for indigenous people in protected areas, Surin Islands, Andaman Sea, Thailand"

<http://www.unesco.org/csi/act/thailand/awareness.htm> "Indigenous People in Parks - Raising Awareness"

<http://www.unesco.org/csi/pub/papers2/surin.htm> "Indigenous People and Parks, the Surin Islands Project"

Livelihoods enhanced, restored or maintained

Through our project activities we have

1. hired local people as project and support staff (6 part time)
2. provided livelihood training that has assisted in income generation (ecotourism, diving and guide training for approximately 10 people)
3. completed several community development projects that have benefited the Moken village of 20-30 people on Koh Ra (improved drinking water access and duration throughout the year)
4. Provided technical training to young Thai scientists and professionals in order to assist them in career development (3 people in 2008-2009).

Appendix 1- PHOTOS



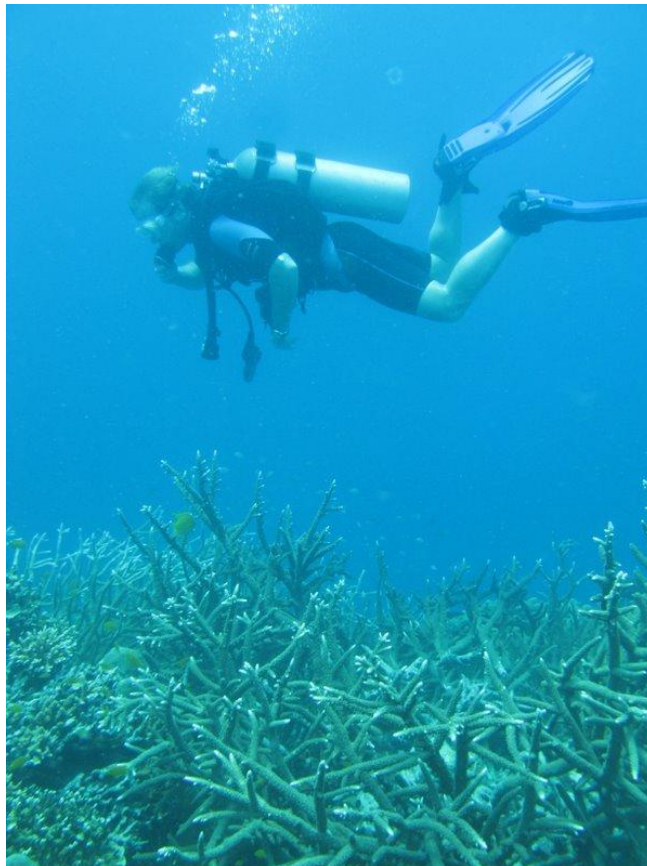
Volunteers heading out by longtail boat for Reef Check surveys



Volunteer doing mock transect on land as part of Reef Check training



Happy volunteers having fun with the transect equipment at Koh Ra



Volunteer Ozzie inspects some spectacular staghorn coral at Surin National Park



High coral growth in 2009 at Koh Pling which was devastated by the 2004 tsunami