Report

Workshop on Sustainable Marine Tourism in Komodo National Park

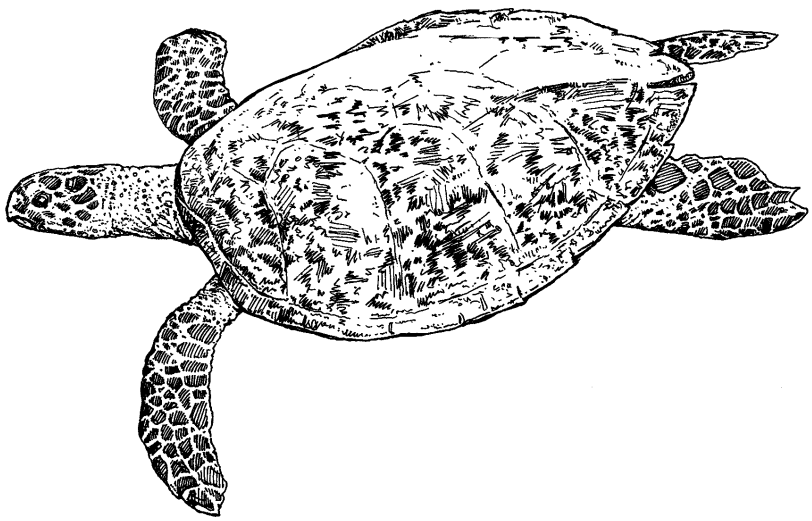
Grand Bali Beach Hotel, Sanur, Bali, Indonesia
February 28-March 2, 2001

organized and hosted by

The Nature Conservancy, Coastal and Marine Program - Indonesia

in collaboration with

PADI-AWARE



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workshop report compiled by Peter J. Mous, June 2001

The mission of The Nature Conservancy is to preserve plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive.

To date the Conservancy and its members have been responsible for the protection of more than 10 million acres in the United States of America and Canada. It has helped like-minded partner organizations to preserve millions of acres in Latin America, the Caribbean, the Pacific and Asia. While some Conservancy-acquired areas are sold to other conservation groups, both public and private, the Conservancy owns more than 1,600 preserves- the largest private system of nature sanctuaries in the world.

Drawn by Indonesia's biological richness and its imminent danger, the Conservancy opened an office in Jakarta in 1991. The first target was to protect Lore Lindu National Park (Sulawesi). In 1995, the Conservancy started the Komodo project. The aim of this project is to help the authorities of Komodo National Park to protect the marine area around the Komodo Islands. The Conservancy has a long-term commitment to the protection of the marine biodiversity of Komodo National Park.

This workshop was supported by PADI-AWARE, USAID, The David and Lucile Packard Foundation, Keindanren Nature Conservation Fund and Sekisui Chemical Co., LTD.

TABLE OF CONTENTS

1 WORKSHOP OBJECTIVES AND SCOPE

The objective of this three-day workshop was to obtain inputs from dive operators on dive tourism management of Komodo National Park. During the first two days Dr Alex Brylske of PADI-AWARE facilitated the seminar 'Marine Resource Management for Dive Professionals', explaining coral reef ecology, and coral reef conservation in relation to the dive industry. Developed to increase interpretive skills of dive professionals, the purpose of the two-day seminar in the framework of this workshop was to create a common understanding on coral reef ecology and conservation among participants. Hence, the seminar formed the basis for the last day of the workshop: a stakeholder consultation on if and how dive tourism in the Park should be managed.

During the workshop it became clear that many issues, such as anchoring regulations and payment of Park entrance fees, are not only relevant for dive operators, but also for cruise vessel operators and other marine tourism operators (sea kayaking, yachting). Though the focus of this workshop was on dive tourism, participants felt that Park management should take into consideration all marine tourism uses, especially since many operators offer a range of products, varying from dragon-watching to SCUBA diving. The participants take into consideration all facets of marine tourism management during the stakeholder consultation of the third day. Other aspects of marine protected area management (e.g., fishery management, enforcement of the ban on blast fishing, alternative livelihood project) were beyond the scope of this workshop.

See Annex I for the workshop schedule.

2 PARTICIPANTS

Participants comprised representatives from the tourism industry (35 persons), Indonesian government (Park authority, 3 persons), and from NGOs (3 persons, excluding The Nature Conservancy) (Annex 1). The target group, representatives from the tourism industry, differed in their dependency on Komodo, nationality, market, volume and product as listed below.

- *Dependency on Komodo*: operators based in Labuan Bajo or Bima; regional dive operators who have Komodo in their portfolio of destinations (mostly based in Sulawesi or Bali); international dive operators; operators with an interest in responsible marine tourism in general rather than in Komodo specifically.
- *Nationality of operator*: Indonesian or expatriate.
- *Market*: day-trip or live-aboard, from backpacker to luxury tourism
- *Volume or capacity*: number of tourists, number / size of vessels
- *Product*: cruising, dragon-watching and hiking, SCUBA diving, snorkeling, sea kayaking, yachting.

This diversity within the target group implicated that interests vary and that the scope to get consensus on management recommendations was limited. Nevertheless, operators unanimously agreed that marine tourism in Komodo should be regulated, that the number of tourists visiting Komodo should be limited to safeguard the quality of the product, and that there was scope to increase visitors fees for financing Park management (see section 4).

Representatives from the Indonesian government were invited to provide direct feed-back on management regulations recommended by the operators. Representatives from environmental NGOs (i.e. The Nature Conservancy and WWF-Wallacea) functioned as resource persons, mainly providing inputs on conservation management of coral reefs in Komodo and in the rest of Indonesia.

3 OUTLINE OF THE SEMINAR ‘MARINE RESOURCE MANAGEMENT FOR DIVE PROFESSIONALS’

3.1 Rationale of the seminar

The seminar was developed because present-day travelers do not only want to relax, they also want to understand the culture and nature of the area they visit. Therefore, the role of interpreters is getting more important. Dive guides and operators, willingly or unwillingly, have this interpretive role. However, they do not always have the knowledge to provide an interpretive experience that goes beyond pointing out species. This seminar aims to enhance interpretive skills of dive professionals.

Furthermore, environmentalism already is and will continue to be a defining theme in the next century. As there’s no such thing as “non-consumptive” tourism, dive tourism too will be under the scrutiny of both resource managers and divers. Divers are demanding that professionals become environmentally responsible. Resource managers are making decisions that will impact livelihoods of dive operators, and these decisions are often made without knowledge or input from dive operators. Therefore, dive operators should be informed on issues relating to coral reef conservation in general, and on responsible dive tourism management in particular. This seminar gives an overview of the status of coral reefs throughout the world, on threats to these coral reefs, and how dive tourism can be both part of the problem and part of the solution.

The seminar consists of four units:

- ecology and biology of coral reefs,
- status and outlook for coral reefs,
- marine resource management: the dive industry’s perspective,
- promoting sustainable diving practices.

Each of the units is summarized below.

3.2 Ecology and biology of coral reefs

In this unit, the emphasis is on ecology (how reef organisms coexist) rather than on taxonomy (species determination). Ecological concepts have global meaning, whereas species knowledge is only applicable to the area visited. Furthermore, ecological concepts are often are more rewarding for divers to learn about than taxonomy.

Ecological concepts that were explained are listed below:

- importance of abundance and distribution of species
- primary production
- photosynthesis
- consumption
- respiration
- food pyramid
- energy flows
- food webs
- nutrients
- parasitism
- commensalism
- mutualism.
- organization of corals (colonies, symbiosis with zooxanthellae).
- coral biology (anatomy, reproduction modes).
- importance of coral reefs (biodiversity, fishery, coastal protection, bio-prospecting for new drugs, tourism)
- importance of biodiversity (resilience to loss of species)
- formation of coral reefs ('Darwin's subsidence theory, Daly's glacial control theory). types of reefs (fringing, barrier, atoll).
- determinants for coral growth (temperature, depth / light, salinity, turbidity, wave action, substrate, nutrients)
- zoning or sub-habitats in coral reefs (back reef, reef crest, fore reef)
- moderate natural disturbance as a source of reef biodiversity
- distribution of coral reefs
- differences between Atlantic and Indo-Pacific reefs
- biological production of coral reefs, limited scope for extractive uses (fishery). competition among corals species
- predation on corals (crown-of-thorns)
- grazing on algae
- fixation of calcium and carbonate
- reef structure and components
- coral fish: ecology, coloration, cleaning behavior, day-night patterns, feeding in relation to anatomy.
- major 'guilds' in coral fish: herbivores, carnivores, benthivores, planktivores
- toxic and venomous fish
- ecosystems associated with coral reefs: mangroves and sea grass beds
- function of mangroves and sea grass beds in relation to coral reefs.

3.3 Status and outlook for coral reefs

This unit provides a global overview of coral reef degradation and its causes. In 1996, it was estimated that 10% of coral reefs (35 million acres) are beyond recovery, and that 70% could be dead by 2050. The assessment of 2000 is even more pessimistic: 25% of reefs are beyond recovery, whereas most of remaining reefs could be dead by 2020.

Causes of coral reef degradation are:

- detrimental land-based activities (deforestation, mining, over-grazing, poor land-use practice),
- eutrophication and pollution,
- coastal development,
- over-fishing,
- blast fishing, cyanide fishing, and other destructive techniques,

- coral mining,
- coral collection and aquarium trade (fish, corals and other invertebrates),
- global threats (thinning of ozone layer, global warming, overpopulation),
- tourism (direct and indirect damage).

There are also natural stresses on coral reefs, but these are more complex and less well understood.

Strategies for coral reef conservation are:

- integrated coastal zone management and community-based management, sustainable development,
- development of Marine Protected Area's
- improving management by furthering better communication between resource managers, users, and scientists.

3.4 Marine resource management: the dive industry's perspective

3.4.1 What is marine resource management?

Marine resource management is an eclectic, science-based field where ecology, social sciences, political sciences, policy-making, community organization, law enforcement, and education constitute a system that promotes the preservation of natural resources in the marine zone. The term 'marine resource management' is actually a misnomer, since only the behavior of people can be managed, not the natural resource itself.

Dive tourism management is one aspect of marine resource management. The impact of marine tourism on coral reefs would be inconsequential if

- tourism would be managed properly, accounting for the number and nature of tourists' visits.
- appropriate tourist behavior would be encouraged.
- capacity and quality of waste disposal systems and sewage systems is sufficient to maintain high water quality in tourist areas, so that coral reefs can recover from any damage.

The reality is that large numbers of poorly managed visitors have led to extensive physical damage, sewage pollution, and degraded water quality so that most reefs cannot recover from other stresses.

3.4.2 Impact of diving on coral reefs

Studies show that divers can have a significant negative impact on coral reefs within those relatively limited areas where diving is especially popular. Fortunately, divers, and especially dive professionals, can also easily do something about this damage. Most studies to date indicate that, at present levels, divers don't appear to be causing damage so extensive that it compromises ecological function, but can quickly degrade the "amenity value" of a reef. Hawkins et al. (1999), however, has shown that diving may change the natural character of a reef even where direct damage through breakage of corals is minimal.

Some studies show that coral species composition between dived areas and non-dived areas differed although levels of coral cover not significantly different. The proportion of old, slow growing massive corals was lower and 'weedy, opportunistic' branching corals had taken their place. It remains uncertain whether this changes is due to diver contact (abrasion) or other stresses.

Divers intentionally or inadvertently touch corals an average of 10 times per dive. Unintentional damage from fins is the primary culprit (thus branching corals are most susceptible to diver damage). The vast majority of damage is caused by very small minority of divers. Rouphael & Inglis (1997) observed that 84% of divers caused no damage whatsoever, while a mere 4% of divers accounted for over 70% of the damage. Poor buoyancy is the single biggest factor in why divers impact reefs. This suggests that dive guides should be very careful with site selection in relation to diver skill and activity. Divers wearing gloves touch the reef more those who do not wear them, and women touch the reef far less than men. A study on diver behavior in the Florida Keys (Talge 1989) shows that 4% to 6 % of all corals on a popular reef (Looe Key) were touched during a typical week, and that 90% of all divers make at least one contact with the bottom (65 percent with hard corals), with the average being 8 contacts. Roberts & Hawkins conclude from their studies conducted during 1992-95 in the Caribbean and Red Sea that diver damage reaches a visible level very quickly, but stabilizes at that level, if visitation remains constant. They also showed that divers can degrade a reef's aesthetic quality, which greatly affects the quality of an underwater experience.

The relationship between diver's experience and bottom contact is complex. Harriott, Davis & Banks (1997) found no correlation between touching and experience, remarking: "It seemed that inexperienced divers generally had poor buoyancy and finning control, but were more cautious about approaching the bottom, while more experienced divers spent more time exploring close to the terrain and bumping it as a result." Also, Rouphael & Inglis (1995) found that experienced divers (more than 100 dives) were just as likely to make contact with corals as their novice counterparts.

Townsend (2000) showed that more experienced divers touched less than novices; but also complete beginners (students) touched less than those with 1-10 dives. Medio (1995 & 1997) and Davis & Harriott (1995) found a significant correlation between lack of experience and likelihood to contact the substrate.

There is no consensus between studies on the damage caused by underwater photographers, who are often blamed for damaging reefs in pursuit of the perfect shot. Rouphael & Inglis (1997) found no statistical difference between the number of contacts made by photographers as compared to non-photographers. In contrast, Medio (1995 & 1997) found that although underwater photographers represented only 15%-20% of his observed subjects, they accounted for 60%-70% of all damaging impacts.

The most significant diving-related damage to coral reefs is not caused by divers themselves, but from anchoring of boats that carry divers. Installing mooring buoys is one way to avoid anchoring damage. There is a Mooring Buoy Planning Guide available on-line (www.projectaware.com); this guide can also be obtained by contacting Project AWARE. Another way to avoid anchoring damage is to practice drift diving.

3.4.3 Marine protected areas

Divers are frequently confronted with marine protected areas, the most famous perhaps being Bonaire Marine Park and the Florida Keys. Komodo National Park, though established because of the terrestrial Komodo dragon, also qualifies as a marine protected area. The concept of a marine protected area is relatively new, explaining why only 15% of all protected areas are marine.

Marine and terrestrial protected areas have in common that they are mostly under-funded, probably because the cost of protection is relatively easily calculated whereas it is far more difficult to assign a monetary value to the benefits of environmental protection. Also, for both marine and terrestrial areas the ‘protected’ status may actually be detrimental if proper management is not in place (so-called ‘paper parks’, a well-known phenomenon in Indonesia). There are also differences between marine and terrestrial protected areas. Marine protected areas generally lack physical limits and barriers, and therefore exchange of organisms and nutrients between the marine protected area and its surroundings is potentially more important than exchange between adjacent terrestrial areas. Also, terrestrial protected areas are mostly lacking what is sometimes called the “third dimension” in marine areas: a high connectivity in the vertical direction.

3.4.4 Purposes and management tools of marine protected areas

Like terrestrial protected areas, their marine counterparts can serve many purposes:

- to maintain biodiversity and ecological health of an area
- to sustain recreational activities
- to protect economically important species
- to educate users of the value of the resource
- to preserve historical sites
- to allow research.

Depending on the purpose of the marine protected area, the manager will want to regulate resource use by applying a selection from the following management tools:

- permits and user fees
- periodic closure of sites
- declaring the protected area as a no-take reserve
- implement a zoning plan.
- deployment of moorings
- involvement of local communities in some aspect of marine protected area management
- implement an education and interpretation program.

The main challenge in managing a protected area is to ensure that the value of the area is retained while optimizing the accumulated benefit from various uses. This brings us to one of the core concepts in resource management: carrying capacity.

3.4.5 Carrying capacity

Carrying capacity is a concept from ecology, but it can be applied to many other fields. The ecological definition of carrying capacity is: The number of individual organisms the resources of a given area can support over a long time period. The concept can be explained with an example from cattle farming. A farmer can easily fit 1000 cows on one ha of grassland. However, if these cows are to live from the grass that grows on this one ha of land, it won't take very long until all grass is consumed and the cows start starving. This is because the biological production of grass is not nearly enough to withstand the grazing pressure of these 1000 cows –in other words, the grass just can't keep up with the cows. The farmer would have been better off reducing the number of cows to a level where grazing pressure is more or less equal to the biological production of grass. At this level, the amount of grass that is eaten by the cow per unit time is equal to the amount of grass that grows back per unit time. If the farmer finds that the carrying capacity of his one ha of land is too low to sustain his cows, he has the option to raise the carrying capacity by fertilizing and irrigating his land. After these enhancements, grass will grow faster, and hence the land can sustain ('carry') more cows.

In the framework of dive tourism management, carrying capacity can be defined as: the maximum number of people who can use a site without an unacceptable alteration in the physical environment, and without an unacceptable decline in the quality of the experience gained by the visitors. This definition already indicates that in the framework of the dive industry there are two types of carrying capacity (apart from the capacity to physically 'fit' a number of divers at a site): The first is a 'social' carrying capacity, or the amount of crowding divers will accept before seeking an alternative destination. The second one is 'ecological' carrying capacity, or the extent to which a site can be used before the reef starts to degrade or until disruption of ecological function occurs.

In studies on Bonaire, Dixon et al. (1993) and Hawkins (1996) both concluded that reefs may show signs of degrading when a use rate of somewhere around 6,000 divers per year is exceeded. But this number varies between reefs, as carrying capacity of a coral reef to sustain dive tourism is influenced by (see also Salm, Clark & Siirila 2000):

- resource quality (i.e., quality of the reef)
- composition of coral communities (i.e., presence of particularly vulnerable coral species)
- reef health, or the ability to recover from natural processes (storms, disease outbreaks, increased predation), direct human impacts (trampling/breakage, extractive activities) and indirect human impacts (pollution, siltation).
- physical limitations of dive sites (i.e., size and shape of the area)
- number of entry points per unit reef area
- number of suitable moorings per unit reef area
- presence of underwater trails and guided tours
- presence of special "high impact" areas
- presence alternative dive sites (artificial reefs, wrecks)
- type of diving activity
- level of diver experience
- level of public and diver's awareness
- behavior of other users
- enforcement of regulations.

A consistent conclusion from researchers is that education largely determines the level and nature of interaction with coral reefs, and one's attitude toward conservation. Dive briefings categorize under education, and dive briefings have been shown to positively affect behavior of divers. Therefore dive briefings help to increase the carrying capacity of reefs to sustain dive tourism. Medio (1996) shows that without briefing, divers made contact with the reef 8 times per dive, and 80% of those contacts were damaging (65% of all contacts were voluntary). After a short

briefing, contact fell to an average of only 1.5, with less than 30% of those damaging (20% of all contacts were voluntary). Townsend (2000) shows that a groups that went diving without a briefing had an average touch rate of 26 per dive, whereas groups that received an environmental briefing touched the reef on average only 7.8 times.

The positive effect of briefings on diver's behavior shows that dive professionals can fulfill an extremely important role to keep diver damage to reefs minimal. To make the most of this role, he or she has to realize that getting divers to change their behavior requires more than knowledge. Behavioral change requires having communicational tools and skills, and the dive professional has to create the opportunity to use them. Some pointers for effective briefings:

- Divers must be convinced that their (changed) behavior can make a difference
- Messages must be kept short
- Do not convey more than 5 points per briefing
- Use "cognitive dissonance" to inspire interest and re-thinking of opinions (particularly among experienced divers). An example of "cognitive dissonance" is 'even though reefs show an abundance of fish life, reefs cannot withstand fishing pressure'
- Use emotional appeal.

3.5 Promoting sustainable diving practices

Fundamental to instilling environmentalism among divers is to convey a new mind-set to divers: once in the water, divers should be guests rather than customers. Guests change their behavior to accommodate the host, whereas customers do not. Likewise, divers should refrain from taking any action that impacts the reef. Guests respect and defer to their host and the local "culture" whereas customers demand service and accommodation. Likewise, divers should be passive in their behavior on the reef, rather than expect the reef community to accommodate any behavior because the dive was paid for.

One of the main attractions to diving is interaction with wildlife. However, interaction with wildlife can lead to reef degradation. Therefore, responsible diving requires that some guidelines are observed, the basic rule being that the diver, as a guest, should interact passively with the environment (the host). First of all, wildlife should not be harassed, even if the harassment (such as manta or turtle riding) does not lead to any visible damage. Harassment always implicates that the animal gets stressed, and that it will have to use part of its reserves to cope with the harassment. As most animals have tight "energy budgets", and as most animals go through periods when they are only barely coping with survival in the wild, any added stresses may prove

fatal. Divers should not touch wildlife, also because it is sometimes difficult to assess if touching will do damage to the animal or not, and divers should back off if the animal shows any signs of stress or avoidance. Divers should never elicit defensive reactions, such as getting a blowfish to pump itself up. Divers should not take pictures of inappropriate behavior toward wildlife (such as shots of a diver riding a manta), as this may encourage this type of behavior with other divers (especially novices). Finally, fish feeding should be discouraged, as this may upset the ecological balance of the reef. Active interaction with wildlife is only appropriate if:

- the interaction is a free choice of the animal
- natural behaviors are not altered
- the experience is for more than pure entertainment.

To encourage low-impact diving, the dive professional should:

- offer knowledge as required, keeping in mind that false information is worse than no information at all
- increase understanding of the reef by emphasizing that everything is part of an interconnected ecosystem, by addressing the relationship between form and function of animals, and by encouraging marine life identification
- encourage divers to descend over sand patches rather than directly over the reef
- remind divers to pay attention during descent
- remain in sand channels rather than swimming over the reef when guiding divers on reef tours,
- caution divers to stay clear of the bottom to avoid stirring up of sediments by diver's fins
- take poor conditions into account not only for the sake of safety, but for environmental impact.
- encourage streamlining of the divers personal equipment
- evaluate dive site selection with consideration to divers' skill levels
- consider drift diving if there are no or too few mooring buoys
- give a special reminder about low-impact diving to photographers.
- encourage the "magic meter" (i.e., ask divers to stay clear of the reef by at least one meter)
- select sites and mooring placements in consideration of the first "terrible 10 minutes", as the diver is especially likely to touch the reef during the first 10 minutes of the dive when he or she is still getting adjusted to the new surroundings
- assist divers with weighting and buoyancy control skills.

To decrease involuntary contacts with the reef, the dive professional should give particular attention to teaching buoyancy control and swimming skills. Both buoyancy control and swimming skills should be taught as early as possible in the curriculum,

and buoyancy control should be part of every practical session. Here are some pointers that should conveyed to students during dive classes:

- Buoyancy control basically depends on the interaction between weight, BCD characteristics and breathing, where weight distribution is as important as amount worn
- Consequences of diving over or under-weighted should be discussed
- Divers should stay current on buoyancy control technology (educational aids, training programs such as PADI's Peak Performance Buoyancy®, new types of BCD's)
- Ankle weights should be discouraged
- The skill 'horizontal hovering' should be part of the training curriculum
- Use peer-teaching
- Develop fin awareness ("stop & tuck") to minimize fins hitting the reef
- Teach "hand sculling" for close-in maneuvering.

There are ways that divers can help with marine conservation, thus changing diving from a 'low-impact' activity to a 'positive-impact' activity. Divers, after some training, can be involved in marine conservation by removing trash and lost or discarded fishing gear. They can join a monitoring or research group (R.E.E.F., RECON, Reef Check, Reef Keeper), and they can report impacts or disease outbreaks to authorities. They can become an advocate for coral reefs, either directly or by supporting organizations committed to reef conservation.

4 STAKEHOLDER CONSULTATION

Note that issues recorded in section 4 do not necessarily reflect the views of the workshop organizers (The Nature Conservancy, PADI-AWARE, the Komodo National Park authority). Rather, they reflect opinions and suggestions of a majority or a minority within the group of representatives from the marine tourism industry. Where there was unanimity, this is explicitly stated in the text.

4.1 Tourism management and financing of Park management

Though the issue on tourism management and Park financing of Komodo National Park only came up at the end of the workshop, participants felt that this subject is extremely important. All participants of the workshop felt that transparency in the management and financing structure of the Park is of the greatest importance. It is felt that both the Park authority and The Nature Conservancy should communicate changes in the management and financing structure, including the planned Joint Venture, as soon as possible to the marine tourism industry. Transparency and communication are prerequisites for the industry to support and stay involved in marine tourism management. Therefore, the marine tourism industry invites The Nature Conservancy and the Komodo National Park authority to give more detailed information on the proposed tourism management and Park financing structure.

In the period between the workshop and the completion of this report, the Komodo Marine Tourism Association (see section 4.2) is currently exploring alternative ways to manage tourism in and around Komodo National Park.

4.2 Komodo Marine Tourism Association

During the workshop, representatives from the tourism industry decided unanimously to found the Komodo Marine Tourism Association (hereafter 'the Tourism Association'). The Bali Boat Owners Association, a loosely-knit group of boat operators that frequently met in Bali to discuss matters pertaining to marine tourism in Komodo, will be absorbed in the Tourism Association. The Tourism Association's members comprise representatives from Indonesian and foreign operators, operators who have diving as core business and those who focus on other activities, and operators who offer live-aboards. Members have in common that they have a stake in the Komodo tourism industry, that they want to promote safe and environmentally

sound tourism, and that they are interested in conservation of nature values in Komodo National Park.

The Tourism Association feels that she can:

- help promoting safety and environmentally sound boating and diving practices in Komodo National Park
- give inputs from the industry to Park management pertaining to tourism management-related issues, such as the design of an entrance fee system and the collection of entrance fees
- help the Park management by providing reports on what is happening in the Park, provided that an efficient reporting mechanism is in place
- help spreading information on the Park and on its management among its own members and other tourism operators
- help spreading information on the Park and on its management to tourists
- help formulating 'sound practices' for the tourism industry and promote these among its members.

4.3 Carrying capacity

Many participants of the workshop felt that 'carrying capacity', in this context relating to the capacity of the Park to sustainably support a nature-based tourism industry, was one of the most important subjects that were explored during this workshop.

All participants agreed that tourism in the Park should be managed, or else the Park is in danger of getting more visitors then it can sustain. All participants agreed that action should be taken to avoid visitation levels to exceed the carrying capacity and to avoid damaging or unsafe practices. Most (but not all) participants felt that there was urgency in getting an efficient tourism management structure in place, because of the rising number of tourism operators who have expressed an interest in adding Komodo to their portfolio of travel destinations. Most participants felt that some form of a licensing system can be an effective tool in avoiding visitation to exceed carrying capacity.

There was a lot of discussion on how many (dive-) tourists can be sustained by various sites. There was agreement that for dive tourism the carrying capacity should be expressed as the number of dives per site per day. There was also agreement that sites differ in their carrying capacity, and that there are sites that are particularly vulnerable (notably Cannibal Rock - the seamount between Nusakode and Rinca - and the sites around Gililawa Laut and Gililawa Darat). After some rough calculations, most participants felt that 5000 dives per year per site, the carrying

capacity for reefs in Bonaire Marine Park (Salm, Clark & Siirila 2000, p. 260) would be somewhat of an over-estimation for most sites in and around Komodo National Park.

Many participants were quite concerned about crowding at some of the more popular dive sites, and procedures were proposed to avoid this (see section 4.5).

4.4 Entrance fees

Participants agreed that entrance fees should be raised from its current low price of less than US$ 2.5 per visitor to finance Park management. Most participants felt that a 'marine usage fee' on top of, or parallel to the regular 'gate entrance fee' would be acceptable. It was felt that transparency on how the raised entrance fees benefit Park management is of the utmost importance to build acceptance among both operators and tourists.

Suggestions for the design of an entrance fee system varied widely among participants, as did the perception on what price was still acceptable to visitors. It was pointed out that operators do not need to roll up the entrance fee in their rates -it would be up to the operator to charge tourists separately for the entrance fees thereby increasing transparency to the visitor.

Participants felt that the entrance fee system should be flexible so that it can both accommodate day-trip and live-aboard visitors, and both short and long trips. Also the method of payment should be flexible (via the harbor master upon clearance, at one of the entrance gates, etc.).

There was no agreement on the following issues:

- Whether different users should pay different fees (for instance, some participants felt that snorkelers should be exempt from a marine usage fee, whereas others though they should be charged as much as SCUBA divers)
- Whether a 'pre-pay' system is an alternative to the present 'pay-upon-arrival' system
- Whether a tag system for individual divers, as in use in Bunaken or in Bonaire Marine Park, should be implemented in Komodo.

See also section 4.4 on how a radio network can help in the logistics of the entrance fee system.

4.5 Radio network

Participants agreed that a radio network would be extremely helpful in tourism management in Komodo National Park:

a. *Control on adherence to fee regulations*. The radio network could facilitate collection of fees and checking if fees have been paid. It is proposed to require each vessel to report by radio (or by telephone for vessels operating from Bima or Labuan Bajo) to a central station upon entering the Park. This station will then relay this information to the speedboat patrols and to the floating ranger stations that will keep records on the vessels that have reported. If the patrols encounter a vessel that has not reported, this vessel will be boarded and a fine can be imposed if necessary.
b. *Avoiding over-crowding at anchor sites and dive sites*. When reporting to the station, vessels will also report their itinerary. The station will keep track on who is planning to anchor where and when, and if one of the sites is getting over-crowded, the station will advise the vessel to revise its itinerary.
c. *Coordination of action in case of emergencies*. The radio network can be instrumental in coordination search & rescue actions.
d. *Reporting of illegal activities*. The radio network can be instrumental in reporting violations regarding to anchoring regulations, illegal fishing, etc.

The technical details, i.e. what radio system(s) should be used, still need to be sorted out and the Tourism Association has offered her assistance in this.

4.6 Code of Conduct

The Tourism Association feels that it is timely to develop a Code of Conduct for the marine tourism industry in Komodo National Park. The following persons offered their assistance in this matter: Boyke Maengkom (Baruna), Mark Heighes (Dive Komodo), Michael Cortenbach (Bali Hai), Cody Schwaiko (Yayasan Kawan Komodo) and Tony Rhodes (Kararu). They will circulate the Code of Conduct from the Coral Reef Alliance as an example.

4.7 Involving the local communities in the marine tourism industry

Participants felt that there are two ways that local communities can be involved in the marine tourism industry:

- by individual operators building a direct relationship with communities through small development projects, exchanges with visitors, etc.

- by using part of the entrance fee and / or marine usage fee for village development and education / awareness projects.

Participants felt that these two ways are not mutually exclusive.

4.8 Other issues

- Participants felt that a facility to dispose of waste would be an improvement to Park infrastructure, and they would be willing to pay for such a service.
- Participants felt that there should be an agreed-upon and uniform naming of dive sites. It was suggested that names should adhere to the following rules: (1) preference to already existing local names, (2) the name should *not* refer to persons or institutions, (3) the name should *not* refer to animals that are often - but not always- found at the site. The Tourism Association will suggest names for the dive sites in Komodo. Condo Subagyo (CNDive), Nyoman Kirtya (Gran Komodo) and Subijanto (The Nature Conservancy) volunteered to look into existing local names for certain dive sites.
- Participants felt that a dive guide booklet, as compiled for the Red Sea (Hurghada), would be informative to visitors and could generate extra income for the Park through advertisements and sales. The participants offered to help marketing such a book to their customers.
- There was no agreement on whether there should be a SCUBA filling station in the Park. Some participants felt that this would encourage unregulated diving, whereas others felt that a filling station would be an enhancement of Park infrastructure.
- Participants felt that the souvenir trade should be regulated. Presently, the hawkers are perceived as a nuisance. A cooperative souvenir shop is suggested as a possible solution to this problem.
- Some participants felt that a wreck deployed near the Park especially for divers would enhance the value of Komodo as a dive destination.
- The situation in Pantai Merah could be dramatically improved if the entrance point would be placed around the corner to the North of the beach. There is already a path from the proposed entrance point to the beach. In this way, boats carrying visitors would not have to pass the shallow corals on their way to the beach. This would prevent damage to the corals and it would prevent boats hindering the swimmers and snorkellers.

5 EVALUATION OF THE WORKSHOP

At the end of the workshop, the following evaluation from was distributed among the participants:

Evaluation / Evaluasi

(please encircle the number that best expresses your opinion) / (*Lingkarilah nomor yang anda rasakan tepat)*

1. This workshop was / *Workshop ini dirasakan:*

of no use				very useful
tidak ada hasilnya				*sangat berguna*
1.	2	3	4	5

2. Do you think that the objectives of this workshop were met?/ *Apakah tujuan dari workshop ini tercapai?*

not at all				exceeded
sama sekali tidak				*melewati yg diharapkan*
1	2	3	4	5

3. This workshop was / *Workshop ini dirasakan:*

too short		just right		too long
terlalu pendek		*cukup*		*terlalu panjang*
1	2	3	4	5

4. What about the amount of background information offered? / *Bagaimana dengan latar belakang informasi yang dibicarakan?*

not enough		just right		too much
tidak cukup		*cukup*		*terlalu banyak*
1	2	3	4	5

5. What about the amount of practical dive-related information offered?/ *Bagaimana dengan informasi yang berhubungan dengan penyelaman?*

not enough		just right		too much
tidak cukup		*cukup*		*terlalu banyak*
1	2	3	4	5

6. What about the amount of time devoted to the participative part (day 3) / *Bagaimana dengan kesempatan yang diberikan kepada peserta untuk berinteraksi (hari ke 3)?*

not enough		just right		too much
tidak cukup		*cukup*		*terlalu banyak*
1	2	3	4	5

On average, participants felt that the workshop was very useful, that its objectives were met, and that the time allocation and amount of information offered were just right (Table 1).

Table 1. *Summary of evaluation results. Note that for question 1 and 2, the best score is '5', whereas for questions 3 to 6 (shaded area) the best score is '3'.*

Score / Questions	1	2	3	4	5	Average score
1			III	IIIII IIIII IIIII	IIIII IIIII IIIII I	4.4
2		IIII	IIIII IIIII I	IIIII IIIII IIII	IIII	3.5
3	I	IIII	IIIII IIIII IIIII IIIII	IIIII II		3.0
4		III	IIIII IIIII IIIII III	IIIII IIIII	I	3.3
5	I	IIII	IIIII IIIII IIIII II	IIIII III	III	3.1
6		IIIII IIII	IIIII IIIII IIIII	IIIII III	II	3.1

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ANNEX 1. PARTICIPANTS AND AFFILIATIONS

	NAME	AFFILIATION
A. Participants		
1	Hansie BATUNA	Murex, Manado.
2	Dick BERGSMA	SeaTrek, Bali (seatrek@indosat.net.id)
3	Karin BETTS	Adelaar, Bali
4	Lawrence BLAIR	Bali
5	Guido BRINK	Ombak Putih, Bali (ph. 0361-730191, fax 0361-733942, opbali@indo.net.id)
6	Glenn CRANDALL	Adelaar, Bali (ph. 0361-285967, Adelaar@indo.net.id)
7	Michael CORTENBACH	Bali Hai Dive Adventures, Bali (ph.0361-720331, fax 0361-720334, diverse@indosat.net.id)
8	Anna van DIJK	Ombak Putih, Bali (ph. 0361-730191, fax 0361-733942, opbali@indo.net.id)
9	Robin ENGEL	Songline Cruises, Jakarta (Hp. 0816-110-6189,fax 0361-286985, songnyc@hotmail.com)
10	Matt HEDRICK	Pelagian, Singapore (matt@dive-asiapacific.com)
11	Mr. HERMAN	Phinisi Sea Safari Cruises, Bali (ph. 0361-720220/721495, fax 0361-720220, seasafari@denpasar.wasantara.net.id)
12	Rob HOSSACK	Perintis, Bali (rhossack@indosat.net.id)
13	Paulus KAMDANI	Pro Dive, Puri Komodo, Labuan Bajo (ph. 0361-758635/758637, fax 0361-757125, pkomodo@rad.net.id)
14	Kameron KAMDANI	Pro Dive, Puri Komodo, Labuan Bajo
15	Ferry KAMO	NDC, Manado.
16	Nyoman KIRTYA	Gran Komodo, Bali (ph. 0361-287166, fax 0361-287165, gkomodot@indosat.net.id)
17	Mrs. Reno KIRTYA	Gran Komodo, Bali (ph. 0361-287166, fax 0361-287165, gkomodot@indosat.net.id)
18	Renee MADER-CHEW	Wakatobi Dive Resort, Bali (ph. 0361-270311/284227, fax 0361-270313, Renee@wakatobi.co)
19	Dick Mc CUNE	Bali International Marina, Bali (ph.0361- 723602/723603, fax 0361-723604, bbsyacht@idola.net.id)
20	Bruce MOORE	Blue Banter Marina, Manado.
21	Joshua PAAT	Baruna, Bali (ph.0361-753820, fax 0361-753809, baruna@denpasar.wasantara.net.id)
22	David PALLET	Sanur Dive College, Bali (ph.0361-284025, fax 0361-284027, sanurdivecollege@eksadata.com)
23	Camilla PALLET	Sanur Dive College, Bali (ph.0361-284025, fax 0361-284027, sanurdivecollege@eksadata.com)
24	Ben PATTIPILOBY	Ambasi, Bali (ph. 0361-237507, fax 0361-237507, ambasi@denpasar.wasantara.net.id)
25	Janice PFEIFER	Adelaar, Bali (ph. 0361-285967, Adelaar@indo.net.id)
26	Hadi PURNOMO	Phinisi Sea Safari Cruises, Bali.
27	Tony RHODES	Kararu Dive Voyages, Bali (Tony@kararu.com)
28	Mrs. RIMAYANTI	Songline Cruises, Jakarta (fax 0361-286985, songnyc@hotmail.com)
29	Hendrik M. ROSEN	Wakatobi Dive Resort, Bali
30	Urbanu SIUS	Komodo National Park.
31	Mark STEVEN	Dive Tastic, Bali.
32	Condo SUBAGYO	CN Dive, Labuan Bajo
33	Peter SUSANTO	Parewa, Bima, Sumbawa.
34	Graeme WHITFORD	Dive Trek East, Kupang.
35	Christianne	Froggies Dive Center, Manado.

B. Non-Governmental Organizations

36	Lida PET-SOEDE	WWF-Wallacea, Bali
37	Naneng SETIASIH	WWF-Wallacea, Bali.
38	Cody SHWAIKO	Yayasan Kawan Komodo, Bali (shwaiko@attglobal.net)

C. Government representatives

39	Novianto BAMBANG	Head, Balai Taman Nasional Komodo, Labuan Bajo
40	Suhartini SEKARTJAKRARINI	Directorat Jenderal Perlindungan dan Konservasi Alam, Jakarta
41	Endang WAHYUNINGSIH	Directorat Jenderal Perlindungan dan Konservasi Alam, Jakarta

C. Supporting staff from The Nature Conservancy, Bali Office

42	Mirza PEDJU, logistics	The Nature Conservancy, Bali.
43	Susantry SIHOMBING, registration and finance	The Nature Conservancy, Bali.
44	Elizabeth 'Icha' NATALIA, registration and finance	The Nature Conservancy, Bali.
45	Johannes SUBIJANTO, resource person	The Nature Conservancy, Komodo.

D. Workshop facilitators

46	Angelique BATUNA, Co-Facilitator	Murex, Manado
47	Alex BRYLSKE, Facilitator	PADI AWARE
48	Mark HEIGHES, Co-Facilitator	The Nature Conservancy / DiveKomodo, Labuan Bajo
49	Boyke MAENGKOM, Co-facilitator	Baruna, Bali (ph.0361-753820, fax 0361-753809, baruna@denpasar.wasantara.net.id)
50	Peter MOUS, Facilitator	The Nature Conservancy, Bali.

Dive Tourism Workshop
The Grand Bali Beach, February 28 – March 2, 2001
hosted by *The Nature Conservancy*

Program Schedule

Scuba diving and coral reefs go together like bread and butter. So it is important that dive professionals know about the science of coral reefs, and about coral reef management in relation to dive tourism. This program is designed to give more information about this, using examples from dive destinations all over the world. It's also hoped that it will give both dive professionals and resource managers a better understanding of each others' perspective. Last, but certainly not least, dive operators will have the opportunity to give their inputs about how dive tourism should be managed in Komodo National Park.

Facilitator:	Alex Brylske (PADI Project Aware)
Co-facilitators:	Angelique Baruna (MUREX, Manado) and Boyke Maengkom (Baruna, Bali)
Hosts:	Peter Mous, Pak Subijanto and Mark Heighes (The Nature Conservancy)
Support team:	Susantry Sihombing (workshop registration and finances), Mirza Pedju (workshop hardware), Icha (workshop registration and logistics)

FEBRUARY 28

The objective of this first day is primarily informational. The morning will discuss just how coral reef ecosystems function (or are suppose to function). The afternoon will provide a global perspective on the status of coral reefs, and just why they are in such perilous shape. While a great deal of information will be discussed, we would like to avoid a "lecture" approach. This is possible only with your active participation, so please feel free to ask questions and contribute to the discussion.

8:30-9:00	Registration
9:00-9:45	Welcoming Address – Rili Djohani (Director TNC CMP), Pak Novianto Bambang (Head Komodo National Park), Peter Mous (Senior Program Officer)
9:45-10:15	Program Orientation - Alex Brylske (PADI AWARE Project)
10:15-10:30	Break
10:30-12:00	Coral Reefs: How Do They Work? (*Insights to improve both your understanding and interpretation skills.*)
11:40-12:00	Discuss and Audience Input
12:00-1:30	LUNCH
1:30- 3:00	Coral Reefs: How Do They Work? (continued)
3:00-3:15	Break
3:15-4:40	Coral Reefs: Status and Outlook (*A look at the worldwide health of coral reefs, and why they're in trouble.*)
4:40-5:00	Discuss and Audience Input

MARCH 1

Today we will turn our attention from the science of coral reefs to their management and protection. The morning will explore where divers and the diving community fit into the broader scheme of coral reef management. The afternoon will be a practical discussion of how dive operators can train their students and supervise their clients to encourage more environmentally-responsible behavior and attitudes.

9:00-10:30	Marine Resource Mgmt.: The Dive Industry's Perspective (*What's happening around the world—why you should care—regarding coral reef management.*)
10:30-10:45	Break
10:45-11:40	Marine Resource Mgmt.: The Dive Industry's Perspective (continued)
11:40-12:00	Discuss and Audience Input
12:00-1:30	LUNCH
1:30-3:00	Promoting Sustainable Diving Practices (*What you can do to make sure that divers are part of the solution rather than part of the problem.*)
3:00-3:15	Break
3:15-4:15	Promoting Sustainable Diving Practices (continued)
4:15-5:00	Marine Conservation Plan for Komodo National Park (Dr. Peter Mous)

MARCH 2

The objective of this day is to get input from the dive industry on how dive tourism in the Komodo area can be regulated, to ensure the sustainability of the industry and to minimize impacts from dive tourism on the coral reefs. Participants are invited to bring up dive tourism related issues that are relevant for Park management. Examples are the location of mooring buoys, an efficient mechanism to collect visitor's fees, how to regulate the number of divers at a site, a mechanism for the coordination of itineraries of operators that are in the Park at the same time. As representatives of the Park authority will be present during this three-day workshop, there is a possibility to discuss tourism management issues directly. This day is THE opportunity for the dive industry to have input on how dive tourism in Komodo can be regulated in the coming years!!

On the first two days of the workshop, everybody can bring up topics for discussion during this final day. As the group is quite large, we will need to break up in smaller working groups.

8.30-9.15	Plenary session to prioritize discussion items, form smaller working groups.
9.15-9.30	Break
9.30-12.00	Working group sessions (feel free to break out for coffee or tea anytime)
12.00-13.30	Lunch
13.30-16.30	Working group sessions (feel free to break out for coffee or tea anytime)
16.30-17.30	Plenary session – Wrap-up

ANNEX 3. WORKSHOP REPORT FROM ALEX BRYLSKE

Comments Regarding the TNC Sustainable Dive Tourism Workshop
February 28-March 2, 2001

Alex Brylske, PADI-AWARE

The first two days of the workshop involved the conduct of a an interactive seminar entitled, Marine Resource Management for Dive Professionals (MRMDP) taught by Dr. Alex Brylske, Marine Conservation and Education Specialist with the PADI Project AWARE Foundation. The goals of this first portion of the workshop were three-fold. First, to provide attendees with an essential understanding of the function, status and outlook of coral reef ecosystems from a global perspective. Secondly, to review pertinent marine resource management issues affecting the dive tourism community, with an emphasis on experiences from MPAs throughout the world. A final practical goal was to cover issues relating to sustainable diving practice, including insights on how to instill environmentally-sensitive attitudes among dive tourists, and guidelines on low-impact training and supervision techniques for divers and snorkeling.

As this was the eighteenth MRMDP seminar, extensive experience regarding the program has been established. Consistent with previous seminars, dive tour operators represented about two-thirds of the attendees; the remainder were representatives from NGOs and government ministries. Responses from all three communities—dive tour operators, NGOs and government officials—was uniformly positive. Tour operators were especially pleased to have acquired a knowledge-base enabling them to provide high quality interpretive experiences to their clients. NGO representatives expressed interest in continuing a dialog with PADI Project AWARE concerning similar diving/coral reef conservation projects. Additionally, government officials from the Ministry of Forestry expressed interest in developing a training seminar based on the MRMDP approach for terrestrial ecotourism operators. All three communities indicated that, consistent with past programs, a major outcome the workshop was the opportunity to interact informally with groups and individuals they rarely, if ever, encounter.

One difference noted between this program and previous seminars was that the group needed little prodding or encouragement to express their views, or to keep the discussion relevant to their specific interests/needs. This is probably due to the close focus on Komodo National Park emphasized by TNC both prior to and during the course. Likewise, having co-facilitators in the seminar who were experienced dive tour operators themselves—known and respected by the majority of attendees—was

undoubtedly useful in maintaining focus, and overcoming any reluctance of the group to ask questions.

Perhaps the most insightful comment made about the Workshop came from Michael Cortenbach of Bali Hai Tours. His remarked, as echoed by a number of other operators, that it was the first two days of the program that made the third day so productive. Without the knowledge and insights gained during Days I and II, the third day would have been, according to Cortenbach, “a lot of hot air and uninformed opinions.”

It is my own opinion that this seminar was one of the most successful in my two years’ experience with the program. Much of this success, I believe, was due to practical focus of the information to specific management concerns, and the culminating activity of the third day, allowing attendees to apply what they learned to the management of Komodo National Park. I was also deeply impressed by how much the dive operators recognized that the local communities should also be involved in the marine tourism industry'.

It is my sincere hope that bringing the MRMDP seminar to the region will not end with this single experience. Given the dynamic nature of dive tourism, and plans for TNC to develop an MPA training center in Bali, I believe that MRMDP could make a useful and continuing contribution to issues related to dive tourism within KNP. It was both a sincere honor and pleasure to have been a part of the workshop.

Comments Regarding Komodo National Park.

Although I did not have an opportunity to experience KNP before the workshop, after the seminar I was able to spend one whirlwind day touring the park. Based on my two diving experiences, I can report that I have not dived on such an apparently healthy coral reef for many years, and never have I witnessed such diversity! Clearly, the resource is a special one deserving the highest level of protection possible.

Fortunately, due to its remoteness and extensive number of dive sites that could be developed, the present dive intensity is probably well below the ecological carrying capacity to support the dive industry. It is noteworthy in this regard to mention that during my extensive tour of the Park, I witnessed not one other dive boat. Even in low season this is encouraging, if not astounding. However, examples from Thailand and elsewhere in the world show that dive tourism development can proceed rapidly well beyond the carrying capacity. Once the capacity of the dive industry exceeds the carrying capacity of the Park, it is extremely difficult to impose regulation of the industry. Therefore it is very important that managers and the industry together use

this opportunity presented by a dive industry that is till in the early stages of its development to take timely action to avoid uncontrolled expansion.

While ecological carrying capacity may not be an immediate concern, action is necessary regarding the establishment and control of social carrying capacities. KNP is fortunate in that there is still time to take a proactive rather than reactive approach to responsible management. It is clear from listening to both dive tourists and operators that the single most important criterion for satisfaction to any diver visiting the park is that they feel they are somewhere few others will ever see. While at present such an experience is still possible, the expected growth of boat and land-based dive tourism into the Park should become a major concern and management objective. Particularly if the top-end tourist begins to feel that KNP has already been "discovered" by the endless hordes of massive low-end tourists, this high-end market will quickly abandon the Park for other yet undiscovered, or perceived undiscovered, destinations. KNP will continue to remain a desirable destination only if it remains literally, and in the minds of the dive community's most adventurous, affluent travelers a "special place." Moreover, it will remain a special place only if appropriate management strategies, particularly relating to social carrying capacity, are implemented soon.