ENVIRONMENTAL ASSESSMENT STUDY –

KOMODO NATIONAL PARK

INDONESIA

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INTRODUCTION

Komodo National Park (KNP) was established in 1980. It was previously listed as a Man and Biosphere Reserve in 1977, and was declared a World Heritage Site and a Biosphere Reserve by UNESCO in 1991. It is widely recognized as an exceptional storehouse of both terrestrial and marine biodiversity with global significance. The initial focus of the KNP was to protect the Komodo dragon (*Varanus komodoensis*) and its habitat, but has since been expanded to protect the overall region as a vital cornerstone of the Banda-Flores Eco-Region (see map of location)A GEF grant for Komodo Collaborative Management Initiative (KCMI) was recently approved to support the 25-year Master Plan for Management of Komodo National Park (KNP). The GEF grant will be directed to an innovative Joint Venture, comprising The Nature Conservancy (TNC) and a private eco-tourism company. The International Finance Corporation (IFC) is the executing agency for this grant. IFC requires an environmental and social assessment be carried out for the KCMI to determine the project's compliance with IFC and World Bank Group (WBG) safeguard policies and guidelines. The project is classified as "Category A" under Operational Policy 4.01, since there is a risk of significant adverse environmental impacts that are sensitive, diverse or unprecedented and that must be minimized or eliminated through the project. The environmental objective of the KCMI project is to protect the natural assets of KNP and ensure their sustainable use.

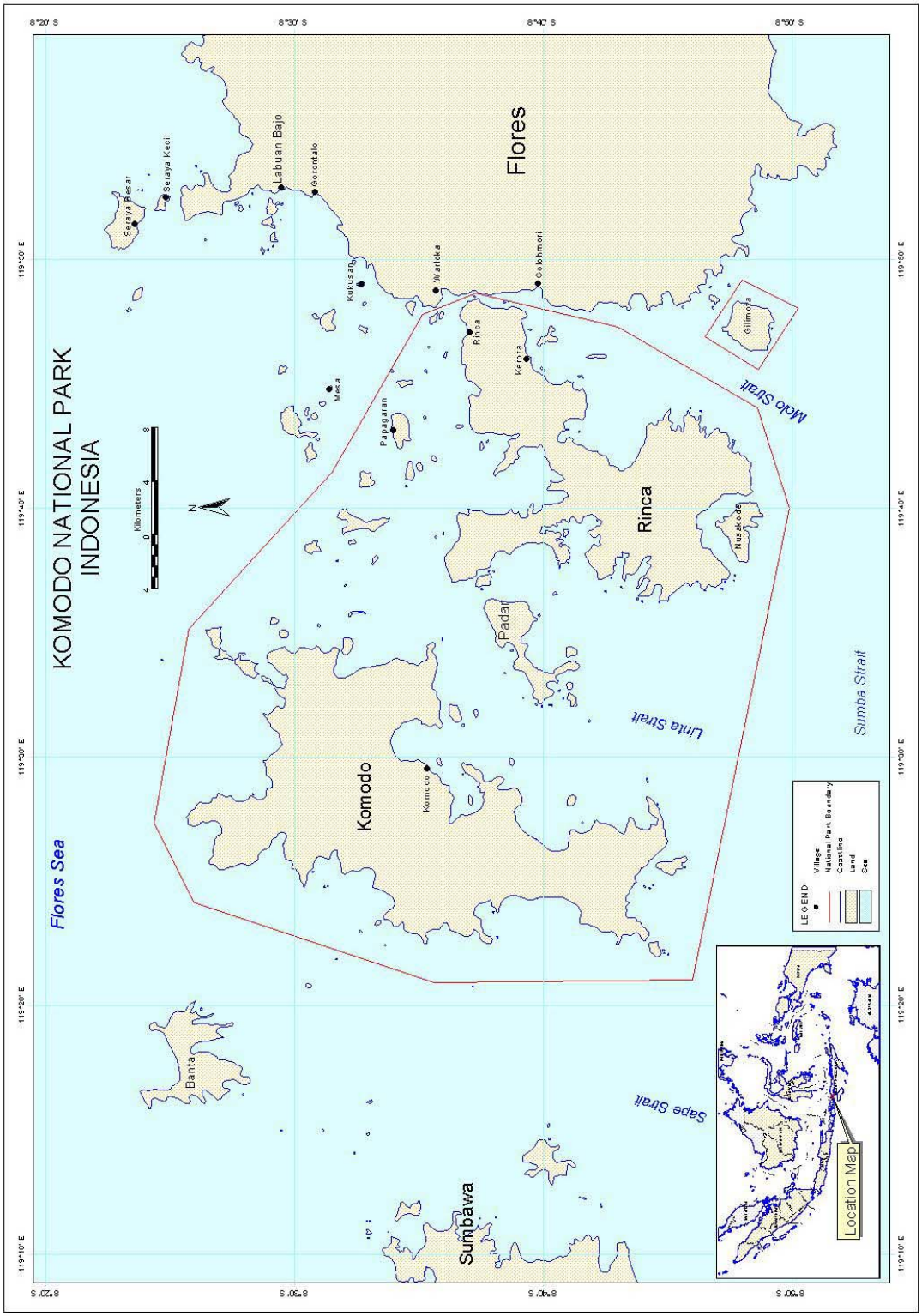
Development of the 25-year Master Plan for Management of Komodo National Park by the Government of Indonesia, with the assistance of The Nature Conservancy, was started in 1995 and concluded in 2000. Official endorsement of the zoning plan followed in 2001. A key element of the 25-year park management plan is the development of self-financing mechanisms for the park. While it is expected that user fees and other sources of tourism revenue will eventually be sufficient to cover the costs of park operations, the KCMI will provide bridge financing for the necessary incremental conservation and tourism development investments to make Komodo a world class nature tourism destination. By the end of the seven-year project, it is expected that the park will be self-financing.

PROJECT DESCRIPTION

The development objective of the Komodo National Park Collaborative Management Initiative (KCMI) is to ensure effective long-term management of Komodo National Park (KNP), by:

(a) improving the effectiveness of park management through the adoption of a collaborative management approach, involving all stakeholder groups, including the Park authority (PHKA), local government, a joint venture between an international NGO (The Nature Conservancy) and a local tourism company, PT Jaytasha Putrindo Utama (JPU), and with additional input from local communities, government agencies and private sector organizations;
(b) supporting the conservation of the marine and terrestrial resources of KNP, using an adaptive management approach to identify and respond to the changing threats facing these resources;
(c) establishing structures and guidelines to promote environmentally sensitive tourism development in the region and developing a strategy for the appropriate use of tourism revenue generated by KNP, to ensure long-term financial security for the park and sustainable benefits for the local communities; and
(d) introducing a system of appropriate incentives to encourage conservation-enhancing livelihoods and stimulate the development of a local economy based on the sustainable use of the resources in and around the park.

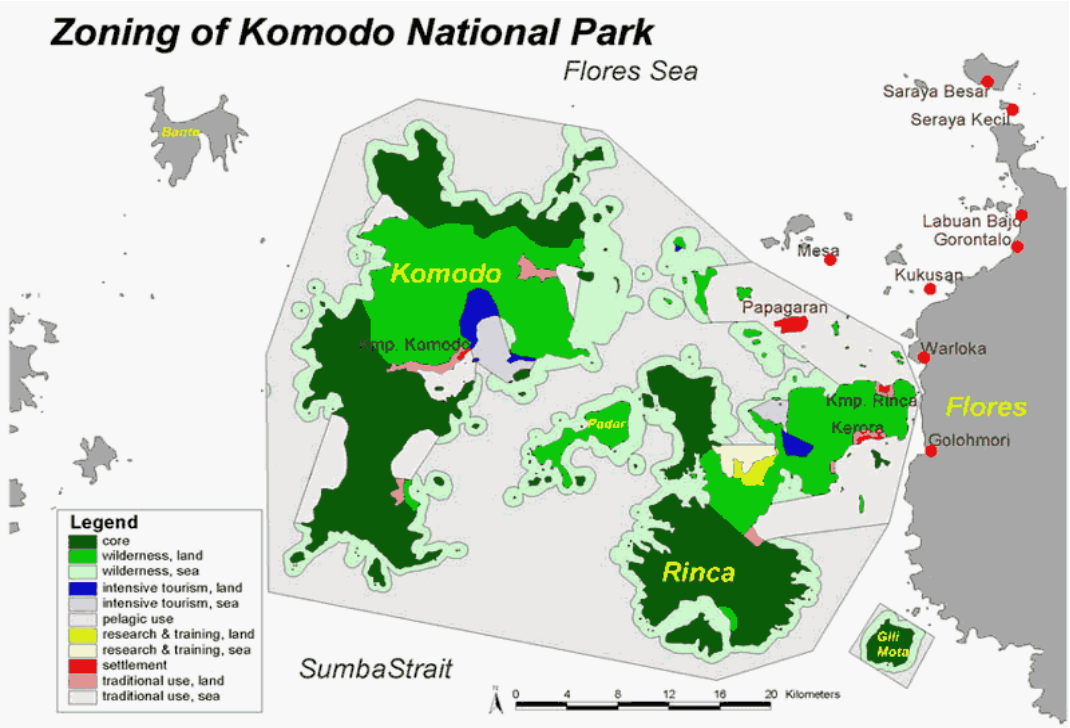
Location of Komodo National Park



Expanding on these elements, the KCMI project will implement a series of actions consistent with the 25-year management plan for KNP. These actions represent the GEF alternative and are not part of the current baseline situation. At this stage, it is envisioned that the proposed GEF activities will include the following elements.

Collaborative Management. A collaborative management approach will be developed for KNP, based on a combination of mechanisms, agreements, and institutions to foster effective partnerships between key stakeholder groups. This will include: (i) TNC and JPU collaborating in a Joint Venture (JV) to run a tourism concession in the park, (ii) a collaborative management agreement between the JV, PHKA and local government to define the responsibilities for park management; and (iii) a series of communication mechanisms to involve local community and private sector stakeholders. An independent and transparent grievance mechanism will be set up to address complaints that cannot be resolved through the regular communication and coordination mechanisms, and a awareness-raising program will encourage the collaboration of local communities in promoting conservation messages and undertaking on-the-ground conservation activities

Conservation Management. The project will strengthen the management of the marine and terrestrial resources of KNP by undertaking a capacity-building program for park staff, implementation of the endorsed a zoning system and implementing a series of resource use regulations adapted for each zone (see zoning map). The project will also strengthen the enforcement of these regulations by initiating a skills development program for enforcement personnel, and investing in support equipment (e.g, boats, radios, etc). The current priority is clearly to halt the destructive fishing practices in and around KNP waters, although the enforcement of terrestrial resource use regulations will also need to be addressed, to stop the poaching of game and the destruction of the mangrove habitats in the park. This component will also involve a rehabilitation program targeted at several degraded ecosystems and a management program for populations of key threatened species, including dragons and sea turtles. In collaboration with the Zoological Society of San Diego, an applied research program will also be set up in the park to support and inform conservation management activities.



Tourism Management and Sustainable Financing. The project will establish appropriate roles and responsibilities for park authorities, local communities, private sector operators and other relevant bodies in the pursuit of coordinated and sustainable tourism development. The project will involve the development and implementation of a tourism marketing strategy for KNP and some improvements in the tourism facilities and services available in the park. The project will also carry out studies to determine the carrying capacity of KNP for a range of tourism activities and resource uses, and will establish impact mitigation plans and guidelines for tourism development in the buffer zone. The sustainable financing strategy will include implementation of a park entrance fee system that rapidly increases gate fees from the current US$2 to US$10 per person and supplements these with a conservation fee and other fees for selected activities, such as diving. A large share of this revenue will be retained for direct support to park initiatives such as enforcement, zoning, monitoring, and staff training. The project will negotiate revenue-sharing terms of the gate fee with the district, provincial and national governments in the context of the emerging decentralization policies, to channel a proportion of park revenue to local development initiatives.

*Incentives for Sustainable Livelihoods***.** This component will involve the following elements: (i) research and development into the sustainable use of marine resources through alternative livelihood schemes for pelagic fishing, and sustainable mariculture of fish, seaweed, other organism; (ii) a small grant fund to address urgent community-defined welfare needs; and (iii) support for sustainable enterprise development by local community members, through the provision of technical assistance and micro-credit via the Sustainable Enterprise Fund. This fund will be administered locally by a committee of community leaders, which will review funding proposals from villages within the park and buffer zone. Enterprises will be selected based on their ability to generate economic returns, avoid additional pressure on natural resources, and replace income or benefits from unsustainable resource use.

Monitoring and Evaluation. A project-wide monitoring and evaluation plan will be developed and implemented, involving annual internal assessments by key stakeholder groups and three external, independent reviews by IUCN and UNESCO. The project will also include a comprehensive set of biological monitoring programs, for both the marine and terrestrial resources and ecosystems of KNP. The success of alternative livelihood programs will be evaluated through monitoring of the socio-economic status of communities inside and outside of the park. Resource use and tourism impacts will be continuously assessed, in order to support conservation and tourism management activities. The performance of key institutional structures of the project, and the effectiveness of park management will also be the subject of monitoring and evaluation, using self-assessment methods and external reviews.

The key policy and institutional reforms supported by the project include the following:

- recent reforms initiated by the Ministry of Finance and Forestry, to be implemented by PHKA, to test new park financing mechanisms – specifically, to test the feasibility of selected national parks (including KNP) becoming self-financing from the tourism revenues they generate;

- the implementation of the 25-year management plan for KNP, elaborated in 2000 by PHKA and TNC, including plans to develop a tourism management strategy, to remove existing perverse incentives currently driving biodiversity loss and to introduce both positive and negative incentives to encourage sustainable use of the park's natural resources;

- the establishment of a collaborative management structure, which will provide a unique policy experiment for national parks in Indonesia, by bringing together the park authority,

local government, an international NGO and a local tourism company, with input from other local stakeholders;

- the provision of technical advice to provisional and national legislators during the current revisions of regulations in the natural resource sector, and the formulation of new regulations on conservation and sustainable use; and

- an awareness-raising program for the government ministers, legislators and members of parliament, to increase their awareness of the threats from destructive fishing practices, the constraints to park management, and the need for collaborative management.

DESCRIPTION OF EXISTING ENVIRONMENT AND COMMUNITIES

Environment

Komodo National Park (KNP) lies between the Indonesian islands of Sumbawa and Flores and is about 500 kilometers east of Denpasar, Bali. The park exhibits both marine and terrestrial environmental values of great importance. This area also features cultural interest and diversity. KNP has a total area of approximately 181,700 hectares (702 square miles) of land and sea, encompassing an archipelago of islands, the two biggest of which are Komodo and Rinca.

The flora and fauna within the park, especially the fish resources, have always been vital natural resources for the local communities. The precipitous islands within the park offer diverse terrain, landscapes, and rich flora and fauna that are of great interest to scientists and tourists alike.

The Komodo Dragon (*Varanus komodoensis*), a monitor lizard endemic to this area, is unique and famous throughout the world. Other terrestrial fauna of note include the orange-footed scrub fowl (*Megapodius reinwardt*), an endemic rat (*Ratus rintjanus*), and Timor deer (*Cervus timorensis*). Approximately 70% of the terrestrial area is open grass-woodland savanna. Other important habitats include tropical deciduous (monsoon) forest, coastal mangroves and quasi cloud forest above 500m on ridges and pinnacles.

The marine environment features enormous variety, from shallow waters and extremely varied coral reef to oceanic depths with strong currents. It is one of the world's richest marine ecosystems. There are exceptionally diverse marine habitats, including coral reefs, mangroves, seagrass beds, seamounts, and semi-enclosed bays. Of the 500 coral species in the Indo-Pacific region, 260 are found in KNP. Indeed, for its size KNP is the most diverse coral reef environment in the world. KNP is an area of outstanding biodiversity and beauty, and is of both national and global significance.

The highly diverse habitats harbor more than 1,000 species of fish, at least 260 species of reef-building coral (full inventories have yet to be made), and 70 species of sponges. Large marine fauna found in KNP include 10 species of dolphins, 7 species of whales (including the endangered blue whale *Balaenoptera musculus* and sperm whale *Physeter macrocephalus*), numerous species of sharks, aggregations of manta rays, several species of turtles (e.g. green and hawksbill turtles are nesting in the park) and, occasionally, dugong (*Dugong dugon*).

The KNP region includes three major island passages, which provide access for migratory marine life from the Indian Ocean and Savu Sea to the Flores and Banda Seas, and the western Pacific. KNP lies in the Wallacea Bio-Region in Indonesia, which has been identified by the World Wildlife Fund (WWF) and Conservation International (CI) as a global conservation priority area.

Marine environment and coral habitats in KNP have the specific strategic importance of being particularly resilient to the effects of coral bleaching caused by global warming and the El Nino current oscillations in particular, due to the up-welling effect of cooling water from deep ocean depths of the Sumba Sea. Hence, in view of the extremely high loss of global coral reef systems, Komodo will act a critical genetic/species storehouse with which to replenish and re-colonize devastated coral habitats elsewhere in Indonesia and the wider the Indo-Pacific region.

KNP's strategic location and ecological significance have been recognized as the ideal starting point for the development of a network of MPAs, including all the highest priority sites in the Flores and Banda Seas Eco-Region.

Communities and Regional Setting

There were approximately 3,267 inhabitants living within the Park in 1999, spread out over four settlements (Komodo, Papagaran, Rinca and Kerora). An estimated 16,816 people were living in fishing villages directly surrounding the Park in 1998. In 1928 there were only 30 inhabitants in Komodo village and 250 on Rinca Island. By 2000 this has risen to over 281 families and 1,169 people on Komodo Island, and 835 people on Rinca. Housing in Komodo village has risen from 194 houses in 1994 to 270 in 2000. Immigration to Komodo has included people from nearby Sape and Manggarai, as well as further afield from Madura and Sulawesi. Immigration to Rinca village has primarily been from Bima, Sape, Manggarai, Selayar and Ende. Park inhabitants mainly derive their income from a pelagic lift net ('*bagan*') fishery that targets squid and small schooling fish.

In the wider Kecamatan Komodo area (containing KNP) there is a population total of 33,001 (1997), and in Kecamatan Sape a population total of 77,857 (as of 2000). Growth rates in the 1990s have been 13.5% and 9.1% respectively. Within this wider area, Labuan Bajo, the 'gateway' to the KNP, has the fastest growing population of nearby settlements.

Traditional communities in Komodo, Sumbawa and Flores have been subject to outside influences. Mobility, mass communications and immigration have brought change. All villages now consist of more than one ethnic group and more than one culture. The majority of fishermen in and near KNP are Moslems, with a strong informal institution of Koran recitation. Hajis have a strong influence on community dynamics. Fishermen from South Sulawesi (Bajau, Bugis) and Bima are also mainly Moslems. The wider communities of Manggarai are mainly Christians. Most communities can speak Bahasa Indonesia, with the Bajo and Manggarai languages being used mainly for daily communication.

The head of the kecamatan (*Camat*) from Komodo has put in place local regulations to address encroachment in the park by providing positive incentives for people to settle on the mainland of Flores.

The education levels of the population within the KNP are generally grade four of elementary school. Less than 10% of those who graduate from this level go to Labuan Bajo to attend high school.

Most villages have a local medical facility, but the quality of medical care is low, and poor health is a problem. Fresh water is scarce, and as natural supplies dwindle in the dry season, water quality or remaining sources deteriorates rapidly as the concentration of impurities and pathogens increases and the dilution factor decreases. Consequently, cholera and diarrhea become rampant. In March 2001, in Komodo village 100 were hospitalized and 4 died of cholera due to fecal contamination of the water source. During the dry season water is imported in jerry cans from

Labuan Bajo, costing families Rp 100,000 per month (2000), a significant amount for subsistence fishing families. People both stay and are attracted to these settlements on the islands in the archipelago for many reasons, the most important being the relatively abundant marine resources compared to other regions of Indonesia and the security provided from the dangers associated with living on the mainland. The latter is mostly related to the village's sense of control over their future and improved independence from outside influences. Dangers envisioned by the communities include government interventions and other 'outsiders' on their livelihood.

The economy within KNP is reliant on fishing (97% of income). Minor cultivation occurs and some woodland products are collected. Further agriculture is not an option due to poor soils, steep terrain and limited water. Although agriculture does supplement fishing in Sape on Sumbawa island, alternative economic opportunities are limited by low education. For local fishing communities, the following characteristics prevail:

- daily and seasonal incomes are variable;
- the catch is perishable and must be marketed quickly;
- large working capital is needed and risks are high;
- small share of profits for fishers; and
- traditional processing of marine products is of low quality.

Community Needs

The observed inadequacy of sufficient supplies of safe water to meet the needs of the existing population within the park indicates that in this vital resource the carrying capacity of the park for permanent population is currently exceeded. This also applies to fuel wood supplies, and such things as locally available building materials. Hence, economic and social incentives are needed to attract people living in the villages to move to the adjacent larger islands (Flores, Sumbawa). The existing major economic opportunity (fishing) does not require extensive education, although training is needed to establish alternative, more sustainable, fishing activities. In the absence of opportunities that require greater educational attainment, children will have few incentives for education past elementary school.

Given low educational levels, the perishability of the fisheries produce, the high levels of debt, and the control of the traders over purchase prices, it is difficult for fishermen and their families to improve their quality of life or increase the opportunities available to their children. Action is required to break the current poverty cycle. The formation of fishing cooperatives and credit unions would allow fishermen to sell directly to the market, increase earnings and raise community wealth. These points are equally true in the region outside, as well as within, KNP.

Technology is fluid and can change rapidly. New destructive fishing techniques have been adopted readily in the past, and have created major problems. Material expectations will rise exponentially in the next 25 years, as villagers are exposed to increased external influences through tourists and television. The combination of increased material "wants" and the expansion of tie-ins to external markets will place a serious burden on Indonesia's marine resources in the future. Extraction of marine resources will probably continue to be the main economic opportunity in the area over the next several decades. Careful management of these resources is necessary to maintain sufficient stock. Eco-tourism will provide opportunities, but may not match the fisheries sector. Increased opportunities for economic diversification will need to go hand-in-hand with improved levels of education. Achieving these related advances must be actively planned, managed and nurtured, however.

Achieving success in programs to raise the opportunities and standards of living of these communities requires that they be directly, involved. It is vital to gain community understanding of the potential gains to villagers and the communities support for the various programs.

Interaction Between Social and Physical Factors in the Region

There is an inextricable link between physical and social factors affecting KNP and surrounding area. As in all natural resource rich coastal and marine locations in South East Asia, former traditional harvesting of resources at sustainable levels is being rapidly replaced by unsustainable resource depletion and destruction of habitat, both terrestrial and marine. This downward spiral of events must be reversed to avoid further environmental decline, and related social and economic difficulties for the region.

The origins of social and physical causes of change are:

- direct population increase and human use pressure on the environment;
- Immigration of people with alien value systems, and the local traditional knowledge systems that may have formerly contributed to appropriate natural resource use and practice;
- introduction of destructive hunting, fishing and resource use techniques; and
- exploitative business practices.

Conversely, on the positive side, implementation of initiatives aimed at alleviating these various social drivers of environmental deterioration and inappropriate activities, in conjunction with effective management, enforcement and regulation will result in improvements to the state of the environment that can deliver significant benefit local communities. The agents of positive change are:

- supporting the ability of communities to restrict non-resident use of resources and to use traditional knowledge systems;
- refocusing local communities livelihoods on to species and habitats that are not endangered or vulnerable;
- introducing more productive, sustainable higher yield cultivation for livestock and mari-culture;
- introducing micro-financing schemes and appropriate credit facilities, as well as local (community-run) cooperatives, that replace lending practices associated with over-exploitation of the natural environment and will encourage the re-investment of economic surpluses into the local communities; and
- training and education to allow local communities to move to better practices, to appreciate the dire consequences of destructive practices, to monitor their actions and to autonomously adapt and change to ensure net benefits are achieved on a sustainable basis.

There are also legal and administrative barriers to effective management. These include limitations facing the operational capacity of the PHKA, which include lack of support from and cooperation with other government agencies and ministries, inadequate capacity and ability in monitoring and evaluation of protected areas, insufficient funding, and difficulties in staff resourcing.

In addition, there are conflicting sectoral priorities within the both national and regional government, some of which are connected to powerful commercial lobbies. The Government of Indonesia (GOI) has passed legislation to address intersectoral conflicts of interest over the use of natural resources in a given area (Spatial Planning Act No. 24 of 1992), but institutional weaknesses and political uncertainty present challenges in making this legislation effective.

The increased population in the park and the surrounding area is resulting in a wider geographic range of fishing, hunting and poaching. Inappropriate techniques (such as indiscriminant gill netting, and deep line fishing, cyanide poisoning and reef bombing, reef gleaning, use of hook and line, and hookah diving to harvest coral reefs) are devastating both habitats (coral reefs especially) and fisheries, and have an increasing impact on invertebrate species and populations as well (i.e. mollusks, crustaceans). This devastation severely impacts ecosystem function and integrity, and prevents the sustainable recruitment of replacement species stock and the recovery of degraded habitat.

REGIONAL AND CUMULATIVE IMPACTS OVERVIEW

Regional Physical and Biodiversity Impacts of the KCMI

The KCMI is premised on securing the biodiversity and marine gene-pool hub of the Banda-Flores Eco-Region, of which the islands in and around Komodo NP are a central part. If successful, the KCMI and the 25-year Master Plan for Management will conserve a biodiversity storehouse crucial to the wider region. The benefit will be a source of marine species that, through both natural processes and active human management/intervention, can replenish adversely affected marine environments elsewhere, whether this adverse affect be due to man-induced phenomena (global warming/coral bleaching, over-fishing, etc) or natural phenomena (natural ecological perturbations, storm events, etc).

The regional and cumulative impacts of KCMI and KNP implementation should be largely positive, and indeed crucial, given the immense and imminent threats to the wider regional marine ecosystem.

Regional Social Impacts

Sustainable resource use is much more likely to be achieved in conjunction with alternative livelihood programs and increased education, than under current conditions. In the near region especially, the positive impacts resulting from successful conservation at Komodo National Park could bring immense benefits to the local communities in the form of sustainable natural resources upon which both traditional livelihoods and new tourism-based activities must depend. This is an important overall goal of the KCMI. Without the KCMI, the resources will soon be unusable. Alleviating direct over-use of the KNP's limited natural resources (fisheries particularly) could help replenishment of fisheries and other marine resources outside the KNP for use by the wider community. The broader extension of the alternative livelihoods programs will be needed, however, to achieve these benefits: Pushing destructive fishing out of the park may just intensify it elsewhere. Thus, KCMI will have to work with local government, business and non-governmental organizations to apply the positive lessons of KNP elsewhere.

Regional Economic Development

The Komodo locality (inclusive of Manggarai district [Kabupaten Manggarai], Nusa Tenggara Timor province and Bima district, Nusa Tenggara Barat province) is an area that historically supported a relatively small population. More recent growth in regional population has been part of a historical trend throughout provincial Indonesia. However, any locality experiencing economic growth or prosperity tends to experience increasing population growth rates. If the KCMI is successful in advancing the objectives of the 25-year Master Plan for Management within the context of a generally buoyant world economy, then significant regional economic growth could be stimulated. The potential dimensions can only be guessed, but 'high end' global tourism destinations have been known to capture the imagination of the market, with spectacular

results. The implications for regional growth under this scenario could be anything from modest to spectacular.

On the other hand, the local region may remain a relative backwater, despite the success of the KCMI and achievement of the tourism growth targets. Many factors, such as greater reforms and changes taking place in Indonesia and the South East Asian economy, over which neither the JV nor the regional government have any control, will greatly influence outcomes.

Unexpected regional economic growth could be problematic, and as welcome as it may be at one level, could negatively impact on the regional social and physical environment if not well managed and guided. While these large-scale trends are beyond the scope and responsibility of the KCMI, KCMI intends to give attention to these wider trends, and to take all actions possible within its operational mandate. In addition, KCMI will work as a facilitator to get business, government and communities to work together in planning for future development.

PROJECT IMPACTS AND MITIGATION MEASURES

Impact and Mitigation Assessment

This assessment of impacts and mitigation measures of the KCMI project looks at each of the major project elements:

- collaborative management
- conservation management
- tourism management and sustainable financing
- incentives and initiatives for sustainable livelihoods
- monitoring and evaluation

While this EAS is not concerned with the 25-year Master Plan for Management itself, it is concerned with proposed new management entity's area of influence within the implementation of the Master Plan, and hence whether implementation will be consistent with IFC Safeguard Policies and Guidelines. The proposed management entity to be funded by the GEF will have direct involvement with various facilities in the park. These facilities will involve construction and operation, and will be associated with the operation of tourism concessions. The KCMI will also involve the purchase of a range of equipment that will operate in KNP (e.g. boats, ranger equipment, etc).

The assessment of impacts and mitigation measures is provided in the following tables. Each table covers one of the major project elements. The project sub-components for each are also listed. Each table is divided into a column summarizing both positive and negative impacts (or risks), and column indicating responses or mitigation measures. The use of the term 'response' (rather than 'mitigation measure') is used in the context of positive impacts in order to indicate the secondary and flow-on benefits that are likely.

Additional explanation of certain key mitigation and preventative measures, to address certain risks or potential impacts, is presented after the table.

Table 1: Collaborative Management - Impacts and Mitigation Measures

PROJECT ELEMENT		
1. Collaborative Management	**Impacts or Risks**	**Responses or Mitigation Measures**
Project Sub-components: ▪ Joint Venture between TNC and JPU ▪ Concession agreement between PHKA, and JV ▪ Collaborative management agreement (CMA) between PHKA, JV and local government ▪ Additional collaborative and communication mechanisms involving public sector bodies, local community, and private sector stakeholders	Positive impacts: - promote Komodo as international nature-based, environmentally sound tourism destination - application of commercial management operations to harness fee-paying visitors and eco-tourists - implement a self-financing plan for park management through user fees - professional and technical capacity of park staff strengthened through training programs - stimulate development of an environmentally sustainable local economy - involved stakeholders perceive their collaboration as worthwhile, with benefits (social, economic, environmental) outweighing the costs (i.e. time and money)	Responses: - increase in services to meet international visitor demands - ensure best business management practices are adopted and seek to continually improve and innovate - monitor and manage according to changing fiscal conditions, and through financing training workshops - encourage and facilitate business development in the surrounding area based on sustainable resource-use principles - build on the development of good will and promote a constructive approach amongst wider stakeholders
	Negative impacts: - risks associated with negotiation difficulties with divergent parties may jeopardize progress - achieving workability of collaborative management structure may prove difficult - internal weaknesses in the collaborative management structure allow poor performance and continued over-exploitation of natural resources - risk of resistance from local power groups or stakeholder interests to CMA - political support for concession diminishes with change in government(s) - lack of sufficient constituency of key stakeholders to support the project - stakeholders not included directly in the CMA become marginalized, and without a voice to promote their concerns and interests	Mitigation measures: - implement carefully designed external controls including regular auditing of Joint Venture and the collaborative management agreement and monitoring by third parties against performance standards - establish a robust system of internal controls and accountabilities, and maintain staff of adequately trained professionals - collaborative management structure subject to regular monitoring and evaluation by third parties - generate broad based support for the concession at district and national level, and undertake high-level awareness raising efforts to maintain political support at all levels - engage in regularly and rigorous stakeholder consultation, and seek practical opportunities for wider stakeholder involvement – hence developing a more equitable and inclusive program - establishment of grievance processes and independent assessments of the degree and quality of collaboration with key stakeholders

Table 2: Conservation Management – Impacts and Mitigation Measure

PROJECT ELEMENT		
2. Conservation Management	**Impacts or Risks**	**Responses or Mitigation Measures**
Project Sub-components: ▪ Develop and capacity building for park staff ▪ Rehabilitation and species management ▪ Research to support conservation management ▪ Implementation of zonation system and resource use regulations ▪ Strengthen enforcement regime	Positive Impacts: - improved work conditions and training attracts good personnel and reduces staff turnover - local communities see wisdom of improved natural resource management to achieve conservation objectives, and recognize advantages to them - effective zoning enforcement combined with support of local fishermen allows the exclusion of foreign-based fishing crews	Responses: - a more stable workforce of loyal and motivated staff increases overall park management effectiveness - local communities willing to adapt their resource use patterns to conform to park conservation management objectives/programs, in line with zoning system - local fishing communities have a greater sense that the 'permitted' fishery resources of Komodo are in their care, for their benefit
	Negative Impacts: - enforcement negatively perceived by local communities with consequent loss of support for the project - difficulties in developing and obtaining new legal tools impedes effective enforcement - inadequate enforcement outside the park will lead to increasing pressures over the park's resources - new threats to KNP's biodiversity emerge and can not be contained in the project - both major and minor research facilities (e.g. field laboratories, jetties) and structures (e.g. in situ monitoring devices) will be established within the park (in accordance with the Management Plan) with consequent risk of minor physical impacts - increased occupational and safety risks associated with operational use of additional and sophisticated equipment (e.g. high speed boats, etc) as part of park management functions	Mitigation measures: - set clear rules of engagement for enforcement, base training on them, and follow them rigorously, link enforcement to stakeholder consultations and grievance procedures - intensive efforts to design and introduce appropriate legislation and judicial improvements - continuous monitoring and evaluation of resources and resource use will be an important part of the project's adaptive management approach in addressing new risks to biodiversity - all major construction will be subject to Indonesian AMDAL ('EIA') process for identification of impacts and suitable mitigation or management plans to address impacts - minor research or management installations will be undertaken conforming to the park management plan, and accepted 'best practice' for park design and construction. Monitoring of potential impacts will be undertaken and sites restored after use - instigate 'health and safety' requirements for all staff, and introduce appropriate 'standard operating procedures' (SOPs) for all equipment use in KNP

Table 3: Tourism Management and Sustainable Financing – Impacts and Mitigation Measures

PROJECT ELEMENT		
3. Tourism Management and Sustainable Financing	**Impacts or Risks**	**Responses or Mitigation Measures**
Project Sub-components: ▪ Carrying capacity studies ▪ Development of mitigation plans and guidelines ▪ Achieving financial sustainability ▪ Incentives for Sustainable Livelihoods ▪ Scoping of alternative livelihoods ▪ Community development grants ▪ Sustainable micro-enterprise development	Positive Impacts: - local and regional tourism service providers agree on priority needs and work together to fulfill them - major barriers to tourism development in the KNP region are reduced, including difficulties in access (e.g. regular and reliable air services) - as political stability in region consolidates, KNP is increasingly perceived as safe and desirable by high-end tourists	Responses: - additional investment attracted to Labuan Bajo and other centers, to provide for increased visitor levels - increase in ancillary tourism support services in the local region (e.g. accommodation, food, transport) - additional tourism destinations and attractions develop in surrounding region (e.g. caves, cultural, resorts, etc) to strengthen the region in the international tourism market - economic multiplier from tourism benefits the region
	Negative Impacts: - visitation levels do not achieve predicted levels in the specified time periods - tourism revenues prove inadequate due to security issues, inadequate facilities/service - excessive tourism demand leads to environmentally unsustainable visitation levels, increased pressures on (local) marine resources for consumption and potential degradation of resources, sites and park facilities - anticipated development of Labuan Bajo as 'Komodo Gateway' (tourist destination, accommodation and servicing 'hub' for access to Komodo National Park) does not materialize, severely limiting area's capacity to cater for higher-end tourists - construction and operation of both major and minor tourist facilities (e.g. visitor centers, arrival jetties, shelters, trails, etc) have potential to cause environmental impacts	Mitigation Measures: - increased marketing effort in line with adopted 'tourism strategy' to raise profile of destination and attractions - tourism marketing strategy will highlight relative safety of Komodo, and project will concentrate on upgrading visitor facilities and services in the park - park carrying capacity assessment studies will be evaluated, and strict visitor levels will be imposed if required. Also 'adaptive management' approaches will allow rapid response and action to address perceived resource and visitor management issues - any voluntary resettlement should be led by local government. The local government policy has been established for a long time. - project will support local government's plans to improve economic infrastructure in Labuan Bajo, which in turn will make the area more attractive to tourists and tourism developers, thereby attracting the necessary investment in tourism infrastructure - for construction of major installations the Indonesian AMDAL ('EIA') process will identify impacts and appropriate mitigation measures - waste treatment will be a special focus of concern and will be addressed using 'state-of-the-art' technology to overcome issues

Table 4: Incentives for Alternative Livelihoods – Impacts and Mitigation Measures

PROJECT ELEMENT		
4. Incentives for Alternative Livelihoods	**Impacts or Risks**	**Responses or Mitigation Measures**
Project Sub-components: ▪ Scoping of alternative livelihoods ▪ Community development grants (small grant fund) ▪ Sustainable micro-enterprise development	Positive Impacts: - the alternative livelihoods schemes prove technically and financially viable - interest in pursuing alternative livelihoods increases, raising demand for involvement - the small grant fund provides an effective 'security-net' for addressing urgent community-defined welfare needs - increasing applications and uptake of support from the Sustainable Enterprise Fund (SEF) occur - success of alternative livelihoods projects starts to alleviate pressure on the park's natural resources	Responses: - increased income to households and communities raises trust and belief in alternatives means of livelihood - alternative livelihoods program is expanded in line with demand, and additional funding and/or means of financing are sought - build on the trust developed through demonstration of a welfare and equity orientated provision to benefit the local community - beneficiaries of the SEF acquire sufficient skills in the technical and administrative aspects of enterprises funded, making investment projects successful and sustainable
	Negative Impacts: - alternative livelihood schemes do not provide sufficient income to participants and local communities - alternative livelihoods are not sufficiently tailored to meet needs of local people and some prove to be unworkable - fishermen do not completely abandon destructive fishing practices - fuel price deregulation significantly increases project costs and reduces economic viability of certain alternative livelihood schemes - marginalization of vulnerable households (e.g. poor, female-headed, ethnic minority households) occurs	Mitigation Measures: - selection of economically and socially viable livelihood projects will be undertaken as a priority, as well as assessment of techniques and practice - increased efforts through consultation to align projects with local communities needs and capabilities - increased information programs, use of incentives, as well as effective enforcement of regulations in order to change behavior - 'cost' risk assessments will be made and open information will be provided in advance of commitment to alternative livelihood projects – less fuel-intensive schemes will be developed - specific attention to equity issues will be given through the implementation of socio-economic goals of the Sustainable Enterprise Fund

Table 5: Monitoring and Evaluation – Impacts and Mitigation Measures

PROJECT ELEMENT		
5. Monitoring and Evaluation	**Impacts or Risks**	**Responses or Mitigation Measures**
▪ Development and implementation of a monitoring and evaluation plan ▪ Biological and resource use monitoring ▪ Collaborative management monitoring and evaluation ▪ Reporting and certification	Positive Impacts: - monitoring programs produce a reliable information base concerning all aspects of park management, all programs being undertaken, and the operations of the Joint Venture and tourism concession - accountability and transparency of all appropriate aspects of the Collaborative Management Initiative is provided - biological monitoring enables sound natural resource management, and assists in decisions concerning natural resource and site 'carrying capacity'	Responses: - confidence in the collaborative management initiative - sponsoring institutions assured of conduct of the operations of park management, joint venture, tourism concession, etc - scientific credibility of natural resource management, and biodiversity and habitat conservation programs undertaken in KNP is established
	Negative Impacts: - potential for insufficient or inadequate monitoring - poor record keeping and information management	Mitigation Measures: - a high priority will be given to rigorous monitoring, including constant assessment of adequacy and innovation - rigorous protocols and procedures for information gathering, storage, archiving and retrieval will be addressed on an ongoing basis

Additional Explanation – Mitigation Measures

A number of mitigation measures are included in the KCMI concerned with social and equity issues. In view of the socio-economic and cultural context of the project these are recognized as important issues, and the KCMI pays particular attention to providing 'social safeguards' for the program. The following expands on these key social mitigation measures, as well as three physical mitigation aspects.

Avoiding Involuntary Resettlement

The project will avoid the involuntary resettlement as defined under the International Finance Corporation's Operational Directive (OD 4.30). The cessation of destructive fishing will create economic displacement from those activities. However, the project will only curb fishing that is unsustainable, which destructive fishing is, and will substitute alternative, sustainable livelihoods for the local communities who have been involved. Traditional, sustainable resource harvesting will be allowed to continue in the traditional use zones. Physical relocation from communities inside the Park will only be encouraged by positive incentives. Should involuntary resettlement become necessary for the objectives of the Park, the JV will be responsible for completing a resettlement action plan (RAP) acceptable to the International Finance Corporation. That RAP will be made publicly available both in the World Bank Group Infoshop and locally for a 60-day period of public comment. Only after that period has passed will the JV carry out the resettlement, and then only in accordance with the plan.

Adaptive Management
Due to the complex and dynamic context in which the project is set, the concept of 'adaptive management' is considered important to the success of the KCMI. "Adaptive management applies the concept of experimentation to the design and implementation of natural-resource and environmental policies. An adaptive policy is one that is designed from the outset to test clearly formulated hypotheses about the behavior of ecosystems being changed by human use".[1] Adaptive management requires a more 'open organizational structure' rather than a rigid, closed bureaucratic structure.

The key characteristic of open organizations is that they are capable of being more flexible both internally and externally, while maintaining stability and purpose. Internal responsiveness is developed and maintained through collaboration. Focused achievement of accepted goals involves participation in planning and implementation. Three key characteristics are used to describe an entire organization, and its sub-systems (component parts). They are unity, internal responsiveness, and external responsiveness. The KCMI will need institutional features that allow for learning from past experience, but sufficient stability to maintain long-term outcomes to address difficult and challenging environmental and social risks.

Community Awareness
KCMI will continue the awareness raising activities based on TNC's program for communicating conservation measures to the local communities. Conservation cadres have already been selected from local villages and are being trained to in participatory communication and consultation methods. Young people will be included to assist in socio-cultural-economic base-line surveys, and assisting with awareness raising. Additionally, the project will:

- Involve local stakeholders in collecting and assessing needed information for decision-making;
- Hold open meetings in which decisions are made, documented, and publicized; and
- Maintain a grievance mechanism, with several layers of dispute resolution.

Stakeholder Consultations
Mechanisms will build on the successful on-going consultations organized by the TNC and will focus on two groups (i) communities in and around the park, and (ii) local and Bali-based tourism operators. Locally the project will work through the Community Forum (Rapat Koordinasi), an existing and effective community-based communication and decision-making forum. The project will pay particular attention to organizing stakeholders to represent themselves at meetings of this organization and will identify steps needed to ensure the forum provides effective inputs for collaborative management. Representatives of the Joint Venture will regularly attend the local forums. Special arrangements have been made to consult with the tourism operators, both in Bali and Labuan Bajo. All consultation activities will be recorded and outcomes considered by the project, through the adaptive management approach.

Grievance Mechanisms
The JV will work through stakeholder consultation mechanisms to identify and try to resolve any emerging points of contention or conflict. This is considered a high priority. Where consultation alone fails, an independent mediation process will be developed and implemented and made available to stakeholders. Formal local and national organizations will be engaged where and when appropriate (e.g. local or national legal aid associations). Emphasis will at all times be on transparency, accountability, and a responsive case by case basis that takes a special account of equity issues and the ability of complainants to access and use the process.

[1] Lee, K.N. 1993. Compass and Gyroscope: Integrating Science and Politics for the Environment. Washington, DC: Island Press, p. 53.

Capacity Strengthening
It is essential for the KCMI to rapidly extend park management capabilities. A strategy to achieve staff capacity building will involve the following initiatives:

- assessing staff needs of the KNP, reviewing the current TNC and PHKA staff and assessing their ability and willingness to be retrained to fit their new and expanded roles;
- retraining, recruitment and repositioning of staff, as necessary; and
- developing a personnel management system, including staff incentive programs and merit based career structure.

Tourism Development of Mitigation Plans and Guidelines
Mitigation plans will be drawn up in consultation with tourism operators in the area and based on clear management objectives for tourism zones of the KNP, to mitigate any adverse effects of tourism. The plans will cover various aspects:

- performance bonds to cover repair, salvage, etc;
- licensing system to deal with commercial operators;
- managing scuba dive operations;
- managing recreational fishing;
- managing cetacean, manta and turtle watching; and
- managing hiking and dragon watching.

Carrying Capacity Studies
It is considered essential for rigorous studies to continue to assess the carrying capacity of various natural resource uses in the park, and the carrying capacity of tourist visitors and activities in particular. Significant consideration to carrying capacity levels has already been given, but more in-depth assessments will be a high priority. Any permitted use within the park will be subject to carrying capacity studies and assessment.

Construction of Buildings, Facilities and Miscellaneous Land Based Structures
It is intended to construct a range of specific facilities in the KNP. Some, such as the research center, hatchery, fish cages, large jetties, and tourist visitor center and facilities, will be major one-off projects. Others, such as trails, signage, bridges, culverts, will be minor and ongoing. These smaller elements will at all times conform to international best practice in park design, planning, construction and maintenance. Manuals from acknowledged centers of excellence will be used, and where necessary modified to meet unique conditions in KNP, and to reflect a unique design vernacular for Komodo.

All construction will be subject to the Indonesian AMDAL process for the identification of impacts and a suitable mitigation or management plan to address negative impacts. All buildings and other facilities will meet World Bank Group policies and guidelines. The AMDAL process will address such issues as:

- location and siting;
- site preparation and designation of material set-down areas and storage areas;
- transport and access to and from the sites, for construction materials and construction workforce, and visitors and users;
- procedures to quarantine materials to prevent unintentional introduction of pests with imported construction materials;
- acceptable operation of equipment during construction and operation phases (noise levels, air emissions, hours of operation, safety procedures, storage of hazardous materials);
- liquid effluent treatment and disposal;

- appropriate architectural design and appearance of structures, with particular attention to visual integration in the landscape-seascape;
- control and treatment of surface run-off, particularly vehicle hard-stand and machine storage areas;
- collection of all solid waste on a continuous and systematic basis, and disposal outside the KNP and buffer zone, at authorized and managed solid waste disposal sites;
- ongoing maintenance provisions to ensure structures are secure, meet specified safety standards, and are visually tidy.

Boat and Marine Equipment Operations
The JV/PHKA will implement specific standard operating procedures (SOPs) to ensure the optimum environmental and safety performance of boats and all marine equipment. These will apply to JV/PHKA vessels and equipment, and to all other boat users that are permitted or licensed to operate within the KNP, and agreed navigable channels adjacent to the park. Boat usage SOPs will include specifying:

- permitted marine access areas and navigable channels;
- specified anchorages;
- specified land sites and jetties;
- specified engine size (related to boat size/displacement weight) and engine type for all vessels (e.g. 4 stroke outboard engine technology only);
- maximum speed for vessels in nominated zones (relating to safety, proximity to shoreline, habitats, coral reef, water depth, and other users – e.g. swimming, snorkeling, diving, permitted fishing, etc);
- pre-use systematic equipment safety check, including regular maintenance of all survival and safety equipment;
- use of personal flotation devices, especially by staff; and
- all diving, professional or tourist, to conform to strict SOPs.

COLLABORATIVE MANGEMENT AND ONGOING CONSULTATION

Although partly covered in the previous section, the following is intended to provide a summary of the overall collaborative management approach.

Objective
The objective of establishing collaborative management in KNP is "improving the effectiveness of park management through the adoption of a collaborative management approach, involving all key stakeholder groups, including the Park authority (PHKA), local government, a joint venture between an international NGO (The Nature Conservancy) and a local tourism company (JPU), and with additional input from local communities, government agencies and private sector organizations."

Approach
The proposed collaborative management approach will consist of:

- TNC and JPU collaborating in a Joint Venture (JV) to run the tourism concession and implement the self-financing plan through a system of user fees;
- a collaborative management agreement between the JV, PHKA and local government, especially with Manggarai district, to define the responsibilities for management in and around KNP; and
- a series of communication mechanisms to involve local community and private sector stakeholders, plus a grievance mechanism to deal with complaints and appeals against decisions made by the formal authorities.

At this stage, it is proposed that the local community groups be engaged in consultations using existing mechanisms for consultations to provide effective community inputs and participation. There are no readily constructed arrangements that would give adequate representation to the wide range of stakeholders. Because of the range of activities being undertaken by local community stakeholder such as types of fishers, and the different impacts KNP management will have upon these activities, a single representative on a collaborative management board will not work effectively. This is likely to be the case not only for fishers, but also for different villages (e.g. Mesa vs. Papagaran villages), traders, tourist operators, as well as the various local governments.

Community Consultations

The effectiveness of many of the proposed activities to achieve the KNP management objectives will depend upon cooperation and active participation of many of KNP residents and resource users. The JV will build on TNC and PHKA's extensive experience in community consultation.

Community stakeholders will be consulted through the existing Community Coordination Forum (*Rapat Koordinasi*), which meets regularly and has already been operating for ten years. To ensure that the full range of community groups are effectively participating in this forum, the JV community awareness team could facilitate focus-group discussions ahead of these regular meetings. These discussions can help to ensure that groups have discussed their concerns and developed common stands on issues to prepare them to participate effectively at the forum meetings. In turn, results of the forum meetings should be presented at the JV meetings, as inputs to any decision-making. Decisions made by the JV should be regularly reported back to the Community Coordination Forum. The effectiveness of this forum to meet KNP management and program objectives should be monitored in the same way as the other institutional actors within the collaborative management agreement (see Table 6 for these suggested indicators).

As well as this consultation mechanism, there are other opportunities to more fully engage local communities in the management of KNP. Recent changes in Indonesian law (especially the Regional Autonomy Law 22/1999) present new opportunities for local communities through their own village governments to actively reinforce park regulations and management. For example, direct participation of local communities in law enforcement can occur through village regulations. Traditional management authorities and practices can be the basis for such regulations. Such practices can also be formalized as village regulations.

MONITORING PROVISIONS

The KCMI involves a comprehensive monitoring program in order to be able to assess program performance, and to determine whether program objectives are being met. The latter includes particular need to identify adverse or negative performance, especially that affecting stakeholders and the community, so that corrective measures can be taken rapidly.

It is important that all physical and socio-economic aspects of the KNP, buffer zones and wider region are understood through the life of the KCMI project. Base-line information will be an important input to the design of monitoring needs. Effective monitoring will focus on the collection of data that will contribute to the ongoing decision making process regarding the physical condition and socio-economic issues of the area.

The criteria for selecting specific indicators to address the evaluation aspects include the following:

- significance – it can detect a change in the conditions that would disrupt either the social or physical system in which the park management program is operating, and which would cause a negative outcome for the program objectives;
- quantitative – quantitative measures are preferred over qualitative;
- easily measurable – the indicator can be measured by field personnel relatively easily using simple methods, or is available from existing and accessible information;
- relevant to concerns – the indicator genuinely reflects the concern being tracked;
- sensitivity – the indicator allows easy detection of changes in conditions that occur in the monitoring time-frame/intervals;
- reliability – monitoring of the indicator can be carried out in the same way during each monitoring cycle;
- responsive to management actions – the indicator can detect a change in conditions resulting from management actions; and
- cost effective – it does not require excessive expenditure on equipment or staff time

Key Questions for Monitoring and Evaluation

In this context, the main functions of the monitoring and evaluation plan are to promote adaptive management, improve project planning, and promote accountability. Correspondingly, a wide range of survey and monitoring questions will be addressed. The social and environmental indicators will feed back into the adaptive management process on an annual basis. This will ensure that outcomes are compared to project objectives and necessary changes are made in future decisions. The following table summarizes the main areas of monitoring emphasis.

Table 6: Monitoring Needs and Indicators

Monitoring Question	Social and Environmental Indicators
Is the collaborative management structure (CMS) effective?	- JV concession agreement in place - degree of outside support for JV and concession agreement - effectiveness of the JV concession agreement in practice - internal satisfaction of the JV partners concerning roles and responsibilities - balance of power within the JV - regularity and productivity of KCM stakeholder meetings - shifts in public acceptance of an participation in the CMS - external/public perception of the KCMI and its stakeholders - annual record of financial accounting - improvements in the working relationships between JV partners - biological monitoring, applied research programs and minimal impact field measures to ensure KNP's environmental quality is not compromised by JV activities - terrestrial invasive species (cacti etc). - distribution and abundance assessments of key terrestrial vegetation
Has the KNP resource management been strengthened?	- trends in staffing capacity and performance - training workshops and courses held - terms and conditions of staff appointments - existence of effective legal regulations and zoning plans - success in implementing regulations and zoning plans - performance of research and monitoring activities in the marine and terrestrial sectors

	- establishment and operation of research and other facilities - expansion in the scope of research activities - condition and maintenance of management and tourism facilities
What is the success of the tourism strategy?	- successful implementation of tourism management strategy - varied terrestrial and marine tourism product development - trends in visitor satisfaction - quality of visitor experience - length of stay - return visitation - trends in multi-media coverage, national and international press. - inclusion of KNP in Indonesia branding campaigns - attendance of venues and participation in varied activities - changes in levels and distribution of visitor use and range of activities (in response to proactive management intervention) - quality and licensing of guides - quality control and enforcement of guide activities in the field - success in marketing activities and media coverage of KNP opportunities, appropriate conservation messages, etc - rate and effectiveness of upgrading tourist accommodation, facilities, services - availability of information interpretative materials - certification standards applied to dive boats, and other recreation boating activities (e.g. Bali/Lombok based live-aboard tour boats) - improvements in guide and dive boat standards - limitation of market entry by new operators - control of growth and crowding of existing operators - level of stakeholder involvement in the tourism management strategy - level of involvement in the development of a wider regional tourism industry
What changes have occurred in socio-economic dynamics in and around the KNP?	- changes in attitude and discernable adoption of conservation ethics within local communities and business operators - changes in proportion of income derived from biodiversity sources - changes in the human population in and around the KNP - discernable community realization of, and interest in, the potential benefits to them of the KNP management plan objectives
Have positive incentives for local fishing communities been provided?	- monitored attitudes amongst selective stakeholders and the local communities towards the KNP and its administration - shifts in resource use patterns, according to the objectives of the KNP master plan - - performance of resource use/activity licensing systems - reduction in fines, penalties and enforcement actions, and corresponding success in achieving strategy objectives - viable operation of mariculture hatchery and local grow-out

	operations - practical effect or influence on migration incentives or disincentives
Have alternative livelihood strategies been developed and are they successful?	- range of livelihood initiatives/options available - successfully commenced and running livelihood programs - failed or failing livelihood programs, and whether reasons for failure are manageable - financial performance of hatchery, grow out cages (fish farming), seaweed farming, pelagic fisheries, handicraft manufacture, etc - attitudes and behavioral assessment studies (outcome) toward livelihood programs - changing levels in occurrence and impact of destructive fishery activity - trends in harvesting levels – to carrying capacity assessments and yield forecasts - degree and rate of expansion of economic base of local communities - assessment of the success of the operation of the local enterprise fund - assessment of the success and effectiveness of the emergency relief fund
Have the legislation changes been concluded, and has enforcement been strengthened?	- assessment of the success in trends in controlling fishing, harvesting, hunting and poaching - successful passage of new fishery and other regulations by the two local governments - successful passage of expanded border legislation and buffer zones by local and provincial governments - effectiveness of field surveillance and interceptions of illicit operators - success in disseminating public information on park regulations and studies on attitudes - success in identifying and countering fishing pressure originating from external and internal sources - success in negotiating and implementing cooperation with the police – e.g. roles, responsibilities, actions, intelligence sharing, joint/coordinated exercises, mutual respect and trust (organizational and individual)
Is the long-term financial strategy being implemented as planned?	- degree of success in achieving an increase of resources available to KNP for management - progress in achieving performance targets in achieving the sustainable financial strategy - degree of interest generated from donors, either expressed or acted on - rate and degree of success in provision of benefits (in-kind) to local communities
What is the overall achievement of the Management Plan?	- assessment of the degree of departure from the original management plan objectives - reasons identified for departures from, or failures in, plan implementation - assessment of the influence of unforeseen events, and the

	need to accommodate such events or factors - availability of actions and options to re-align performance with the plan - justifications for re-aligning actions versus re-aligning the plan - assessment of success in re-alignment strategies and actions set in place
What changes in the terrestrial animal populations are occurring?	- success in identification of indicator species, preferably with existing (base line data). - success in monitoring seasonal and annual trends. - success in identifying causal factors, and if man-made - success in mitigating negative impacts. - population data: number, composition, fecundity and birth rates, recruitment, mortality - geographic distribution - interspecies population dynamics
What changes in vegetation are occurring?	- succession of savanna to forest assessed to determine key fauna habitat re: availability of prey species for Komodo dragon
What changes are occurring to overall environmental determinants?	- climate and microclimate in key habitats - along prescribed transects (humidity indicators, disturbance indicators, structural changes, etc) - change in habitat quality
Are changes occurring with respect to the presence and numbers of Cetaceans?	- species composition, spatial distribution, relative species abundance, occurrence and movement patterns - identification of critical habitats - identify sites with consistent sightings for eco-tourism potential - marine protected area management programs identified as contributing to conservation of cetaceans inhabiting or migrating through the park - mitigation of (emerging) threats
Are there changes to manta ray and reef shark populations?	- population size and distribution - determine the length of time shark and ray species spend within the park - identify best manta ray and shark watch sites for eco-tourism potential
Are grouper stocks and spawning aggregation sites being affected?	- changes in grouper populations
How are coral habitats changing?	- on-going monitoring of percentage change in diversity and coverage of live and dead corals and related marine fauna and flora - identification of type and extent of human induced damage at all key (dive) sites
What marine resource use patterns are occurring?	- determine the status of capture fisheries and reef-based fisheries in and near the park, and determine the beneficial versus destructive changes in resource use patterns
Are sea turtle populations within the park being affected?	- marine protected area management programs identified as contributing to conservation of turtles inhabiting or migrating through the park

	- turtle nesting beach surveys in place and confirming nesting rates stable or increasing - observed turtle numbers in park stable or increasing - diminished levels of observed turtle mortality and injury due to human activities
Is seagrass habitat being maintained?	- accurate spatial mapping of seagrass meadows undertaken - assessment of condition of total seagrass meadow condition, and confirmation of level of protection - established relationship with conservation of seagrass and continued population of dugong within the park
Are mangrove habitats stable and protected?	- confirmation of stable total area of mangroves - composition and condition of mangroves mapped and established to be stable or improving - changes in the existence and extent of fish spawning grounds in mangrove areas - changes/reduction in traditional uses within mangrove areas

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