AN OVERVIEW OF ISSUES RELEVANT TO THE CONSERVATION OF THE NESTING TURTLE POPULATION ON PULAU SANGALAKI, KABUPATEN BERAU, KALIMANTAN TIMOR

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TABLE OF CONTENTS

1. Background

Sangalaki Island, in the Berau district of East Kalimantan province, Indonesia, contains one of the largest known nesting populations of Green Turtles in the Celebes Sea and has turtles nesting all year-round.

Since at least 1934 turtle eggs have been collected on Sangalaki under concessions from the government. Between 1934 and the Second World War the concession was closed every second year, and in those years all nests were left to hatch. Following a period of unregulated collecting during the War and for several years afterward, concessions were reintroduced in the late 1950s, but without any closed season. These concessions persisted, in various forms, until 1 January 2002.

The precarious state of Sangalaki's turtle population has been recognised by experts since at least the mid-1980s. A detailed study of the status of marine turtles in Indonesia conducted by J.P. Schulz for WWF and IUCN in 1984 recommended an immediate ban on egg collecting on Sangalaki, in line with the protected status of the island at the time.

By the end of the 1990s it was clear that the Sangalaki turtle population had reached a critical stage.

Typically the numbers of turtles coming ashore to nest at a particular place varies considerably from year to year. Occasional years in which there are much higher numbers (often associated with an *El Nino* event two years before) tend to give the impression that there are more turtles in the nesting population than average numbers suggest. This makes it difficult to give unambiguous figures, and can also make it difficult to convince local people that there is any real conservation issue. Nevertheless it is clear, as stated above, that the total number of turtles nesting on Sangalaki has declined drastically from its pre-collecting status.

This tiny (22 ha) island reportedly attracted an average of 200 nesting turtles per night half a century ago. In the 1970's an average of around 150 turtles per night still nested there, most of which were Green Turtles (*Chelonia mydas*). Since then the numbers have dropped precipitously. While numbers of nesting turtles typically show considerable inter-year variation, it is clear that current levels are only a small fraction of the natural, unexploited population. This is supported by anecdotal information from the Derawan community. For example, one 52 year old fishermen told of seeing up to 2,000 Green Turtles on the Pulau Panjang reef flat at low tide when he was a teenager. Now he considers it is a good day if he sees four turtles there.

2. The Legal Situation

In 1982 Sangalaki was declared a National Marine Park (Taman Laut) by Decree 604/Kpts/Um/8/1982 (19 April 1982) of the Minister of Agriculture. This Decree also zoned nearby Samama Island as a Strict Nature Reserve (Suaka Margasatwa Alam). Under Indonesian law it is not permitted to take any animal or plant products from a Marine Park or Strict Nature Reserve.

The letting of concessions by the local government continued after the creation of the Marine Park, though this was in violation of national laws.

In January 1999 Green Turtles were listed as a protected species under national law No.7/1999 and thus became subject to law No.5/1990. The latter law provides complete protection to listed species and, among other things, forbids taking, storing, or trading in their eggs. These laws have been used as the basis of several successful prosecutions of persons trading in marine turtles in Bali in the last 18 months.

Concessions continued to be let until the present by the Kabupaten Government for islands in the Berau archipelago, despite the total protection afforded by the January 1999 law.

In late 2001 the government of Kabupaten Berau decided to implement 100 percent conservation of turtle eggs on Sangalaki, to commence from 1 January 2002. Collecting under concessions approved by the Berau government continued on other islands in the Kabupaten, apart from Pulau Samama. As of the end of February 2002, there is not yet any local government regulation to give effect to this decision (though legally this is unnecessary because of the existence of the national laws).

3. The Reasons to Conserve Turtle Populations

One of the major obstacles currently hindering the implementation of turtle conservation on Sangalaki (and ultimately on other islands in the archipelago) is the lack of understanding at all levels of the need for such conservation. Despite the efforts of national and international NGOs to influence government policy, there are probably few individuals in government in Berau who can explain why there is a need for 100 percent conservation of local turtle populations. On the other hand there are many who feel that they can explain why such conservation is not needed.

There is an urgent need to explain in detail the need for conservation of turtle resources in Berau. This should be targeted at all levels, from the DPRD down to the primary schools, though the primary focus in the short-term should be the DPRD and senior officials in key government agencies.

In summary, the main reasons for turtle conservation are:

- turtle numbers have reached a critical level and if exploitation continues the local populations are likely to become extinct;
- there are national laws protecting all species of marine turtles, and these national laws give effect to an international convention (CITES) to which Indonesia is a signatory;
- marine turtles are a "flagship" species, that is, a highly visible species in which there is considerable public interest, and which can easily become a symbol for conservation of a wider ecosystem;

- conservation of turtles and their habitats (i.e. seagrass areas, coral reefs, nesting beaches) will at the same time conserve a wide range of other species dependent on the same habitats. Some of these other species are of considerable economic significance;
- conservation of turtles will provide easily understood lessons about environmental management and species conservation which people can readily transfer to other, less obvious or interesting species. In this context they provide good examples in relation to management of both marine and coastal ecosystems;
- sustainable turtle populations will allow the development of turtle-based ecotourism that has the potential to make very significant contributions to the regional economy; and
- the turtle is the symbol of Kabupaten Berau, and its conservation will provide an element of pride for the people and government of the region.

4. Economic Benefits of Turtle Conservation - How and When?

The benefits of turtle conservation will not come from the resumption of harvesting of turtle eggs in the short term.

Conservation management of the turtle populations nesting on Sangalaki is necessary if the population is to survive. Because of the long period required for Green Turtles to reach sexual maturity (of the order of 25-30 years) the number of breeding individuals can be expected to continue to decrease for at least that period. Until there is a significant increase in the nesting population (25-40 years from now), harvesting of eggs would only prolong (if not endanger) the recovery process.

There is a real potential for a significant benefit to the regional economy, and thereby to the local population, from turtle-based ecotourism. Before this can be achieved there will need to be some considerable inputs from various stakeholders, in the form

of strategic tourism planning, tourism infrastructure development, and targeted promotional campaigns[1].

5. Threats to the Nesting Turtle Population and Breeding Success

The currently identified threats to the nesting turtle population on Sangalaki include:

- overharvesting of eggs;
  As described above, this has been going on for many decades and represents the most significant current threat to the recovery of the turtle population. While there is officially a total halt to egg collection on Sangalaki, substantial numbers of eggs are being stolen and the lack of any law enforcement response to this may lead to an uncontrollable situation in which all or most eggs are illegally harvested.
- capture of adult turtles for consumption;
  This is still occurring, as evidenced by an adult turtle washed ashore on Derawan in mid-February 2002, with its front flippers tied in the manner used by turtle hunters. The level of the catch is unknown, but given the virtual lack of any patrolling of the waters around the islands and the level of demand, the catch could be quite high.
- weed infestation of nesting areas, leading to reduction in the available nesting area and hindrance to hatchlings attempting to reach the sea;
  Two main species of plants are invading the best nesting areas. These species are preventing nesting turtles from establishing nests, thus reducing the area available. In addition these plant species hinder the movement of hatchlings to the sea, either by hindering their movement or by blocking their view of the horizon. This is occurring in what is potentially the most important nesting habitat on the island, because of its height above high tide and its areal extent.
- driftwood logs blocking access of adult female turtles to the nesting areas and blocking movement of hatchlings to the sea;

[1] See separate discussion paper on *Reaping the benefits from turtle conservation in Kabupaten Berau, Kalimantan Timor, Indonesia*,

This is a well documented problem on Sangalaki and other islands in the region and stems from the increased level of logging and land clearing in the last 30 years.

- predation of eggs and hatchlings by monitor lizards and rats;
  Sangalaki has extremely large populations of monitor lizards and rats. Monitor lizards have been observed to dig up nests which contain rotten eggs (probably sometimes before the other eggs have hatched, and thus gaining access to the developing embryos). Rats also dig up nests which are too shallow and eat the eggs. In addition, both monitor lizards and rats patrol the nest areas at night and in the morning, and both are known to eat hatchlings. Monitor lizards, at least occasionally, also steal eggs from the egg chamber as they are being laid. The populations of both these predators is increased to some extent by the availability of uncovered food material in a bin behind the dive resort kitchen.
- disorientation of hatchlings and nesting females by artificial lights;
  Both hatchlings and nesting females find their direction to the sea by moving toward the lowest bright horizon. The presence of artificial lights which are visible from the beach or nesting areas will tend to disorient the turtles and prevent them finding their way to the sea. While the management of the dive lodge makes some attempt to control light sources, these efforts tend to be inconsistent and lacking in follow-up.

6. Law Enforcement

It is always preferable to achieve compliance with natural resource management laws through consultation and agreement based on the awareness of the community of the reasons behind the laws. However, in certain circumstances it is unavoidable that law enforcement action needs to be taken. Such circumstances include: repeated offences by an individual or group, despite awareness raising and warnings; breaches of the law by powerful outsiders against whom the local community is unable to take action; and breaches of the law by powerful insiders against whom the majority of the local community is unable to take action.

Law Enforcement Agencies

The main agency responsible for enforcing the laws protecting marine turtles and their habitats is the Balai Konservasi Sumber Daya Alam (BKSDA) under the Forestry Department.

Forestry Police within the BKSDA or its local Sections and Sub-sections have the power to arrest people breaching the law. The offenders are then turned over to the police with details of the case and it is the police who prepare the case and take it through the law courts.

Police can also make arrests in relation to offences under the relevant national laws, though police officers are not usually posted to conservation areas unless specifically requested to provide assistance in law enforcement.

Role of Local Government

One of the key roles for local government in law enforcement is to provide a supporting political, policy and administrative environment within which law enforcement can occur.

In the case of the protection of the Sangalaki nesting turtle population this environment is virtually absent at present.

Government policy is unclear. There are various versions of the current policy of the Berau government in relation to protection of turtles and their eggs. It has been announced at different times and in different locations by government officials that: (a) the total ban on collecting eggs on Sangalaki is a “trial” for a six month period. If this is successful, the ban will be extended to all other islands in the Kabupaten. If it is not successful the concession will be reinstated; and (b) the initial six month period is a “transition” phase which will lead into total protection throughout the islands of

the Berau archipelago. In recent weeks the “transition” version has been given more prominence, but the situation is still far from clear.

Successful law enforcement also depends on the field activities being backed up by the political will to carry through with prosecution of offences. Unfortunately representatives of the Berau government have stated on three occasions recently that the law against collecting turtle eggs will not be enforced[2]. The reasons given[3] for this policy are not entirely logical. They are presented below, followed in each case by a rebuttal:

- the community has to be given time to adjust to the new conservation situation and until then some level of theft has to be tolerated.
  The "community" is not carrying out the theft. It is being done by a small group of individuals employed by, and under the protection of, powerful interests. Until now neither Turtle Foundation nor KSDA have detected any theft by members of the local community who are not part of the group employed by Haji Sa'gah.
- the previous egg collectors suffered loss of income as a result of the introduction of full protection and some level of theft should be tolerated to allow them to have some interim income until other work can be found.
  The egg collectors previously received a wage from Haji Sa'gah (the concessionaire at the time). They now receive a wage from him as a supervisor or as labourers to unload boats. They have not suffered any loss as a result of the protection of turtle eggs.
- the law cannot be enforced in relation to Sangalaki while there is still a concession over other islands in the Kabupaten.
  There is no connection between the two situations. Turtle egg collection is illegal under national laws, and the provisions for prosecution are found in those national laws. If the Kabupaten government is afraid of being embarrassed because of its illegal concessions, they are able to prosecute egg poachers on Sangalaki under national laws relating to Marine Protected Areas. This could not

[2] Head of Bapedalda in a phone conversation on 1 Feb; Monitoring and Research Team discussion on 2-3 February; and Head of Persatuan Bangsa dan Perlindungan Masyarakat (PBPM, formerly SOSPOL) on 24 February.
[3] The reasons presented here were advanced by the Heads of Bapedalda and PBPM on 2-3 February and again on 24 February. The responses described here were given by Turtle Foundation workers on both occasions.

be construed as having any connection with the concession over other, non-protected, islands.

Poaching of Turtle Eggs

Poaching by a Group of Construction Workers Employed on Sangalaki

Since the commencement of the local government's 100 percent conservation policy on Sangalaki on 1 January 2002 there have been repeated instances of theft of turtle eggs from the island. Evidence from direct sighting of the individuals involved; observation of individuals on the beach at all hours of the night, sometimes in close proximity to robbed nests and caches of stolen eggs; distinctive footprints at robbed nests and at caches of stolen eggs; and reports from people on Derawan Island, all point to the majority of the theft being done by a single group of individuals employed by Haji Sa'gah, supposedly to unload building materials under his construction contracts on the island[4]. This group has been accommodated in the same hut as a person called Kamlun, who is employed by Haji Sa'gah as the construction supervisor on the island, despite his previous profession as the leader of the egg collectors under Haji Sa'gah's concession on Sangalaki.

The group associated with Kamlun was warned by KSDA staff on a number of occasions that their activities were illegal.

Clearly this is a situation which meets the requirements of law enforcement as outlined above. There have been repeated offences, and the individuals involved belong to a group of powerful insiders against whom the community (in its broadest sense) is powerless.

Others Involved in Theft of Eggs

[4] This same group under Kamlun were stealing eggs that had been handed over for hatching under the previous 20% conservation regime as early as July 2001.

Apart from the thefts by the group employed by Haji Sa'gah, there is evidence which suggests that other groups are stealing eggs from time to time on Sangalaki. This evidence includes different techniques of locating and digging egg chambers and different sets of footprints around stolen nests. These events are infrequent and, during the period from 20 January to 21 February ,have coincided with visits to the island by members of the Army (Battalion 613) and Navy groups stationed on Derawan. These groups make periodic visits to Sangalaki, staying in the dive lodge. They currently play no role in turtle conservation management - when asked the reason for their presence they usually cite either illegal Filipino immigrants, the threat of Filipino terrorists, or the need to detect illegal log shipments.

Factors Inhibiting Successful Law Enforcement

In summary, the factors inhibiting successful law enforcement on Sangalaki in relation to theft of turtle eggs are:

- lack of clarity in relation to local government policy (explained above);
- lack of political will at the local government level to follow through with prosecution (explained above);
- the high level of influence of a group of powerful individuals originating from Derawan over other stakeholders in turtle conservation management;
  As described above, the only significant theft of turtle eggs from Sangalaki since the inception of total protection appears to have been by a group associated with Kamlun and working for Haji Sa'gah. The powerful connections of this group has made them virtually immune from either legal action or dismissal by the Sangalaki Dive Lodge which has contracted Haji Sa'gah to refurbish the resort's dive centre.
- lack of transport and other infrastructure for law enforcement agencies;
  KSDA needs transport facilities: to change over its field crews on Sangalaki every two weeks; to transport detainees to Berau; and to carry out patrols of the Sangalaki lagoon and Samama Island. At present they are obliged to use chartered speed boats or to get lifts on resort speedboats if these are operating on the days they need to travel. The Turtle Foundation has provided half the

cost of a wooden boat body that will be powered by a 30hp outboard motor, but this is at best a temporary and inadequate solution. What is required is a speedboat with at least one and preferably two 40hp outboards and an adequate annual operating budget. In addition KSDA field teams need to be able to communicate with their base on the mainland by radio. If police are to be stationed on Sangalaki (as envisioned by the Kabupaten government) then they too will require transport and communication facilities.

Involvement of the Derawan Community in Law Enforcement on Sangalaki

It has been suggested by more than one NGO that the Derawan community should be involved in law enforcement (and other aspects of conservation management) on Sangalaki. As the discussion above suggests, local communities cannot enforce laws against powerful outsiders or powerful insiders. To put people in a situation where they are expected to do this is to invite either total failure of law enforcement or the escalation of social tensions - almost always to the detriment of those community members tasked with law enforcement.

The question needs to be asked as to whether the Derawan community has any interest (beyond a desire for employment) in being involved in law enforcement or management on Sangalaki[5]. Unless there is evidence of a clear and genuine interest in such involvement as well as some potential for successful outcomes (debatable in the light of the Haji Sa'gah issue), community involvement should not be forced merely for the sake of the pandering to the philosophical bias of one or two NGOs.

The Egg Collection Concession on Other Islands

[5] See discussion elsewhere in this paper on the community's involvement with Sangalaki turtles.

The Berau government plans to cease the egg collection concession over the remaining turtle nesting islands at the end of July[6] 2002 and to extend the total protection of turtle eggs throughout the kabupaten.

While this is a laudable aim from the point of view of turtle conservation, it raises some serious issues about the long-term effectiveness of law enforcement in the area. One of the basic principles of successful law enforcement is that the law must be respected by the community. If a law is not respected, then there is likely to be little compliance with it. A law which is not enforced is unlikely to be respected, and the problem in Berau is that neither the kabupaten not BKSDA has the capacity at present to extend law enforcement over the whole of the archipelago. If the result of this inability to enforce the law is blatant theft of turtle eggs, then the level of respect for this legislation will decline significantly, with predictable impacts on compliance on Sangalaki.

Maintenance of the concession over the remaining islands until law enforcement arrangements have been developed and tested on Sangalaki, and the capacity exists to extend this to the other areas, would overcome this problem. However it does not get around the two problems that: (a) the concession is illegal under national law; and (b) the concession is having a significant impact on turtle populations, and the longer it continues, the lower will be the likelihood of recovery of those populations.

An alternative might be to focus law enforcement on the marketing of turtle eggs, based on the principle that if a market does not exist then there will be no harvest. This might have some impact on the harvest, but several considerations suggest that the impact might be slight or non-existent. These considerations relate to alternative markets. The main source of turtle eggs in Kabupaten Berau (other than Sangalaki) is the remote island of Bilangbilangan. If there is no law enforcement there, it is possible that Filipino egg collectors will move into the area, or that local egg collectors will harvest the eggs and transfer them to Filipino boats at sea. There are many family and historical connections between the coastal population of Berau and

[6] This was previously announced as the end of June, but recent statements refer to the end of July.

the Philippines, particularly among the Bajau community. It is rumoured in northeastern Kalimantan Timor that significant mid-ocean transfer of illegal commodities (e.g. fuel and turtles) is already happening. Alternatively, local collectors might continue to collect the eggs, but direct them to the Malaysian or Taiwan markets (which are reported to be supplied from Berau already).

7. Community Involvement with the Nesting Turtles on Sangalaki

It is one of the ideals of natural resource management that the relevant community be involved in the management of the resource.

Community involvement (sometimes called "co-management) can take many forms. It does not mean that the community, or a particular group within the community is solely responsible for management of the resource. Responsibility for proper management of the resource will always rest with the government agency identified by law or policy as having that duty. Community involvement is not simply a question of whether it is the community or the relevant government agency that manages the resource. There can be different levels of involvement of communities in management, and there is no single correct degree of involvement. The appropriate level of involvement of the community will depend on a range of factors, including the level of community interest in being involved.

To try to create a certain level of community involvement in resource management in the face of inadequate levels of interest on the part of the local community would be a self-defeating exercise in political correctness.

There also needs to be a consistent approach to community involvement. No good reasons exist for advocating community involvement in turtle management but not in management of reef fish populations. In fact, since the communities in the area currently have a considerably closer relationship with reef fish than they do with turtles, there is possibly a stronger argument for involvement in the management of the former.

Who is "the Community" in Relation to the Sangalaki Turtle Resource

The term "community" in relation to management of a particular natural resource can be a very broad concept. It embraces all those stakeholders with an interest in the management of the resource - including (but not limited to): local inhabitants having some current or traditional connection with the resource or interested in the conservation of the resource; users of the resource (not restricted to those who harvest the resource, but including those who use it passively, e.g. wildlife viewing, and possibly including groups living far from the local area); and interested NGOs.

Proponents of "community involvement" in the management of Sangalaki's turtles who restrict their arguments to involvement of the local community on Derawan[7] are taking a very narrow view of the what constitutes the relevant community. Any community involvement mechanism developed for the Sangalaki turtle resource should provide roles for all elements within the broader community with an interest in participating in management.

The Derawan Community's Relationship with the Sangalaki Turtle Population

Much has been made by some NGOs, and by the Berau government, of the Derawan community's interest in the Sangalaki turtle population and particularly the eggs laid on the island. These parties often state that the community has been disadvantaged by the introduction of 100 percent conservation and therefore needs to be "compensated", as well as being given a role in the monitoring and management of turtle nesting on Sangalaki.

In reality, the vast majority of the community on Derawan has probably not had any involvement in the harvesting of turtle eggs on Sangalaki since the 1960s, when there was a system of individual three-day concessions available to local people. Since at least the early 1980s, but probably the 1970s, there has been a practice of

[7] There is no community on Sangalaki.

awarding the concession over the turtle nesting islands to the highest bidder. As a member of the Derawan community said to Turtle Foundation workers in January 2002 "at that time, the rich people pushed out the poor people".

Under the concessions, the only people who benefited from the eggs laid on Sangalaki were the concessionaires (i.e. already-rich individuals) and their employees (often family members of the concessionaire). There were between five and eight employees on Sangalaki during the concession operated by Haji Sa'gah for at least the last 6-7 years. According to people on Derawan, the eggs from Sangalaki were not taken to Derawan, but directly to the major markets, so that there was no secondary employment generated on Derawan by the collecting activity.

During the years when he held the concession, Haji Sa'gah actively discouraged other people from the local community from obtaining any benefit from the Sangalaki eggs - in fact, he had a policy of paying his staff a substantial reward for information on anyone stealing eggs from his concession areas.

Thus there is no recent history of the general community on Derawan obtaining any benefit (commercial or subsistence) from the turtle nesting on Sangalaki. Perhaps this is at least part of the reason that, until now, Derawan people have not attempted to come to the island to steal eggs under the new conservation arrangements.

This is not to say that the community on Derawan does not have any interest in knowing what is being done to conserve nesting turtle populations on Sangalaki. Turtles are a very obvious component of the marine environment, and many Derawan families have had some involvement with turtles or turtle eggs over the past 70 years or more. In a brief time spent on Derawan in January 2002, Gordon Claridge, one of the Turtle Foundation workers, met a number of individuals who offered stories of their experiences or those related by their parents or grandparents. During the same visit there were many questions from Derawan people as to exactly what was happening on Sangalaki under conservation management. Thus, the Derawan community clearly has a cultural / historical interest in the local turtle populations, and is potentially a valuable ally in conservation management.

8. Awareness Raising

Given the Derawan community's cultural / historical interest in the local turtle populations and their curiosity about what is happening on Sangalaki, it is clear that there is fertile ground for awareness raising to generate support for turtle conservation.

It would have made sense, in the lead-up to achieving total conservation protection of the Sangalaki turtle nesting, to initiate a well planned and targeted awareness raising campaign on Derawan to ensure community support. Time was clearly available to do this - WWF and Kehati had been campaigning for 100 percent conservation on Sangalaki since at least April 2001. Though effective awareness raising did not occur before the initiation of conservation management (and has not yet commenced), the initiation of such a campaign is still a high priority.

The approach and methodology adopted to carry out an awareness raising campaign are crucial to its success. The following principles and components are recommended:

i. Ensure that staff carrying out awareness campaigns have sufficient knowledge of turtle conservation and turtle biology to ensure credibility with the local population.

   Local people have generations of experience with turtle populations, ranging from day-to-day observations to close involvement by some in turtle or turtle egg harvesting. They have a wealth of information on these topics, and will not respect awareness workers who have less information on the topic than they do. In addition, certain important elements of the local ecological knowledge about turtles will be based on misunderstandings of observations, or on unsubstantiated beliefs. Awareness workers need to be able to identify and deal with key local misconceptions regarding turtle ecology.

ii. Ensure that staff carrying out awareness raising programs with local communities are sufficiently mature to be able to relate comfortably to people of all age groups;

This is particularly important in relation to older people who have the major part of the community's store of historical and ecological knowledge about turtles. This group is also likely to include the key opinion-makers in the community. Young and / or immature staff will not be able to deal appropriately with this group within the population.

iii. Ensure that groups and individuals carrying out awareness raising programs have some expertise and experience in this field.

The success of awareness raising campaigns is easily jeopardised by the activities of incompetent practitioners. Communities are typically initially suspicious of awareness raising activities, and generally scrutinise the implementers carefully to see whether they know what they are doing. If NGOs which do not have this type of capability are to be used in awareness raising, then there should be an intensive period of capacity building carried out by appropriately qualified trainers.

iv. At an early stage in the awareness raising program, establish an activity to collect and record the community's historical, cultural and ecological knowledge in relation to turtles.

This will have several important results. First, the local knowledge base will contain important data on the history of exploitation in relation to turtle populations. Collating and analysing this data will help to explain aspects of the current state of the turtle population. Second, the exercise will be a way of showing respect for the community's store of knowledge about the local turtle population, and will help to establish a cooperative joint approach to the subject. Third, returning the assembled information to the community in a formal format such as an illustrated book will generate substantial community pride in their association with the turtle population. This pride can easily be harnessed to generate support for conservation of the turtle population.

v. Carry out, as a matter of urgency, a series of in-depth presentations on the conservation management of Sangalaki's nesting turtles for the widest possible audience on Derawan. As a follow-up to this activity, take at least 8-10 representatives of the community to Sangalaki for a guided tour of the conservation management, explaining all aspects of monitoring, management and law enforcement.

The Derawan community has not had any information on the realities of conservation management on Sangalaki. Neither do they fully understand the need for total protection of the turtle population, including the prohibition on egg collection. The "sosialisation" of the decision on protection has not in any way answered people's questions about the need for such a measure. The conservation management of turtles on Sangalaki needs to be totally open and transparent as far as the Derawan community is concerned - if Derawan people understand and agree with the management objectives they will be likely to become strong advocates for the program.

vi. Engage any interested elements of the Derawan community in some practical aspect of turtle conservation that will provide a focus for ongoing discussion and transfer of knowledge.

A practical activity might be to provide training to interested members of the community so that they take over the hatchery activities on Derawan (but definitely not the headstarting program). The hatchery and headstarting program now run by BMI (Derawan Dive Resort) is viewed with suspicion by at least part of the community. There are stories circulating that the activity is a cover for collection and sale of eggs. In addition, the hatchery operation is producing mainly male hatchlings (most or all nests are raised inside a covered shed) and the headstarting program is probably not producing turtles which are viable in the wild. Handing the responsibility for hatching turtles on Derawan over to the community would be a way of showing confidence in their interest in turtles. Involvement of interested individuals as well as school classes, youth groups etc. will provide a range of communication channels into the general community.

9. Monitoring of Turtle Populations and Activities

Why Monitor?

Monitoring is the process of identifying trends in a situation so as to reveal whether or not it is coming closer to a desired goal. Monitoring typically measures indicators, rather than spending money and effort on repeatedly measuring absolute values.

Without monitoring it is not possible to know whether management is having the desired effect. In relation to the nesting turtle population on Sangalaki, there are several aspects of the situation that need to be known by those responsible for management. These include:

- the trends in the nesting population (research suggests that the average number of turtles landing on the beach during the peak of the nesting season is a reliable indicator – though there are several complicating factors – see below);
- any changes in hatch success of natural nesting;
- any changes in hatch success of relocated nests;
- any changes in the preferred nesting areas;
- factors affecting the establishment of nests and the movement of hatchlings to the sea, and changes in these factors and their impacts;
- indicators of the health of individual nesting females (injuries, abscesses, etc.) and changes in the frequency of occurrence of these;
- the size (carapace length) of nesting females and changes in the composition of size classes; and
- percentage of nests stolen and changes in this percentage.

All of these indicators are relatively easy to measure on the nesting beaches, though the collection of the data over the necessary periods requires considerable inputs of manpower and funding.

Baselines

In order to identify the results of management of a natural resource it is useful to know the baseline situation at the time when management commenced.

With turtle populations it can be extremely difficult to establish baselines. The numbers of turtles nesting in a particular area changes significantly from week to week and from year to year. For this reason it is necessary to monitor over periods of several years in order to have some idea of, first, the baseline situation and, second, a reliable idea of changes away from this baseline.

A concentrated monitoring program will be necessary on Sangalaki for several years in order to identify the baseline situation. This monitoring program can be combined with security patrolling, which will be necessary for some time.

Turtle Foundation's Monitoring Activities Since 20 January 2002

Since 20January 2002 Turtle Foundation workers have installed a system of marking 25 metre sectors of the beach so that turtle nesting and hatching data can be accurately recorded. This system builds on the poles which already existed every 100 metres around the beach and every 25 metres in sectors 2 and 3.

This is a necessary part of turtle conservation management because of the need to:

- be able to re-find nests and relocated nests so as to measure hatch success;
- be able to record false crawl data so as to be able to analyse and respond to factors leading to false crawls; and
- indicate to monitoring and management staff precisely where an event or object is located on the 1500 metre beach.

The present pole system is rudimentary and needs to be further refined. In particular, the poles need to be shortened to the minimum necessary height to reduce the impact on the visual environment. However they need to be clearly visible at night from within the adjacent sector, so as to minimise the need for monitoring teams to walk to posts to check sector numbers. In places the temporary driftwood poles need to be replaced with more permanent poles.

10. Research and Research Results

The population of nesting turtles on Sangalaki offers opportunities for research which are becoming increasingly rare in Southeast Asia. However the simple fact that the opportunity exists does not necessarily justify all proposed research.

It is particularly important that proposed research be scrutinised to determine whether it is likely to divert efforts and funds from the immediate highest priority of establishing a secure and sustainable conservation management system for the Sangalaki turtle population. Lists of research priorities previously prepared for Sangalaki seem to be based on an assumption that management resources are somehow separate from research resources, and include a significant proportion of "nice to know" objectives which have no immediate management relevance.

Objectives of Research and Permission for Conducting Research

Virtually all research activities have some environmental impacts, and the question always needs to be asked whether the impacts (particularly on the already very reduced turtle population) is justified by the usefulness of the research results.

Research should be permitted on the Sangalaki turtle population only if it satisfies the following criteria:

- it will have no unacceptable negative impacts on the turtle population or its habitats or on other aspects of the environment, and will not unacceptably interfere with environmental management activities;
- it will contribute to solving identified high priority environmental management problems in relation to turtles; and
- it has been approved by the relevant authorities.

Approval, Coordination and Supervision of Research

Research on the Sangalaki turtle population or its habitats should occur only with the approval of the BKSDA Kalimantan Timor. Requests for approval of research should

include identification of the anticipated environmental impacts of the research activity and a clear statement of how the activity will contribute to solving priority management issues. Approval should be subject to the condition that research results will be formulated in a manner which directly relates to identified resource management issues.

Turtle and turtle habitat research activities should be coordinated by the [[[Monitoring and Research Committee]] in conjunction with BKSDA.

Turtle and turtle habitat research activities should be approved, supervised and monitored by KSDA Berau. BKSDA should consider establishing a network of advisors to assist them to manage research activities. Such a network need not be local, but could be established using an email group. This approach would allow inputs from relevant experts throughout the region.

Ownership of Research Results

The idea that research results belong to the researcher is an outdated and discredited concept. Being allowed to carry out research, particularly in a protected area or in an area where a local community has a valid interest needs to be regarded as a privilege.

In particular researchers need to recognise that the data which they collect and manipulate belongs first to the local community and second to the management agency responsible for the protected area or the protection of the species involved. Recognition of ownership imposes a responsibility on researchers to:

- explain to local communities the nature of the work that they intend to do;
- obtain permission from the relevant government agency responsible for the area or the species involved;
- involve local communities and relevant government agencies in the research to the greatest extent practicable;
- provide local communities and the relevant government agency with an overview of the data they have collected and their preliminary conclusions - before leaving

the area - in a form and language which are meaningful to the community and useful to the government agency; and

- return the final outputs and conclusions to the community in a format which is meaningful to the community and useful to the government agency.

11. Headstarting (*Penankaran*)

It is of concern that there have been suggestions that headstarting of hatchlings might be adopted as a management strategy on Sangalaki.

"Headstarting" is the hatching and raising of young turtles in captivity for release to the wild. The theory behind this practice is that larger sizes of immature turtles suffer less predation, and thus releasing them when they are 6-9 months old will ensure that a higher proportion survive the period during which mortality is the highest.

This concept has been subject to concern and criticism since at least the early 1980s, and recent opinion is that it has no demonstrable benefits and has a number of clear negative aspects. For this reason, headstarting has largely been abandoned in most countries, though it continues to be practised in Indonesia.

Problems with headstarting include:

- inadequate nutrition (or inappropriate nutrition – on Sangalaki headstarted hatchlings raised by the concessionaire over a number of years were fed on giant clam, because "fish caused the water quality to deteriorate");
- behaviourial modifications (including lack of imprinting on natal beach, lack of exercise and appropriate sensory stimuli, lack of opportunity to hunt natural food, conditioning to seek food from humans or to wait passively for food to be provided, etc.);
- failure to leave the reef habitat (with its many predators) once released (hatchlings newly emerged from the egg have an instinct to swim for three days once they reach the sea, so as to move far beyond the reef environment. They

do not return to this environment until they are several years old – considerably older than headstarted turtles – and less susceptible to predation);

- disease (brought about by poor hygiene and overcrowding);
- introduction of disease to wild populations;
- bite injuries to flippers (as a result of overcrowding and leading to secondary infections and loss of body parts);
- the cost of overcoming the above problems, and the issue of whether these funds would be better used to protect turtle habitat and turtles in the wild. Even a number of multi-million dollar headstarting programs have been abandoned as unproductive; and
- population modelling studies have shown that headstarting is unlikely to make any significant difference to the level of the breeding population unless there is a simultaneous reduction to juvenile mortality in the wild.

Headstarting is an inappropriate activity in a protected area such as Sangalaki where there is more than adequate natural nesting area and hatchlings can easily reach the sea.

12. Operation of a Hatchery on Sangalaki

The Turtle Foundation began operating a hatchery on Sangalaki around February 2001 as a place to incubate eggs handed over by the concessionaire under the 10 percent (and later 20 percent) conservation regime. Hatcheries provide security for clutches of eggs, where they can be guarded from predation and theft. The advantage of having many clutches in a small area (and thus requiring less field patrolling effort) is offset by the considerable amount of work involved in relocating eggs and managing the hatchery (maintenance, record keeping, hygiene management, hatchling release, etc.) and the risks involved in having a large number of eggs concentrated into a small area where they may be impacted by disease, fungus, pollution, vandalism, etc.

There need to be compelling reasons to maintain a hatchery in a protected area where there is adequate nesting area and security from predation and theft. Apart from the risk of flooding of a significant proportion of the nesting beaches (?50-60%) by high tides twice per year[8], such compelling reasons are unlikely to exist on Sangalaki once the theft issue has been overcome.

It is recommended that use of the hatchery on Sangalaki be discontinued.

13. Role of Sangalaki Dive Lodge in Relation to Conservation Management

The Sangalaki Dive Lodge company is operating a commercial business within a national protected area that is the nesting habitat for a regionally (Sulu Sea) significant turtle population. The company's resort is located on and behind one of the major turtle nesting areas on the island.

Impacts of Resort Activities

The primary role of the Sangalaki Dive Lodge operation in relation to turtle conservation management should be to ensure that its operations do not give rise to threats to the breeding success of the turtles. Areas in which the company can contribute include:

- reducing the level of light which shines out from the resort buildings and maintaining ongoing surveillance of this issue;
  Guest rooms are seldom sources of outside light - guests generally receive a briefing on arrival which includes a request not to use the porch light other than to find the keyhole when returning to their rooms. However recently there have been several consistent sources of light shining outside the buildings. These have been mainly from the staff quarters (an unnecessarily bright light in the "foyer" area between the rooms), outside the TV room and toilets (lights on the

[8] The impact of flooding by high tides is not fully understood. It is likely that a proportion of eggs will not hatch, but the impact depends on the stage of development at the time of flooding, and the period for which the

walkway and shining out from doors which are continually left open), and one of the staff houses where the porch light is left on for long periods each night.

- improving the management of stored wastes, particularly food scraps, so as to limit access by rats and monitor lizards, and the disposal of food wastes at sea;
  The resort maintains a series of waste bins at the back of the kitchen area, clearly labelled for storage of different types of waste. However during the month that the latest team of Turtle Foundation workers spent on Sangalaki, there was little attempt to differentiate the wastes thrown into each bin, so that food was mixed with plastics, cans and glass. Monitor lizards were seen feeding on food scraps at all hours of the day. Food waste that was taken by speedboat to be disposed of at sea often contained plastic material.
- carrying out environmental impact assessment of construction activities prior to commencing construction and giving particular emphasis to limiting or avoiding the impacts on nesting turtles;
  A major series of construction activities is planned at the resort over the next year or two. This includes new living quarters for staff, a jetty to allow access to boats moored at the reef edge, and an apartment complex. All of these will have potential environmental impacts which need to be identified and assessed, and measures identified to remove or mitigate them prior to approval of the proposed construction. Monitoring programs will need to be designed and implemented to ensure that the measures are having the intended effect.
- carrying out environmental impact assessment of new types of activities prior to commencement.
  As with all commercial operations, the dive lodge can be expected to change and adapt its operations to keep pace with developments in the industry and the changing demands of its clients. Some of these changes will involve new types of activities, with the potential for environmental impacts. An example is the proposed operation of a photo processing facility in the dive centre. If this involves chemical processing of film and prints there is a potentially significant environmental problem associated with the disposal of the chemical fixer. Because the dive centre is in such close proximity to a turtle nesting area this

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flooding persists.

needs careful attention. International best practice generally requires that these types of chemicals be disposed of in a chemical waste treatment facility.

Role in Relation to Environmental Management Outside the Resort Operation

There is a need for clarification of the role of the Sangalaki Dive Lodge company in making decisions about environmental management issues that do not relate directly to the operation of the lodge. The recent situation in which the manager of the lodge (with no background or expertise in environmental management) made major decisions about management of nesting turtle habitat is an example of the need to clarify this issue.

For example, on16 February the manager of Sangalaki Dive Lodge ordered that Turtle Foundation workers and their assistants to stop removing weeds which significantly inhibit nesting and hatchling movement to the sea. In the past these have been removed by Turtle Foundation volunteers (native vegetation and plant species which do not reduce nesting success are not removed). On another occasion the same person ordered that the management and monitoring team not remove logs which were blocking nesting and hatchling access to the sea, because "there had been complaints that this had caused erosion". In the past 18 months Turtle Foundation volunteers have cut the logs into sections and either burned them or moved them back into the sea. Apart from the fact that the logs play no significant role in inhibiting erosion (they may even contribute to it depending on how they lie), no such complaint had ever been made to Turtle Foundation, and the manager involved has no expertise in coastal zone management.

General Environmental Management of Resort Operations

Turtle conservation management is not carried out in isolation, but is part of a broader approach to the conservation of the marine environment within and outside the Sangalaki Island Marine Park. The whole matter of the company's environmental

management approach needs to be examined, including issues such as: containment of chronic spills of oil and fuels which are currently polluting the island's groundwater; disposal of human wastes; disposal of food wastes at sea; purchase of fish caught in the Samama Strict Nature Reserve; fishing by construction workers on the Sangalaki reef (not only for their own food but also to take / send back to their families) and collection of giant clams for food by construction workers (both of these in the Marine Park); use of wood from Maratua in resort buildings; the adequacy of instructions to guests taken on snorkelling trips to Kakaban Lake; and use of poisons in pest control programs and whether these can get into island food chains via rats or insects, possibly affecting top-level predators such as the two species of raptors which breed on the island, of the island's population of megapodes.

14. Integration of Turtle Conservation Within Management of the Marine and Coastal Environment

The conservation management of the turtle populations on Sangalaki Island needs to be integrated into the overall management of the marine and coastal environment of the Berau archipelago. If the turtle management is treated as a separate issue there is a very real risk of cross-sectoral conflicts and the emergence of impacts on the turtle population from activities approved or conducted by non-conservation agencies.

This integration requires that there be, at a minimum, ongoing communication and coordination between relevant agencies. At present there appear to be some deficiencies in this area, and in particular BKSDA and its local office do not appear to be kept well informed of developments in the kabupaten by the local government agencies.

A coordination and consultation structure needs to be set up to enhance coordination. In addition, agencies with responsibility for turtle conservation need to conduct awareness raising activities with other agencies, particularly those with the power to approve infrastructure and industrial developments in the area, to make

them aware of the conservation values and environmental sensitivities of the turtle populations (and their habitats).