THE WORLD BANK/IFC/M.I.G.A.

OFFICE MEMORANDUM

DATE: October 22, 2001

TO: Mr. Ken King, Assistant CEO, GEF Secretariat
Att: GEF PROGRAM COORDINATION

FROM: Lars Vidaeus, GEF Executive Coordinator

EXTENSION: 3-4188

SUBJECT: **Country Name:Indonesia Project Name:Komodo National Park Collaborative Management Initiative Work Program Inclusion – Resubmission**

Please find enclosed the electronic attachment of the above mentioned project brief for work program inclusion, which addresses comments received from the GEF Secretariat dated 18 October, 2001 on the project brief that was submitted for the Work Program Submission on 1 October, 2001. GEFSEC comments (in italics) have been addressed as follows:

PROGRAM AND POLICY CONFORMITY

Project Design

How will other biodiversity threats (political instability and social instability, human migration and encroachments) be addressed? We have added 2 new paragraphs at the beginning of section B.3 to address political and social instability. We also now say in section F.2 that the area around Komodo and Labuan Bajo has been largely unaffected by the political and social instability that has occurred in several other parts of Indonesia.

Role of Ministry of Marine Affairs and Fisheries. Although much of the park is in marine waters, those waters are under the control of the Ministry of Forestry (see footnote 8). However, we agree that it is important to engage the Ministry of Marine Affairs and Fisheries at the initial stages of the project. This point has been strengthened in the second paragraph of section E.4.

Targeted Research. The program of research is to be developed over the life of project in consultation with donors (e.g. San Diego Zoo) and will be management oriented to enable it to respond to identified research needs. However, there may have been some confusion from our reference to "Research and Development" related to the alternative livelihood activities. This is not research strictly speaking, but a scoping of appropriate alternative livelihood activities. Approximately $300K of GEF will be used to identify which alternatives (e.g. seaweed

Republic of Indonesia

Komodo Collaborative Management Initiative

Project Document

September 2001

KEY ACRONYMS AND TERMS

ADB	Asian Development Bank
ALS	Alternative Livelihood Scheme
BAPEDALDA	Regional Environmental Impact management agency
BAPPEDA	Regional Development Planning Board
BCA	Benefit Cost Analysis
BSAP	Biodiversity Strategy and Action Plan
Bupati	Mayor (district level government)
CAS	Country Assistance Strategy
CDGs	Community Development Grants
CEO	Chief Executive Officer
CI	Conservation International
CMA	Collaborative Management Agreement
CMS	Collaborative Management Structure
COREMAP	Coral Reef Rehabilitation and Management Program
CP	Circling Patrols
CRMP	Coastal Resources Management Project
EIA	Environmental Impact Assessment
ESW	Economic and Sector Work
FAD	Fish Aggregating Device
FRS	Floating Ranger Stations
GEF	Global Environment Facility
GIS	Geographic Information System
GOI	Government of Indonesia
HPI	Indonesian Tourism Association
IFC	International Finance Corporation
IUCN	World Conservation Union
JPU	P.T. Jaytasha Putrindo Utama (Indonesian eco-tourism company)
JV	Joint Venture
Kabupaten	District
KCMI	Komodo Collaborative Management Initiative
KMTA	Komodo Marine Tourism Association
KNP	Komodo National Park
LBHI	national legal aid association of Indonesia
MACONAR	Maluku Conservation and Natural Resources Project
MMAF	Ministry of Marine Affairs and Fisheries
MREP	Marine Resources Evaluation and Planning project
NGO	Non-Governmental Organization
NPV	Net Present Value
NTB	Nusa Tenggara Barat
NTT	Nusa Tenggara Timor
PA	Protected Area
PHKA	Directorate General of Forest Protection and Nature Conservation (National Park Authority)
PRA	Participatory Rural Appraisal
Rapat Koordinasi	Community Coordination Forum
SDP	Special Deployment Patrols
SEF	Sustainable Enterprise Fund
SPP	Surrounding Park Patrols
TNC	The Nature Conservancy

TRS	Terrestrial Ranger Stations
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development
WWF	Worldwide Fund for Nature

Indonesia
Komodo Collaborative Management Initiative

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PROJECT BRIEF

1. IDENTIFIERS:

PROJECT NUMBER:	502468
PROJECT NAME:	**Indonesia: Komodo National Park Collaborative Management Initiative**
DURATION:	7 years
IMPLEMENTING AGENCY:	World Bank
EXECUTING AGENCY:	IFC
REQUESTING COUNTRY:	Indonesia
ELIGIBILITY:	CBD Ratification on 23 August 1994
GEF FOCAL AREA:	Global Biodiversity
GEF PROGRAMMING FRAMEWORK:	OP2: Coastal, Marine and Freshwater Ecosystems

2. Summary:

The objective of the Komodo National Park Collaborative Management Initiative (KCMI) is to ensure the long-term effective management of Komodo National Park (KNP), through the adoption of a collaborative management approach. Thus KCMI involves 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. KCMI also represents a ground-breaking policy experiment for the Government of Indonesia, as it involves the granting of a tourism concession by the Ministry of Forestry to the Joint Venture (JV) company, to authorize this private sector-NGO partnership to set and collect gate fees, establish and implement carrying capacity limits, and develop a tourism licensing system. The aim of this privatization of park management is to bolster the limited capacity of PHKA to protect the threatened resources of KNP, and to make KNP a self-financing park, with its management costs being covered by tourism revenue. A separate tri-partite collaborative management agreement between the JV, PHKA and the local government will set out further divisions of responsibility between these three bodies in conservation management, monitoring and enforcement, and sustainable livelihood activities. KCMI will base its conservation of KNP's unique marine and terrestrial biodiversity (including globally important coral reefs and the Komodo dragon) on an adaptive management approach that enables project activities and planning to respond to the changing threats to this highly complex ecosystem. Positive incentives (including a micro-enterprise fund for local family-based businesses, research and development of sustainable methods of marine resource use, and community development grants to finance urgent welfare needs) will be used alongside negative incentives (regulations and fines) to encourage local communities to switch from the current destructive fishing practices to sustainable livelihoods based on the rational use of the area's resources.

3. Costs and Financing (US$million):

GEF:	Preparation (PDF B):	0.35
	Project:	5.00
	Sub-Total GEF:	**5.35**

Co-Financing		
TNC:	Preparation:	0.10
	Project	4.80
Sub-Total TNC:		4.90
Park Revenue:		6.70
Sub-Total Co-Financing:		**11.60**
Total Project Cost:		**16.95**

4. ASSOCIATED FINANCING: n/a

5. OPERATIONAL FOCAL POINT ENDORSEMENT: Effendy A. Sumardja
Deputy for Law Enforcement and EIA
Environmental Impact Management
Agency/GEF National Focal Point
Indonesia

6. IA CONTACT: Deborah Vorhies, IFC
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A. PROJECT DEVELOPMENT OBJECTIVE

1a. Project Development Objective (see Annex 1)

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 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;

(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.

The KCMI will support a 25-year management plan recently developed by the Government of Indonesia with the assistance of The Nature Conservancy (TNC). 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, GEF funding is needed to 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 GEF grant period, it is expected that the park will be self-financing.

1b. Global Environment Objective

The global environment objective of this project is to conserve and sustainably use the unique biodiversity assets of Komodo National Park (KNP).

Komodo National Park (KNP) is widely recognized as an exceptional storehouse of both terrestrial and marine biodiversity with global significance. Established in 1980, it is listed as a World Heritage Site and a Man and the Biosphere Reserve. KNP lies in the Wallacea Region of Indonesia, identified by WWF and Conservation International as a global conservation priority area. Located between Sumbawa and Flores islands, the park consists of three main islands, Komodo, Rinca, and Padar and several smaller islands, with a total land area of 41,000 hectares. The park contains most of the habitat of the world's largest reptile, the Komodo monitor (*Varanus komodoensis*), commonly referred to as the Komodo dragon (small populations of Komodo dragons are found outside the park on Flores island, but these areas are not well

protected). While originally established to protect the Komodo dragons, the park is now also highly valued as a marine reserve, as it includes 132,000 hectares of marine waters, with important reef flat, mangrove and sea grass bed habitats. The park is one of the richest areas for coral species in Indonesia – a total of 253 scleractinian (reef building) coral species from 70 genera, and 70 sponge species, occur within KNP and at nearby Banta island. KNP also has one of the most diverse collections of fish in the world, with up to 1000 different species. Park waters also harbor dugong (*Dugong dugong*), dolphins (10 species), whales (7 species), and hawksbill (*Eretmochelys imbricata*) and green turtles (*Chelonia mydas*).[1] Apart from the unique Komodo dragon, other terrestrial species of note include the orange-footed scrubfowl (*Megapodius reinwardt*), an endemic rat (*Rattus rintjanus*), and the Timor deer (*Cervus timorensis*).

There are approximately 3,300 inhabitants living in the park, spread out over four settlements (Komodo, Papagaran, Rinca, and Kerora). An estimated 17,000 people live in fishing villages in the surrounding area. These local populations in and around the park mainly derive their income from a pelagic lift net ('bagan') fishery that targets squid and small schooling pelagic fish.

Because of its unique biodiversity and scenic beauty and in spite of its remoteness and underdeveloped facilities, KNP today is one of the most visited nature reserves in Indonesia. There was a rapid increase in park visitors during the 1990s, peaking at 32,000 in 1996. While political and economic instability in the region have reduced the visitors to less than half that number, the park remains one of the most heavily visited protected areas in eastern Indonesia. The potential benefits of tourism and biodiversity conservation are threatened by (a) institutional weaknesses in park management and governance, and (b) the serious depletion of biodiversity in the area.

To address institutional weaknesses, there is a critical need to develop an effective collaborative institutional structure for park management. This structure needs to build synergistic relationships between the key stakeholders in the area, including the protected area authorities, the joint venture partners, the private sector, local communities and NGOs. Komodo National Park has been selected by PHKA as a pilot site to test new park financing mechanisms and privatization of park management. This creates an opportunity to implement an innovative park management structure.

To address biodiversity depletion, there is a critical need to tackle the resource destructive activities currently taking place in the park. These activities include destructive fishing practices, such as dynamite-, cyanide-, and compressor fishing, which are severely threatening the park's demersal (bottom dwelling) and sedentary marine resources by destroying both the habitat (coral reefs) and the resource itself (fish and invertebrate stocks). Terrestrial threats include the increasing pressure on forest cover and water resources, as the local human population has increased 800% over the past 60 years. In addition, the Timor deer, the preferred prey source for the endangered Komodo dragon, is still being poached. Pollution inputs, ranging from raw sewage to chemicals, are increasing and may pose a major threat in the future. The underlying factors driving these activities include a lack of alternative sustainable sources of income for the local communities, a lack of effective enforcement of the protected area, inadequate levels and allocation of funding for park management, and a lack of incentives to

[1] TNC's extensive biological monitoring program is revealing the presence of additional species in KNP. A recent discovery was the rare pygmy Bryde's whale (*Balnaeoptera edeni*) – the first confirmed observation of this species in Indonesia.

utilise the resources of the park sustainably. The Indonesian economic crisis has exacerbated many of these problems.

While The Nature Conservancy has played a crucial role in assisting PHKA to step up its enforcement of marine regulations in the park, recent political instability in the country has created a new urgency to further improve enforcement, and to provide immediate financial returns to local people who agree to refrain from the biodiversity depleting activities. GEF involvement would provide critical incremental funding to set into motion a more effective and financially secure approach to the conservation of the park's globally significant biological resources.

2. Key Performance Indicators

The KCMI project will make use of a large set of indicators to monitor the status of the park's biodiversity, the quality of park management and tourism management, and the activities and welfare of local communities in and around the park. Some of the key performance indicators are outlined below.

Objective to be Monitored	Performance Indicator	Expected Change
Biodiversity conservation	Health of coral reef.	No significant reduction in live hard cover due to local human impacts.
	Health of major reef predators.	No significant reduction in major reef predator populations due to local human impacts.
	Incidence of fires in park (as indicator of poaching activity).	Fires decreasing by 50% by end of year 3 and by 80% by end of year 7.
	Terrestrial animal populations	No decrease in animal populations; specific targets for individual species.
	Levels of fish populations (included in ongoing monitoring program).	Recovery of grouper, wrasse, squid, anchovies and clupeids populations.
Sustainable use	Extent of destructive fishing within park boundaries.	Annual destructive fishing effort in park waters decreasing by 15% per year.
	Amount of by-catch in legal fisheries	Reduction of by-catch by at least 10% per year.
	Use of hookah compressors in park waters.	Use of these (now banned) compressors will decrease by 20% per year, completely stopping by end of year 5.
	Sustainable development of pelagic fishing by local fishermen.	Pelagic fishing will have expanded in a sustainable manner, accompanied by a diversification of target species, fishing methods and gear types.
Quality of park management	Involvement of stakeholder groups in park management	The new collaborative management structure to include a wide range of stakeholders, including the park authorities, local communities, private sector interests, local government and NGOs.
	Operation of a zonation system	A zonation will have been set up by end of yr 2 and will have been used to tailor management activities to the biodiversity objectives of each zone.
	Use of adaptive research to support park management	Increased use of adaptive research, for example into Komodo dragon reproduction and reef regeneration.
	Use of biodiversity assessments	The use of biodiversity assessments and monitoring systems will have become standard practice in the management of KNP by end of yr 5.
Welfare of local communities	Average income of fishing households participating in alternative livelihood schemes.	Average income from alternative livelihood schemes will at least match the average incomes from other non-destructive fishing practices.
	Number of households benefiting from the Sustainable Enterprise Fund (SEF).	By end of yr 3, at least one household in each target community will be supported by enterprises funded by the SEF. The majority of the enterprises funded will still be operating at project end.
	Communities benefiting from the Community Development Grants (CDGs).	Community grants will have been smoothly administered and the majority of projects funded will have made a significant impact on community welfare, as assessed by community members.
	Status of fishing rights of local communities	By end of yr 3, fishing within KNP waters will be restricted to local communities.
Tourism management	Establishment of tourism carrying capacity limits	Carrying capacity limits will have been set by end of yr 2 and will have been used in the design of the license system.
	Operation of a licensing system	A licensing system for tourist activities will have been set up and will be operating smoothly by end of yr 3.
	Shift in number and type of tourists visiting KNP	By end of project, KNP will be attracting 35,000 mostly high-end tourists annually (cf current 12,000 to 14,000 mostly low-end)
Project sustainability	Self-sufficiency of KNP	By end of project the park will be deemed to have successfully achieved a self-financing status, and will have secured an ongoing source of revenue to maintain project activities.

B. STRATEGIC CONTEXT

1a. Sector-related CAS Goal Supported by the Project

CAS document number: 18963-IND (Feb 99 Progress Report) **Date of latest CAS discussion:** July 19, 1997.

Indonesia's economic and social crisis began just days after the July 1997 World Bank Board discussion of the CAS, and the preparation of a new CAS is still ongoing. A CAS progress report, published in 1999, presented a complete revision of the assistance strategy, to focus on protecting the poor, stabilizing the economy, and laying the foundations for recovery.

The KCMI project fits very well with the environmental and social priorities set out in the CAS progress report, namely the *strengthening of environmental institutions* and the *support of community-based natural resource management.* The key components of the World Bank's strategy for protected areas in Indonesia, outlined in the CAS progress report, are perfectly reflected by the project. These are "decentralization of management authority, promotion of livelihood systems based on sustainable use of biodiversity, and building local constituencies for environmental protection…."

1b. GEF Operational Strategy/Program Objectives Addressed by the Project

Indonesia was accepted as a member of the World Heritage Convention on July 6, 1989 and ratified the Convention on Biodiversity on August 23, 1994. The project is consistent with the GEF Operational Strategy to support long-term protection of globally important ecosystems. The project directly addresses the joint objectives of conservation and sustainable use of biological resources, of the GEF Operational Program for Coastal, Marine and Freshwater Ecosystems. The project is fully consistent with the guidance of the Conference of the Parties (CoP), as it:

(a) demonstrates clearly the use of the *ecosystem approach* through its holistic approach to the natural resources (marine and terrestrial) of the park and the local communities and institutions associated with the park;
(b) ensures an *equitable sharing of the benefits of biodiverstiy*, by offering financially-attractive alternative livelihoods and funding biodiversity-enhancing enterprises proposed by local people;
(c) centers on the use of *incentives*, and *capacity building* to fulfil its conservation and sustainable use objectives; and
(d) includes *targeted research* to determine and monitor the status of key natural resources within the park.

2. Main Sector Issues and Government Strategy

Biodiversity Conservation

Indonesia is one of the two most biologically diverse nations on earth, along with Brazil. The country's thousands of islands include 10 percent of the world's known plant species, 12 percent of its mammals, 16 percent of reptiles and amphibians, 17 percent of birds, and 25 percent of fish.[2]

[2] Wells et al, 1999.

Indonesia is the world's largest archipelago, with more than 17,000 islands and an 81,000 km coastline rich in coral reefs, seagrasses and mangroves. Its marine biodiversity includes 2,500 species of mollusks, 2,000 species of crustaceans, 6 species of sea turtles, 30 marine mammal species, and over 2,000 fish species. Indonesia has approximately 75,000 km^2 of coral reefs, making up 12 to 15 percent of the total reefs worldwide. With 362 scleractinian (hard) coral species and 76 genera recorded, Indonesia lies at the epicenter of the world's coral reef diversity.[3]

However, Indonesia's biodiversity is currently under great pressure. The main causes of the ongoing biodiversity loss and species extinction in Indonesia are habitat loss and fragmentation, habitat degradation, overexploitation, and secondary extinction. For example, sixty percent of Indonesian coral reefs are classified as badly degraded, and even reefs in the remotest parts of the archipelago are being over-fished and damaged by practices such as cyanide poisoning and bombing.[4]

Government Strategy

The GOI has historically shown a strong commitment to biodiversity conservation. Overall spending on conservation more than doubled between 1992 and 1997, and during the period leading up to Indonesia's economic crisis in late 1997, GOI's total annual investment in protected areas had been in the range of US$22-33 million, of which foreign donors were contributing approximately 15-20 percent.[5] The post-crisis situation, however, has revealed a worrying trend of disproportionate reductions in environmental expenditures. Indonesia has imposed larger cuts on environmental spending that on other social sectors since the economic crisis. Moreover, among the East Asian crisis countries, Indonesia has spent the least on environmental prevention and mitigation before the crisis and has cut environmental budgets more deeply during the crisis. More worrying in the context of decentralization is evidence that environmental expenditure has declined more steeply in regional budgets than in the national budget.[6]

A major developing country player in international conservation agreements, Indonesia has hosted a number of recent fora, including the 1996 Convention of the Parties following the Rio Earth Summit, the 1997 Expert's Meeting of the Jakarta Mandate on Marine and Coastal Biological Diversity, and the 2000 International Coral Reef Symposium. Current planning for biodiversity conservation is based on the *Indonesian Biodiversity Strategy and Action Plan (BSAP)*, which was developed by the Ministry of Environment, with the help of the World Bank, in 1993. This strategy built on previous policy initiatives, including *Act No. 5 Concerning the Conservation of Living Resources and Their Ecosystems of 1990, the Tropical Forestry Action Plan of 1991, and the Biodiversity Action Plan of 1991.* The BSAP is very much in line with GEF guidelines, as it stresses the need for a sound analysis of the causes of biodiversity loss and the development of management regimes that are based on the sustainable use of biological resources. The BSAP listed 75 high-priority areas for the protection of biodiversity, several of which have subsequently been designed as conservation areas and many have received government and donor financing, including major contributions from the GEF.

[3] These figures are taken from GEF Project Document on Republic of Indonesia: Coral Reef Rehabilitation and Management Project, Report No. 17333-IND, World Bank.
[4] World Bank, 2001.
[5] Wells et al, *op cit*.
[6] World Bank, 2001.

The GEF is now financing the preparation of a second national BSAP to review conservation achievements and reassess priorities.

The government agency responsible for nature conservation is the Directorate General of Forest Protection and Nature Conservation (PHKA), one of seven Directorate Generals within the Ministry of Forestry. The main thrust of PHKA's work has been the establishment of integrated conservation and development projects, linking biodiversity conservation in protected areas (PAs) with local social and economic development in and around the PAs. Indonesia now has some 40 national parks and 342 other reserves with a combined area of 22.4 million hectares (including 4.5 million marine hectares).[7]

Overall government and donor spending on marine PAs has been considerably less than on terrestrial parks. Indeed, it is only within the last fifteen years that marine conservation has started to receive the attention it deserves, in such a marine-oriented country as Indonesia. The importance of coastal and marine resources management has now been formally recognized by national policy makers - the establishment of the Ministry of Marine Affairs and Fisheries (MMAF) in October 1999 by the then newly-elected President Wahid represented a radical step in promoting the sustainable use of these resources as part of national-level planning.[8] However, practical progress remains far behind official commitments and targets. The Strategy for Coral Reefs, developed by the Ministry of Environment set a target of establishing 30 million hectares of marine PAs by 2000, but so far only 4.4 million hectares have been established, many as marine extensions to terrestrial parks (as is the case in Komodo).

Major Threats to Biodiversity

Indonesia's biodiversity is increasingly under threat from powerful national-level pressures and the future status of the country's biological resources is insecure if these threats are left unchecked.

- Political and Economic Instability

The 1997 crash of the Indonesian economy led to widespread social and political upheavals, the repercussions of which are still being felt nationwide. The value of the rupiah fell to a quarter of its previous value and has continued to fluctuate, despite the government's efforts to stabilize it. The country's tourism industry suffered and is still struggling to recreate a positive image of the tourism product. Economic hardship and fierce fighting between different political and religious groups forced many families to migrate, putting pressure on biodiversity sites that were previously protected by their remoteness. Frequent changes in ministerial positions create an added level of uncertainty and disruption for conservation efforts.

- Economic Incentives Driving Resource Depletion

Large-scale exploitation of Indonesia's natural resource base (timber, fish, coal etc.) has been shown to generate high economic returns for the companies involved. The attractive economic incentives, and the frequent lack of resources or political will to deter such encroachment, have

[7] Wells et al, *op cit*. The Ministry of the Environment also plays a role in protected areas, and is responsible for any EIAs carried out in national parks.

[8] The responsibility for marine national parks has now been transferred from PHKA to MMAF, although since KNP covers both terrestrial and marine habitats, PHKA retains responsibility for this park.

been responsible for much of the resource degradation and overexploitation in national parks by powerful commercial interests.

- Limited Capacity of the Park Authority

Effective management of the country's network of protected areas has been undermined by PHKA's lack of capacity, weak institutional status, and unclear role. There have been numerous reviews of the shortcomings of PHKA, all of which paint a similarly bleak picture. For example, the Asian Development Bank's *Institutional Strengthening for Biodiversity Conservation Study* concluded that: "Although PHPA [previous title of PHKA] is the primary agency responsible for managing Indonesia's protected areas, it faces a daunting series of constraints and limitations in carrying out its mandate, including its general lack of stature within its own Ministry, 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, an undermotivated staff which is also insufficient in numbers and in training".[9]

- Conflicting Sectoral Priorities

The objectives of biodiversity conservation - and in particular protected area management - in Indonesia are often in direct conflict with other government priorities that are associated with powerful commercial lobbies. The design and implementation of certain national sectoral programs do not conform to the environmental protection laws in place and, being government-run programs, these cannot be tackled by park management regimes but require lengthy high-level negotiations with officials who stand to lose much if these development programs are withdrawn. The GOI has introduced 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 lack of political will have limited the effectiveness of this legislation.

3. Sector Issues to be Addressed by the Project and Strategic Choices

- Political and Economic Instability

The project area and its surroundings have been unaffected by the political instability that has occurred in several parts of Indonesia. However, the impact of the political and economic instability in Indonesia as a whole on the country's tourism industry has been felt in KNP, where visitation levels have fallen to less than half the pre-crisis peak of 32,000 (in 1996). A strategic choice has therefore been made to counter this impact by developing a tourism marketing strategy for KNP that highlights the relative safety of the area, and by improving the visitor facilities and services in the park.

As in other protected areas of Indonesia, KNP's biological resources are under threat from increased anthropogenic pressures caused by the economic instability. Migration into the park has increased significantly over recent years, primarily driven by the economic opportunities provided by unsustainable resource use. A strategic choice has therefore been made to tackle these pressures by encouraging local government – via the collaborative management agreement – to enforce the existing restrictions on migration into the park, and by strengthening the enforcement of resource use regulations.

- Economic Incentives Driving Resource Depletion

[9] Published by the British Council, 1996, cited in Wells et al, *op cit*.

The economic drivers of resource exploitation in KNP are most obvious in the highly profitable live-reef food fish trade. Fishing companies from Hong Kong and other Asian countries are active in and around KNP waters, and the target species of groupers and Napoleon Wrasse (which can fetch up to $180 per kg in Hong Kong restaurants) are under severe threat, due to the unsustainable fishing methods used and the particular life history characteristics of these fish. On a much smaller scale, economic incentives are also behind the destructive fishing practices of the local fishermen, as these methods are much more profitable than the traditional (and sustainable) 'bagan' fishing.

A strategic choice has therefore been made to: (i) provide positive incentives for local fishermen to switch to biodiversity-enhancing livelihoods; and (ii) introduce a system of disincentives to discourage resource degradation. These disincentives will take the form of fines, penalties and stricter enforcement measures.

- Limited Capacity of the Park Authority

The institutional shortcomings of PHKA, mentioned above, have been major limitations to the effective management of KNP, and TNC's work there has involved a major capacity building program for local PHKA staff. This effort has already produced some excellent results – for example, training park rangers in enforcement techniques and equipping them with additional boats and radios resulted in a substantial decrease in reef bombing incidents, from 300 per year in 1993 to fewer than 100 per year in 1996. Based on this experience, PHKA increased the park budget for marine enforcement. However, the authority still has an inadequately trained staff for fulfilling its responsibilities in KNP, and its relations with other government agencies active in the region remain hindered by its weak institutional status.

To address these problems, a strategic choice has been made to take a *two-pronged* approach. Firstly, a Collaborative Management Agreement (CMA) will be drawn up between PHKA, a Joint Venture between TNC and a private sector tourism company, and the mayor (Bupati) of Manggarai district. Parties to the CMA will also interact with other stakeholders with complementary areas of expertise, including local tour operators, national and provincial level government, other government bodies, NGOs, and local community representatives. This creation of an innovative park management institution, tailored to meet the specific needs of KNP and to address some of the limitations of PHKA, will be the first of its kind in Indonesia.[10] Secondly, a parallel expansion of the ongoing capacity building program for the PHKA staff will seek to strengthen the ability of PHKA to undertake its now more focused set of responsibilities.

The problems facing PHKA should be seen within the context of a more general lack of institutional capacity among other government bodies, local non-governmental organizations, private entrepreneurs and local communities, to participate in biodiversity conservation. The project will support the ongoing capacity-building and awareness-raising programs for these various groups.

[10] The nearest equivalent to the proposed CMS approach is Gunung Leuser National Park in Sumatra, where management authority has been handed over to a private foundation, YLI, which received a seven-year conservation concession from the Ministry of Forestry in 1995. PHKA's role in Gunung Leuser is expected to be limited to monitoring compliance with the terms of the concession agreement inside the park.

- Decentralization to Local Government

Following the change of government in 1999, the new government indicated that it would *decentralize* much of its authority to the District (Kabupaten) level. Act no. 22 of 1999, and Presidential Decrees UU26/1999 and UU25/1999 set out the basic regulations under which this decentralization occurs, and implementation of these regulations commenced in January 2001. While the regulations stipulate that conservation policies will be one of the few sectors still controlled by the central government, the new dynamic political power sharing between central and local governments will require major adjustments in the *implementation* of conservation policies. These adjustments are still being negotiated between central and local governments, but it is already clear that park management will now necessitate a more intensive collaboration with local governments and will rely much more than before on the willingness of local governments to financially support the parks. This latter change is due to the new distribution scheme of state revenue, related to the autonomy regulations. It has been predicted that decentralization of resource management authority to the provincial and district levels is likely to lead to increased resource exploitation, with significant impact on biodiversity and protected areas. This is due to the fact that district governments, which typically generated only about one-fifth of their total budgets in the 1990s, will become both more dependent on land- and natural resource-based revenue sources and more autonomous. The reliance on natural resource-based revenue sources is likely to create perverse incentives for districts to accelerate land conversion and natural resource exploitation in the forestry, mining and fishery sectors, to generate local revenues.[11]

KNP lies within the district of Manggarai in Nusa Tenggara Timor province. Expected expansion of the park boundaries will mean that the park also includes land in Bima district in Nusa Tenggara Barat province. Decentralization will give these two district and provincial governments a much stronger stake in the park and the surrounding area than before, though it will also create added pressures on the natural resource base, as mentioned above.[12] So a strategic choice has been made to intensify and strengthen the relations between park management and district and provincial government. To this end, the Bupati of Manggarai district will collaborate with PHKA and the Joint Venture in a tri-partite agreement, to define the roles and responsibilities of each party in the management of KNP. National level PHKA will retain overall authority for KNP, maintaining its responsibilities as outlined by the World Heritage Commission at the time of KNP's designation as a World Heritage Site. The collaboration of local government will be particularly important in controlling development within the buffer zones of the park, assisting with enforcement efforts, and defining the expanded park boundaries. Park financing and revenue sharing plans will also need to be negotiated with the two district governments.[13] The project will also support ongoing awareness-raising efforts by TNC, directed at local government officials, to help ensure they use their new responsibilities wisely.

[11] World Bank, 2001.

[12] The new regional government and fiscal allocation laws in 1999 granted Provincial governments jursidiction over terrestrial seas (out to 12 nautical miles) and local governments jurisdiction for up to 4 nautical miles; regulations to implement this legislation are still in the process of development. (Dahuri and Dutton, 2000).

[13] A similar strategic choice has been made in the preparation of the proposed ADB-funded Marine and Coastal Resources Management Project. Unlike the previous project, which worked largely with central government, the new project has given much responsibility for site selection and implementation to provincial and district BAPPEDAs, with the central Ministry acting primarily as facilitator and coordinator.

It is encouraging to note that Kabupaten Manggarai has developed an information package, aimed at attracting foreign investment to the area, which supports the principles of sustainable development in an environmentally sensitive area. Use of this package commenced in 2001. In particular, the Manggarai district government has committed itself to, and is now financially capable of, improving the general development standards in the Labuan Bajo area. The current lack of adequate infrastructure has been identified as a limiting factor in the attraction of larger numbers and higher end tourists to KNP. The planned improvements to, for example, transportation, water and solid waste disposal will not only increase the area's attractiveness and capacity for tourism, but will also bring enormous welfare benefits to the local populations and mitigate against potentially negative impacts of tourism, such as pollution. These benefits will in turn contribute towards protecting the economic value of KNP. The development of Labuan Bajo as a gateway to Komodo and the rest of Flores (the so-called 'Komodo Gateway' idea) will therefore support the goals of the KCMI project and will serve as an important multiplier of project benefits. More details on the 'gateway' infrastructure developments planned by the local government are contained in Annex 6.

- Conflicting Sectoral Priorities and Overlapping Jurisdictions

The issues of conflicting priorities of different sectoral programs and the lack of coordination between the various government agencies active in and around national parks are clearly manifest in KNP. As the park contains terrestrial, marine and coastal components, the number of ministries and government agencies involved is astounding, and it has proved difficult to elicit cooperation and support from these bodies.[14] For example, fishing permits issued by the district or provincial fisheries services for the area around Komodo include the waters within the park boundaries and the PHKA does not have the legal authority to manage these fishing vessels from the park. This problem has a major impact on the park's resources but could easily be eliminated by better coordination.

A strategic choice has therefore been made to create a fit between the marine and terrestrial ecosystems and the institutions of management, through the development of a Collaborative Management Agreement (CMA) and associated coordination and consultation mechanisms to promote effective partnerships between the various bodies with responsibility for KNP. *Intersectoral coordination* will be promoted through high-level talks to resolve policy issues, particularly on questions of enforcement and tourism. Positive working relations with the newly created Ministry of Marine Affairs and Fisheries will be crucial to the effectiveness of park management.

- New Self-Financing Experiment for National Parks

The Ministry of Finance has recently initiated a policy experiment within PHKA, to test new park financing mechanisms and privatization of tourism management. KNP is one of three

[14] In managing KNP, the Ministry of Forestry needs to coordinate with the activities of the Ministry of Marine Affairs, The Ministry of Finance, the Ministry of Settlements, the State Ministry of Environment, the Ministry of Regional Planning, the Ministry of Internal Affairs, the Ministry of Transportation, the Ministry of Communication, the Navy, the Ministry of Agriculture, the Governor of NTT, the Governor of NTB, and the District Heads of Manggarai and Bima.

parks selected as pilot sites, along with Gede Pangrango and Bromo Tengger, and it is expected that these parks will eventually become self-financing from the tourism revenues they generate. Indeed, KNP is seen as having the best chance of achieving this financial self-sufficiency in the medium term.

This status as a 'pilot site' allows KNP to experiment with innovative management structures. So a strategic choice has been made to support the development of a tourism concession in the park, to be operated by a Joint Venture (JV) company, composed of TNC and a local tourism company, JPU. The rationale for setting up this joint venture is based on the proven track record of both partners in investing in KNP, and the complementarities between the conservation-oriented NGO and the tourism-oriented private sector company. In September 2001, the Ministry of Forestry Protection and Nature Conservation (PHKA) agreed in principle to the granting of this concession to the JV and set out the process by which this would be formalized. The concession agreement will give the JV the authority to set and collect gate fees, establish and implement carrying capacity limits, and develop a tourism licensing system. A separate tri-partite collaborative management agreement between the JV, PHKA and the local government will set out further divisions of responsibility between these three bodies in conservation management, monitoring and enforcement, and sustainable livelihood activities. The JV is committed to building local park management capacity, particularly that of the PHKA staff, and the performance of the concession will be subject to independent monitoring, and will remain accountable to the Directorate General of PHKA.

C PROJECT DESCRIPTION SUMMARY

The KCMI is intended to address the dynamic challenges and opportunities facing KNP in a comprehensive program of investments, policy reforms, management interventions, community development projects, and institutional strengthening. There are a number of factors that make this entire initiative an important experiment both nationally and internationally. This experimental nature lies in the following aspects:

- the testing of the ***new park management and financing models;***
- the innovative partnering of an international NGO (TNC) with a local tourism operator (JPU), local government and the park authority (PHKA), using a ***collaborative management approach,*** with strong links to local community and private sector stakeholders; and
- the adoption of an ***adaptive management*** approach, to enable the project to respond to the inevitable fluctuations and shocks that occur in complex ecosystems, and the changing political environment.

These features of the project make it particularly useful as a model for protected area management throughout Indonesia and indeed throughout the South East Asian region.

1 Project Components (see Annexes 1 and 2)

The KCMI project will implement a series of actions consistent with the 25-year management plan for Komodo National Park. These actions represent the GEF alternative and are not part of the current baseline situation. An indicative budget showing the cost and funding allocations for the project components is presented at the end of this section. However, it should be stressed that the use of an adaptive management approach will only be possible if the budget remains flexible, and it is likely that the allocations presented in the budget will change during project

implementation. At this stage, it is envisioned that the proposed GEF activities will include the following:

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, (i) 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 deal with complaints that can not be resolved through the regular communication and coordination mechanisms, and a participatory 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, developing a zoning system and implementing a series of resource use regulations adapted for each zone. The project will also strengthen the enforcement of these regulations by initiating a skills development program for enforcement personnel, and investing in enforcement operations (including the development of a patrolling system for both marine and terrestrial habitats) and technology (such as boats and radios). 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$20 per person and supplements these with other user fees for selected activities, such as diving and dragon watching. 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 arrangements with the district and provincial governments in the context of the emerging decentralization policies, to channel a proportion of park revenue to local sustainable development initiatives.

Incentives for Sustainable Livelihoods. This component will involve the following elements: (i) scoping of appropriate alternative livelihood schemes for pelagic fishing, mariculture, and seaweed farming aimed at promoting the sustainable use of marine resources; (ii) grants 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 and contribute to the conservation of natural resources.

Monitoring and Evaluation. A project-wide monitoring and evaluation plan will be developed and implemented, involving annual internal assessments by all 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. 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.

Component	Total Costs		GEF	TNC*	Park Revenue
	US$M	% of Total	US$M	US$M	US$M
1. Collaborative Management	**1.6**	**9.8**	**0.5**	**0.9**	**0.2**
1.1. Establishment and Operation of Joint Venture	0.4	2.4	0.1	0.2	0.1
1.2. Collaboration with Public Sector Stakeholders	0.2	1.0	0.1	0.1	0.05
1.3. *Collaboration with other Stakeholder Groups*	1.0	6.3	0.3	0.6	0.1
2. Conservation Management	**6.2**	**37.6**	**1.9**	**2.2**	**2.1**
2.1. Development and Capacity Building of Park Staff	1.9	11.3	0.6	0.7	0.6
2.2. Rehabilitation and Species Management	09	5.6	0.3	0.3	0.3
2.3. Research to Support Conservation Management	0.9	5.6	0.3	0.3	0.3
2.4. Development of Zonation System Resource Use Regulations	0.6	3.8	0.2	0.2	0.2
2.5. Strengthened Enforcement	1.9	11.3	0.6	0.7	0.6
3. Tourism Management and Sustainable Financing	**4.2**	**25.5**	**1.3**	**0.5**	**2.2**
3.1. Managing the Impacts of Tourism	1.3	7.9	0.4	0.2	0.7
3.2. Achieving Financial Sustainability	2.8	17.0	0.9	0.3	1.6
4. Incentives for Sustainable Livelihoods	**2.5**	**15.2**	**0.8**	**0.7**	**1.0**
4.1. Scoping of Alternative Livelihoods	1.3	7.9	0.4	0.4	0.5
4.2. Community Development Grants	0.3	1.8	-	0.2	0.1
4.3. Micro-Enterprise Development	1.1	6.7	0.4	0.2	0.5
5. Monitoring and Evaluation	**2.0**	**12.1**	**0.6**	**0.5**	**0.9**
5.1. Development and Implementation of a Monitoring and Evaluation Plan	0.1	0.6	0.03	0.02	0.05
5.2. Biological and Resource Use Monitoring	1.3	7.9	0.4	0.3	0.6
5.3. Collaborative Management Monitoring and Evaluation	0.4	2.4	0.1	0.1	0.2
5.4. Reporting and Certification	0.2	1.2	0.06	0.05	0.09
Total	**16.5**	**100.0**	**5.0**	**4.8**	**6.7**

Note: Numbers may not add up due to rounding. Allocations may change during project implementation.
* This reflects funding mobilized by TNC from a variety of donors and other institutions, including San Diego Zoo.

2 Key Policy and Institutional Reforms Supported by the Project

The project will support:

- recent reforms initiated by the Ministry of Finance, to be implemented by PHKA, to privatize tourism management functions in national parks and 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.

3 Benefits and Target Populations

The key benefits expected from the project and the groups most likely to gain from the project outputs are outlined below. The project will also provide important global environmental benefits by better conserving the unique ecosystem of KNP, and will provide valuable lessons for the management of other national parks in Indonesia and elsewhere.

Outputs	Key Benefits Expected	Target Populations
Collaborative Management Agreement (CMA) for KNP	• strengthened park management capacities • more inclusive management structure	• TNC and JPU (JV) • PHKA – national and local level • Local government • Local communities, entrepreneurs, and other stakeholder groups to be associated with the collaborative management approach
Conservation Management	• training for PHKA staff • better-informed decision-making for park management • management activities tailored to specific biodiversity needs of different zones • decline in destructive fishing practices and poaching incidents • increased capacity and effectiveness of surveillance operations	• PHKA staff • JV • local communities • local police and the fisheries enforcement branch of the Navy
Tourism Management and Sustainable Financing	• better coordination of tourism services in the region • increased revenues from tourism available for park management • improved tourism facilities and services in the park • share of revenue for local governments • achievement of self-financing goal for KNP	• dive, tour and hotel operators • local households involved in tourism services (home-stays, restaurants, etc) • tourists wishing to visit KNP • JV • PHKA – national and local • local governments
Incentives for Sustainable Livelihoods	• source of legal income-generating opportunities • financing of local biodiversity-enhancing enterprises • reduction in local exploitation of KNP's natural resources	• local participants in the alternative livelihood schemes • local beneficiaries of the fund • those employed by the enterprises funded • local communities and local economy
Monitoring and Evaluation	• facilitating adaptive management • promoting accountability in park management	• all stakeholder groups involved in project

4 Institutional and Implementation Arrangements

These arrangements for project implementation represent the current thinking of the project design team. The Board of Directors of the JV will need to determine the most appropriate procedural and personnel arrangements for project implementation, based on its negotiations with PHKA and local government, concerning the concession agreement and the collaborative management agreement. Hence, some of the details presented below may change and evolve during the early stages of the project.

Project Coordination and Oversight. The shareholders of the Joint Venture will appoint a highly qualified professional manager as President Director, who will oversee all project activities. The President Director will be supported by a Deputy Director based in Labuan Bajo, who will be in charge of coordinating the day-to-day activities of the JV. The Deputy Director will be the main liaison point between the JV and the local PHKA and district-level government, both of which are also based in Labuan Bajo. To ensure continuity with the TNC-supported work in KNP, TNC will second at least one senior member of its Bali-based coastal and marine conservation program to the JV for at least a two-year period. TNC will also transfer its Komodo field assets (including boats, vehicles and office equipment) to the JV. Coordination between the JV partners will be maintained by monthly meetings of its Board of Directors.

Project Implementation. The project will run for a period of seven years. A total of 25 senior ranger level staff and 100 ranger level staff will be employed in the field. These staff will be selected from the existing staff of TNC and PHKA working in KNP, on the basis of their capacities and willingness to take on new responsibilities and learn new skills for the implementation of the project. The TNC staff recruited will resign from TNC and be employed by the JV, while the PHKA staff selected will remain on the payroll of PHKA, and their salaries will be topped up by the JV, bringing them into line with the salaries of the JV's own staff. The JV, PHKA and the Bupati of Manggarai district will negotiate the exact nature of their collaboration, and the roles and responsibilities of each party. It is anticipated that the concession agreement will have been finalized and the collaborative management agreements will also have been drawn up by the start of project implementation.

Funding Arrangements, Accounting, Financial Reporting and Auditing Arrangements. The Joint Venture will be the recipient of the GEF grant. The finance and administration manager in the JV will handle all funds and be responsible for all internal controls, accounting and financial reporting. All project accounting, financial reporting and auditing will be done in accordance to standards acceptable to the IFC. Annual project plans will be prepared prior to the conclusion of each calendar year. An independent financial audit will be performed annually. The JV's community development manager will be designated as the administrator of the Community Development Grants (CDGs). After grants have been approved, the administrator will be responsible for keeping financial records, disbursing funds, and monitoring grant use. Award recipients will be required to designate an individual responsible and accountable for managing award funds. The tourism/enterprise manager will be responsible for coordinating the Sustainable Enterprise Fund, liaising with the selected micro-credit provider, and providing annual financial reports on the fund's operation.

5 Monitoring and Evaluation.

Monitoring of project activities will be performed annually by the JV and PHKA, in consultation with all key stakeholder groups (see Annex 2 for details). The results of these

annual assessments will be documented in a 'State of the Park' report, to be produced and disseminated in both English and *Bahasa Indonesia* by PHKA and the JV. The regular assessments, and the comprehensive program of biological, resource use and tourism impact monitoring, will allow for adaptive management and project planning. Management effectiveness will also be monitored, using the guidelines set out by the World Commission on Protected Areas (Hoskins et al, 2000). External reviews of the project will be conducted at end of years 3 and 6 and again at project completion.

D PROJECT RATIONALE

1 Project Alternatives Considered and Reasons for Rejection

Linkage with related private tourism development project

The project idea to support the management of KNP was put forward at the same time as a request for IFC funding from a private entrepreneur to support expansion of his eco-tourism facilities in the region. So the two main alternatives to the current form of the project were to limit the intervention to (i) supporting the work of PHKA through a GEF grant, or (ii) providing IFC financing to invest in the private tourism development. However, the first of these two alternatives would have failed to address the need for increased tourism revenues to ensure the financial security of KNP, while the second alternative would not have assured any improvements in biodiversity conservation. Thus it was decided to combine the strengths of all the different partners, including PHKA, TNC, and the tourism company, by pursuing the tourism developer's request for IFC funding while developing the GEF-funded project for KNP. The interdependencies of the two types of intervention mean that success of the KNP project relies on increased tourism in the region, and the economic feasibility of the expanded eco-tourism facilities is dependent on the conservation of KNP as an attractive destination.

Institutional Changes in Park Management

Considerable discussions took place during the initial design stages on the most appropriate institutional arrangements for park management. Four options were considered: (i) maintaining the status quo, with one or two personnel changes; (ii) forming a coalition of key stakeholders in support of KNP, as an influential lobby group; (iii) forming a joint venture (JV) company and applying for a tourism concession for the park; and (iv) establishing a new foundation with full management authority.

It was felt that neither options 1 or 2 represented enough of a change to provide the innovative, vigorous approach needed to make significant improvements to the shortcomings and institutional weaknesses of PHKA. Option 4 was attractive because of its straightforward approach to overall park and tourism management. However this option had several disadvantages, including a lack of existing enabling legislation, and potential conflicts with PHKA, as the authority would have had to give up its responsibility for park management. Thus it was decided to follow option 3, and to establish a separate collaborative management agreement between the JV and PHKA, and district government, to set out the responsibilities of each party in the management of the park.

Composition and status of the joint venture

The project design team considered a number of organizations and companies as possible partners for TNC in the joint venture (JV). The possibilities of IFC, PHKA, and local

communities holding shares in the JV were considered, but it was finally agreed that the partnering of TNC and JPU is the most appropriate combination. PHKA will still maintain a role in park management, but through separate collaborative management agreements, and the involvement of local communities will be assured through their representation in the Community Coordination Forum (*Rapat Koordinasi*). The alternative of setting the JV up as a not-profit-making body was also debated but it was decided to establish the JV as a for-profit company whose charter directs that that any profits earned will be fed back into conservation. This will give the JV respect among the other commercial bodies involved in the area, while maintaining its credibility as an institution with conservation as its bottom line.

Type of concession

There are very few legal or institutional precedents in Indonesia for the granting of a concession in a national park to such a joint venture. The project design team held high-level discussions with PHKA to decide which type of concession to apply for. Although the original idea was that the JV would take control of both conservation management and tourism management, the granting of a conservation concession to the JV is not possible under current Indonesian legislation. Hence it was decided to apply instead for a tourism management concession and to negotiate the sharing of other management responsibilities through separate collaborative management agreements with PHKA.

2. Major Related Projects Financed by the Bank and/or Other Development Agencies (completed, ongoing, and planned)

Sector Issue	Project (for GEF projects, entry into GEF work program) [for non-GEF projects, implementation start-up date]	Latest Overall Performance Ratings (Bank-financed projects only)
Bank-financed • Biodiversity conservation in protected areas.	Kerinci Seblat Integrated Conservation and Development Project (1995) Coral Reef Rehabilitation and Management Project (1997) Maluku Conservation and Natural Resource Management Project (1999)	S U
Other development agencies • National park management • Coastal zone planning and participatory coastal resources management	**UNDP:** Strengthening Management of Kutai and Lore Lindu National Parks (1998) Developing a Model for Ecosystem-based Conservation in Halimun-Salak, West Java (PDF A approved 2000)	
	ADB: Marine Resources Evaluation and Planning [1993-1998] Coastal Communities Development and Fisheries Resources Conservation [1997] Marine and Coastal Resources Management Project [proposed]	
	USAID: Natural Resources Management (NRM) Program [1992] Coastal Resources Management Project [1997] Community-based Marine Resource Management in Central Maluku, Irian Jaya [1997]	

Project Ratings: HS (Highly Satisfactory), S (Satisfactory), U (Unsatisfactory), HU (Highly Unsatisfactory)

3 Lessons Learned and Reflected in Proposed Project Design

The KCMI project draws on the experience of several established conservation projects in Indonesia, including the World Bank Kerinci Seblat ICDP, the USAID Coastal Resources Management Project (CRMP) and Natural Resources Management (NRM) Program, and the completed ADB Marine Resources Evaluation and Planning Project (MREP). More recent projects, including the World Bank Coral Reef Rehabilitation and Management Project (COREMAP) and Maluku Conservation and Natural Resource Project (MACONAR), and the ADB Marine and Coastal Resources Management Project (MCRMP) will yield further lessons. The KCMI project will take active steps to share experiences with these ongoing initiatives and facilitate replication of project successes. These efforts will include, for example, reports of the internal assessments and external reviews of the project, joint training programs with related projects in the region, and exchanges of information and lessons learned at relevant workshops. If early results are available, they will be presented at the Parks Congress in 2003. IFC will make every effort to disseminate the experience and is already considering how to incorporate the lessons in two future projects. The major lessons learned can be summarized as follows: "The most appropriate models for marine conservation probably require integration of the PA within a regional integrated coastal zone management strategy and depend on local support and community stewardship to protect and sustainably use marine resources."[15] The lessons generated from related projects and the reflection of these lessons in the design of the KCMI project are summarized below.

[15] World Bank, 2001.

General Lesson	Project Case	Design Feature Reflecting Lesson Learned
Many projects in protected areas place too much emphasis on countering local-level pressures on resources, and fail to adequately address ***large-scale external threats*** to the area's biodiversity.	The ***Kerinci Seblat Integrated Conservation and Development Project*** in Sumatra is facing this problem, as it is heavily focussed on working with boundary villages, while the continued development of oil palm and timber plantations in the buffer zones of the park pose a much more serious threat to the forests.	The project will tackle the major threat posed by external fishermen engaged in destructive fishing practices, by developing an expanded and well-equipped enforcement network, and by eliciting the support of a wide range of public and private sector bodies.
Changes in ***institutional arrangements*** for park management need to be ***negotiated in advance***, rather than imposed in a top-down manner.	The establishment of a new project management unit in ***Gunung Leuser National Park*** in Aceh and North Sumatra, by a private foundation that was granted management authority over the park, has proved quite contentious. The role and responsibilities of PHKA, vis-à-vis the project management unit, were not made clear and this has resulted in considerable confusion and conflict between the two bodies.	As the project involves some fundamental changes in the institutional framework of KNP management, a highly transparent and collaborative process has already been established to ensure that all parties – the PHKA, the Joint Venture partners and the local government – work together closely to develop an agreed and explicit working relationship, with clearly-defined roles and responsibilities.
Lasting improvements in the quality of ***park management*** require considerable investment in ***capacity-building*** efforts for all key stakeholder groups.	The ***Marine Resources Evaluation and Planning Project (MREP)***, working in ten provinces of Indonesia, developed an intensive capacity building and training program, particularly aimed at provincial government bodies involved in coastal and marine management. The project provided some 2,575 person months of training in, for example, GIS and integrated coastal zone planning.	The project will support the development of TNC's existing capacity-building efforts, to focus particularly on PHKA staff, with additional capacity-building/awareness-raising activities directed at local government officials and local communities.
Engendering ***local-level support*** for biodiversity conservation requires the ***empowerment*** of local communities and the demonstration of potential economic ***benefits*** from the sustainable use of natural resources.	The ***Kerinci Seblat*** project, while suffering from the shortcoming mentioned above, has developed an impressive participatory village-level planning program, whereby trained NGO and community facilitators assist villages to develop community conservation agreements. Villages that successfully put these contractual agreements into practice will receive development grants of US$50,000 over a six-year period. A review of the ***MREP*** stressed the need for local government and community ownership of management plans, and their participation in the development and implementation of these plans.[16] The *CRMP* succeeded in engaging local government, academic, industry and community groups in a participatory planning process to develop an integrated management plan for Balikpapan Bay and watershed in East Kalimantan.	The project will work with local communities to encourage behavior change and promote their empowerment. The Community Development Grants, the Sustainable Enterprise Fund, and the development of alternative livelihoods will not only allow local people to gain more control over their development, but will also provide them with direct economic benefits from these biodiversity-sensitive activities. The overall stakeholder participation strategy and collaborative management approach will further strengthen local ownership of the project activities.
Tourism-related threats to biodiversity are best tackled by the park authorities actively engaging with ***private sector*** operators.	***Bunaken National Marine Park*** in North Sulawesi, despite suffering from serious shortcomings in park management, planning and implementation, has benefited from a private and public sector partnering. Many of the local dive operators in the area have formed an association to better express their concerns and engage in cooperative activities with government agencies to protect the marine resources on which they depend. The members of the association have adopted a code of ethical, environmentally-sensitive behavior, and they monitor each other's compliance to this commitment. They have also set up a monitoring network to report illegal fishing practices so they can radio reports of violations directly to the park authorities and the marine police. In addition, an annual diver fee system has been initiated as a means of increasing the available funding for conservation and enforcement. Fees will be managed by a stakeholders' advisory council.	The project will collaborate closely with local and regional tour operators, through monthly discussion meetings. Consultation with these operators will be particularly important in the preparation of the Tourism Marketing Strategy, the establishment of tourism impact mitigation plans and the development of environmentally-sensitive tourism development guidelines.

[16] Asian Development Bank, 2001.

4 Indications of Recipient Commitment and Ownership

The Joint Venture (JV) between TNC and JPU will be the recipient of the GEF grant. The commitment of both these parties to the conservation of KNP's biodiversity has been demonstrated by their long-standing investment in the area. TNC has been providing financial and technical assistance to the local PHKA team since 1996. The organization has already invested US$2,000,000 in KNP, for park planning, facilitation of enforcement, long-term coral and fish monitoring programs, community awareness programs, alternative livelihood programs, and training for park rangers and community members. TNC has also committed its time and resources to tackling the legal and institutional issues involved in setting up the joint venture with JPU. From TNC's point of view, the formation of the JV and the operation of the concession is in line with the organization's policy of handing responsibility over to local groups and gradually withdrawing its support as projects become self-financing.

For its part, JPU – a local company specialized in nature based tourism – has been a key ally for TNC and KNP, and has sponsored considerable media coverage of the park and the ongoing conservation efforts, through newspaper articles, magazines, travel marts, and trade shows. The company has also sponsored eco-tourism workshops, documentaries on Komodo, and journalist visits to the park, as well as facilitating several high profile government meetings in and visits to KNP. In all, the company has already provided an estimated US$50,000 of in-kind support for conservation and promotion activities for KNP. Furthermore, the CEO of the company chairs and is a member of several national and international tourism networks and in this capacity is instrumental in marketing KNP as a high end tourism destination. The company will bring its tourism business and marketing expertise to the concession, as an ideal complement to TNC's conservation and community development experience. The company has agreed that all profits of the JV will be re-invested in the park. The indirect benefit will be a well-managed park, which is the premise for the company to develop its 200 ha of land around KNP and in West Flores for high end nature based tourism facilities.

The intensive efforts by TNC and JPU to obtain a tourism concession for KNP and to negotiate the sharing of park management responsibilities with PHKA has given the JV partners a strong sense of ownership in the project and a large stake in its success.

Government ownership of this project is also high, as evidenced by the fact that the local-level PHKA team committed itself to developing the 25-year management plan for KNP, along with TNC, and the fact that central-level PHKA has taken considerable efforts to develop new policies for park financing and partnering with other institutions.

5 Value Added of Global Support in this Project

GEF support will secure the more effective and sustained protection of a globally important storehouse of unique terrestrial and marine biodiversity. GEF funding will also allow the development of a sustainable financial strategy for the park and a long-term financial security that would otherwise not be possible. GEF support will provide much-needed global visibility to KNP, which will help raise international

awareness about the urgent need to tackle environmentally destructive activities in the area. GEF involvement will also be a key lever in convincing local and provincial governments of the global significance of KNP and the crucial need for their support of the park.

The project will build on similar GEF-financed initiatives in Indonesia, including the Kerinci Seblat Integrated Conservation and Development Project, the Coral Reef Rehabilitation and Management Project, and the Maluku Conservation and Natural Resources Project, and will contribute valuable lessons for national parks elsewhere in Indonesia and in other South East Asian countries.

E ISSUES REQUIRING SPECIAL ATTENTION

1a Economic Analysis (supported by Annex 6)

Some key economic data for Komodo National Park are as follows:

Indicator	Value
Total Land Area	41 000 ha
Total Marine Area	132 000 ha
Total Marine Area (Coral)	1 700 ha
Population of Kecamatan Komodo (People)	38 000
Population of Park Area (People)	3 200
Population of Park Area (Dragons)	2 400
Number of Doctors in Kecamatan Komodo	1
Annual Visitors 1996/97	32 174
Annual Visitors 1999/2000	15 599
Proportion Foreign Visitors 1997	94%
Proportion Foreign Visitors 2000	87%
Number of Hotels and Home Stays in Area	36
Median Per Day Cost for Room & Board	<$5
Average Park Entry Fee 2000	$2
Proposed Park Entry Fee	$20
Per Capita GDP in Kecamatan Komodo	$123/yr
Proportion Attributable to Fishing	24.9%
Proportion Attributable to Tourism	1.2%
Typical Income from Blast-Fishing	>$1 140/yr/person
Potential Income from Seaweed Farming	$1 200/yr/person
Estimated Economic Benefits of Conservation	$3.5 million/yr
Seven Year Cost of Management Plan	$16.5 million
NPV of Conservation Initiative (@ 10%/yr)	$1.24 million

Benefit Cost Analysis (see Annex 6)

A base case scenario for the Benefit Cost Analysis (BCA) was developed that reflects a most likely scenario for incremental park investments and associated benefits of the conservation project. The BCA focused on the most significant quantifiable benefits, to provide an order of magnitude basis for judging economic efficiency.

For the BCA, present value costs and benefits are estimated based on a 10% real discount rate. From a national (Indonesian) perspective, the net present value (NPV) of the net social benefits of the project is US$1.24 million. The NPV at a 5% discount rate is US$9.22 million; at a 15% discount rate the NPV is *minus* US$1.48 million. The results indicate the overall economic efficiency of undertaking a conservation project of this type in the base case. Because of the uncertainty in technical linkages, the spawning aggregation function values are excluded from these base case estimates; at a 10% discount rate, they would add US$3.65 million to the base case (see Annex 6 for more details).

1b Incremental Costs (supported by Annex 4)

The incremental costs (funded by GEF) associated with the global benefits of the KCMI project are estimated at US$6.93 million in the base case. Sensitivity analyses show that the incremental costs would be lower at higher levels of visitation, as follows:

- 38,000 visitor cap: US$5.734 million Incremental Cost
- 43,000 visitor cap: US$4.803 million Incremental Cost
- 48,000 visitor cap: US$3.739 million Incremental Cost

It is on this basis that GEF assistance of US$5 million is requested.This level of international conservation expenditures provides a cost-effective mechanism for protecting an important habitat; the expenditures at such a level translate to a transfer of US$808/km^2/yr for protection of the total area. Typical conservation expenditures around the world reflect international interventions corresponding to approximately US$25/km^2/yr to US$2,500/km^2/yr of protection. This initiative therefore provides an opportunity to implement relatively efficient conservation expenditures.

Project Component	**Baseline Scenario (US$ Million)**	**GEF Alternative (US$ Million)**	**Incremental Expenditures (US$ Million)**
Collaborative Management	0.0	1.6	1.6
Conservation Management	0.5	6.2	5.7
Tourism Management and Sustainable Financing	0.0	4.2	4.2
Incentives for Sustainable Livelihoods	0.2	2.5	2.3
Monitoring and Evaluation	0.2	2.0	1.8
Total	**0.8**	**16.5**	**15.7**

Note: Numbers may not add up due to rounding.

2 Financial

Financial Impacts of Fuel Price Deregulation on Alternative Livelihood Schemes

The financial viability of some of the alternative livelihood activities (and some unsustainable activities) will be impacted by the planned deregulation of fuel prices. Thus, for example, the removal of subsidies will marginalize cyanide fishing, while also potentially undermining efforts to promote a sustainable pelagic fishery as an alternative livelihood. The project will therefore make contingency plans for this

coming deregulation, to ensure that some of the alternative livelihood schemes being tested are less prone to fuel price shocks, and to provide extension services related to such alternatives will in advance of planned fuel price increases.

3 Technical

The adoption of an adaptive management approach to park management will require the establishment of systematic ***biodiversity assessments and monitoring*** of all key species and environmental variables. The project will support an expansion of the current monitoring program of coral and fish, to include arboreal animals (juvenile dragons), terrestrial animals (Komodo dragon, deer, water buffalo, horses, pigs, turtles and scrub fowl), vegetation (across all major habitats), cetaceans, and environmental variables (including temperature and humidity levels, water quality, and habitat disturbance). The 25-year management plan for KNP includes technical details as to the preferred methods, locations, and frequencies of these monitoring activities, and San Diego zoo will participate in the development and implementation of the terrestrial monitoring system.

The development of ***alternative livelihood schemes*** will include careful screening to ensure that the activities promoted are technically, economically, and environmentally sound. In particular, the development of mariculture will require close monitoring to identify any adverse environmental impacts. The project will assist ongoing efforts by PHKA and TNC to develop full circle aquaculture of high quality food fish, as a promising alternative to wild capture and cyanide. This scheme will include the establishment of a local hatchery for production of fingerlings to be used as 'seed' supply for local grow-out schemes, to enable the aquaculture to be a self-sustaining ('full-circle') system, since grow-out schemes using wild-caught juveniles would increase pressure on the sedentary resources.

4 Institutional

The lack of precedent for a ***collaborative management approach*** in a national park in Indonesia means that the institutional arrangements will need to be developed from scratch, and will probably involve a certain amount of trial and error before an effective structure is achieved. The relationship between ***PHKA*** and the ***Joint Venture*** (JV) is a crucial one. The restructuring of park management and the sharing of responsibilities between PHKA, the JV and local government, in a ***collaborative management agreement*** will necessitate new legal and institutional frameworks. These arrangements can then serve as a unique model for other national parks in Indonesia.

The institutional capacity and exact responsibilities of the ***Ministry of Marine Affairs and Fisheries*** remains untested, and the initial stages of project implementation will continue and intensify the discussions with the Ministry to establish a positive working relationship and finalize the nature of their collaboration. Likewise, the new administrative responsibilities and fiscal claims of the ***local and provincial governments*** have still not been fully defined and clarification will require intensive discussions.

Other new institutional structures to be established, or tested, by the project include a ***community-run committee*** to administer the Community Development Grants and a partnership arrangement between the JV and a local micro-credit provider, to establish and operate the Sustainable Enterprise Fund.

5 Social

The success of this project is very much dependent on the extent to which it can provide the different stakeholder groups – and particularly the resource users – with the right incentives to conserve the park's resources. The perverse incentives currently in place are a major cause of biodiversity loss. These perverse incentives include: (i) high financial gains from destructive fishing practices, with relatively low risk of punishment, due to inadequate enforcement by park management; and (ii) the granting of fishing licenses to crews from neighboring provinces, which include the right to fish within KNP waters. Compounding these counter-conservation incentives, is a lack of positive conservation-enhancing incentives, including: (i) the absence of financially attractive alternatives to entice local fishermen away from destructive fishing practices; and (ii) a lack of mechanisms for local communities to participate in decision-making regarding park management, engendering little feeling of ownership or commitment to conservation.

The project will seek to redress these problems by:

- supporting ongoing environmental awareness-raising campaigns among local communities;
- empowering local communities to participate in park management, through their representation in the Community Coordination Forum (*Rapat Koordinasi*);
- facilitating development of the local economy, which will have a significant impact on the per capita income in communities living in and around the park;
- providing local fishermen with economically-acceptable alternatives to destructive fishing practices through the alternative livelihood schemes – which will also enable them to break their economic dependency on middlemen; and
- tackling the fishing rights issue, through discussions with the MMAF.

The project will increase local communities' *security of tenure* over the area's resources and will help create *enforceable boundaries* around village fishing areas. These are both necessary conditions for enduring, self-governing common property regimes.

The main **gender issue** to be addressed by the project is the need to develop alternative livelihood programs appropriate for women as well as men – currently the marine resource focus of these programs has meant that most of the benefits are accruing to men (who make up the vast majority of fishers). Therefore the objectives of the Incentives for Sustainable Livelihoods component will specifically include women as a target group and the development of local family-based enterprises will seek to support initiatives run by women as well as men. One activity which has proved promising is the training of local women in new fish processing techniques, so they can sell the fish products to the local homestays.

The major **social conflict** anticipated by the project design team reflects the relationship between the local fishermen and commercial fishing crews from Korea, Hong Kong and other Asian countries who use destructive fishing methods around KNP waters. The external fishing crews are much better equipped and skilled in destructive fishing practices than the locals and catch much larger quantities of fish, with no regard for sustainability. They have also persuaded many local fishermen to use the same fishing methods in KNP waters and then bring the fish to the mothership moored beyond the park boundaries. As the project clamps down on these fishing methods and seeks to raise local people's awareness about the need to sustainably harvest the fish stocks, there is likely to be some degree of conflict with the commercial crews who will try to continue operating near KNP.

6 Environmental

As the project involves a negligible amount of new construction, a full-scale EIA is not required. An Environmental Audit will be conducted, and is currently being scoped.

Resettlement. The project will avoid physical resettlement and sustained economic displacement.

7 Participatory Approach

The KCMI project has followed a highly participatory process throughout the planning stages and has already generated a great deal of local support for, and awareness of, the objectives and planned components. The development of the 25 Year Management Plan for KNP was undertaken with the active involvement of community leaders as well as a broad range of other stakeholders in the area, and the ongoing community awareness and development activities of TNC and PHKA have involved a high level of participation by local people, including the network of trained conservation cadres in the villages. Training courses have been conducted to familiarize PHKA staff and other local stakeholders with the use of participatory techniques such as Participatory Rural Appraisal (PRA). The project components themselves have been developed on the basis of consultations and discussions with a wide range of stakeholders. The main participatory activities undertaken to date are summarized below.

Participatory Activity	Stakeholders Involved	Dates	Outputs
Coordination Forum	Forestry, fisheries, and tourism officials, mayors, planning and police officers, court officials, legislators, military, NGO representatives and local village leaders from Komodo, Sumbawa and Flores.	February 1996	• Increased understanding of objectives of the park; • Starting point for continuous dialog among stakeholders; • Integration of local stakeholders' concerns and interests in the Management Plan; • Strengthened local government commitment on enforcement issues; • Consensus on expanded park boundaries, including Banta Island.
Participatory Mapping of Important Fishing Grounds	Communities in and around KNP	1996	• Importance and location of marine natural resources for each village; • Integration of this information into the zonation plan.
Awareness-Raising Program	Communities in and around KNP	1996 onwards	• Continuous dialog on park objectives, impact of destructive fishing practices, and participation of communities in natural resource management.
World Heritage Sites and Eco-tourism Workshop	Government officials, private sector tour operators, NGOs	October 1999	• Discussion of role of eco-tourism in national parks, particularly KNP.
National Workshop	National government officials from the Ministries of Forestry, Environment, Finance, Planning, Tourism, Marine Affairs and Fisheries, representatives from the Indonesian Tourism Promotion Board, international NGOs (WWF, CI) and World Bank.	February 2000	• Discussions on feasibility of innovative park financing mechanisms; • Exchange of experience with other conservation projects throughout Indonesia;
Training Workshop on Awareness-Raising	Local NGO staff and community members.	May 2000	• Identification and training of park conservation cadres to continue the awareness-raising work; • Development of different media to promote marine conservation messages.
Launch of Management Plan	Local and national government authorities, and the media.	July 2000	• Raised profile of the park • Support generated for the Management Plan
Tour Operators Workshop	50 tour operators and dive operators from Bali and Sulawesi.	February 2001	• Promotion of sustainable dive tourism in KNP; • Input of operators into user fee

			issue; • Identification of operators' concerns about likely project impacts on their businesses.
Study Tour of Concession Team to Galapagos	National, provincial and local government officials, director of national parks, TNC and JPU representatives.	March 2001	• Discussion of similarities and challenges facing the two parks (tourism, marketing, litigation).

In addition to these activities, the project planning process has also involved a series of more focussed consultations with institutional and business stakeholders. During 2000 these have included:

- meetings with the Director General of Nature Conservation and Protection on the financing strategy for KNP;

- discussions with the teams involved in innovative management changes in other National Parks, including Gunung Leuser, Way Kambas, and Bunaken, to share the lessons learned; and

- consultations with the boat and tour operators in Bali and Jakarta, to discuss tourism development in the region.

See Annex 8 for the complete stakeholder participation strategy for project implementation.

8 Checklist of IFC Policies

Policy	Risk of Non-Compliance
Environmental Assessment (OP 4.01)	**L**
Natural Habitats (OP 4.04)	**L**
Indigenous Peoples (OP 4.20)	**L**
Involuntary Resettlement OP 4.30)	**M***

H (high), M (medium), L (low).

*The project will seek to avoid any sustained economic displacement through the alternative livelihood programs and other incentives to stimulate the development of a local economy based on the sustainable use of the area's resources.

F SUSTAINABILITY AND RISKS

1 Sustainability

An analysis of the ***financial sustainability*** of the *collaborative management structure* is included in Annex 7. The financial sustainability of the *project* will depend on the park becoming self-financing by project end. This achievement in turn depends on the success of the project's revenue-raising strategy, which aims to increase the number of tourists and change the mix of tourists to a higher-end clientele who would be willing to pay substantially higher user fees. For this to happen, KNP would need to be seen as a safe, easily-accessible tourism destination and this will require significant improvements in its current image – tarnished by Indonesia's continuing

social and political unrest, by a lack of reliable transport to the park, and by the poor quality of visitor facilities and services presently available in the park.

Assuming that this revenue-raising strategy is successful, the tourism revenue generated by the park should cover the recurrent costs of biodiversity and tourism management, and should also provide incentives for the local governments and local communities to commit to environmentally sensitive development and livelihoods. By far the largest recurrent costs will be those related to marine enforcement measures, although it should be possible to scale down these expenses as the fishermen are made aware of the new tougher regulations and as the deterrent effect of regular convictions of violators sets in. There should be little need for any major new investments in the years following project completion, although some modest investments may be required to fully establish a wide range of alternative livelihood schemes (ALS), to reach significant numbers of households.

The financial sustainability of the project also depends on the sustainability of the new institutional arrangements for park management. This ***institutional sustainability*** in turn depends on, *inter alia*: (i) the legal standing of the concession; (ii) the institutional stability of the Joint Venture and Collaborative Management Agreement; and (iii) the maintenance of good working relations between PHKA, the JV and local government.

Given the fact that the project creates a whole set of new institutional relationships, and entails substantial changes to the traditional notion of park management, a good deal of thought has been given to ensuring these changes can be sustained beyond the life of the project. Thus, the following measures have been taken:

- the designation of a seven-year life-span for the project, to allow time for the new institutional frameworks to be developed and consolidated;

- the partnering of local government, a Joint Venture company and PHKA, through a Collaborative Management Agreement, to combine the strengths and resources of each party;

- the involvement of a broad range of stakeholders via a variety of mechanisms, to build a strong constituency for project activities;

- the emphasis on creating viable alternative livelihoods for local people, to develop a sustainable local economy based on the rational use of natural resources; and

- the strong element of monitoring and evaluation, to enable continuous assessment of the project activities, and timely adjustments where necessary.

2 Critical Risks (reflecting assumptions in the fourth column of Annex 1)

The assumptions underpinning project design are listed in Annex 1, along with the associated risks that would threaten the success of the project. A set of crucial risks has been identified and is outlined in the table below. Each risk is assigned a relative rating from low to high. A description of risk mitigation measures for each risk is also presented.

One of the high risks for the project is that tourist arrivals and revenues do not grow as anticipated. This risk can be reduced by improving the tourism experience through upgrades in facilities and services and by developing a diversified marketing strategy. However, these measures could be nullified by regional or global political and economic crises. Although political instability is beyond the control of the project, it is worth noting that the area around Komodo and Labuan Bajo has been unaffected by the political instability that has occurred in several parts of Indonesia. Another risk rated as high is the inability to foster new tools for an effective enforcement system. This risk will be addressed by working with local parliaments, judges, lawyers and police to develop fair and adequate measures for reducing unsustainable resource use. A third high risk factor is that few of the alternative livelihood schemes prove workable. Such circumstance may emerge because of any number of reasons: failed marketing schemes, unanticipated political turmoil, or persistent technical failures in spite of diversification. The greatest asset for circumventing such problems will be the presence of a competent adaptive management structure that is capable of receiving input and insights from a wide range of stakeholders and translating that information into appropriate actions.

In addition to these high risk factors, two types of risk are rated as substantial. One of these is reduced support over time for the tourism concession and related management agreement. This could result from a change in government or from adverse publicity about the project. To reduce this risk, it will be important to continue to develop strong political support for the concession and collaborative management agreement at the local, provincial and national level, including awareness building among various stakeholders. Another substantial risk is that internal weaknesses in the collaborative management parties result in the unsustainable resource use and diversion of gate fees, thereby threatening financial sustainability. This risk can be mitigated by carefully designed internal and external controls including regular monitoring and review of the Joint Venture and the collaborative management agreement.

The overall level of risk facing the implementation of the project is evaluated as substantial. The most important risks facing the project stem from the innovative and ambitious nature of the project, as well as the perverse economic incentives to degrade the resource base. However, the potential benefits of the project far outweigh the risks involved, and the risks of not undertaking the project are of such magnitude that biodiversity loss would almost be a certainty.

Risk	Rating	Risk Mitigation Measure
Tourism revenues in KNP prove inadequate (e.g. due to security concerns, or lack of quality infrastructure in the park) to cover park management costs.	H	Tourism marketing strategy will highlight relative safety of Komodo and project will include upgrading of visitor facilities and services in the park.
Enforcement effort seriously impeded by difficulties in developing new legal tools.	H	Intensive efforts to design and introduce appropriate legislation and judicial improvements.
The alternative livelihood schemes do not provide sufficient income, or are not tailored to the needs of the local people, and fishermen do not completely abandon their destructive fishing practices.	H	Selection of economically and socially viable livelihood alternatives and the concurrent use of fines and penalties to discourage destructive fishing practices.
Reduced political support for the concession (e.g. after possible change of government) threatens its operation.	S	Generation of broad-based support for concession at district and national level and high-level awareness-raising efforts.
Internal weaknesses in collaborative management parties result in the overexploitation of natural resources and the	S	A robust system of internal controls will be put in place and only qualified staff will be retained by the

diversion of gate fees, thereby jeopardizing the financial sustainability of the JV and KNP.		JV. Collaborative management operations will be subject to regular monitoring and evaluation.
Tourism demand is over-stimulated, to environmentally unsustainable levels.	M	An initial assessment of the park's carrying capacity and the imposition of strict controls on visitor levels.
Lack of sufficient constituency among key stakeholders to support project.	M	The use of a transparent, consensus building approach.
The anticipated development of Labuan Bajo does not materialize, severely limiting the area's capacity for higher-end tourists.	M	The 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.
Fuel price deregulation significantly increases project costs and reduces the economic viability of certain alternative livelihood schemes.	M	Communities will be informed of the risks of cost increases in advance, and alternative livelihood schemes that are less fuel-intensive will also be developed.
New threats to KNP's biodiversity emerge and can not be contained by the project.	N	The continuous monitoring and evaluation of resources and resource use will be an important part of the project's adaptive management approach.

H (high), S (substantial), M (modest), N (negligible or low).

cultivation) are technically and financially feasible. To clarify our meaning in section C.1, we now refer to this R&D activity as scoping of alternative livelihood activities.

Full-circle aquaculture of high-quality food fish. This phrase refers to the establishment of a local hatchery for production of fingerlings to be used as 'seed' supply for local grow-out schemes, to enable the aquaculture to be a self-sustaining ('full-circle') system, since grow-out schemes using wild-caught juveniles would increase pressure on the sedentary resources. This is now explained in the last paragraph of section E.3.

Community welfare grants. Throughout the document we have now renamed this activity as community development grants. Please note this will be funded by co-financing, not with GEF funds.

Where would the funding for infrastructure needs come from? The airport, port, and other infrastructure improvements are part of an approved planning and budget document of the local government and provincial government and would be financed by government. Please note that while the project will clearly benefit from improved infrastructure, the success of the project does not depend upon complete and timely investment therein. The improvements would benefit the project but none are crucial. This point is now explained in section B.3 and on the third page of annex 6.

All agreements should be finalized prior to endorsement. There are ongoing negotiations to finalize the wording of these agreements. As we now state in section C.4 under "Project Implementation", the concession agreement and collaborative management agreements should be finalized prior to the start of project implementation.

Sustainability

What would the other partner of the JV contribute to initial costs? The other partner will make a modest necessary founding contribution, but in the start up phase the critical input from the private sector partner will be the business skills and experience, and specific knowledge and experience in the tourism sector, critical to the development and implementation of the tourism development strategy. This is now stated in section D.4 and in annex 7, section 6.

Higher park entrance fees. In annex 2, we now state that visitor surveys have shown a willingness to pay within the range projected. Proposed highest levels fees have been proven to be within the acceptable levels middle- and upper level tourists are prepared to pay for highly quality nature tourism experience (e.g. the entry fee for the Galapagos is $100). The presence of the Komodo dragon along with world class diving provides unique tourism experience. Please note that local residents will not be required to pay these increased fees (also clarified in annex 2).

Project risk. We accept your assessment that that there is high risk associated with the project because it is innovative in its financing and collaborative management design. This is now indicated in section F.2. Nevertheless the project benefits far outweigh the risks involved, and the risks to the area's biodiversity if no such project intervention is undertaken are very serious.

Replicability

The monitoring and evaluation section of the project (see annex 2) provides budget for documentation and publication of the experience of the project. Part of the strategy of engaging independent verification of the outcomes of the project from UNESCO and IUCN will facilitate the broadest possible dissemination of the experience, for example through WCPA. If early results are available, they will be presented at the Parks Congress in 2003 (as now indicated in section D.3). IFC will make every effort to disseminate the experience, and is already considering how to incorporate the lessons in two future projects. In addition, the conservation management component (section D.3 and annex 2) describes joint training programs with other marine conservation projects in Indonesia.

Stakeholder Involvement

Local community participation in JV. Extensive study of the various options for local community participation showed that this would not be productive at this point. As we have now added in section D.1, the possibility of greater community participation in the JV will be considered at the midterm review of the project.

Beneficiary population. The beneficiary population will be larger than the number of park inhabitants (now consistently referenced as 3,000 persons). To prevent encroachment and to generate local support for the park, it is necessary for the project to provide incentives for biodiversity friendly economic activities in villages outside the park. Because present fishing practices and incomes are not sustainable, we believe that the project will enable a better local economy than would otherwise be the case as shown in the benefit-cost analysis in annex 6.

Clarify how much of the benefits trickle down to local populations. It is difficult to precisely quantify the amount of benefits that will be captured by local communities, but many of the project activities are directed toward building a sustainable economy for local communities. As shown in the benefit-cost analysis table in annex 6, we anticipate the lost income (from foregone destructive practices) to be offset by new income (from the alternative livelihood activities). During the 7-year project life, the new income will largely substitute for the lost income. However, by the end of the 10^{th} year, the entire "in-park" population is assumed to have adopted the new activities. After year 10, the new income will amount to $850,000 per year, which represents a substantial improvement in local economic activity. We have added some additional explanation of this to annex 6.

JPU and JV as project beneficiaries. Please note that the JV founding provisions (see annex 7) include the requirement to re-invest all net profits. This is described broadly to include local community initiatives. We believe there will be clearly increased opportunities for sustainable livelihoods as shown in the table in annex 6. We have added an explanation that the destructive fishing practices are not sustainable and are assumed (in the absence of the project) to yield declining economic returns as the coral reef ecosystem is rapidly destroyed.

Indigenous or migrant? It is difficult to define what is indigenous since there has been a great movement of people around coastal areas of Indonesia for centuries. Many of the families living in the vicinity of the park have done so for generations. There has been a modest influx of migrants over the past decade.

Enforceable boundaries . We agree that not all of the productive fishery lies close to the villages. In fact one of the alternative livelihood activities is to train the local fishermen to do pelagic fishing in deeper waters away from the park. In those waters there could be some potential for conflict with large fishing villages. This is why we mention discussions of fishing rights issues with the Ministry of Marine Affairs and Fisheries and have clarified the need for inter-sectoral coordination in the second paragraph of section E.4. Much of the destructive fishing is carried out by small-scale fishers (often with support and encouragement from commercial traders), and we have clarified this in section B.3.

Conflict resolution. No changes requested.

Revenue sharing. There have been discussions about revenue sharing of the gate fee with local, provincial, and national governments. Although these issues have not been finalized, the plan is to ensure that each level of government will receive at least as much as it currently receives in gate fees with some opportunity for growth as tourism numbers increase. The JV has also discussed using a portion of the gate fees to support the community programs. These issues are now clarified in the description of the "Achieving Financial Sustainability" (sub-component 3.2) in annex 2 and also in annex 7.

Monitoring and Evaluation

UNESCO resources. We expect that UNESCO will continue to periodically check on the status of Komodo as a World Heritage Site, but we would not expect them to be willing to expend resources monitoring the GEF project. However we will be coordinating closely with UNESCO and seeking opportunities for collaboration.

Coral bleaching. We now mention in annex 2 that the monitoring system put in place should track coral bleaching.

FINANCING

Financing Plan

Change in financing package. At the PDF B stage, this project included two components, the park management, as well as an ecotourism venture. Subsequently, it was decided not to include the earlier projected private sector contribution. First because the nature of the private sector contribution is indirect – it would take the form of investment in ecotourism facilities outside the boundaries of the Park. Thus, although it is related to the project in the sense of providing access for tourists and therefore facilitating the collection of tourism revenues, it is not directly a part of the project as finally defined (see section D.1 for further explanation). The project definition was finalized during the PDF B process. Second, the private sector investment was not included because of the uncertain nature of the investment. Business plans are not yet finalized, and are in any event dependent upon the approval of this project.

The current make-up of contributions to the project are: GEF 31% (incremental cost), TNC-secured donor funding 29% and the balance, 40% is the contribution of the JV, the private sector actor, through the revenues generated by them.

Shortfall in agreed financial package. There is no "shortfall" per se – project definition has changed and is tighter. The original conservation objectives can be accomplished at a lower overall cost.

IFC contribution. This is very much different to a classic profit-generating IFC project. The design of the JV – to facilitate a business-like approach to Park Management, but not to generate net profits to investors – effectively precludes IFC from a commercial-type investment therein, nor would it have been appropriate. However, IFC does and will continue to make a substantial contribution of private sector expertise to the setup and management of the JV. The GEF's interest in bringing IFC is to catalyze this kind of innovative business-like approach to developing financial self-sustainability to park management in a world of declining subsidies to parks, not to try and solicit handouts from the private sector. There is no GEF subsidy to the private sector as the private sector does not stand to make any profit from this project.

Budget line flexibility. GEFSEC comments noted.

Budget line questions. One of the largest supply items is fuel due to the high cost of patrolling and other transportation needs in the widely dispersed marine environment of the park. Another significant supply item is food provided to the remotely stationed rangers and other field staff. Other supply items include office supplies, reference materials, software, tools, and vehicle and boat service supplies. Occupancy includes rental of office and staff housing space in Labuan

Bajo, utilities, and maintenance of space. Fees and insurance include permits, liability and other insurance, and meeting expenses. Salaries cover 125 individuals.

Many of the cost estimates were derived from TNC's 6 years of running field operations in the park area. The important thing to note is that the JV will be run on business lines. This means maximizing revenue, but, in the event that revenues vary, cutting costs accordingly. This is prudent business practice, which will be enhanced by private sector participation.

Revenue. The $6.7 million is anticipated revenue. This projection comes from the JV cash flow tabulation in annex 7. The BCA calculations in annex 6 do not show tourism revenues, but rather tourism net benefits from recreational activities.

.INSTITUIONAL COORDINATION AND SUPPORT

Core commitments and linkages

A summary description of how the project fits with the World Bank's program in Indonesia is given in section B.1a.

The proposal is consistent with the *Criteria for Review of GEF Projects* as presented in our earlier submission of 1 October, 2001.

Please let me know if you require any additional information to complete your review prior to inclusion in the work program. Many thanks.

Distribution:

cc: Messrs./Mmes. *Relevant Regional staff/task manager (acronym); Relevant RC and Thematic Spec.,* Khanna, Aryal (ENV); ENVGC ISC, Relevant Regional Files

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Annex 1.
Project Design Summary

Hierarchy of Objectives	Key Performance Indicators	Means of Verification	Critical Assumptions and Risks
CAS Goal Protect the poor, stabilize the economy, and strengthen institutions to support sustainable growth			
Sector-related CAS Goal Strengthen environmental and social institutions	Strengthened regulatory framework and enforcement; reversal of environmental degradation; generation of revenues; more effective local institutions participating in biodiversity conservation	CAS updates and ESW	The protection and sustainable use of KNP resources and the institutional strengthening of PHKA will bring sustainable economic, environmental and social benefits to the coastal communities in and around the park and will ensure the survival of globally significant species and ecosystems.
GEF Operational Program Coastal, Marine and Freshwater Ecosystems	Healthy and sustainably managed ecosystems	Sector reports	
Project Development Objective **Global Objective** To conserve and sustainably use the biodiversity assets of Komodo National Park (KNP)	Strengthened and more coordinated conservation measures in operation and widespread uptake of conservation-enhancing livelihoods based on the rationale use of the park's natural resources.		
Development Objective Effective management of Komodo National Park (KNP) based on a collaborative management structure involving key stakeholder groups, a system of positive and negative incentives to address the underlying causes of biodiversity loss, and the development of long-term financial security for the park with sustainable benefits accruing to local communities.	A more broad-based participation of stakeholders in the management of the park. Clear signs of improved park management, including rehabilitated ecosystems, the presence of upgraded tourism facilities and services., and a significant reduction in the use of destructive fishing practices, poaching, and other biodiversity-damaging activities. By end of project, the park will have secured an ongoing source of income to maintain project activities. Local communities will have seen clear and direct economic benefits from having a well-managed, healthy set of natural resources in the park.	Internal assessments by the Collaborative Management Agreement parties and other key stakeholder groups. Independent external assessments of park management and performance of the Joint Venture (JV). Social assessment monitoring reports of changes in household livelihood strategies in local fishing communities. Records of enforcement activities and of observed number of crews engaged in destructive fishing practices. Records of park's finances. Independent audit of park's financial resources and assessment of park's post-project financial security. Social assessment monitoring and evaluation reports.	Ability and willingness of stakeholder groups to work together. Capacity of park staff to acquire new technical, administrative and participatory skills. National and local level commitment to enforcement measures. Technical and financial viability of alternative livelihood schemes ***Risk*** that alternative livelihoods are not sustainable, to be addressed by cautious testing of alternative livelihood schemes on offer and by following the existing agreements and regulations on in-migration. Stabilization of political situation, and the return of an increased and sustainable level of visitors to KNP. ***Risk*** that a change in government jeopardizes the concession agreement between PHKA and the JV; to be addressed by building up close partnerships with both local and national level decision-makers.

Hierarchy of Objectives	Key Performance Indicators	Means of Verification	Critical Assumptions and Risks
Output 1 An effective Collaborative Management Agreement (CMA) for KNP is set up and in operation, and mechanisms for consulting with and involving other stakeholder groups are functioning well.	The CMA will be established by end of yr 1, as will the stakeholder consultation mechanisms. The JV will have been seen to take account of the opinions and concerns of the stakeholder groups consulted. Overall management of the park will have significantly improved from an initial baseline at beginning of project.	Official documents detailing the composition and mandate of the collaborative management structure. Reports of stakeholder consultation meetings. Independent monitoring reports on functioning of the JV and the quality of park management.	The stakeholders involved perceive their collaboration with each other as worthwhile, with the benefits (social, economic, environmental) outweighing the costs (in terms of their time and money). ***Risk*** that the stakeholders not included in the CMA become marginalized and their voice is not heard; to be addressed by the establishment of clear grievance processes and independent assessments of the degree and quality of collaboration with key stakeholders.
Output 2 Conservation Management in the park is strengthened.	Park management staff will have been provided with training in technical, administrative and participatory skills. A system of marine zoning and regulations will have been set up by end of yr 2, following a consultative process with local communities (see output 6). Management activities in the coastal waters around KNP will have been clearly tailored to address the biodiversity objectives of each zone. The number of observed illegal fishing operations will have decreased by at least 20% by end of yr 3, and by 40% by end of project.	Reports of training workshops. Documents detailing the marine zoning and regulations. Park management records, documenting the use of biodiversity assessments. Independent assessment reports of park management. Patrolling records.	Staff turnover in PHKA is not excessive, to ensure continuity and sustained impact of the capacity-building efforts. Local communities are willing to adapt their natural resource use to conform to the conservation regimes of the marine zoning system. The foreign-based fishing crews can be effectively excluded from Komodo's coastal waters. ***Risk*** that institutional weaknesses and lack of political will undermine the enforcement effort; to be addressed by engendering high level support among both local and national level government officials.
Output 3 A tourism management strategy is developed and implemented, and sustainable financing of park management is assured.	Effective mitigation plans will have been put in place to minimize adverse environmental and social impacts. Park entrance fees will have increased to US$20, and a system of other user fees will be functioning. Revenue-sharing agreements will have been negotiated with district, provincial and national level government by end of yr 1. A licensing system will have been set up, based on an established carrying capacity, and will be operating smoothly by end of yr 3. Tourism facilities and services will have significantly improved in the park. The tourism marketing strategy will have shown significant results in increasing tourism levels in KNP.	Document outlining tourism development strategy and reports from stakeholder workshops held to develop tourism development strategy. Park revenue records. Legal documents of revenue-sharing agreements. Licensing regulations and records of numbers and types of licenses granted. Opinion polls of visitors to KNP, at pre-project and post-project stages.	Providers of tourism services agree on priority needs and work together to fulfill them. The major barriers to tourism development of the KNP region are reduced, including problems of access. The political situation in the region stabilizes and KNP is perceived as safe by high-end tourists. ***Risk*** of tourism levels not matching the predicted increase, weakening the financial sustainability of the park. To be addressed by the development of an effective marketing strategy and close monitoring of its implementation.

Hierarchy of Objectives	Key Performance Indicators	Means of Verification	Critical Assumptions and Risks
Output 4. Incentives for sustainable livelihoods are put in place.	Significant numbers of local fishermen will have ceased their destructive fishing practices and will be participating in the alternative livelihood schemes. Those participating in the alternative livelihood schemes earn enough from these enterprises to support their households, with their average incomes at least matching the potential earnings from other non-destructive fishing practices. Local households will have become aware of the Sustainable Enterprise Fund's existence and will know how to apply for funding. By end of yr 2, applications to the fund will have been processed with an average turnaround time of 2 months or less, and 60% of the enterprises funded will still be operating after two years. Projects sponsored by the Community Development Grants ~~Fund~~ will have had a significant effect on local people's welfare.	Reports on alternative livelihood schemes. Social assessment monitoring reports of participation in the alternative livelihood schemes and the Sustainable Enterprise Fund. Baseline and monitoring reports on natural resource use by local communities. Records of the Sustainable Enterprise Fund and the Community Development Grants ~~Fund~~. Social Assessments.	The alternative livelihood schemes prove technically and financially viable. Beneficiaries of the Sustainable Enterprise fund acquire sufficient skills in the technical and administrative aspects of the enterprises funded, to make them successful and sustainable. The project can provide enough assistance to a large enough group of people to significantly reduce pressure on the park's natural resources. ***Risk*** that the alternative livelihood schemes will not provide sufficient income for the fishermen to cease their destructive fishing practices altogether, to be addressed by the concurrent use of fines and penalties for such practices. ***Risk*** of the marginalization of vulnerable households (e.g. poorer, female-headed, or ethnic minority households), to be addressed by the socio-ecomomic equity goals of the Sustainable Enterprise Fund.
Output 5. A comprehensive monitoring and evaluation program is being implemented and is being used to keep park management responsive to changing conditions.	The use of terrestrial biodiversity assessments and monitoring systems will have become standard practice in the management of KNP by end of yr. 5.	Monitoring reports. Reports of external reviews.	The monitoring programs produce results that are sufficiently reliable and timely to be used as a basis for management decisions.

Annex 2.
Detailed Project Description

The KCMI project occurs during a very dynamic period within the local and national economies, with newly emerging threats and opportunities for the conservation of the park's resources. The continued economic stagnation and the persistent poverty levels create ongoing incentives for non-sustainable use of the local resources, and local institutional weaknesses to enforce regulations that ban such non-sustainable use remain equally impoverished. The effects of the decentralization of fiscal and development authority are gradually emerging, as are the capacity and commitment of the local districts and provinces to the conservation of KNP's resources. In the meantime, substantial economic and institutional opportunities exist for the park. Tourism recovery is expected to bring visitor numbers back to pre-crisis levels. Local government acknowledges the potential for a 'Komodo Gateway' that will promote economic development and tourism throughout the area, and the park has been granted special status as a pilot area for testing management and fiscal models that might not otherwise be consistent with current GOI park administrative policies.

Project Component 1. Collaborative Management (US$1.6 million).

The *Collaborative Management* component forms the basis of the KCMI project. The project will adopt a collaborative management approach that consists of a combination of agreements, mechanisms, structures and existing institutions to synthesize the interests of all key stakeholder groups and facilitate constructive partnerships between them. The main elements of the collaborative management approach will be: (i) a Joint Venture between TNC and JPU: (ii) a concession agreement between PHKA and the JV; (iii) a collaborative management agreement between PHKA, TNC and local government; and (iv) additional collaborative mechanisms to involve other public sector bodies and local community and private sector stakeholders.

Sub-Component 1.1: Establishment and Operation of Joint Venture (US$0.4 million) (See Annex 7 for details).

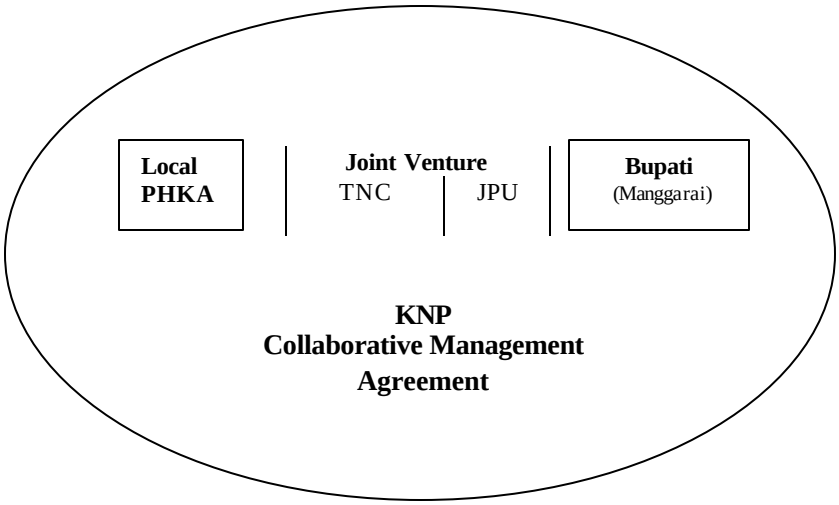
During the final stages of project preparation, a Joint Venture (JV) between The Nature Conservancy (TNC) and P.T. Jaytasha Putrindo Utama (JPU) was formed. The mission of this JV is to (i) enhance the conservation of KNP's biodiversity; (ii) achieve financial sustainability for the park through the sustainable use of its resources; and (iii) ensure that local communities and other stakeholders share in the benefits generated by the park. This mission is fully consistent with the 25-year management plan for KNP. Specific objectives of the JV are:

- To promote Komodo as an international nature tourism destination;
- To implement a self-financing plan for the park through a system of user fees;
- To strengthen the capacity of the national park authority to undertake conservation management and enforcement through a collaborative management agreement; and
- To stimulate the development of an environmentally sustainable local economy.

In order to fulfill this mission, the JV applied to PHKA for a tourism concession for KNP, and in September 2001 PHKA agreed in principle to the granting of this concession. The tourism concession will include the lease of the two entrance sites of KNP, Loh Liang (Komodo island) and Loh Buaya (Rinca island). The concession will contract to the JV the authority to set and collect gate fees, establish and implement carrying capacity limits, and establish a tourism licensing system. A further Collaborative Management Agreement (CMA) between the JV, the park authority and the local government will set out other responsibilities of the JV for park management (see sub-component 1.2). The JV will be staffed in part from the present KNP field staffs of both TNC and PHKA, with additional staff hired as needed. The selection of qualified staff and an intensive program of capacity building will be undertaken to improve the quality of day-to-day park management. The current combined staffing levels of PHKA and TNC operations in KNP are 149, and the planned staffing level of the JV will increase this to 164 personnel.

Sub-Component 1.2: Collaboration with Public Sector Stakeholders (US$0.2 million).

A tri-partite Collaborative Management Agreement (CMA) will be developed between the JV, the PHKA and the Bupati of Manggarai district to define the responsibilities of each party for the conservation and sustainable use of the natural resources in and around KNP. If the proposed park extension is approved, the Bupati of Bima district would also be included in the CMA. The specific management responsibilities of PHKA and the JV will be set out in this agreement; for example, PHKA will retain responsibility for enforcement activities in KNP while the JV will take the lead on tourism management and marketing. The three parties to the CMA will also develop mechanisms to coordinate with other relevant public sector bodies, including the provincial governments, the local departments of the Ministries of Tourism and Marine Affairs and Fisheries, the police and the fisheries enforcement branch of the Navy.



Sub-Component 1.3: Collaboration with Other Stakeholder Groups (US$1.0 million).

As far as possible, the project will make use of existing institutions and communication channels to involve local stakeholders, including communities in and around KNP and tourism operators active in the region. This sub-component will include the following activities:

- ***Community Awareness.*** KCMI will base its awareness raising activities on TNC's well-developed program for communicating conservation messages to local communities. Conservation cadres have already been selected from the target villages and are being trained in participatory communication and consultation methods. These young people will be responsible for undertaking a socio-cultural-economic baseline survey of the target communities, using Participatory Rural Appraisal (PRA) techniques, and annual follow-up surveys. They will also assist in the awareness raising activities to promote conservation of KNP resources. Methods to be used in this program include:

Tools for Community Conservation Awareness Program	Target Audience
Conservation-theme Newsletter and Calendar	All local stakeholders
Zonation Information Sheet	Fishermen, local government
Social Marketing tools:	
• Puppet shows	• Children
• Comic books	• Children
• Conservation video show	• Teenagers in high school
• Competitions (drawing, speech, slogan, billboard, poetry)	• Children and teenagers
• Sermons	• Religious leaders
• Music	• All local stakeholders

Finally, a program of voluntary community conservation activities will be established, to encourage local people to participate in, for example, beach cleaning, rehabilitation of coral reefs, mangroves and seagrass areas, and the collection and treatment of used oil from boats. Competitions, awards, and special campaigns will support these activities.

- ***Stakeholder consultations.*** Stakeholder communication mechanisms will be developed to solicit and receive suggestions regarding the project and feedback on project activities. These mechanisms will build on the on-going consultations organized by TNC and will focus on two key local stakeholder groups: (i) communities in and around the park, and (ii) local and Bali-based tourism operators. In the case of local communities, the project will work through the Community Coordination Forum (*Rapat Koordinasi*), an effective community-based communication and decision-making mechanism that has been active in this area for the last ten years. A representative of the Joint Venture will attend regular *Rapat Koordinasi* meetings every two months, and the JV will call additional meetings of *Rapat Koordinasi* if and when urgent matters arise. In the case of tourism operators, a JV representative will meet monthly with the recently established Komodo Marine Tourism Association (KMTA), representing the Bali-based operators, and the Labuan Bajo branch of the Indonesian Tourism Association (HPI Manggarai), representing the local operators. The JV representative will present a report of each *Rapat Koordinasi* and tour operators' meeting to the Board of Directors, together with recommendations on how the outcomes of these meetings should be taken into account by the project, through the adaptive management approach.

- ***Grievance mechanism.*** The JV is fully committed to addressing the concerns of stakeholder groups and, wherever possible, will work through the stakeholder consultation mechanisms outlined above to identify and try and resolve any emerging points of contention or conflict. To deal with conflicts that cannot be resolved through these stakeholder consultations, an independent mediation process will be set up and made available to stakeholders deemed to have a valid grievance. Grievances may arise concerning, for example, the allocation of funds, licenses or other management actions. A nominated spokesperson for the JV will act as first point of contact for complaints, and will direct complainants in the first instance to the local branch of the national legal aid association, *Lembaga Bantuan Hukum Indonesia* (LBHI), or similar organization, for facilitated mediation. To allow for grievances that can not be resolved through LBHI, the Joint Venture will establish an open and transparent agreement with an independent mediator to hear cases. On a case-by-case basis, the JV will offer the services of this mediator and will cover the costs of the complainants' access to this dispute resolution process, including transportation and meeting costs.

Project Component 2. Conservation Management (US$6.2 million).

The objective of the *Conservation Management Component* is to improve the effectiveness of the conservation of KNP's resources through: (i) enhancing the ability of park managers and other stakeholders; (ii) providing the necessary resources for conservation management; and (iii) developing systems for research and development that identify conservation priorities and monitor the impacts of conservation management.

Sub-Component 2.1 Development and Capacity-Building of Park Staff (US$1.9 million).

The project will develop and implement a staff development strategy for all personnel working in KNP. This strategy will consist of:

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

The multi-faceted nature of the project will require park staff to fulfill a number of different roles, including activities related to:

- conservation (sub-components 2.2 and 2.3);
- resource use regulations and enforcement (sub-components 2.4 and 2.5);
- tourism services (see sub-component 3.2);
- community development and enterprise development (see component 4); and
- monitoring and evaluation (see component 5).

Staff unable to meet the challenges of these new activities will be offered the opportunity to move to other PHKA offices or to take early retirement with compensation. Training of the retained park staff will be undertaken as part of a comprehensive capacity building program for all key target groups, as outlined below. This training program will be organized by the JV, in collaboration with PHKA and the Bupati, and professional training resource centers. Training will be conducted over a one-year period, in a series of workshops and training courses, and joint training opportunities will be pursued with other marine conservation projects in Indonesia, including COREMAP and MACONAR. .

Target Groups	Training Topics
Park managers	• site conservation planning; • enforcement strategies (see sub-component 2.5).
Park rangers	• coral reef rehabilitation; • mooring buoy installation and maintenance; • diving; • monitoring and inventory; • socio-economic issues in marine conservation; • participatory techniques in marine conservation; • English language and communication skills.
Fisheries managers	• role of marine reserve in fisheries management; • economic importance of conservation; • aquatic ecology; • boating skills and maintenance; • ecological monitoring and inventory; • law enforcement.
NGOs, conservation cadres, extension workers	• marine conservation; • alternative livelihood development; • World Heritage Convention; • community participatory development; • cross cultural awareness; • community needs analysis; • community based tourism; • gender awareness; • community conservation awareness; • NGO working ethics; • cultural, social, environmental and economic monitoring.
Policy and decision makers	• economic importance of conservation; • marine conservation; • landscape ecology and regional spatial planning; • PRA; • conservation related laws and regulations.
Marine tourism operators and developers	• marine conservation; • environmental health; • pollution threats; • management skills.
Journalists and television producers	• marine conservation; • in-depth reporting of conservation; • legal issues.

Sub-Component 2.2 Rehabilitation and Species Management (US$0.9 million).

Several specific terrestrial and marine habitats within the Park have been severely degraded. Approximately 150 km^2 or 25% of the terrestrial ecosystem of KNP has been severely degraded by fire and the poaching of lontar palms. The mangrove habitat has also been degraded by local residents cutting trees for fuelwood and construction materials. Large parts of the coral reefs have been damaged by destructive fishing practices, including bombing and cyanide fishing. The project will support research and monitoring to document the natural succession patterns in savanna, mangrove, and coral reef ecosystems. This information will then be used to design rehabilitation pilot programs. Similarly, the protection of threatened species – including Komodo dragons and sea turtles – will require active management interventions, based on careful assessments of the demographic and ecological factors involved. Interventions for species management include relocation, rehabilitation, and habitat modification. The rehabilitation and species management activities currently being considered include:

- ***Coral reef rehabilitation:*** The project will collaborate with a scientist from the University of California, Berkeley, who is currently exploring methods to rehabilitate areas of coral in KNP damaged by blast fishing. The research is investigating various methods to stabilize rubble substrate, thereby enhancing the conditions for coral settlement. Rehabilitation of coral reefs will only be undertaken in severely degraded areas unlikely to recover without intervention. These include areas where there is a strong current and no hard substrate.

- ***Mangrove rehabilitation:*** An initial assessment of the severity of mangrove degradation will be used to develop a mangrove rehabilitation plan. Only native species will be planted and restoration will attempt to mimic naturally occurring succession patterns and species associations.
- ***Control of non-endemic species:*** The introduction of non-native animal species, including dogs, cats and goats, poses a risk to threatened endemic species, due to disease, predation, or competition for resources. PHKA staff already undertake regular campaigns to shoot feral dogs, which are known to prey on young Komodo dragons and compete with dragons for food resources, such as deer, wild boar, rodents, birds and carrion. The project will consider supporting this and other control programs. Non-endemic plants also pose a threat to the integrity of the park, and weed infestation – dominated by prickly pear and a common herbaceous weed – has been observed along walking trails. The project will initiate an assessment of the effects of trail construction and use on weed dispersal (and on soil erosion) and will develop appropriate weed control programs.
- ***Soil conservation:*** The study on trail-induced erosion will inform the construction and placing of future trails and the maintenance of existing ones, to minimize erosion and run-off. Development in the settlement zone will also seek to minimize erosion and conserve soils.
- ***Komodo dragon management:*** Given the small population sizes of Komodo dragons and their primary prey species, Timor deer, local extinctions and inbreeding depression may occur. It may be necessary therefore to actively manage these species through translocation or reintroduction of individuals. The project will conduct a population assessment of both the source and target populations prior to any such intervention. The genetic variations between the dragon populations on Komodo, Rinca and Padar islands will be taken into account in any translocation or reintroduction program.
- ***Sea turtle protection:*** A recent preliminary field study has shown that wild boar causes high mortality in sea turtle eggs in the Komodo area. Rangers have been protecting some of the nests by erecting physical screens around them. After a further assessment of the problem is undertaken, the project will consider supporting this protection program.

Sub-Component 2.3 Research to Support Conservation Management (US$0.9 million).

This sub-component will be undertaken in collaboration with the Zoological Society of San Diego, as part of a broader five-year program of collaboration between PHKA, TNC and San Diego zoo. In particular, the zoo will support the establishment of research stations in KNP and will assist in the collection and analysis of data on terrestrial wildlife and habitats. This assistance will include an important element of park staff capacity building. The KCMI project will support the development of a comprehensive research program, on both terrestrial and marine resources and habitats. The actual research agenda will be developed following an assessment of priority information needs. Topics to be investigated could include, for example: (i) the reproductive biology of the Komodo dragon; (ii) grouper and Napoleon wrasse spawning behavior and aggregations; (iii) resource use of coral reefs and consequences for protected area management. The project will seek co-financing from other institutions to support this research work.

Sub-Component 2.4 Development of Zonation System and Resource Use Regulations (US$0.6 million).

The project will support the finalization of a zonation system for KNP and will seek PHKA endorsement of this system and the associated regulations pertaining to each of the zones. Specific follow-up activities will include physically marking the zone boundaries as appropriate, and socialization of the zones' boundaries to the stakeholders (printing zoning maps and their regulations). The park zoning and regulations will be complemented by local legislation issued by the district and provincial governments on, for example, resource use and buffer zone development.

TNC and PHKA have already drawn up a comprehensive set of resource use regulations for KNP, as set out in the 25-year Management Plan. These include, for example:

- Ban on the use of explosives for fishing in and outside the park;
- Ban on the use of poisons for fishing in and outside the park;
- Ban on the use of hookah compressors and scuba gear for fishing in the park and its buffer zones;
- Regulating fishing of milk-fish, and squids in the traditional use zones;
- Regulating sport fishing activity;
- Regulating waste and garbage management;
- Anchoring regulations;
- Regulating recreational dive activity.

The regulations will be discussed with all stakeholders, including the police, district attorney, local parliament, local government agencies, communities, tour operators, hotels and restaurants, visitors, and other park users. The role of conservation cadres and community awareness staff will be crucial during this consultation phase. Regulations on tourism-related activities in KNP will be complemented by the introduction of a licensing system for these activities (see sub-component 3.4 below).

Sub-Component 2.5 Strengthened Enforcement Regime (US$1.9 million).

The purpose of this sub-component will be to curb destructive fishing practices, halt poaching and prevent further degradation of the mangrove habitat. Local communities are dependent on the fisheries supported by the park to make a living, but destructive fishing practices threaten their livelihoods – preliminary data clearly show that it is communities from outside the park that are having the most damaging impact on the marine resources. Intensive patrolling is proving an effective measure to decrease dynamite fishing, but cyanide fishing has been difficult to ban. Profit margins in the cyanide fisheries are large enough to allow for very large bribes. Therefore, strengthened enforcement will need to be undertaken in close collaboration with local government, and in conjunction with the establishment of exclusive use rights for local communities in selected zones of the park's waters. The project will fund recruitment, selection and training of the enforcement task force, and investments in enforcement operations and equipment.

This sub-component will include the following activities:

- ***Strengthening Enforcement.*** The project will support an intensive training program for park rangers involved in enforcement to develop their skills, prepare them both physically and mentally, and strengthen their teamwork. After completing an initial training program, newly-trained staff will be employed in the field under the supervision of team trainers, to test their skills and readiness. On-the-job training will be provided on a yearly basis to refresh the team and review their individual and team performance. PHKA and the JV will also develop agreements with other enforcement agencies including the coast guard, police and the enforcement branch of the Navy, to collaborate their enforcement efforts in and around KNP. These agreements will set out the authority and responsibility of each body over area coverage, and will establish standing operational procedures and legal procedures.
- ***Support for Enforcement Operations and Technology.*** The KCMI project will support the development and implementation of an operational work plan for surveillance and enforcement. This work plan will set out guidelines for surveillance routes, communication, engagement rules, boat inspection, schedules, codes of conduct, equipment use and maintenance. PHKA will take the lead, in consultation with the JV and local government and with other bodies involved in enforcement. A comprehensive patrolling system will then be established to cover both the terrestrial and marine habitats of the park. Since all park boundaries are situated in marine waters, boats will be the most suitable vehicle for patrolling the park. These boats will also function as mobile (floating) ranger stations and will be equipped with proper communication systems, armor, field observation instruments, tender speedboats, supplies, and personnel. The boats will be deployed primarily to monitor the most sensitive sites in the park such as spawning aggregation sites and fragile dive sites. Their operation will be controlled by the park headquarters in Labuan

Bajo, via a reliable and secure radio communication system. The elements of the enforcement system will therefore include:

- twelve terrestrial ranger stations (TRS);
- five wooden vessels as floating ranger stations (FRS);
- twice-weekly terrestrial and marine regular circling patrols (CP); and
- special deployment patrols (SDP) and surrounding park patrols (SPP) as and when needed.

The SDPs and SPPs will be undertaken in conjunction with other agencies and can be assigned to patrol areas outside the park, as requested by local government. The project will invest in at least two 30 feet speedboats for regular patrols, transportation of personnel and supplies to FRS and land-based ranger stations, and for response to emergency situations.

Project Component 3. Tourism Management and Sustainable Financing (US$4.2 million) (See Annex 9)

The objectives of the *Tourism Management and Sustainable Financing Component* are to: (i) manage the impacts of tourism (sub-component 3.1); and (ii) increase revenue within the limits set by the carrying capacity, to achieve financial sustainability for the park (sub-component 3.2).

Sub-Component 3.1 Managing the Impacts of Tourism (US$1.3 million).

This sub-component will seek to minimize the biophysical and social impacts of tourism through the use of a variety of mitigation measures, based on an assessment of the park's carrying capacities for different tourist activities. This will require an iterative process of assessing the impacts, adjusting the tourism management accordingly (as part of the project's adaptive management approach), and re-assessing the impacts. The following activities are therefore only examples of the kinds of work that will be undertaken:

- ***Carrying capacity studies.*** An initial assessment of the tourism carrying capacity of KNP concluded that, with adequate management and infrastructure provision, the overall capacity is in the order of 50,000 persons per year. Carrying capacities for particular tourist activities, including diving, dragon watching and cetacean watching, were also estimated (see Annex 9 for details). These carrying capacities may need to be adjusted following research on the effect of dragon viewing on these animals' behavior patterns (see sub-component 5.2 below), as the continued presence of well-adjusted dragon populations is crucial to visitor satisfaction as well as for the integrity of the park. The project will support a more in-depth assessment of carrying capacities for an expanded set of tourist activities, as well as other permissible activities such as construction of visitor infrastructure, production of nature films in the park, commercial and subsistence fishing, and extractive use of terrestrial resources in the traditional use zones. These carrying capacity studies will then feed into the design of mechanisms to control the level of certain activities and/or management interventions to increase the carrying capacity of certain sites for certain activities.

- ***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 the tourism zones of KNP, to minimize the adverse effects and plan for the anticipated increase in tourism levels in KNP. These plans will include the following controls:

  - Introducing a bond system for tour operators that covers the cost of repair, salvage, and/or rehabilitation in the event that resource damages occur;
  - Introducing a licensing system to deal with commercial tourism operations (e.g. minimal quality standards for boats/ships/seaplanes, permitted activities, number of tourists, requirements for fee collection, reporting, and codes of conduct);

- Managing scuba diving and snorkeling (e.g. designation of approved dive sites for different skill levels, limiting the number of divers per day at each site, code of conduct for dive operators, and instructions to divers;
- Managing recreational fishing (e.g. designation of permitted areas, allowable species and sizes, bag limits, introduction of 'catch and release' system);
- Managing cetacean watching (e.g. designation of permitted areas and times, types of vessels, numbers of tourists, code of conduct regarding feeding and approach distances);
- Managing turtle watching (e.g. designation of permitted areas and times, numbers of tourists, code of conduct regarding approach distances);
- Managing hiking (e.g. use of designated trails, installation of infrastructure and provision of education and interpretation services);
- Managing dragon watching (as for hiking, plus attention to dragon behavior issues – see sub-component 5.2.

The objective of the licensing system for tour operators is to spread tourism impacts across different sites and throughout the year. This system will be drawn up in close consultation with the local and Bali-based operators and the allocation of licenses will follow an agreed and highly transparent process, to avoid any allegations of favoritism of, or discrimination against, any particular operators. Small-scale, local operators may require some initial assistance to conform to the minimum standards, to enable them to compete on a level playing field with the larger commercial operators. This assistance could take the form of low interest loans, technical support and compliance training.

Education and awareness raising of tourists and tour operators will be an important part of the mitigation efforts. A variety of media will be used to encourage environmentally sensitive behavior among those visiting the park.

This work will link closely with the monitoring of tourism impacts, as described in Component 5 below, including monitoring of the impact on the dragon populations in the park. The project will also support the development of guidelines for tour operators entering the tourism zones of the park. These guidelines will cover, for example, the environmental management of sewage discharge, the appropriate disposal or removal of garbage (pending development of a garbage disposal system in or near the park), the prevention of shoreline erosion, and the maintenance of beaches, coral reefs and other ecosystems. Coral reef damage from anchoring has already been reduced by the installation of mooring buoys at key dive sites in the park. This mooring buoy program will be expanded as part of sub-component 3.2.

Sub-Component 3.2 Achieving Financial Sustainability (US$2.8 million).

This sub-component will seek to increase park revenue, within the limits of carrying capacity, by increasing visitation levels and by increasing the average revenue paid by each visitor. The following activities will be undertaken:

- ***Development and implementation of a tourism marketing strategy.*** The three main elements of the marketing strategy will deal with: (i) positioning KNP as a unique and attractive tourism product; (ii) promoting KNP as such a tourism product; (iii) coordinating with those active in the tourism market of the area. For this work, the project will draw on the tourism marketing experience of JPU, TNC's partner in the JV and a well-established tourism operator with an extensive marketing network. Additional professional expertise will be employed to develop and implement the strategy. Attracting substantially higher numbers of tourists is the bottom line objective of the marketing strategy and associated with this is the diversification of target markets to include not only the backpacker market but also higher-end tourists, including nature lovers, scientific visitors and marine sports enthusiasts. Given the fierce competition among nature-based tourism destinations worldwide, the success of the marketing strategy will depend on the implementation of infrastructure improvements both within the park and in Labuan Bajo, to allow KNP to compare favorably with other destinations in terms of quality and availability of accommodation, ease of access, and general visitor facilities. A key focus of the marketing effort will be the presence of the Komodo dragon, which gives KNP a unique selling point and makes it distinct from other regional and international destinations.

- ***Improving the visitor experience in KNP.*** The poor quality of existing tourism facilities and services in KNP has been identified as a limiting factor for visitor satisfaction, and if visitor levels are to increase as anticipated, significant improvements will be required. The tourism services to be improved include those related to interpretation, guided walks, and the communication skills of park staff (see sub-component 2.1). The tourism facilities most in need of upgrading include systems for access and movement, accommodation facilities, and energy and water supply systems. Sub-concessioning some of these facilities will be considered. An overview of the planned infrastructure development is as follows:

Type	Details	Location	Comments
Systems for Access and Movement	Improved landing facilities (jetties with pontoons to accommodate tidal movements)	• Loh Liang • Loh Buaya (pontoon only)	Existing facilities can only accommodate a small number of vessels and are difficult to access at all tides.
	Mooring buoys	As required to accommodate additional dive boats	Final location subject to detailed use analysis and consultation with the dive industry.
	Track construction and associated infrastructure	• Loh Liang • Loh Buaya	Includes steps, boardwalks, bridges and viewing areas.
	Day use facilities (shelter, tables, paved areas)	• Pink Beach	Required to reduce impacts on unmanaged areas.
Accommodation Facilities	Limited accommodation facilities in association with research facility	• Loh Liang	
	Restaurant, retail and day use facilities	• Loh Liang • Loh Buaya	Sales of food, beverages and merchandise will contribute to park revenue.
Energy and Water Supply Systems	Energy-efficient, low pollution systems	• Loh Liang • Loh Buaya	Alternative technology toilet systems, desalination systems, and power systems have been identified.
Interpretation Facilities	Interpretive Center and Information Boards	• Loh Liang • Loh Buaya	Expand and upgrade existing centers.
	Trail markings	• Loh Liang • Loh Buaya	Caters for better interpretation for larger groups.

- ***Establishment and implementation of an entrance fee and user fee system.*** As authorized in the tourism concession agreement, the JV will increase the park entrance fee and introduce a series of additional user fees. Visitor surveys have shown a willingness to pay within the range projected. Proposed highest levels fees have been proven to be within the acceptable levels middle- and upper level tourists are prepared to pay for good tourism experience. The exact level of entrance fee has yet to be finalized but it is likely to involve an increase from the current Rp20,000 (US$2) for foreigners to Rp200,000 (US$20). This entrance fee will be made up of a US$10 gate fee and a US$10 conservation fee, as provided for in the tourism concession. Additional user fees will be charged for selected activities, including diving, dragon watching, cetacean watching, snorkeling and hiking, resulting in an average fee of US$50/visitor. Discounts will be available for Indonesian nationals visiting the park, as well as children and students. A system of day use permits, weekly passes, and one-year 'membership' subscriptions that include a heavily discounted annual pass will also be considered. Other fees may be targeted at tour operators, including boat, cruise ship and seaplane operators, in the form of licenses and mooring/landing fees. Revenue sharing of the gate fees will be negotiated by the JV and local, provincial and central government. The plan is to ensure that each level of government will receive at least as much as it currently receives in gate fees with some opportunity for growth as tourism numbers increase.

Project Component 4. Incentives for Sustainable Livelihoods (US$2.5 million).

The objective of the *Incentives for Sustainable Livelihood Component* is to provide positive incentives to resource users in and around the park to switch from destructive practices, such as cyanide and blast fishing, to biodiversity-sensitive livelihoods. To achieve this, the component will involve the following elements: (i) scoping of ~~research and development for~~ alternative livelihood schemes based on the sustainable use of marine resources; (ii) providing ~~small~~ community development ~~welfare~~ grants; and (iii) stimulating the local economy through the development of sustainable micro-enterprises.

Sub-Component 4.1 Scoping ~~Research and Development~~ of Alternative Livelihoods (US$1.3 million).

This sub-component will build on TNC's ongoing efforts in developing a range of alternative livelihood schemes (ALS) for small groups of people from target villages in and around the park. The economic and technical viability of these schemes have been tested by implementing pilot programs and providing local people with incentives to participate in these experimental programs. These incentives have generally taken the form of providing free infrastructure and equipment, free training and, in some cases, assistance with marketing. The main ALS programs to date have been pelagic fisheries, seaweed production, and mariculture. The KCMI project will continue to identify, test and demonstrate new alternative livelihood schemes and will also continue expansion of the mariculture program, to test, for example, pearl culture, sea cucumber culture, and sea horse culture.

Sub-Component 4.2 Community Development Grants ~~Fund~~ (US$0.3 million).

This sub-component will establish ~~a~~ Community Development Grants ~~Fund (CDGF)~~ (CDGs), the objectives of which will be to: (i) provide ~~small~~ grants for community-defined projects that address urgent welfare needs; and (ii) demonstrate a clear link between effective park management and immediate, transparent distribution of financial benefits to community stakeholders. The CDG ~~sF~~ will be administered by a committee composed of representative informal and formal community leaders from the target villages. At project start-up, the Board of Directors of the JV, in consultation with communities (through the *Rapat Koordinasi* mechanism) will define the basic criteria for grant selection and the general procedures for administering the grants, including the following parameters and procedures:

Basic Criteria for Grant Selection for Community Development Grants~~Fund~~

Target Recipients:

- community groups in target villages;
- grants should be distributed equitably across the Komodo area;
- grants should be given to groups with the organizational capacity to absorb and manage the funds.

Prohibited Investments:

- activities that negatively impact the park and its surroundings;

Investment Areas:

- grants that complement and leverage existing community activities;
- grants that promote development, employment, conservation or support the mission of KNP;
- grants that include a component of self-help by the recipients (in the form of cash, materials or labor);
- emergency relief can be eligible.

Grant Size:

- small enough to be absorb ed by informal community groups but big enough to make a difference;
- average grant estimated to be between Rp1 million and Rp2 mllion (US$100 to US$200).

General Procedures for Community Development Grants~~Fund~~

- grants should be allocated only once or twice a year, to avoid burdensome administrative procedures;
- *Rapat Koordinasi* can serve as a means for soliciting proposals and identifying grant-making opportunities;
- a Community Development staff member of the JV will be designated as the grants ~~fund~~ administrator. This administrator may solicit proposals from groups, counsel applicants, receive applications, and prepare them for submission to the CDG~~F~~ committee;
- after applications are approved, the ~~fund~~ administrator will keep records, disburse grants ~~funds~~, monitor grant use, and keep the CDGs~~F~~ committee informed;
- the CDG~~F~~ committee will award grants and submit them for review and approval to the JV Board of Directors and PHKA;
- award recipients will be required to designate an individual responsible and accountable for managing award funds;
- Grant allocation will begin in year 2, allowing year 1 for organization of the CDG~~F~~ committee and the development of criteria and procedures.

Sub-Component 4.3 Sustainable Micro-Enterprise Development (US$1.1 million).

This sub-component will seek to stimulate the local economy by:(i) identifying opportunities for small individual family-based businesses; (ii) helping local people to develop these businesses; (iii) financing these businesses with soft loans; and (iv) providing ongoing technical assistance to these businesses. As a first step, the JV will recruit an Enterprise Manager, who will be responsible for: (i) overseeing this sub-component and ensuring comprehensive business planning and analysis for each opportunity; (ii) facilitating and negotiating alliances with sources of complementary enterprise inputs; and (iii) coordinating business enterprise capacity building of key JV staff.

Financing the biodiversity-sensitive enterprises will involve the establishment and implementation of a micro-credit fund to finance local biodiversity-sensitive enterprises. The objective of this Sustainable Enterprise Fund (SEF) is to encourage local households to switch from destructive fishing practices to more sustainable sources of income. The SEF will be available to households living in any of the twenty-three target villages in and around KNP, potentially serving some 10,000 or 11,000 households. Two main client groups for the fund will be: (i) groups of fishermen seeking an alternative to middleman credit; and (ii) individual entrepreneurs in Labuan Bajo seeking financing for tourism related businesses or other urban enterprises. The SEF will be designed primarily with the first client group in mind, given the fact that they comprise the majority of the population, and the difficulties they face in accessing formal credit from other sources. The SEF will therefore include the following elements:

Characteristics of a Fishermen-Friendly Micro-Credit Fund

- credit cycles appropriate to the fishing seasons – from one month for working capital to 12-18 months for investment capital;
- group financi ng to reinforce community organization and serve as an alternative to collateral;
- loan amounts from Rp1,000,000 (US$100) per person (for working capital) to Rp15 million (US$1,500) per group (for investment in new boats and gear);
- technical assistance in organization, training in book-keeping, financial management skills, and accessing marketing information;
- a hands-on, iterative relationship between the credit provider and the credit group; and
- an appropriate approach for each community that is sensitive to power and kinship structures with middlemen.

The JV will operate the SEF through a partnership arrangement with an existing micro-credit provider. Selection of this provider will be based on the following criteria:

Selection Criteria for Micro-Credit Partner for Sustainable Enterprise Fund

- reputation;
- financial sustainability;
- willingness to cooperate with a conservation project and abide by environmental criteria;
- capacity to deliver group-based financing;
- capacity to deliver technical assistance and provide on-the-ground follow-up and support to local groups;
- acceptance of micro-credit provider by communities in the Komodo region;
- willingness to invest capital and resources in the development of a Labuan Bajo office to serve the region; and
- compatibility of objectives and approaches with those of the project.

Two established micro-credit groups have already been identified as possible partners – Bina Swadaya and Tanaoba Lais Manekat. The JV will pursue discussions with these groups to select the most appropriate one to manage the SEF. The JV will then negotiate broad terms of reference with the selected partner, fund a detailed assessment by the partner of the micro-credit market, and negotiate the opening of a branch office in the Labuan Bajo area. Once the SEF is up and running, the JV will contribute to the start-up of the local office and will also make annual capital contributions to increase the credit portfolio. The estimated overhead costs for the SEF are approximately US$50,000 and the fund will be capitalized at US$200,000. The average loan will be in the order of Rp6,000,000 (US$600), corresponding to the average annual income for households in the Komodo area.

The project will also consider assisting local groups to collectivize (by forming, for example, fishing cooperatives, handicraft societies, or industry organizations), in order to capture a larger proportion of the potential revenue from their economic activity. This assistance and advice will be provided on a no-cost basis.

Project Component 5. Monitoring and Evaluation (US$2.0 million).

The objective of the *Monitoring and Evaluation Component* is to continuously assess: (i) the status of key terrestrial and marine resources and ecosystems in KNP; (ii) the impacts of resource use on these resources and ecosystems; and (iii) the performance of the KCMI project as a whole and the quality and effectiveness of park management in fulfilling the conservation and sustainable use objectives for the project. The ultimate goal is to improve park management by informing an adaptive management approach, responsive to the changing threats and opportunities observed in Komodo area, and to strengthen the accountability of those bodies responsible for park management. The project will support research studies, capacity building, and publication and dissemination of the results of monitoring and evaluation.

Sub-Component 5.1 Development and Implementation of a Monitoring and Evaluation Plan (US$0.1 million).

This sub-component will build on the preliminary scoping of a general monitoring and evaluation plan for KCMI that was undertaken during project preparation. This plan makes provision for an annual internal assessment process involving all key stakeholders, supplemented by an external independent assessment by a representative from IUCN's regional network and the Jakarta UNESCO office every three years. The project will finalize these procedures and implement the following supporting activities to facilitate monitoring and evaluation:

- support for the attendance of approximately 30 stakeholders at the annual internal progress review;
- study tour and role definition workshop for representatives of four regional universities;
- provision for two external progress reviews and end-of-project evaluation.

The types of indicators to be used in this general project-wide monitoring could include the following:

Class of Indicator	Preliminary Indicator
Status, effectiveness and sustainability of management structure.	• Approval of tourism concession; • Changes in permanent institutional cooperation; • Shifts in public acceptance of and communication with the JV and the collaborative management approach; • Closer working arrangements between JV partners and CMA parties.
Conservation management capacity: staffing, training, regulations, zoning, and research.	• Changes in capacity and performance of staff; • Existence of legal regulations and zoning plans; • Expansion of research activities.
Tourism management.	• Existence of tourism management strategy; • Changes in tourism infrastructure and marketing; • Improvements in guide and dive boat standards; • Changes in levels and distribution of visitor use and range of tourism activities.
Socio-economic dynamics.	• Changes in local attitudes to KNP and conservation ethics; • Changes in resource use patterns; • Changes in human population in and around KNP; • Changes in proportion of income derived from biodiversity sources.
Alternative livelihoods.	• Existence of seaweed farms, mariculture hatchery and other alternative livelihood schemes; • Operations of Sustainable Enterprise Fund; • Operation of Community Development Grants ~~Fund~~; • Changes in levels of destructive fishing acitivites; • Changes in economic base of local communities.
Regulatory system: legislation, policy, enforcement.	• Changes in the levels of illegal activities; • Enforcement of fisheries regulations; • Trends in surveillance and convictions.
Finance and budgets.	• Functioning of the sustainable financing strategy; • Changes in funds available for park management; • Changes in direct benefits to local people; • Shifts in revenue allocation and external support.

Sub-Component 5.2 Biological and Resource Use Monitoring (US$1.3 million).

This sub-component will include the following activities:

- ***Marine resource and ecosystem monitoring.*** As detailed in the 25-year management plan for KNP, the following marine resources and ecosystems will be monitored:
  - *Coral reefs*: including changes in the percentages of live hard coral, dead hard coral, soft coral and other (rock, sand, sponges, tunicates, algae, weeds, anemones, clams, etc.) and changes in the extent of coral bleaching.
  - *Grouper and Napoleon wrasse spawning aggregation sites*: including changes in the populations of twelve key species of the Serranidae (groupers) and Labridae (wrasses), as indicators of the impact of fisheries on fish stocks. Monitoring will also identify spawning locations, seasons and behavior for key species.
  - *Cetaceans*: including seasonal patterns in cetacean distribution and abundance, the location of preferred feeding grounds, and the presence of mating and calving locations, and migration corridors.
  - *Seagrass beds*: including cover, species abundance and diversity, mortality, recruitment, and growth rates.

- ***Terrestrial resource and ecosystem monitoring.*** With support from the Zoological Society of San Diego, a systematic monitoring program for terrestrial monitoring will be developed. Terrestrial animal populations to be monitored will include juvenile dragons (their arboreal nature necessitates a separate monitoring effort), adult dragons, deer, water buffalo, horses, pigs, turtles and scrubfowl. A range of terrestrial habitats will also be monitored, including the overall distribution and size of the mangrove forest, savanna, monsoon forest, and quasi-cloud forest. In particular, succession of savanna to forest needs to be monitored, as the dragon's prey species are dependent on the presence of savanna.

- ***Marine resource use monitoring.*** The project will continue the ongoing marine resource use monitoring program, the objective of which is to determine which community groups are involved in which fishing activities, and where and when they fish. This will show any changes in the behavior of fishermen due to management measures. All non-bagan fishing vessels and groups encountered during routine patrols will be monitored to identify, for example: the number of fishermen involved, the type of fishing gear, the quantity, quality and species composition of the catch, and the origin of the fishing vessel or group.

- ***Monitoring of tourism and tourism impacts.*** This monitoring will provide critical information to the implementation of the Tourism Management strategy, the objective of which is to stimulate *controlled change* in visitor numbers and profile. The variables to be monitored include:
  - *Visitor use:* including visitor origins, group size, length of stay, number of visits to park, type of accommodation used, and commercial tour destinations and visitor numbers.
  - *Biophysical impacts:* including coral damage, human-dragon interactions (see below), environmental management of visitor infrastructure, trail damage and weed infestation, water quality at heavily used sites, and general levels of pollution and litter.
  - *Socio-economic impacts:* including tourist expenditure, contact with host communities, occupation of host community members, and attitudes and perceptions of host communities.

- ***Dragon monitoring.*** Since Komodo National Park's recognition as a World Heritage Site and much of its future tourism success relate to the protection of Komodo dragons, the health of the population of this charismatic species is a key concern. Monitoring dragon response to visitors will provide much-needed information for the management of dragon viewing activities and the design of a management regime for this species. The variables to be monitored include:

Monitoring Dragon Response to Visitors:
Variables to be Measured at Viewing Areas.

- Habitat type where animal was sighted;
- Time of year (breeding season);
- Sex of animal(s);
- Age of animal(s);
- Number of animals if a group is involved;
- Distance to animal when spotted;
- Duration of encounter with animal;
- Number of tourists present when animal was sighted;
- Behavior of tourists;
- Initial behavior of the animal when spotted, before it reacted to the tourist party;
- Response to animal to the tourist party;
- Behavior of the animal when the animal stopped interacting with the tourist party;
- Distance the animal was displaced in reaction to the tourist party.

Sub-Component 5.3 Collaborative Management Monitoring and Evaluation (US$0.4 million).

This sub-component will consist of the following activities:

- ***Reviewing the performance of key institutional structures.*** The quality of the interactions between the key stakeholder groups and the effectiveness of their collaboration will be monitored as part of the annual internal assessment process, and will also be a component of the regular external reviews. This monitoring will cover the quality and effectiveness of the following bodies and communication channels: (i) the JV (TNC and JPU); (ii) the Collaborative Management Agreement (JV, PHKA, and the Bupati); the Community Development Grants ~~Fund~~ committee (community representatives); the Sustainable Enterprise Fund partnership (JV and the micro-credit provider); the Community Coordination Forum (*Rapat Koordinasi*) and the interactions of the JV with the tourism operators (Komodo Marine Tourism Association and the local branch of the Indonesian Tourism Association). The monitoring of each of these groups and communication mechanisms will include assessments of:

- the satisfaction of the individual partners in the relationship;
- the balance of power within the relationship;
- the regularity and productivity of their meetings; and
- the public perception of the group/mechanism.

- ***Assessing management effectiveness.*** The monitoring of the Joint Venture and Collaborative Management Agreement will also include assessments of the effectiveness of these bodies in managing the park. The project will make use of the "Framew ork for Assessing the Management of Protected Areas", published by the World Commission on Protected Areas (WCPA) (Hockings et al, 2000). An initial baseline assessment was undertaken by a TNC representative during project preparation and this assessment will be finalized and repeated as part of the annual internal monitoring process. The baseline assessment is detailed in Annex 10.

Sub-Component 5.4 Reporting and Certification (US$0.2 million).

This sub-component will include the following activities:

- ***Annual 'State of the Park' report.*** Following the annual internal assessment, as part of sub-component 5.1, a 'State of the Park' report will be produced by the PHKA, JV and local government and disseminated to key groups, including GEF, IFC, UNESCO, and IUCN. A summary in *Bahasa Indonesia* will also be produced and disseminated nationally and to the local stakeholder groups.

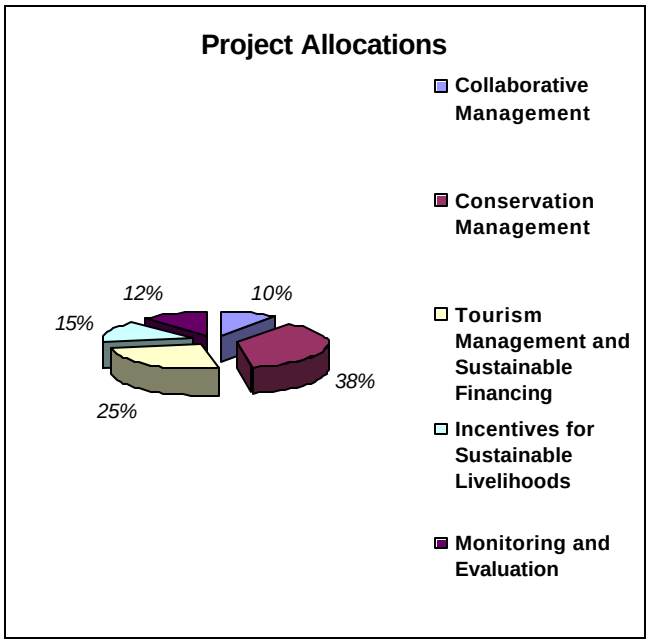
- ***External validation of project assessment and management effectiveness.*** The two three-yearly independent reviews by IUCN and UNESCO and the end-of-project evaluation, under sub-component 5.1, will serve to verify the internal assessments and highlight any areas of concern not picked up by the internal assessments.

Annex 3.
KCMI Estimated Project Costs

It should be noted that the budget presented below is intended as a general indication of major cost items for the project, and should not be regarded as fixed. Some changes in the costs of the different components will be likely, as the project responds to the changing threats to KNP and its resources.

KCMI Project Budget for 7 years

				Project Components					
				Collaborative Management	**Conservation Management**	**Tourism Management**	**Sustainable Livelihoods**	**Monitoring & Evaluation**	**Total**
Component Allocations				0.1	0.375	0.25	0.15	0.125	
OPERATING COSTS									
Salaries	unit		annual cost						
	senior mgt	40000	120000	84000	315000	210000	126000	105000	
	middle mgt	36000	180000	126000	472500	315000	189000	157500	
	junior mgt	12000	120000	84000	315000	210000	126000	105000	
	senior ranger	6000	150000	105000	393750	262500	157500	131250	
	rangers	3000	300000	210000	787500	525000	315000	262500	
	admin&tech	6000	120000	84000	315000	210000	126000	105000	
	Subtotal		990000	693000	2598750	1732500	1039500	866250	6930000
Travel			145000	101500	380625	253750	152250	126875	1015000
Equipment			50000	35000	131250	87500	52500	43750	350000
Supplies			537000	375900	1409625	939750	563850	469875	3759000
Contractual services			65000	45500	170625	113750	68250	56875	455000
Communications			85000	59500	223125	148750	89250	74375	595000
Fees, Insurance, & Charges			78000	54600	204750	136500	81900	68250	546000
Occupancy			20000	14000	52500	35000	21000	17500	140000
Training and other			30000	21000	78750	52500	31500	26250	210000
Total Operational			2000000	1400000	5250000	3500000	2100000	1750000	14000000
STARTUP COSTS									
Travel			29000	2900	10875	7250	4350	3625	29000
Equipment			375000	37500	140625	93750	56250	46875	375000
Supplies			477000	47700	178875	119250	71550	59625	477000
Contractual services			145000	14500	54375	36250	21750	18125	145000
Construction			450000	45000	168750	112500	67500	56250	450000
Communications			32000	3200	12000	8000	4800	4000	32000
Fees, Insurance, & Charges			83000	8300	31125	20750	12450	10375	83000
Occupancy			4000	400	1500	1000	600	500	4000
Training and other			155000	15500	58125	38750	23250	19375	155000
Subtotal			1750000	175000	656250	437500	262500	218750	1750000
Carrying capacity studies			500000		250000	250000			500000
Enterprise Fund Startup			250000				250000		250000
Total Startup			2500000	175000	906250	687500	512500	218750	2500000
TOTAL OPER. & STARTUP				1575000	6156250	4187500	2612500	1968750	16500000


Project Allocations
Collaborative Management
Conservation Management
Tourism Management and Sustainable Financing
Incentives for Sustainable Livelihoods
Monitoring and Evaluation
12%
10%
15%
38%
25%

Annex 4
Incremental Cost Analysis

Context and Broad Development Goals

The establishment of protected areas, including national parks, is an important component of Indonesia's conservation strategy. However, the majority of national parks established to date have been terrestrial, and resource management has generally focused on land-based activities. Marine national parks have only recently begun to receive the attention they deserve. Komodo National Park is both a terrestrial and marine reserve, as it covers 132,000 hectares of ocean and 41,000 hectares of island and coastline. The park is considered one of Indonesia's richest coral areas and contains one of the world's richest fish fauna, as well as being home to the Komodo dragon, *Varanus komodoensis*. Terrestrial ecosystems in the park include open grass-woodland savanna, tropical deciduous forest and quasi cloud forest, and the marine ecosystems include seagrass beds, coral reefs and mangroves. The approximately 3,000 people living within the park boundaries are largely reliant on pelagic fishing for their livelihoods.

The present situation in KNP is characterized by reduced but continuing destructive fishing practices (bombing and cyanide fishing), primarily by non-park inhabitants, and high pressure on demersal stocks such as lobster, shellfish, grouper and Napoleon wrasse. The uncontrolled development of tourism activities also poses an emerging threat to the park. While GOI has shown a strong commitment to conserving its biodiversity resources, institutional weaknesses in the park authority (PHKA) have been a major hindrance to the effective management of the country's protected areas, including KNP.

Since 1996, The Nature Conservancy (TNC) has supported the PHKA in the management of KNP, including the strengthening of enforcement measures to reduce destructive fishing practices, the promotion of alternative livelihood programs, capacity building for local communities and, for the last five years, the development of a 25-year Management Plan for the park. The Management Plan sets out four objectives for the park:

- Establish a terrestrial and marine reserve in KNP which fully protects the natural communities, species, and the terrestrial and marine ecosystems;
- Ensure the long-term survival of the Komodo dragon and maintain the quality of its habitat;
- Use the park's resources in a sustainable way, for tourism, education, and research;
- Protect the stocks of exploited reef fish and invertebrates in the reserve, thereby creating a source of recruits to enhance fisheries on fishing grounds in and around KNP.

Baseline Scenario[1]

Scope and Costs. Under the baseline scenario, the annual investment by GOI in KNP would continue to be in the order of US$116,000, the majority of which would be spent on the 107 park staff salaries. This baseline level of financing would obviously rule out a comprehensive implementation of the 25-year Management Plan for KNP. The without project scenario would most likely be limited to trying tackle the most immediate concerns, in this case maintaining a minimum enforcement presence to limit destructive fishing practices. However, the inevitable infrequency of patrols and the lack of adequate equipment would make this effort of very limited effectiveness. A continuation of some additional activities, such as the alternative livelihoods program, would also be envisaged, albeit at a severely reduced level.

[1] A key assumption of the ICA is that the baseline scenario excludes any international support for GOI in the management of KNP. Thus, TNC support for PHKA is not included in the without project baseline, in order to fully separate this baseline from the with project scenario, where TNC will play a major role.

The baseline scenario is described here under the six components of the proposed project, for ease of comparison with the GEF alternative scenario.

(a) **Collaborative Management Agreement:** would not be established and PHKA would be the sole institution responsible for park management.

(b) **Conservation Management:** would be greatly restricted by lack of funds. Enforcement would operate at a minimum level and the development of regulations would be unlikely, in the absence of the necessary skills and resources. Baseline costs for this component are estimated at US$487,000.

(c) **Tourism Management and Sustainable Financing:** would not be developed in the without project scenario, although the new fiscal claims of the local governments on a share of KNP revenue would need to be met.

(d) **Incentives for Sustainable Livelihoods:** would be restricted, under the baseline scenario, to the development of one or two alternative livelihood schemes that require little in the way of capital investment or technical training. The most likely programs to be implemented would therefore be, for example, employment as unskilled labor in development activities, or handicraft or other opportunities associated with tourism. However the number of households able to make their living from these income sources would be quite limited. The baseline costs for this component are estimated at US$162,000.

(e) **Monitoring and Evaluation:** PHKA would likely limit monitoring activities to the basic necessities of, for example, monitoring the status of the Komodo dragon populations and the coral and fish stocks. This monitoring would necessarily be of a rather approximate nature, due to limited resources. The baseline costs for this component are estimated at US$162,000.

Domestic and Global Benefits. The baseline scenario represents a minimal level of protection and management of the biological resources of KNP, and a low-level investment in community development (through a partial implementation of the alternative livelihood program). Domestic benefits would therefore be limited, as households living in and around KNP would see no significant increase in average incomes. In addition, the lack of resources to upgrade the tourism facilities in the park would make it difficult to warrant an increase in the park entrance fee, which in turn would rule out achievement of the self-financing goal.

The global benefits would be even more limited, as the severely constrained baseline efforts of PHKA would make very little impact on the anthropogenic pressures on the park's globally significant natural resources. Destructive fishing practices and other unsustainable activities would continue in the absence of any significant positive or negative incentives for behavior change.

The baseline scenario would therefore leave the critical conservation-related needs of the park unmet, would fail to counter the major threats to the park's biodiversity, and would result in only a slowing down of the impending ecosystem degradation and species loss.

Global Environmental Objectives

The global environmental objective of the GEF Alternative is to conserve and sustainably use the unique biodiversity assets of Komodo National Park. Given the global significance of the park as a marine reserve and home of the Komodo dragon, and the severe anthropogenic pressures facing the park's biodiversity, there is an urgent need to bolster the very limited baseline capacity to conserve these threatened resources.

GEF Alternative

Scope and Costs: Under the GEF alternative, the GOI would be able to undertake a much more comprehensive and effective program to ensure the conservation and sustainable use of the biodiversity in KNP, based on the implementation of the 25 year Management Plan for the park. This would include the following components:

(a) a **collaborative management structure** that combines the strengths of an international conservation NGO, a local private sector tourism company, PHKA and local government in close collaboration with local communities and other stakeholders, to manage the park in an effective and accountable manner (US$1,600,000);

(b) strengthened and adaptive **conservation management**, to ensure the conservation of globally significant biodiversity (US$6,200,000);

(c) a coherent strategy to ensure conservation goals are fully incorporated into **tourism development** plans in the area to mitigate against any adverse environmental impacts of tourism activities within the park, and to establish an appropriate **entrance and user fee system** to cover the costs of park management (US$4,200,000);

(d) a comprehensive implementation of the **incentives for sustainable livelihoods** programs to encourage a significant number of households to switch to conservation-enhancing livelihoods and to stimulate development of a local economy based on sustainable resource use (US$2,500,000);

(e) a **monitoring and evaluation** program that enables the project to respond to changing threats to the park's biodiversity, and to make park management more accountable (US$2,000,000).

Benefits. Implementation of the GEF Alternative would secure a more effective and long-term protection of globally significant marine and terrestrial biodiversity. Domestic benefits generated by the project would include:

- institutional strengthening of PHKA;
- improved and more collaborative management of KNP;
- sustainable tourism development in and around the park;
- empowerment of local communities to enable them to participate in, and benefit from, biodiversity and tourism management; and
- achievement of the self-financing goal for KNP.

Global benefits of the GEF Alternative would include:

- sustained and intensified protection of currently-threatened species and ecosystems;
- generation of an innovative model for park management and financing, replicable elsewhere; and
- attitudinal shifts among stakeholders at all levels regarding the value of biodiversity and their responsibility to conserve and sustainably use the natural resources of the region.

Incremental Costs.

Incremental Expenditures. The total expenditure under the Baseline Scenario is estimated to be US$812,000 while the total expenditure under the GEF Alternative is estimated to be US$16,500,000. The incremental expenditures under the GEF Alternative are therefore US$15,688,000.

Incremental Costs. The incremental expenditures are partially offset by an incremental domestic benefit of US$8,755,000. This benefit would not have been realized in the Baseline Scenario and is primarily associated with entrance fees captured by the park, plus associated user fees, other sources of park revenue, and consumer surplus. The net result is that the incremental cost of the base case GEF Alternative is US$6,933,000. Sensitivity analyses show that the incremental costs would be lower at higher levels of visitation, as follows:

- 38,000 visitor cap: US$5.734 million Incremental Cost
- 43,000 visitor cap: US$4.803 million Incremental Cost
- 48,000 visitor cap: US$3.739 million Incremental Cost

It is on this basis that GEF assistance of US$5 million is requested.

Cost Effectiveness. An intervention of US$6.933 million translates to a transfer of US$808/km^2/yr for protection of the total area of KNP. A GEF intervention of US$5 million corresponds to a transfer of US$583/km^2/yr. Typical conservation expenditures around the world reflect international interventions corresponding to approximately US$25/km^2/yr to US$2,500/km^2/yr of protection. This initiative therefore provides an opportunity to implement relatively efficient conservation expenditures.

Incremental Cost Matrix

Component	Cost Category	Cost ('US$000)	Domestic Benefit	Global Benefit
a) Collaborative Management	Baseline	0.00		
	GEF Alternative	1,600	Strengthened institutional framework for park management; More participatory, accountable structure, with increased role for local stakeholders.	Replicable model for privatizing and democratizing park management elsewhere.
b) Conservation Management	Baseline	487	Minimal level of management of KNP possible.	Some degree of protection of some elements of the park's biodiversity.
	GEF Alternative	6,200	Major improvements in park management; Expanded capacity of PHKA staff; Development of a well-equipped and coordinated enforcement network, covering both marine and terrestrial regulations.	Sustained and intensified protection and management of more species and ecosystems in the park; Contribution to international efforts to stop blast and poison fishing;
c) Tourism Management and Sustainable Financing	Baseline	0.00		
	GEF Alternative	4,200	Sustainable increases in visitor levels; Trend towards higher-end tourists; Empowerment of local communities to capture a larger share of tourism revenues.	Countering tourism-generated threats to the park's biodiversity.
d) Incentives for Sustainable Livelihoods	Baseline	162	Provision of some additional sources of income for some households.	Some degree of success in countering destructive fishing practices.
	GEF Alternative	2,500	Introduction of legal and sustainable sources of income. Further development of alternative income sources; Empowerment of local communities; Demonstration of potential economic benefits of biodiversity-sensitive enterprises.	Reduction in destructive fishing practices. Protection of previously-exploited biodiversity resources; Attitudinal shift among local communities and local governments regarding the value of biodiversity.
e) Monitoring and Evaluation	Baseline	162	Minimal level of resource monitoring.	
	GEF Alternative	2,000	Comprehensive monitoring of resources and levels and impacts of resource use; Strengthened accountability of park management bodies.	Facilitation of adaptive management – more secure protection of park resources.
Sub-totals	Baseline	812		
	GEF Alternative	16,500		
	Incremental Expenditures	15,688		
Domestic Benefit Adjustments	Captured Benefits - Park	6,711	[includes captured fees by park (5536) plus other revenue (1175)]	
	Captured Benefits - Govt	1,006	[includes GOI share of fees (1384) less fees that would be received in baseline (378)]	
	Other Benefits	1,038	Consumer surplus of domestic visitors	
Incremental Cost Calculation	Incremental Expenditures	15,688		
	Benefit Adjustments	8,755		
	Incremental Costs	6,933		

Annex 5
STAP Roster Technical Review

IFC comments upon the STAP review of the KCMI –
Komodo Collaborative Management Initiative

The STAP reviewer has made many excellent comments, which will certainly be taken into account as we prepare for implementation of this project, although we do n ot feel that they require any amendment of the project brief as submitted.

We thank the Reviewer for the reference to the Auffenberg publication, and will ensure that it is consulted in development of the species management aspects of the project.

WE recognize the concern of the Reviewer as to anticipated levels of tourism. This has been identified in the project development process and is addressed as a significant risk within the brief. We will be adopting all possible strategies to minimize our risk in this regard.

STAP TECHNICAL REVIEW
PROJECT TITLE: KOMODO COLLABORATIVE MANAGEMENT INITIATIVE, REPUBLIC OF INDONESIA

Reviewed by
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KEY ISSUES

1. **Scientific and technical soundness of the project.**
This project has been developed over several years and is based on a very detailed assessment of the situation on the ground. The lists of species are comprehensive, including some new records of marine species. However, it was surprising that the document contained no reference to the classic book on the Komodo dragon, namely Auffenberg, Walter. 1981. **The Behavioral Ecology of the Komodo Monitor.** University of Florida, Gainesville. 406 pp. This book contains considerable relevant information about the most important species for the project.

The research component of the project is relatively modest, except for the proposed monitoring programme. The project will also need to pay attention to the problem of managing invasive alien species of plants and animals. This is particularly challenging in that the main prey species for the Komodo dragon, such as wild pig, horses, and perhaps even deer, are introduced by humans; and important predators on young Komodo dragons are also introduced by people (cats and dogs).

Regarding technical soundness of the project, the project clearly has been designed by a capable team that has been able to identify well the key issues requiring attention. It is particularly encouraging to see the significant participation of the Nature Conservancy (TNC), a leading manager of conservation lands. Their proposed adaptive management approach has proven effective elsewhere.

2. **Global environmental benefits/drawbacks.**
This project will help conserve the world's largest terrestrial lizard species, which is confined to the project area (plus a small portion of the island of Flores, mostly along the coast, and not within any existing protected areas). The project will also protect significant marine resources, though marine conservation efforts have proven more difficult in Indonesia because of the challenges of patrolling.

3. **How project fits within GEF goals.**
The project fits within Operational Programme 2 (coastal, marine, and freshwater ecosystems). It is designed to address several of the provisions of the Convention on Biological Diversity, particularly in terms of Article 7 (identification and monitoring) and Article 8 (*in situ* conservation). Through involving the private sector, it also addresses Article 10b.

4. **Regional context.**
The project area is in the center of Indonesia, a megadiversity country. While the terrestrial fauna is relatively modest, as is to be expected from an island group of this size, the diversity of fish species is remarkably high at both regional and global levels.

Indonesia's National Strategy for Sustainable Development, published by the State Ministry for Environment in 1997 includes the following priority activities related to protected areas:

- Developing a regional conservation programme to integrate protected area conservation and management activities with regional development, including NGOs and local communities and including traditional protection patterns within the programme.
- Decentralizing authority and intrusting the local government, communities, and NGOs with greater authority in the management of protected areas.
- Increasing the scope of participation of communities, local government, and NGOs in the management of protected areas by establishing pilot projects in certain areas.

The Komodo project would appear to fit very well within these criteria. The decentralization of protected area management remains challenging, but this project will be helpful in showing some useful approaches.

5. **Replicability of the project.**
The project is an ideal opportunity to test the feasibility of the idea of "conservation concessions", where the government is essentially assigning responsibility for a major protected area to a non-governmental entity in return for specified benefits. The project has an extremely high level of support among relevant Indonesian government officials, which may open opportunities for replication elsewhere in Indonesia and indeed elsewhere in the tropics. It is perhaps worth noting that Gunung Leuser National Park, in Sumatra, was an earlier example of a conservation concession, under which the Leuser International Foundation was granted in 1995 a 7-year renewable exclusive conservation concession for nearly 1.8 million hectares, with financing including a European Union grant in the amount of US$ 40.6 million. Such examples may well indicate ways of moving ahead elsewhere in the world.

6. **Sustainability of the project.**
The project is receiving a substantial investment from TNC which, together with the proposed GEF investment, is designed to enable the park to become self-financing by the end of the project. This depends on a reasonable flow of tourists, which the project document identifies clearly as a risk. Recent events have indicated the volatility of the tourism market, not just for Komodo; but given a modest level of expectation of global stability, Indonesian tourism would appear reasonably likely to prosper if not flourish. In any case, the activities designed under this project will provide the greatest

reasonable probability of improved management of the protected area in the long term. The improved fishing techniques will provide immediately perceivable benefits to the local communities, irrespective of tourism income.

SECONDARY ISSUES

1. **Linkages to other focal areas.**
   This project falls clearly within the Biodiversity Focal Area of the GEF. While climate change may lead to some change in sea level and fire regime, and conceivably even to ocean currents, such impacts are likely to be relatively modest. Healthy coral reefs will continue to sequester carbon, but no estimate of this effect has been made.

2. **Linkages to other programmes.**
   In addition to the major related projects mentioned in section 2 of the project rationale, Komodo is a World Heritage Site, declared in 1991. Therefore, the United Nations Foundation Project on World Heritage Sites may also have an interest in this project. The project document could have given more emphasis to the World Heritage status of the project area. Komodo is also a Biosphere Reserve, a factor which also receives inadequate attention. As a Biosphere Reserve, Komodo is liked with UNESCO's Man and the Biosphere Programme, which promotes international scientific cooperation dealing with the interactions between people and the environment in all parts of the world. Biosphere reserves provide for the protection of indigenous genetic resources, plant and animal species, ecosystems, and landscapes of value for the conservation of the world's biological diversity; promote the goals of conservation and sustainable use of resources through close cooperation with local communities and taking full advantage of traditional knowledge, indigenous products and appropriate land management; and provide facilities for research, monitoring, education, and training. Considerable scope for cooperation with UNESCO would seem promising under this project.

   The project would also contribute to the so-called "Jakarta Mandate" a programme of work on conservation of marine biodiversity established by the second Conference of Parties of the Convention on Biological Diversity.

3. **Other beneficial or damaging environmental effects.**
   The project identifies the levels of tourism that would lead to potentially damaging effects in the protected area. However, such levels of tourism appear unlikely to be attained.

4. **Degree of involvement of stakeholders in the project.**
   The project has been very effective in identifying key stakeholders, and specifically in engaging an Indonesian private sector entity as a project partner. Because this entity, P.T. Jaytasha Putrindo Utama, an Indonesian eco-tourism company, has a significant financial interest in the project, it is likely to remain deeply involved. The significant involvement of the local government in this contract is especially important. Many of the local villagers are already involved in tourism and would welcome some order in the industry.

5. **Capacity building aspects.**
The project will use primarily government staff, but given the significant levels of management input under the project, it can reasonably be expected that the skills of the Indonesian staff will be enhanced through the project. To the extent that the trained officers will then be promoted to work elsewhere in Indonesia, the entire protected area system of the country may be enhanced.

6. **Innovativness of the project.**
As indicated above, this project is an outstanding opportunity to test the innovation of a "conservation concession" under somewhat different conditions than have been attempted elsewhere. The significant investment made by a major international NGO (TNC) and the involvement of a significant private sector entity at the national level, are of major interest as an innovation into the management of biodiversity with global implications. The project has the potential of becoming a demonstration project to be replicated, at least in approach much more widely.

One major challenge remains access for tourists, given the somewhat dubious quality of some of the local boats. But this is a sound project and worthy of GEF support.

Signed, Jeffrey A. McNeely

1 October 2001

Annex 6.
Economic Analysis

A detailed economic analysis was carried out during project preparation in order to: (i) review economic policy and related initiatives that will affect KNP management; (ii) prepare a benefit cost analysis of conservation initiatives; (iii) assess the financial sustainability of the park under likely revenue collection scenarios; (iv) assess the economic viability of alternative income generation opportunities in local villages; and (v) identify incremental costs consistent with definitions of the Global Environmental Facility (GEF).[2]

Conservation Benefits and Alternative Livelihoods

The economic analysis investigated a range of conservation benefits, including the maintenance of sustainable livelihoods from alternative income sources, and also identified some foregone benefits through interrupting current (mostly unsustainable) activities. In addition to assessing the net benefits associated with the sustainable resource use under alternative livelihoods, the functional benefits of conservation address: net recreational benefits; benefits of a demersal fishery spawning function; and biodiversity benefits of system resilience under conditions of global climate change. The analysis does not include numerical estimates of erosion control.

The scope of the alternative income sources addresses a number of potential activities: mariculture, seaweed culture, pelagic fisheries, pearl farming, handicraft, habitat restoration (employment with park), employment in unskilled labor in development activities, and direct opportunities associated with tourism. As a basis for comparison, the economics of some 'unsustainable' practices are also presented. These unsustainable activities are expected to yield declining returns in future years as the coral reef ecosystem is destroyed. Analyses are conducted on a consistent basis and consider the general economic feasibility of these alternatives.

Alternative Livelihood Benefits

Conservation of habitats in Komodo National Park will produce both direct and indirect benefits. From the perspective of local populations, the most obvious benefits are those related to the development of alternative livelihood opportunities connected to functioning ecosystems. At present, local populations remain relatively impoverished because the resource quality is degraded, and greater efforts must be spent to obtain cash income or food from the marine area. Although damage caused by cyanide or blast fishing is destructive and receives great attention, most of these destructive practices are undertaken by "non-resident" populations; persistent degradation through such methods has undermined reef quality and has made it harder for local populations to make a living from methods that may otherwise be sustainable.

In identifying potentially available alternative livelihoods, there is a need to differentiate between two issues: economic efficiency; and, economic equity. The efficiency issues essentially address the question: "Is the value of the production greater than the cost of production?" Answering "Yes" to this implies that there is some positive value associated with the activity. The equity or distributional issue addresses the question of how this value is divided. From the standpoint of economic equity, there are frequent local complaints that the prevailing income distribution is in some way unfair. A simple structural analysis of many local activities would support this: in many instances, numerous sellers are facing only one or two buyers (so-called "middlemen"). In other instances, scale issues make it difficult to compete with off-island producers; wood-carvers in Bali, for example, are equally adept at carving dragons as carvers in Komodo, and the Balinese carvers enjoy a locational advantage for marketing end-products. This situation cannot be regulated away, nor are incentive structures readily constructed and implemented to remedy this situation. The most successful potential mechanism for addressing this problem is to encourage appropriate forms of "collectivization" among resource users and harvesters; this may take the form of formal community cooperatives organized around existing social structures, or simple marketing protocols that promote locally produced goods.

[2] See Ruitenbeek and Cartier, 2001 for details of the full economic analysis.

From an efficiency perspective, the analyses show that a wide range of alternatives may potentially generate viable and sustainable livelihoods for local populations. Keeping in mind that average per capita income is about $123 a year in Kecamatan Komodo, specific activities that generate in excess of $1000 a year would be capable of supporting a single household. All of the sustainable activities evaluated in this study – mariculture, pelagic fishing, seaweed farming, handicraft carving – pass this threshold. Culturally the most promising are those that require relatively simple extension inputs and are not prone to potential increases in factor costs (e.g., projected fuel price increases). From this perspective, seaweed farming is likely to see the most rapid uptake. But this analysis does not advocate that management try to pick the most efficient alternative; the current strategy – which involves demonstrating, testing and supporting pilot projects of a wide range of alternatives – is the most appropriate in a dynamic system. At this stage, such diversification is an appropriate strategy and it is likely to remain so until such time as livelihoods have shifted to sustainable practices. The economics of the main alternative livelihood schemes are summarized below.

Activity	Sustainability*	Extent*	Key Economic Issues and Risks	Net Income $/person/yr
Cyanide fishing	L	M	Illegal and lethal	720
Small pelagics	H	H	Few	1 080
Blast fishing	L	M	Illegal and lethal	1 140
Seaweed Culture	H	L	Skills, markets	1 200
Pelagic fishery	H	M	Capital	1 680
Mariculture	M	L	Skills	1 800
Handicrafts	H	L	Markets, skills, competition	4 080
Pearl Farming (Mabe)	M	L	Markets, skills, capital	4 964

*L=Low; M= Moderate; H=High

Illegal activities – such as blast fishing and cyanide fishing – currently being undertaken by those living in and around the park, generate substantial short-term returns albeit at high personal risks and lasting damage to the area's ecosystem. Yields for these activities are typically in excess of about $1000/person/year.

The new opportunities that are intended to replace or substitute for these activities provide comparable or somewhat higher levels of income. Although, with the exception of some specialized areas such as pearl culture, the income levels are not likely to make anybody fantastically wealthy. From a planning perspective, this is an important point. If the economic analyses demonstrated that exceedingly large income levels were available through any of these means, then it is likely that these activities would be proceeding apace in any event. In this instance, it therefore shows that the role of policy interventions is to assist in removing any technical barriers that might exist for these activities. Providing support for modest levels of skill enhancement, extension, or capital (for FADs, for example) is thus appropriate.

Direct Recreation and Tourism Benefits

For the purpose of this analysis, the recreational benefits that accrue to the project are those directly captured by various economic instruments. First, park fees paid by tourists are regarded as incremental benefits. Second, a lower bound to the consumer surplus is included for domestic visitors; this lower bound is taken as the difference between the domestic and foreign visitor charges (i.e., it is assumed that they derive the same enjoyment that foreign visitors do, but are charged less). No consumer surplus value is attributed to foreigners as they fall outside of the national scope of this analysis. Third, the incremental visitors are assumed to generate some modest additional revenues to the park from sales of consumer items. The net benefit at a visitor level of 33,000 visitors a year corresponds to monetized recreation benefits of US$2.4 million annually from direct fees and taxes, and US$0.3 million annually from domestic consumer surplus.

Indirect Benefits of Fishery Function (Spawning Aggregation)

There is a growing literature in scientific quarters on the importance of spawning aggregation sites to a regional fishery. Protecting such sites could have far-ranging effects; work on the Nassau Grouper in the Caribbean, for example, shows that the species migrates in excess of 100 kilometers to spawn, and that only a handful of such sites remain intact. As noted in the management plan for Komodo, there is some evidence that spawning aggregations also occur in Komodo, and research is on-going on the linkages this might have to a broader regional fishery. At this time, little is known about the complex dynamics of spawning aggregations in Komodo. Moreover, no economic analyses of the value of this function have been conducted elsewhere in the world, hence no formal methodology has been developed for treating this potentially important value.

Upon the advice and request of TNC, a valuation method was therefore researched and developed for this particular study site. International experts in the field were consulted, a literature survey was conducted, and data from the FAO, Bima and Ruteng fisheries departments were used to construct an estimate for this value. Because of the uncertainties involved in some of the linkages and the basic fishery data reliability, a simple model was developed for the demersal fishery in the park area. In the case of KNP, the maximum value of the spawning function is calculated to be US$629,000 annually at 100% protection of the spawning sites.

Benefits Associated with Bioprospecting and System Resilience

Scientific studies suggest that areas such as KNP will be of greater economic importance in the future because of their inherent resilience to global climate change. In the case of KNP, this resilience is associated with the cold water upwellings; coral bleaching, for example, has been negligible in KNP. A preliminary economic analysis of this function attributes incremental resilience value of US$788,000 (Present Value terms) to this function.

Local Development Priorities

The findings of the economic analysis show the potential complementarity between tourism development and general economic development. For some time, GOI local government has been supportive of the concept of the so-called 'Komodo Gateway', entailing improvements in the economic infrastructure in the Labuan Bajo area. The objective of such a development plan is to promote Labuan Bajo as a gateway to Komodo and the rest of Flores, and the financial capability of local government to contribute to such development is improving with decentralization. These investments in basic infrastructure would benefit most directly the local people, while also servicing the needs of tourists and mitigating potentially negative impacts of tourism. Studies by the World Travel and Tourism Council, for example, suggest that tourists use two to four times the amount of water and energy as local populations and generate a commensurately larger volume of waste. It should be noted that, while the project will clearly benefit from the planned improvements in infrastructure, the success of the project does not depend on complete and timely investment therein. The improvements would benefit the project but none are crucial. Infrastructure improvement requirements in the areas of sanitation, transport and water supply are expected to be of the order of US$9.28 million over the next 7-10 years, for the following (government funded) investments:

Sector	Current Status	Planned Investments	Investment (US$ MM)	Komodo Park Implications
Water Supply, Sanitation, Solid Waste & Resource Recovery	10 km of serviced mainline pipe.	13 km of drainage rehabilitation.	$1.25	Improved tourism asset. Potentially higher operating costs.
Drainage	4 km of drainage cleared 1991-98.	13 km of drainage rehabilitation.	$1.43	Improved tourism asset.
Roads	16 km of roads improved 1991-98.	37 km of road rehabilitation.	>$0.5	Improved tourism asset.
Airport Infrastructure	Accommodates cargo and passengers. Commercial services must connect via Bima; no fuel for non-stop services.	Runway extensions and improvements, terminal upgrading and fuel storage requirements.	>$3.0	Accommodate non-stop jet traffic.
Port Infrastructure (Upgrade)	Port is self-financing and generates >Rp10 million monthly.	Minor upgrading of reception areas for higher volumes.	$0.1	Accommodate fast ferry and higher passenger numbers.
Port Infrastructure (New)	Selected feasibility studies completed.	Passenger terminal, cargo and fishery landing area.	$3.0	Accommodate fast ferry and higher passenger numbers. Decrease cargo costs. Provides improved fishery marketing and storage.
		TOTAL	>$9.28	

Benefit Cost Analysis (BCA)

The BCA was conducted using accepted procedures. A cash flow summary of project costs and benefits is presented below.

Benefit Cost Analysis Cash Flows (thousand US$)

Year	Direct Costs	Lost Income	New Income	Direct Recreation	Consumer Surplus	NSB
2001	-	-	-	-	-	-
2002	3 000	(192)	85	385	54	(2 668)
2003	2 750	(192)	170	540	75	(2 157)
2004	2 750	(192)	255	740	99	(1 848)
2005	2 000	(192)	340	970	126	(756)
2006	2 000	(192)	425	1 280	162	(325)
2007	2 000	(192)	510	1 800	225	343
2008	2 000	(192)	595	2 380	297	1 080
2009	2 000	(192)	680	2 380	297	1 165
2010	2 000	(192)	765	2 380	297	1 250
2011	2 000	(192)	850	2 380	297	1 335
2012	2 000	-	850	2 380	297	1 527
2013	2 000	-	850	2 380	297	1 527
2014 -36	2 000	-	850	2 380	297	1 527
Undiscounted:						
7 Yr ->	(16 500)	(1 344)	2 380	8 095	1 038	6 331
Discounted:						
5%	(33 361)	(1 412)	10 192	30 029	3 771	9 218
10%	(19 437)	(1 073)	4 948	14 921	1 882	1 241
15%	(13 185)	(838)	2 807	8 643	1 095	(1 478)

All benefit and cost streams are presented in real 2001 US$. Discounting is conducted at annual real discount rates of 5%, 10% and 15%, consistent with economic analysis procedures for projects in

Indonesia. Discounting is conducted to 2001 as base year; we treat the 10% discount rate as the base case.

The project is assumed to start in 2002 for a seven-year period, with benefits and costs continuing thereafter at no substantial real increase or decrease. The time horizon for project evaluation is set to 35 years.

Alternative income generating schemes are assumed to take hold incrementally over a 10-year period until the entire "in-park" population is benefiting from them. After year 10, the new income will amount to $850,000 per year, which represents a substantial improvement in local economic activity.

In the absence of this project, it is assumed that the following reference conditions would hold:

Tariffs would remain at current levels and some level of park management would exist that was revenue neutral. In effect, in this reference case, no net recreational benefits would accrue as the costs of service provision were offset by the captured benefits. The reference case net recreational benefit is therefore nil, permitting the base case to treat actual benefits and costs as incremental benefits and costs for the purposes of benefit cost analysis.

Some level of non-sustainable activities would persist, generating benefits to local populations. For analytical purposes, this income stream is treated as a cost in the base case benefit cost analysis to represent foregone income when improved park management occurs. It consists of annual net incomes of $60 per person per year to inhabitants in the park for a period of 10 years. After this 10-year period, it is assumed that the income stream would no longer be available because of degradation of the resource. It is this income stream that is replaced by new alternative livelihoods.

In conducting this analysis, a number of conservative conventions were followed that have a tendency to depress the potential benefit streams. In other words, the actual project efficiency is likely to be somewhat greater than that represented here. Specifically,

- long term project revenues were assumed to stay fixed after seven years, with a cap of 33,000 visitors annually. However, considerable scope may exist for increasing fee levels or relaxing this cap after a seven year monitoring period that provides better insights into carrying capacity.
- the base case analysis conservatively estimates incremental incomes to be $150 per capita inside the park and $25 per capita outside the park. This is consistent with modest regional growth according to current GDP statistics. In some instances, it is likely that higher values will be achieved but one could argue that, if such high levels of income were indeed available then individuals would have pursued them in any event without the interventions included in this project. These values thus represent a best judgement of what might reasonably be attributed to this conservation project.
- the estimates provide a lower bound treatment of consumer surplus associated with recreation. Domestic consumer surplus is taken as the value between the actual gate receipts and the value that foreigners would be willing to pay. This ignores some potential consumer surplus among domestic users beyond the higher choke point in the demand function. Also, the analysis assumes that no additional consumer surplus is captured from foreigners, although it is quite likely that some may be captured if a voluntary donation system is implemented (e.g., around "annual memberships").
- the base case estimates exclude an off-site fishery support function (e.g., spawning aggregation function). Sensitivity analyses suggest that they would add US$3,660,000 present value benefits to the project.

Annex 7.

Business Plan for Putri Naga Komodo
A Joint Venture Company for Promoting Conservation and Tourism
in Komodo National Park

1. Legal structure

A joint venture company, Putri Naga Komodo, will be formed to establish a corporate structure to manage a tourism concession for Komodo National Park and to engage in collaborative park management with the government of Indonesia. The joint venture will have two shareholders, The Nature Conservancy (TNC) and Jaytasha Putrindo Utama (JPU), a local Indonesian company. Since 1995, TNC has been assisting the national park authority with conservation activities in the park and has helped design the park's recently adopted 25-year master plan. TNC also has sponsored alternative livelihood projects in nearby communities to encourage the adoption of conservation enhancing economic activities. JPU has successfully established environmentally focused resorts in Indonesia under the name "Alam Resorts Indonesia" and is the largest tourism investor in the Komodo area. JPU has been a strong supporter of conservation efforts in the park and is actively involved in national and international tourism networks.

The JV will determine the most appropriate administrative arrangements for project implementation, based on its ongoing negotiations with PHKA and local government. Hence, some of the details presented below may change and evolve during the early stages of the project.

The shares of the joint venture company will be distributed as 60% TNC and 40% JPU. The Articles of Association and the JV agreement will stipulate that the JV will not provide any financial returns to its shareholders. The JV will be run as a business and seek to make a profit. All net profits will be reinvested in activities that further the mission of the JV. TNC will benefit from the JV by no longer needing to fund raise for its conservation activities in the park. The profitability of JPU's other tourism businesses in the area will be enhanced by the improved protection and attractiveness of the park.

Under Indonesian law, the Board of Commissioners is the controlling body for any company. The Board of Commissioners for Putri Naga shall be appointed from 3 candidates nominated by TNC and 2 candidates nominated by JPU. The Board of Commissioners will have the authority and responsibility to supervise and oversee the activities of the Board of Directors (the company's management team). The Board of Directors shall consist of at least 6 people: the President Director (Chief Executive Officer), the Deputy Director (Chief Operating Officer), the Financial and Administration Director, the Tourism/Marketing Director, the Community Development Director and the Conservation Director (see attached organizational chart). All Directors will have appropriate professional credentials.

The JV will base most of its operations in Labuan Bajo, the current location of the park headquarters and the TNC Komodo field office. In addition, the JV will have an office in Bali to handle international marketing activities.

2. Mission and objectives

The mission of the JV is to (i) enhance the conservation of KNP's biodiversity; (ii) achieve financial sustainability for the park through the sustainable use of its resources; and (iii) ensure that local communities and other stakeholders share in the benefits generated by the park. Specific objectives of the JV are:

1. to promote Komodo as an international nature tourism destination;

2. to implement a self-financing plan for the park through a system of user fees;

3. to strengthen the capacity of the national park authority to do conservation management and enforcement through a collaborative management agreement;

4. to stimulate the development of an environmentally sustainable local economy.

3. Modus operandi

The JV will enter into a tourism concession agreement and collaborative management agreement with the government of Indonesia. The tourism concession will include the lease of the two entrances to KNP, Loh Liang and Loh Buaya. The concession will contract to the JV the authority to set and collect gate fees, to establish and implement capacity limits, and to institute a tourism licensing system. The collaborative management agreement of the JV, the park authority, and the local government will establish mechanisms to improve conservation management, facilitate monitoring and enforcement, and implement sustainable livelihood activities.

4. Competitive environment

Tourism is one of the most dynamic sectors of the world economy. Over the past 50 years, global tourism has maintained an average growth rate of 7% per year. While Europe and North America dominate worldwide tourism arrivals, East Asia and Pacific are gaining market share. Despite a weak Asian economy and political unrest, the Asian Pacific region experienced an 11% growth in visitors in 1999. Among the different types of tourism, nature based tourism is one of the fastest growing types. This was reflected in the 1990s when tourism arrivals at Komodo more than doubled. While political and economic instability have significantly reduced visitation from the peak level achieved in 1997, the park remains a popular destination for international tourists. With improvements in infrastructure within the park and surrounding area, Komodo should be able to compete effectively with leading international nature tourism destinations such as Galapagos, Hawaii, Great Barrier Reef, Costa Rica, and Nepal.

5. Tourism Strategy

The JV will focus its tourism development activities on building Komodo as an international destination. This will include a media campaign, participation in international tourism industry venues, and working with the wholesalers who put together tour packages. Currently, most visitors to Komodo are independent budget tourists from Europe spending one or two days in the park staying at homestays and using local vessels chartered opportunistically. Over time, the profile of the visitor will change to more upmarket tourists from Europe, Australia, and North America, coming to Komodo on packaged tours for dragon watching and/or scuba diving. In addition the cruise industry, which previously accounted for nearly one half of the annual visitors, will be encouraged to return to Komodo. Given the somewhat ephemeral nature of the cruise ship market, the JV will not place undue emphasis on this sector.

Currently there are 17 basic hotels and home stays providing 250 rooms in the Labuan Bajo gateway to Komodo. There is one 3 star hotel providing 20 rooms, and construction is expected to begin soon on a new 3 star hotel with 30-40 rooms (owned by JPU). The JV will support market entry at a variety of levels to increase the number and quality of accommodations in the area.

6. Financial strategy

The JV will take on financial responsibility for the conservation, economic development, and tourism management activities of the park. Enforcement activities will remain the responsibility of the park

authority. Operational costs are expected to average $2,000,0000 per year. Investment costs will be $1,000,000 in year 1, $750,000 in year 2 and $750,000 in year 3. These costs include boats, vehicles, training, carrying capacity studies, and capitalization of a small business enterprise fund.

The JV will have $50,000 of initial capital provided by TNC. TNC will transfer its Komodo field assets (boats, vehicles, and office equipment) to the JV. The Global Environment Facility will provide additional startup costs. Initially, the JV will depend on GEF and TNC funding to cover most of its costs. JPU will make a modest necessary founding contribution, and in the start up phase the critical input from this private sector partner will be the business skills and experience, and specific knowledge and experience in the tourism sector. These skills and experience will be critical to the development and implementation of the tourism development strategy. Over the life of the project, gate fees and other revenues are expected to gradually increase until a break-even level is achieved in year 7. Note that the $184,000 net cash flow in year 7 is approximately the same as the final year GEF payment ($200,000). (See attached table.) The revenue projections assume tourist numbers will increase from 18,000 in the first year to 33,000 in year 7. This is a conservative scenario 33,000 visitors came to the park in 1997 with the existing infrastructure and with virtually no international marketing. A more optimistic assumption of 48,000 visitors by year 7 would increase annual net cash flow to $904,000.

The JV will negotiate the revenue sharing arrangements with local, provincial, and national government. The exact percentages have yet to be finalized but the plan is to ensure that each level of government will receive at least as much as it currently receives in gate fees with some opportunity for growth as tourism numbers increase.

JV Cash Flow for Years 1-7

000 dollars

Year	1	2	3	4	5	6	7	**Totals**
Initial Costs	1000	750	750	0	0	0	0	2500
Operational costs	2000	2000	2000	2000	2000	2000	2000	14000
Total uses	3000	2750	2750	2000	2000	2000	2000	16500
GEF funds	1500	1250	750	500	500	300	200	5000
TNC funds	1000	1000	1000	800	600	400	0	4800
net user fees	288	400	528	672	864	1200	1584	5536
other revenue	25	40	80	130	200	300	400	1175
Total sources	2813	2690	2358	2102	2164	2200	2184	16511
NET (' 000 dollars)	-187	-60	-392	102	164	200	184	11
# visitors	18000	20000	22000	24000	27000	30000	33000	
user fees per tourist	$20	$25	$30	$35	$40	$50	$60	

Notes:

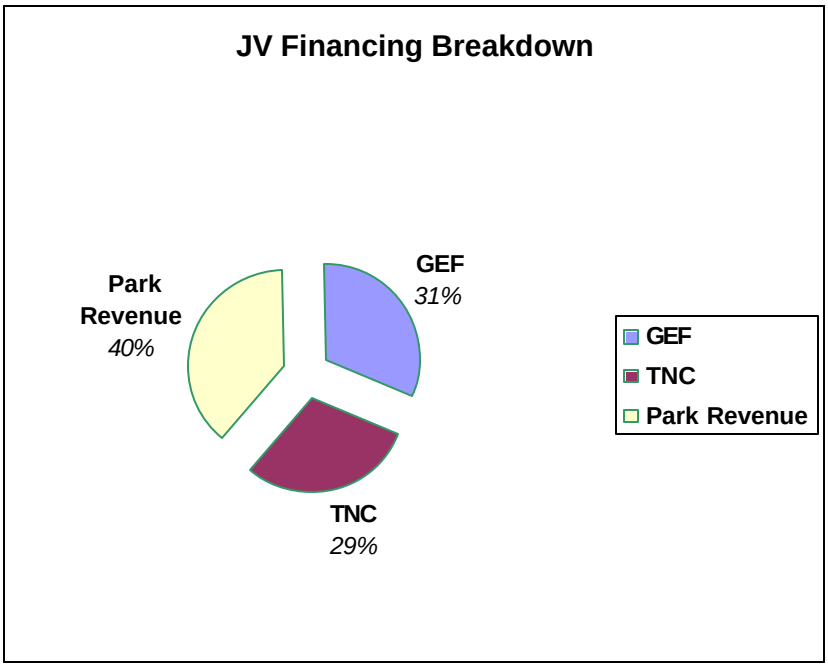
Initial costs include 500K for carrying capacity studies and 250K for enterprise fund startup

TNC funds include 1000K from San Diego Zoo

Net gate fees are 80% of total (balance distributed to 3 levels of government)

Other revenue includes restaurant and merchandise sales at visitor center and research fees

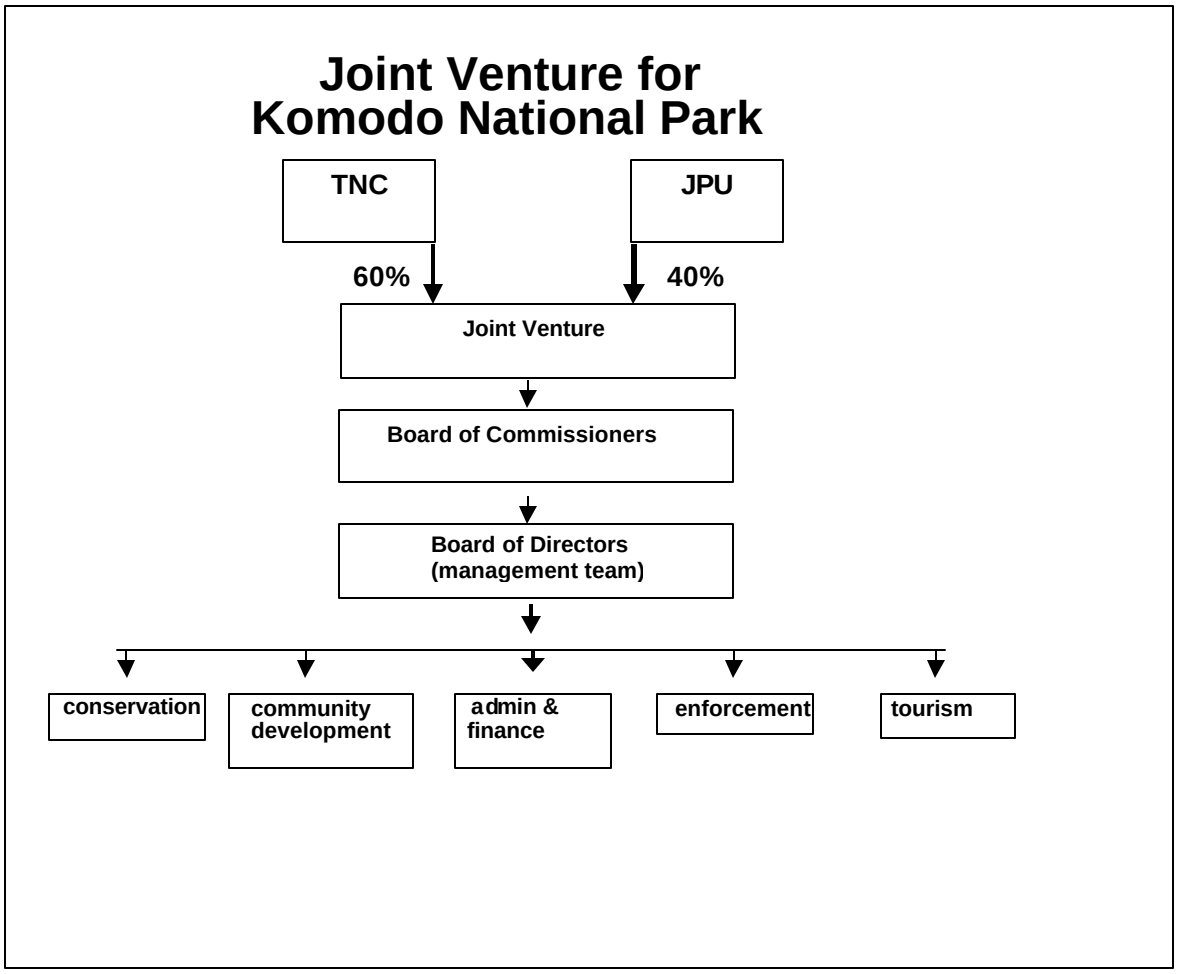
User fees are a weighted average for international and domestic visitors with latter being 10% of total



7. Risk analysis

The JV faces three types of potential risks. First, revenues may not materialize as projected. This could be due to a slower than expected rate of growth in the number of tourists due to competition from other tourist destinations, a global economic downturn, or global or regional political instability. In addition, if private sector development of lodging in the gateway area does not materialize, the JV may not be able to increase fees as rapidly as suggested. Second, costs may be higher than expected due to rising fuel or labor costs. Third, the JV faces political risk if its tourism concession is cancelled or modified by future governments.

A mid-project review of the JV's performance will reassess costs and revenues. If the cash flow projections have not been achieved, costs could be reduced or the revenue sharing agreement with government could be renegotiated. Furthermore, adjustments in the marketing strategy could be made to increase the number of visitor arrivals.


Joint Venture for
Komodo National Park
TNC
JPU
60%
40%
Joint Venture
Board of Commissioners
Board of Directors
(management team)
conservation
community development
admin & finance
enforcement
tourism

Annex 8.
Stakeholder Analysis and Participation Strategy

Stakeholder Analysis

An analysis of the key stakeholder groups, their interests and the likely impacts of the project on these groups are summarized in the table overleaf. TNC and PHKA have already undertaken some detailed socio-economic survey and stakeholder analysis work as part of their ongoing programs in KNP and as preparation for the KCMI project. One output of this work has been the identification of resource use patterns in the main target villages. This analysis, presented below, shows that many villages in the Komodo area still depend on the unsustainable use of marine resources, and some are also involved in the depletion of terrestrial resources.

Villages	Types of activities	Main stakeholders
Bajo Pulo	Blasting, cyanide fishing, hookah compressor. Center of activities coordination and marketing line.	Outside/local trader; Local/outside fishers
Bugis	Blasting, cyanide fishing, hookah compressor. Center of activities coordination and marketing line.	Local fishers; outside/local trader
Mesa	Blasting, cyanide fishing, hookah compressor	Local fishers, local trader
Simpasai, Kaleo	Deer poaching, bush fire, illegal wood collection	Locals
Soro	Transportation for deer poaching parties	Outside/local trader; Local/outside fishers
Seraya, Kaleo	Base for preparing blasting, cyanide, hookah compressor, trawling, long line. Base for outside fishers from South Sulawesi, East NT, Sape, Lombok and other areas.	Outside/local trader; Local/outside fishers
Labuan Bajo	Center of activities (planning, provision of material, marketing), pollution. Other endangered species market: giant clam, turtle, shark fins.	Outside/local trader; Local/outside fishers
Pasir Panjang, Pasir Putih, Komodo, Papagarang	'Bubu' traps, blasting, expansion of settlements, mangrove cutting.	Outside/local trader; Local/outside fishers

The participatory mechanisms employed by PHKA and TNC during project preparation are summarized in the brief under the Participatory Approach section (Section 9 of Part E). The planning of further participatory mechanisms to be used during project implementation is outlined in the Stakeholder Participation Strategy Table at the end of this annex.

KOMODO NATIONAL PARK COLLABORATIVE MANAGEMENT INITIATIVE

STAKEHOLDER ANALYSIS

PRIMARY STAKEHOLDER GROUPS

1. LOCAL COMMUNITY STAKEHOLDERS

Stakeholder Group	Current Position	Interests	Likely Project Impacts on the Stakeholder Group
Local fishermen	Heavily dependent on income from fishing – no real alternatives; Many fishermen engaged in destructive fishing practices.	Continued access to fish stocks; Exclusive fishing rights in KNP waters; Financially-attractive alternatives to destructive fishing practices.	Clamp down on destructive fishing practices will negatively affect local fishermen's income, but their participation in altemative livelihood schemes and the exclusion of outside fishing crews from KNP will provide a more secure income base for this group. Average net change in incomes is likely to be positive.
Middlemen traders/moneylenders	Currently exert a tight control on local fishermen and fishing economy of KNP, by fixing low prices and charging very high interest rates on credit.	Maintain current privileged social and economic status.	The project will break the cycle of dependence of the fishermen on this group and establish a more equitable, less paternalistic relationship between these two groups; The participation of the middlemen as shareholders in the mariculture program will allow them to maintain their status in the community, and will make good use of their marketing skills and experience.
Women	A vulnerable group – largely reliant on their husband's fishing income.	Secure household income and access to some independent source of income.	The project is developing alternative income-generating activities for women, such as new fish processing for the local tourist market.

2. INSTITUTIONAL STAKEHOLDERS

Stakeholder Group	Current Position	Interests	Likely Project Impacts on the Stakeholder Group
PHKA: • National level • Local office	National PHKA: poor reputation and weak institutional position; Local PHKA: unable to fulfil its park management responsibilities due to institutional and financial weaknesses.	National PHKA: enhanced reputation of KNP as well-managed self-financing park; Local PHKA: continued role in park management.	National PHKA: positive improvements in PHKA status if can show KNP as success; Local PHKA: park management role maintained in collaborative management arrangement with JV and local government.
TNC	Heavily invested in KNP; currently the major funder of park management activities.	Involvement of TNC in JV and as concession holder breaks new ground for the organization – its reputation is on the line.	Gains international recognition as an innovator if project succeeds.
Regional Governments	Recently given new powers and responsibilities for development planning and revenue sharing.	Increased tax revenues and employment; sustainable development; maintenance of fish stocks to support fisheries around the park.	The project will increase park revenue and, thereby, the revenue available to the district governments; the newly developing power dynamics between the two provincial and district governments involved will be sharpened as KNP becomes important income source.

3. PRIVATE SECTOR STAKEHOLDERS

Stakeholder Group	Current Position	Interests	Likely Project Impacts on the Stakeholder Group
Tourism industry: • Local hotels, homestays, restaurants; • New hotel owners from outside; • Cruise ships, sea safari ships, small tourist boats and ferries; • Dive operators.	Have seen sharp decline in tourism levels, now expecting a recovery; reliant on KNP as a major tourist attraction in the area.	High tourism volume; (Tour operators – continued access to KNP); Improved tourism facilities and services in the park.	Tourism levels likely to increase but project will place controls on visitor numbers and activities – tour operators may see their business restricted by the project: those who do not comply with the environmental requirements will lose access to KNP; the level and structuring of gate fees will affect the visitor profile (local/international; low/high-end) and therefore the client base of the operators.
JPU	Local tourism company, TNC's partner in the JV and co-holder of the concession.	JPU has a major stake in the project; its interests are: improved tourism and conservation management; increased visitor levels; and a higher-end clientele.	Gains high profile as private sector partner in park management. Also enhances its business reputation if the concession proves financially successful.
Live reef fish companies	Obtaining large financial gains from destructive fishing practices around KNP waters; Involving local fishermen in their operations.	Continued access to these resources.	Strengthened enforcement will severely reduce these operations, and should eliminate them completely after several years; No project benefits foreseen for this stakeholder group

SECONDARY STAKEHOLDER GROUPS

Stakeholder Group	Current Position	Interests	Likely Project Impacts on the Stakeholder Group
Fishermen from neighboring islands	Fishing in KNP waters.	Continued access to KNP fishing grounds, with little regard for sustainability.	The project is seeking legal means of excluding these fishermen from KNP; this will reduce their income and/or force them to travel farther to other fishing grounds.
Local NGOs	Currently very few, all quite weak.	Most of the local NGOs operating on Komodo are primarily focussed on social and health issues.	The project will help establish new local NGOs, including a fishing coop and an organized network of village-level conservation cadres.
Government Ministries	Ten sectoral Ministries plus various government agencies are involved in KNP, making coordination very difficult.	Sectoral objectives, sometimes conflicting with each other or with the conservation goals of the project.	The project will attempt to resolve the major conflicts of interest and will support intersectoral coordination.
Law Enforcement Agencies: • Police • Coast Guard • Navy	Involved in enforcement of marine regulations.	Support for their work in controlling destructive fishing practices and poaching.	The project will strengthen these agencies by supporting, equipping and expanding the enforcement network; the project will also result in an increased workload for these groups.
Scientific Community	Several Indonesian and international research institutions are currently involved in, or are proposing to become involved in, the project.	Access to the unique resources and processes of the park.	The project will give these groups opportunities to pursue their research interests, while trying to ensure that the studies are of some practical use for park management planning.

Stakeholder Participation Strategy

Stakeholder Groups	Project Components	Level of Participation[3]	Mechanisms of Participation
Local communities	Collaborative Management	Consultation	Collaborative management approach will involve consultation with local communities via the Community Coordination Forum (*Rapat Koordinasi*).
		Collaboration	Local communities will be encouraged to participate in practical conservation activities, as part of the community awareness program.
	Conservation Management	Information-sharing	Local fishermen and boat owners will be clearly informed about new regulations and enforcement regimes.
		Collaboration	Local conservation cadres will help socialize the new regulations with local members will communities.
	Tourism Management and Sustainable Financing	Collaboration	Participation of a growing number of local people in tourism businesses (homestays, restaurants, etc.)
	Incentives for Sustainable Livelihoods	Collaboration	Participation of local men and women in the alternative livelihood schemes, as beneficiaries of the Sustainable Enterprise Fund, and in the community-based committee managing the Community Development Grant~~s Fund~~.
		Empowerment	Supporting locally-owned enterprises and community-defined welfare projects.
	Monitoring and Evaluation	Collaboration	Local communities will be involved in annual participatory project-wide assessments.
Private Sector	Collaborative Management	Consultation	Local and Bali-based operators will be consulted via monthly meetings with KMTA and HPI Manggarai.
		Collaboration	Participation of local tourism company (JPU) in the Joint Venture.
	Tourism Management and Sustainable Financing	Collaboration	Involvement of tour operators, transport providers, hotel owners, and beachfront developers in development of a tourism management strategy. Project is also consulting with tour and dive operators in the selection of appropriate entrance fees and user fees.
	Monitoring and Evaluation	Collaboration	Tour and hotel operators and other businesses involved in the project will be invited to participate in annual internal project-wide assessments.
Park Authority (PHKA)	Collaborative Management	Collaboration	Collaboration of PHKA with the JV and local government in the Collaborative Management Agreement
	Conservation Management	Collaboration	PHKA staff will play key role in park management.
		Empowerment	Capacity building of local PHKA staff.
	Tourism Management and Sustainable Financing	Collaboration	PHKA will collaborate with JV and local government in tourism management and in setting and implementing new fee structure for park.

[3] Levels of participation range from *information-sharing*, *consultation*, and *joint assessment*, where the focus is on learning and information, to the more participatory *shared decision-making, collaboration*, and *empowerment*, where stakeholders can actually influence and share control over project activities and benefits. See World Bank, The World Bank and Participation, Operations Policy Department, September 1994.

	Incentives for Sustainable Livelihoods	Collaboration	Involvement of PHKA staff in the development of alternative livelihood schemes.
	Monitoring and Evaluation	Collaboration	PHKA will be involved in annual internal project-wide assessment, and in continuous biological and resource use monitoring.
NGOs	Incentives for Sustainable Livelihoods	Collaboration	A local micro-credit NGO will be involved in the development and operation of the Sustainable Enterprise Fund.
Local government	Collaborative Management	Collaboration	Bupati of Manggarai will for part of tri-partite Collaborative Management Agreement, with JV and PHKA.
	Conservation Management	Collaboration	Local governments' collaboration vital to success of this component, particularly for enforcement.
	Tourism Management and Sustainable Financing	Shared decision-making	Local government will be involved in discussions leading to development of tourism management strategy, and in negotiations for revenue sharing.
		Collaboration	Local government will collaborate with PHKA and JV in setting controls on tourism development and in tourism impact on KNP.
		Empowerment	Local government to receive a share of tourism revenue from the park.
	Monitoring and Evaluation	Collaboration	Local government will participate in annual internal assessments of the project.
Other government bodies			
Navy	Conservation Management	Collaboration	Involvement of the enforcement branch of the Navy in the development of regulation and enforcement regimes; collaboration in implementation
District Fisheries Office	Conservation Management	Shared decision-making	Agreement required to exclude KNP waters from fishing licenses granted by Fisheries Office
Local police	Conservation Management	Collaboration	Involvement of police in development of regulation and enforcement regimes; collaboration in implementation
Port authorities	Tourism Management and Sustainable Financing	Collaboration	Involvement of port authorities in the development to a tourism management strategy
Legislative bodies	Conservation Management	Shared decision-making	These bodies to provide advice and help develop appropriate new regulations
Other Stakeholders			
Non-local small-scale fishing crews	Conservation Management	Information sharing	These crews will be clearly informed of the new regulations and enforcement regimes
Universities and research institutions	Conservation Management	Collaboration	Involvement of such institutions in research to support conservation management activities.
	Monitoring and Evaluation	Collaboration	Involvement of these institutions in the biodiversity monitoring activities (e.g. San Diego zoo)

Annex 9.
Assessment of Tourism Market and Carrying Capacity for KNP

Tourism Market Assessment

Current Visitor Levels and Trends

Recent trends in KNP visitor numbers are summarized in tabular form below. These figures should be considered approximate, though reasonable, estimates of use. The significant trends to note include:

- peak visitation to KNP occurred in the year 1996/97 at 32,174 people and has since declined to less than half that number;
- between 86 and 93% of the visitors are from overseas, with Europe the most important service market, with a total of 50% of all visitors;
- industry sources suggest that the sudden drop in visitation between 1996 and 1998 was not a reflection of the tourism product, but rather a result of tourist perceptions of safety issues in Indonesia, and the cessation of a large cruise ship service to Komodo;
- the market sector most affected by the downturn has been the cruise ship industry, and current visitation is dominated by free and independent (backpackers);
- the current visitor profile is greatly influenced by access to the area (limited and often unreliable), and the type of accommodation available locally (mostly budget level);
- however, new air and marine services are being introduced, and there are signs that high end tourism, on live aboard boats, is emerging as a major element in the market;
- barriers to further growth of the high end market include poor municipal infrastructure in the Labuan Bajo area (including a lack of communication infrastructure and frequent electricity blackouts) and health concerns (malaria and dengue fever are rampant in the area, and a cholera outbreak in March 2001 hospitalized 100 and claimed four lives).

Registered Visitors

	1995/96	*1996/97*	*1997/98*	*1998/99*	*1999/2000*	*2000/01*	*2001/02*
April	2 273	2 037	2 343	2 078	1 440	829	1127
May	2 292	2 182	2 346	1 724	1 351	715	861
June	1 986	2 142	2 016	1 295	1 047	845	1009
July	2 657	2 984	2 776	2 154	1 697	1 282	1874
August	4 040	4 267	4 351	3 330	3 065	2 197	n.a.
September	2 835	2 910	3 169	2 478	1 516	1 314	n.a.
October	2 428	2 994	3 026	1 861	1 387	1 119	
November	2 181	2 465	2 443	1 605	981	1 550	
December	1 337	1 848	1 494	1 175	967	562	
January	2 560	2 662	2 353	1 284	1 277	1 171	
February	2 503	3 185	2 302	1 924	367	616	
March	1 938	2 498	2 192	1 160	464	1295	
Total	29 030	32 174	30 811	22 068	15 559	12 200	
Foreign	26 967	30 304	28 098	19 338	13 491	10 955	
Foreign Share (%)	92.89	94.19	91.19	87.63	86.71	89.80	

Observed Tourism Impacts in KNP

Biophysical Impacts

In terms of immediate priorities, destructive fishing practices, over-harvesting and poaching are the major threats to the natural resources of KNP. It is therefore understandable that little scientific evidence of the (lesser) impacts of tourism is available. While it appears generally true that there is no evidence of major tourism-related biophysical impacts under current levels and types of use, some emerging impacts have been observed and these are summarized below.

Nature of Impact	Locations	Source of Information	Management Actions
Anchor damage to coral	Pink Beach and possibly other popular diving and snorkeling sites.	• TNC staff • Goodwin et al, 1997 • PDF B tourism study team observations	Mooring buoys have been installed at 25 locations in and around KNP
Changed behavior of Komodo dragons	Feeding of, and scavenging by dragons has disrupted natural behavior. This is particularly evident around ranger stations at Loh Liang and Loh Buaya.	• Claudio Ciofi (pers com to tourism study team) • PDF B tourism study team observations	Feeding of dragons at observation point at Bau Nggulung was stopped in 1994.
Trail erosion and obstruction	There is evidence of trail erosion along the park's most heavily used trail leading to Banu Nggulung. There are instances where the path has been blocked by fallen trees leading to path diversion and widening.	• Goodwin et al, 1997. • PDF B tourism study team observations	Bridges have been built over two gullies but general levels of trail maintenance and site hardening are low.
Weed dispersal	The walking trails on Rinca island suffer from localized areas of heavy weed infestation, notably prickly pear and a common herbaceous weed.	• PDF B tourism study team observations	There are no weed control programs in place.

Socio-Cultural Impacts

In 1996, one of the PDF B tourism study team members (Bill Carter) visited KNP and prepared an eco-tourism strategy for the park (Carter et al, 1996), at a time when approximately 30,000 visitors arrived each year. Despite a decline in annual visitation levels to around 15,000, some socio-cultural and occupational changes were observed by the tourism study team in 2001, comparing the current situation to that seen in 1996. These changes include:

- the number of local community members selling art and craft at Loh Liang has (apparently) doubled;
- sellers now promote their wares by boat to anchored tourist vessels;
- individual members in the local communities are making a reasonable living from art and craft manufacture;
- additional beach cabin style accommodation in the buffer zone has been developed by local entrepreneurs to service a backpacker market;
- small retail tourist businesses have been established in Labuan Bajo;
- up-market accommodation has been developed near, but not in, Labuan Bajo;
- the efforts of The Nature Conservancy are changing the livelihoods of some community members;
- use of banned fishing methods appears to be declining rapidly;
- accommodation quality and associated services at Labuan Bajo has declined; and
- tourism (dive and charter boat) services have increased.

Equally, a number of other socio-cultural indicators appear *not* to have changed:

- fishing remains the principal livelihood for local community members;
- local capital to invest in tourism development is low;
- the population of in-park communities appears to be still increasing;
- in-park communities appear to remain tolerant of and friendly to tourist visitors, presenting a village community cultural experience for visitors;
- commercial opportunities from these visits are still not well exploited;
- basic reliable and effective public utilities of power, potable water and waste disposal remain unavailable in village communities and in Labuan Bajo; and
- Labuan Bajo appears to be largely unaffected by tourism in terms of its development and the behavior of residents.

Implications for Tourism Carrying Capacity

It appears that the residents of Labuan Bajo and villages within KNP are largely:

- unaffected by the existing level of tourism; and
- not gaining the benefits of tourism (e.g. employment, improved social infrastructure, economic inflows, improved education).

However, despite the downturn in pre-1996 visitation figures, and the absence of community infrastructure:

- some community members have responded to the tourist potential of the area by modifying their livelihoods to meet an expected demand for goods and services, and
- external (to the region) entrepreneurs are responding with investments in tourism infrastructure and services.

Implications for Tourism Management

Taking into account the current impacts of visitation, and the overarching goal of the project – to conserve and sustainably use the biodiversity assets of KNP – the management of planned visitation should ensure that tourism:

- does not place at risk the natural values of KNP;
- provides quality visitor experiences involving opportunities to learn about and better understand the natural and cultural settings of the park and its surroundings;
- does not place at risk the cultural values and practices of local communities;
- provides real economic and social benefits to local communities; and
- generates a net income stream that is sufficient to adequately manage KNP.

Carrying Capacity Assessment

The definition of carrying capacity used for the purpose of this analysis is:

> "the maximum intensity of use that a tourism site can sustain without undergoing unacceptable physical or biological deterioration and without causing appreciable impairment of the tourist experience or cultural wellbeing of host communities at a given level of management."

Assessment of the carrying capacity of KNP was undertaken using a combination of a threshold approach and an impact assessment approach, and carrying capacity was considered

for a sample of terrestrial and marine tourist activities that currently occur or could potentially occur within the park. The activities considered are: diving and snorkeling, game fishing, cetacean (whale and dolphin) watching, turtle viewing, reef walking, bush walking, and dragon watching. The range and distribution of potential sites for these activities are summarized below.

Activity	Number and Quality of Opportunities	Distribution	Comments
Diving and snorkeling	There are more than 20 high quality dive sites within KNP and its buffer zone. Approximately 10 of these are recognized internationally. Numerous good snorkeling sites are located on fringing reefs around islands.	The majority of the good dive sites are located between Komodo and Rinca Islands. These sites are easily accessible by day-trip from Labuan Bajo. Other good dive sites are located off Gilli Banta and Gilli Motang. Good dive sites are also accessible from Sape.	There is considerable variety in the dive sites amd their degree of difficulty. Strong currents make some sites only suitable for experienced divers.
Game fishing	The waters of KNP and its buffer zone are believed to offer good game fishing potential for Spanish mackerel, yellowfin tuna, skipjack and sharks.	Potential game fishing areas are easily accessible by fast vessel from Labuan Bajo and areas to the north.	There does not appear to be any reason why game fishing for pelagic species cannot be commenced immediately on a sm all scale with appropriate monitoring.
Cetacean watching	Although cetacean numbers, locations and migratory routes are still being fully assessed, it appears as though KNP has the potential to support whale and dolphin watching operations.	Whales and dolphins have been sighted throughout the park. It is understood that whale migration occurs between Komodo and Rinca islands.	Additional work is required to ascertain the feasibility of cetacean watching as a regular tourist activity.
Turtle viewing	There are numerous beaches on Komodo and Rinca islands that have been identified as turtle nesting sites.	None of the identified nesting sites are within close proximity to Labuan Bajo or Sape.	Night-time excursion from Labuan Bajo to view turtle hatchlings could be difficult. Additional work is required to ascertain the feasibility of turtle watching as a regular tourist activity.
Bush walking	Opportunities for bush walking are mainly restricted to trails for dragon viewing and trails to lookout points on Komodo and Rinca islands.	The existing walking trails on Komodo island and Rinca island will continue to be the focus for bush walking activities. An additional trail for bush walking on Komodo island could be considered.	There are safety risks form dragons an d buffalo that need to be considered in any expansion of bush walking activities.
Dragon watching	Komodo and Rinca islands offer the only opportunities for dragon watching.	Both islands are easily accessible from Labuan Bajo. Komodo island is also accessible by day trip from Sape. In the past, cruise ships have anchored off Komodo island to enable passengers to go ashore.	There is little or no relevant information on animal behavior issues and thresholds.

Overall Carrying Capacity

Four potential levels of annual visitation were used in the assessment of overall carrying capacity, namely 15,000, 30,000, 60,000 and 120,000. These levels of visitation parallel the experience of other destinations in South-East Asia, where tourism has started from a product based on marine and terrestrial features. They are also consistent with past, present, and possible future levels of visitation. A summary of changes and management needs that are expected to manifest themselves under each use level scenario is presented below.

Annual Visitor Numbers	Types of Visitors	Likely Changes in Biophysical Conditions	Likely Changes to Visitor Experiences	Likely Changes in Local Communities	Management Actions Required to Ensure Sustainability
15,000 (existing)	Mainly free and independent travelers with a high proportion of backpackers. Larger groups of up to 25 on dive boats and safari boats. Prepared to accept lower standards of accommodation, fewer visitor services and some uncertainty in arrangements.	Minor evidence of biophysical change in areas of concentrated use (e.g. erosion and weeds along trails).	A good quality experience for self-reliant travelers. Use densities are low and perceptions of crowding are not a problem.	Low	Licensing of all commercial operators; Training of operators and guides; Improved trail maintenance and weed management; Mooring buoys at popular dive sites; Research on dragon-human interactions.
30,000 (previous peak)	A mix of visitors. The free and independent travelers remain but are joined by more sophisticated and wealthier visitors who are seeking nature-based experiences with a taste of adventure. These new visitors demand higher standards of accommodation and greater reliability of transport and other services.	Increased evidence of biophysical impacts in use areas, including erosion of tracks, litter, flipper and anchor damage.	A good quality experience for self-reliant independent travelers and more up-market groups. Use densities are low and perceptions of crowding are not a problem.	Low but altered 'income' base for some	As above plus: review of strategy for dragon viewing; improved interpretive information and facilities in park; toilet facilities at popular destinations within park; day use area at Pink beach; improved jetty and landing facilities, restaurant and day use area, plus retail/cultural infrastructure at Loh Liang.
60,000	The visitors now include greater numbers of visitors on organized packages. The free and independent visitors are declining in number as KNP is perceived as being 'discovered'. New visitors may arrive in larger groups (e.g. from cruise ships) and demand more structured and organized travel with good accommodation and services. There are increasing numbers of older people and children.	Evidence of biophysical impact observable. Local water quality declining with *E. coli* counts rapidly rising. Disposal issues with human and solid waste disposal.	Crowding at dragon viewing sites and loss of 'wild' experience at Rinca. Crowding at 'best' diving and snorkeling sites. Dissatisfaction with experience is commonly expressed.	Obvious to older community members	As above plus: dragon viewing and research facility; reef-based pontoon for large scale diving and snorkeling operations; alternative arrangements for visitation to local communities.
120,000	Package and group tours make up the bulk of visitation. Groups are larger and larger capacity vessels are needed to transport visitors around the park. Newer visitors generally have lower levels of environmental knowledge and awareness.	Major issues with water, sewage and solid waste. Physical attrition of vegetation around walking tracks common. Behavior of dragons modified?	Rationing of dragon viewing opportunities and diving sites leads to criticism of management and major dissatisfaction.	High, including loss of cultural identity	As above plus: walking track hardening; additional reef-based pontoon for large-scale diving and snorkeling operations.

Activity-Specific Carrying Capacities

Based on the availability of tourism opportunities and the capacity of individual sites within the park, the carrying capacities for each tourist activity were assessed as shown in tabular form below. Special attention needs to be given to assessing the impact of dragon watching activities on the animals' behavior, to safeguard the wellbeing of the dragon. Thus, the carrying capacity for dragon watching will need to be reviewed following behavioral studies on the dragon populations (see description of proposed studies in Annex 2 under the monitoring and evaluation component). In addition, the current site for dragon viewing at Loh Liang will exceed its capacity if annual visitation levels go beyond 30,000. Either, additional viewing areas and tracks will be needed or a different way of presenting the dragons will need to be employed.

Activity	Potential Capacity in KNP (persons per annum)	Comments
Diving/snorkeling	100,000+ if support infrastructure provided.	Numerous good quality sites and low impacts if well-managed.
Game fishing	5,000+ if year-round availability of game fish.	Needs to be managed predominantly as a catch and release fishery with mariculture of bait fish.
Cetacean watching	50,000 if good reliable watching areas can be found over several months within half-day travel distance of Labuan Bajo.	All cetacean watching activities need to be licensed and undertaken in strict accordance with scientifically-based guidelines.
Turtle viewing	5,000 if suitable nesting beaches can be found in close proximity to Labuan Bajo or resorts.	Limited viewing season and there are limits on number of visitors that can be accommodated at each viewing area.
Bush walking	Properly constructed and will managed walking trails in this type of setting can accommodate more than 25,000 persons per annum. Depends on suitable visitor infrastructure.	Except for where trails are used to view dragons, demand is unlikely to ever exceed capacity.
Dragon watching	For viewing dragons in the wild, the capacity on Komodo island may be as low as 20,000 persons per annum. Additional capacity is available on Rinca island development of a dragon viewing area within a research facility could increase capacity to 50,000+. Depends on suitable visitor infrastructure.	Additional research on human-dragon interactions is needed. Sites for viewing dragons in the wild are very limited.
Cultural tourism	50,000+ if impact mitigation strategies are in place in local communities.	Need for comprehensive social impact assessment and in particular development of programmed copin g strategies.

Conclusion

It appears that a reasonable carrying capacity, based on biophysical and socio-economic criteria and on what is believed to be a practical degree of management and infrastructure provision, is of the order of 50,000 persons. Not all activities have this capacity and it is assumed that while the majority of visitors will participate in dragon viewing and/or diving, smaller numbers will seek out the more specialized activities.

Annex 10.
Baseline Assessment of Management Effectiveness in KNP

From WCPA Framework for Assessing the Management of Protected Areas.

This preliminary baseline assessment was undertaken by a TNC representative during project preparation, in 2000. Follow-up assessments will be conducted as part of the annual internal monitoring process.

Issue	Criterion judged relevant	Maximum Score	Baseline KNP Management Score	Effectiveness (Percentage)
General				
1.Legislation	Problems with legislation or regulations are a significant but not major barrier to achieving management objectives.	3	1	33
2. Law Enforcement	There are major deficiencies in law enforcement capacity (e.g. staff lack skills, patrol capacity is low, problems with legal processes).	3	1	33
3. Planning	An approved management plan exists but it is only being partially implemented because of funding constraints or other problems.	3	2	66
4. Resource Inventory	Information on natural/cultural resources is sufficient for key areas of planning/decision making or this information is being rapidly acquired.	3	2	66
5. Resource Management	Requirements for active management of natural and cultural resources are only being partially addressed.	3	2	66
6. Maintenance	Maintenance is only undertaken when equipment/facilities are in need of repair.	3	1	33
7. Neighbors	There is limited contact between managers and individuals or groups who own or manage neighboring lands and seas.	3	1	33
8. Economic Benefits to Local Communities	There is little or no flow of economic benefits to local communities from the existence of the protected area.	3	0	0
9. Communication	There is a planned communication program that is being used to build support for the protected area amongst relevant stakeholders but implementation is limited.	3	2	66
10. Management Systems	Problems with management systems (e.g. budgeting, office procedures, staff training) significantly constrain management effectiveness.	3	0	0
Additional Items for Protected Area Categories II, III and V				
12. Resident Communities and/or Traditional Landowners	Resident communities and/or traditional owners have input into management decisions but no direct involvement in decision making.	3	1	66
Additional Points	Programs to enhance local community welfare while conserving protected area resources are being implemented.		+1	
13. Visitor Opportunities	Some consideration has been given to the provision of visitor opportunities in terms of access to areas of the park or the diversity of available experiences but little or no action has been taken in this regard.	3	1	33
14. Visitors	Visitor facilities and services are grossly inadequate (either do not meet the needs of most visitors or visitor use is seriously damaging resources).	3	0	0
15. Commercial Tourism	There is limited co-operation between managers and tourism operators to enhance visitor experiences and protect park values.	3	2	66
Total		42	17	40.48%

Annex 11.
Documents in Project File

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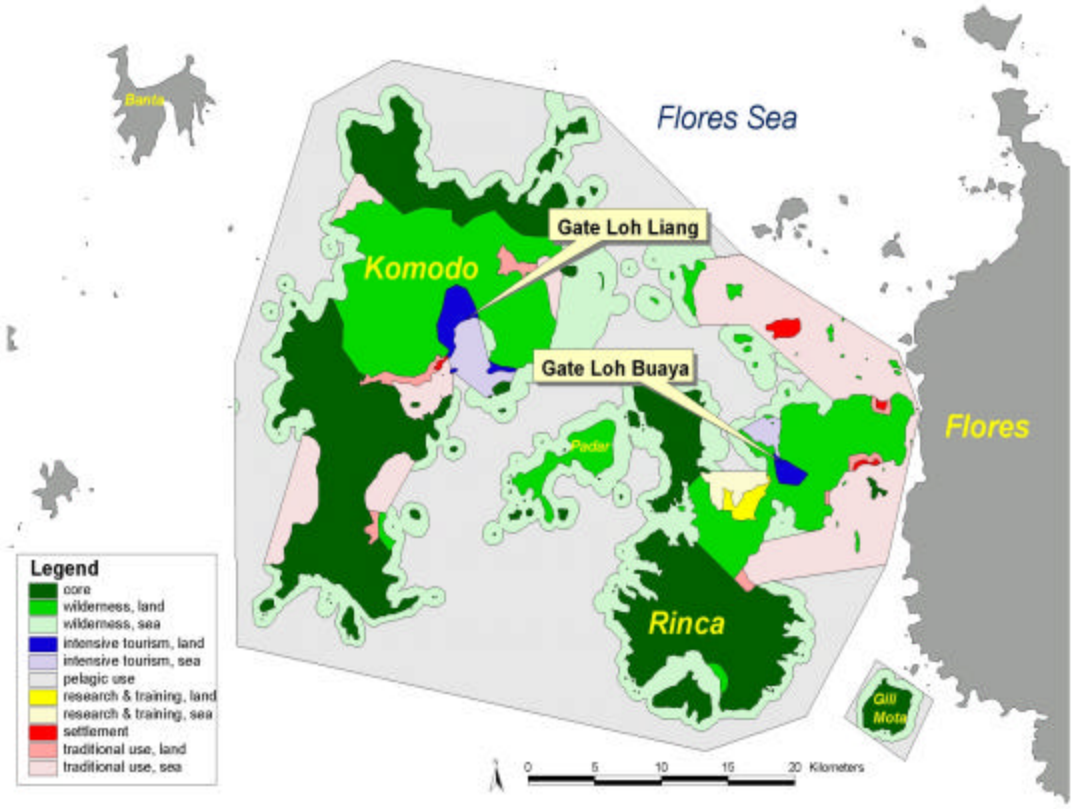
World Bank, 2001. Indonesia: Environment and Natural Resource Management in a Time of Transition. World Bank, Washington, D.C., February 2001.

Annex 12
Map of Komodo National Park Zonation System



Annex 13.
Species Lists

Birds

Family	Latin name	English	Indonesian	Site
Fregatidae	*Fregata ariel*	lesser frigate bird	bientayong kecil	K
Ardeidae	*Ardea sumatrana*	great-billed heron	cangkak besar	K,P, R
	Butarides striatus	little heron	kokoan laut	K, R
	Engretta sacra	Pacific reef egret	bango air	K,P, R
Pandionidae	*Pandion haliaetus*	Osprey		
Accipitridae	*Accipiter novaehollandiae*	gray goshawk		R
	Haliaeetus leucogaster	white-bellied sea eagle	moik	K,P, R
	Haliastur indus	brahminy kite	kepingan	K,P, R
Falconidae	*Falco moluccensis*	spotted kestrel	alap-alap sapi	K,P, R
	Falco severus	oriental hobby	alap-alap macan	R
Phasianidae	*Gallus varius*	green jungle fowl	kratak	K, R
Turnicidae	*Turnix maculosa*	red-backed button quail	bubug	P, K
Charadriidae	*Charadrius leschenaultii*	Greater sand plover	cerek	K,P, R
	Charadrius peonii	Malasian plover		K,P, R
	Pluvialis dominica	lesser golden plover	trulek	P
	Glareola isabella	long legged pratincole	terik kaki panjang	
Scolopacidae	*Actitis hypoleucos*	common sandpiper	tiril	R
	Arenaria interpres	ruddy turnstone		K, P
	Numenius arquata	Eurasia curlew	gagajahan	K,P, R
	Numenius madagascariensis	eastern curlew	srindik	P
	Numenius phaeopus	whimbrel	gagajahan	K, P
	Triga totanus	common redshank		R
	Triga glareola	common sandpiper	tiril	K, R
Burhinidae	*Esacus magnirostris*	great tick-knee	bebek kaut	K,P, R
Laridae	*Sterna albifrons*	white-fronted tern	peka	M
	Sterna bergii	great crested tern	peka	M
	Sterna sumatrana	Sumatran tern	peka	M
Columbidae	*Caloenas nicobarica*	nicobar pigeon		K, P
	Chalcophaps indica	Green winged dove	walik tanah	K
	Dukula aenea	green imperial pigeon	pergan	K, P
	Dukula bicolor	pied imperial pigeon	pergan	K
	Geopelia striata	peaceful dove	kolong	K, P, R
	Macropygia ruficeps	little cuckoo-dove		K
	Ptilinopus jambu	jambu fruit dove		K
	Ptilinopus melanospila	black naped fruit dove		
	Streptopelia chinensis	spotted dove	kukul	K, R
Psittacidae	*Cacatua sulphurea*	lesser sulfur crested cockatoo	kakatua	K, R, P
Caculidae	*Centropus bengalensis*	lesser coucal	bubut	P, R
	Centropus sinensis	greater coucal	dudut candung	K
	Eudynamys scolopacea	common koel	olak olek	K
Strigidae	*Ninox scutulata*			R
	Otus scops	scops owl		R
	Tyto alba	barn owl		R
Caprimulgus	*Caprimulgus* sp.	night jar	burung malam	P
Apodidae	*Collocalia esculenta*	white-bellied swiftlet	peka jawa	K
	Collocalia sp.			K
	Cypsiurus batasiensis			K
Alcedinidae	*Halcyon chloris*	collared kingfisher	kero	K, P, R
	Halcyon sancta	sacred kingfisher	kero	K,R
Meropidae	*Merops philippinus*	blue tailed bee eater	birik-birik	R
	Merops superciliosus			K, R
Picidae	*Picoides macei*	fulvaus brested woodpecker	betok	K
	Picoides moluccensis	brown-capped woodpecker		R
Alaudidae	*Mirafra javanica*	singing bush-lark		K,P, R
Hirundinidae	*Hirunda daurica*	red-rumped swallow	burung	R
	Hirunda tahitica	Pacific swallow	burung kepinis	K, P
Campephagi-dae	*Coracina novaehollandiae*	cuckoo shrike		K, R
Dicruridae	*Dicrurus hottentottus*	sparangled drongo	saeran	K, R
Oriolidae	*Oriolus chinensis*	Black-naped oriole	kekero	K, R
Covidae	*Corvus macrorhynchus*	large-billed crow	kepu	K, P, R
Paridae	*Parus major*	great tit	bomok	K, P
Turdidae	*Saxicola caprata*	pied bush chat		K, R
Sylviidae	*Cisticola juncidis*	sitting cisticola		K, P, R
Muscicapidae	*Hypothymis azurea*	black-naped monarch		K, R
Pachycphali-dae	*Pachycephala pectoralis*	whistler		K, R
Motacillidae	*Anthus novaeseelandiae*	Richard's pipit		K, P, R
	Motacilla sp.	wangtail		K
Artamidae	*Artamus leucorhynchus*	whitebreasted wood swallow		R
Nectarinii-dae	*Anhreptes malacensis*	brown throated sunbird	burung madu	K, P

Dicaaeidae	*Dicaeum igniferum*	flowerpecker	burung	K
	Diceum sp.		cabe	
Zosteropidae	*Zosterops chloris*	mangrove white eye		K, R
	Zosterops wallacei	wallace's white eye		
Megaodiidae	*Megapadius reinwardt*	orange-footed scrub fowl	burung gosong	K,P, R
Meliphagidae	*Philemon buceroides*	noisy friar bird	kokoku-wak	K, R
Ploceidae	*Poephila guttata*	zebra finch		K, P

Key: K = Komodo, **P** = Padar, **R** = Rinca, **M** = marine

Amphibians and Reptiles

Family	Species	English	Indonesian	Site
AMPHIBIANS				
Microhylidae	*Oreophryne darewkyi*			R
	Oræophryne jefersoniana			K
	Kalolula baleata			K
REPTILES				
SNAKES:				
Colubridae	*Ahaetulla ahaetull*			K, P, R
	Ceberus rhynchops			K, R
	Elaphe subradiata			K, R
	Lycodon gulicus			K, P, R
	Psammodynastes pulverulentus			K,R
Dibamidae	*Dibamus novaeguineae*			K
Elapidae	*Naja naja*	cobra	ular sendok	K, R
Typhlopidae	*Typhlops polygrammicus*			K
Viperidae	*Trimeresurus albolabris*	viper		K, P, R
	Vipera russeli	Russel's viper		K, P, R
LIZARDS				
Agamidae	*Draco volans*			K, R
Gekkonidae	*Cosymbotus platyurus*			K, R
	Cyrtodactylus darmandvilled			K
	Cyrtodactylus defossei			K
	Cyrtodactylus laevigatus			K
	Gekko gecko			K, P
	Hemidactylus frenatus			K, P, R
	Lepidodactylus intermedius			K, P, R
	Peropus mutilatus			K
Scincidae	*Cryptoblepharus boutonii*			K, P
	Emoia similis			K
	Leiolopisma kadarsani			K, P
	Leiolopisma sembalunicum			R
	Mabuya multifasciata			K, R
	Sphenomorphus florensis			K, P, R
	Sphenomorphus mertensi			P
	Sphenomorphus oxycephalus			R
	Sphenomorphus schlegeli			K
	Sphenomorphus striolatum			K, R
Varanidae	*Varanus komodoensis*	Komodo dragon		K, R
	Varanus salvador	Monitor lizard		K
CROCODILES				
Crocodylidae	*Crocodylus porosus*			R?

TURTLES

Cheloniidae	*Chelonia mydas*	green sea turtle	M
	Eretmochelys imbricata	hawskbill turtle	M

Key: **K** = Komodo, **P** = Padar, **R** = Rinca, **M** = marine

Marine Fishes

1. Carcharhinidae - Whaler Sharks
   - *1.1.* *Carchachinus amblyrhynchos* (Bleeker, 1856)
   - *1.2.* *Carcharhinus melanopterus* (Quoy & Gaimard, 1824)

2. Henigaleidae - Weasel Sharks
   - *2.1.* *Triaenodon obesus* (Rüppell, 1835)

3. Dasyatididae - Stingrays
   - *3.1.* *Dasyatis kuhlii* (Müller & Henle, 1841)
   - *3.2.* *Taeniura lymma* (Forsskål, 1775)
   - *3.3.* *Taeniura meyeni* (Müller and Henle, 1841)

4. Mobulidae - Manta Rays
   - *4.1.* *Manta birostris* (Walbaum, 1792)

5. Moringuidae - Worm Eels
   - *5.1.* *Moringua javanica* (Kaup, 1856)

6. Muraenidae - Moral Eels
   - *6.1.* *Echidna nebulosa* (Thunberg, 1789)
   - *6.2.* *Gymnothorax fimbriatus* (Bennet, 1831)
   - *6.3.* *Gymnothorax flavimarginatus* (Rüppell, 1828)
   - *6.4.* *Gymnothorax javanicus* (Bleeker, 1865)
   - *6.5.* *Gymnothorax sp.*
   - *6.6.* *Gymnothorax zonipectus* (Seale, 1906)
   - *6.7.* *Rhinomuraena quaesita* (Garman, 1888)
   - *6.8.* *Strophiodon brummeri* (Bleeker, 1859)

7. Congridae - Conger Eels
   - *7.1.* *Conger cinereus* (Rüppell, 1828)
   - *7.2.* *Heteroconger haasi* (Klausewitz and Eible-Eibesfeldt, 1959)

8. Ophichthidae - Snake Eels
   - *8.1.* *Leinuranus semicinctus* (Lay & Bennet, 1839)
   - *8.2.* *Muraenichthys macropterus* (Bleeker, 1857)
   - *8.3.* *Myrichthys maculosus* (Cuvier, 1817)

9. Clupeidae - Herrings
   - *9.1.* *Spratelloides gracilis* (Temminck & Schlegel, 1846)

10. Plotosidae - Eel-tailed Catfishes
   - *10.1.* *Plotos lineatus* (Thunberg, 1787)

11. Synodontidae - Lizardfishes
   - *11.1.* *Synodus dermatogenys* (Fowler, 1912)
   - *11.2.* *Synodus jaculum* (Russell & Cressy, 1979)
   - *11.3.* *Synadus variegatus* (Lacepède, 1803)

12. Harpodontidae - Bombay Ducks
   - *12.1.* *Saurida gracilis* (Quoy & Gaimard, 1824)

13. Gobiesocidae - Clingfishes
   - *13.1.* *Diademichthys lineatus* (Sauvage, 1883)
   - *13.2.* *Discotrema echinophilla* (Briggs, 1976)

14. Antennariidae - Anglerfishes
   - *14.1.* *Antennarius sp.*

15. Bythitidae - Cuskeels
   - *15.1.* *Brosmophyciops pautzkei* (Schultz, 1960)
   - *15.2.* *Ogilbya sp.*

16. Hemifamphidae - Halbeaks or Garfishes
    16.1. *Zenarchopterus gilli* (Smith, 1945)

17. Belonidae - Needlefishes or Longtoms
    17.1. *Tylosurus crocodilus* (Lesuer, 1821)

18. Holocentridae - Squirrilfishes
    18.1. *Myripristis adusta* (Bleeker, 1853)
    18.2. *Myripristis berndti* (Jordan & Evermann, 1902)
    18.3. *Myripristis hexagona* (Lacepède, 1802)
    18.4 *Myripristis kuntee* (Valenciennes, 1831)
    18.5. *Myripristis melanostictus* (Bleeker, 1831)
    18.6. *Myripristis murdjan* (Forsskål, 1775)
    18.7. *Myripristis violacea* (Bleeker, 1851)
    18.8. *Myripristis vittata* (Valenciennes, 1831)
    18.9. *Neoniphon argenteus* (Valenciennes, 1831)
    18.10. *Neoniphon sammara* (Forsskål, 1775)
    18.11. *Sargocentron caudimaculatum* (Rüppell, 1835)
    18.12. *Sargocentron diadema* (Lacepède, 1802)
    18.13. *Sargocentron melanospilos* (Bleeker, 1858)
    18.14. *Sargocentron microstomus* (Günther, 1859)
    18.15. *Sargocentron praslin* (Lacepède, 1802)
    18.16. *Sargocentron spiniferum* (Forsskål, 1775)

19. Aulostimidae - Trumpethishes
    19.1. *Aulostomus chinensis* (Linnaeus, 1766)

20. Fistulariidae - Flutemouths
    21.1. *Fistularia commersoni* (Rüppell, 1835)

21. Centriscidae - Razorfishes
    21.1. *Aeoliscus strigatus* (Günther, 1860)

22. Syngnathidae - Pipefishes and Seahorses
    22.1. *Corythoichthys amplexus* (Dawson & Randall, 1975)
    22.2. *Corythoichthys intestinalis* (Ramsay, 1881)
    22.3. *Doryhamphus excisus* (Kaup, 1856)

23. Scorpaenidae - Scorpionfishes
    23.1. *Ablabys taenianotus* (Cuvier, 1829)
    23.2. *Pterois volitans* (Linnaeus, 1758)
    23.3. *Scorpaenodes guamensis* (Quoy & Gaimard, 1824)
    23.4. *Scorpaenodes hirsutus* (Smith, 1957)
    23.5. *Scorpaenodes parvipinnis* (Garrett, 1863)
    23.6. *Scorpaenodes varipinnis* (Smith, 1957)
    23.7. *Scorpaenopsis exycephala* (Bleeker, 1849)
    23.8. *Sebastapistes cyanostigma* (Bleeker, 1856)

24. Platycephalidae - Flatheads
    24.1. *Cymbacephalus beauforti* (Knapp, 1973)
    24.2. *Thysanophrys chiltoni* (Schlutz, 1966)

25. Serranidae - Groupers and Anthias
    25.1. *Aethaloperca rogaa* (Forsskål, 1775)
    25.2. *Anyperodon leucogrammicus* (Valenciennes, 1828)
    25.3. *Cephalopholis argus* (Bloch & Schneider, 1801)
    25.4. *Cephalopholis boenack* (Bloch, 1790)
    25.5. *Cephalopholis cyanostigma* (Kuhl & Van Hasselt, 1828)
    25.6. *Cephalopholis leopardus* (Lacepède, 1802)
    25.7. *Cephalopholis microprion* (Bleeker, 1852)
    25.8. *Cephalopholis miniata* (Forsskål, 1775)
    25.9. *Cephalopholis sonnerati* (Valenciennes, 1828)
    25.10. *Cephalopholis spiloparaea* (Valenciennes, 1828)
    25.11. *Cephalopholis urodeta* (Schneider, 1801)
    25.12. *Cromileptes altivelis* (Valenciennes, 1828)
    25.13. *Diploprion bifasciatum* (Cuvier, 1828)
    25.14. *Epinephelus areolatus* (Forsskål, 1775)
    25.15. *Epinephelus coioides* (Hamilton, 1822)
    25.16. *Epinephelus farciatus* (Forsskål, 1775)
    25.17. *Epinephelus fuscoguttatus* (Forsskål, 1775)
    25.18. *Epinephelus hexahonatus* (Bloch & Schneider, 1801)
    25.19. *Epinephelus maculatus* (Bloch, 1790)
    25.20. *Epinephelus merra* (Bloch, 1793)

25.21. *Epinephelus ongus* (Bloch, 1790)
25.22. *Epinephelus polyph ekadion* (Bleeker, 1849)
25.23. *Epinephelus quoyanus* (Valenciennes, 1830)
25.24. *Epinephelus tauvina* (Forsskål, 1775)
25.25. *Plectranthias longimanus* (Weber, 1913)
25.26. *Plectropomus areolatus* (Rüppell, 1830)
25.27. *Plectropomus laevis* (Lacepède, 1802)
25.28. *Plectropomus maculatus* (Bloch, 1790)
25.29. *Pseudanthias dispar* (Herre, 1955)
25.30. *Pseudanthias huchtii* (Bleeker, 1857)
25.31. *Pseudanthias hypselosoma* (Bleeker, 1878)
25.32. *Pseudanthias lori* (Randall & Lubbock, 1981)
25.33. *Pseudanthias luzonensis* (Katayama and Masuda, 1983)
25.34. *Pseudanthias pleurotaenia* (Bleeker, 1857)
25.35. *Pseudanthias smithvanizi* (Randall and Lubbock, 1981)
25.36. *Pseudanthias squamipinnis* (Peters, 1855)
25.37. *Pseudanthias tuka* (Herre & Montalban, 1972)
25.38. *Variola albimarginata* (Baissac, 1953)
25.39. *Variola louti* (Forsskål, 1775)

26. Pseudochromidae - Dottybacks
26.1. *Labracinus cyclophthalmus* (Müller & Troschel, 1849)
26.2. *Psedochromis bitaeniatus* (Fowler, 1931)
26.3. *Psedochromis elongatus* (Lubbock, 1980)
26.4. *Psedochromis fuscus* (Müller & Troschel, 1849)
26.5. *Psedochromis marshallensis* (Schultz, 1953)
26.6. *Psedochromis paccagnellae* (Axelrod, 1973)
26.7. *Psedochromis perspicillatus* (Günther, 1862)
26.8. *Psedochromis quinquedentatus* (McCulloch, 1926)

27. Terapontidae - Grunters
27.1. *Terapon jarbua* (Forsskål, 1775)

28. Apogonidae - Cardinalfishes
28.1. *Apogon angustatus* (Smith & Radcliffe, 1911)
28.2. *Apogon apogonides* (Bleeker, 1856)
28.3. *Apogon aureus* (Lacepède, 1802)
28.4. *Apogon chrysopomus* (Bleeker, 1854)
28.5. *Apogon chrysotaenia* (Bleeker, 1851)
28.6. *Apogon coccineus* (Rüppell, 1835)
28.7. *Apogon compressus* (Smith & Radcliffe, 1911)
28.8. *Apogon cookii* (Macleay, 1881)
28.9. *Apogon cyanosoma* (Bleeker, 1853)
28.10. *Apogon exostigma* (Jordan & Straks, 1906)
28.11. *Apogon fraenatus* (Valenciennes, 1832)
28.12. *Apogon fragilis* (Smith, 1961)
28.13. *Apogon gilberti* (Jordan and Seale, 1905)
28.14. *Apogon guamensis* (Valenciennes, 1832)
28.15. *Apogon hartzfeldi* (Bleeker, 1852)
28.16. *Apogon hoeveni* (Bleeker, 1854)
28.17. *Apogon lateralis* (Valenciennes, 1832)
28.18. *Apogon leptacanthus* (Bleeker, 1856)
28.19. *Apogon margaritophorus* (Bleeker, 1854)
28.20. *Apogon moluccensis* (Valenciennes, 1832)
28.21. *Apogon nigrofasciatus* (Schultz, 1953)
28.22. *Apogon notatus* (Houttuyn, 1782)
28.23. *Apogon novemfaciatus* (Cuvier, 1828)
28.24. *Apogon parvulus* (Smith and Radcliffe, 1912)
28.25. *Apogon perlitus* (Fraser and Lachner, 1985)
28.26. *Apogon properupta* (Whitley, 1964)
28.27. *Apogon sangiensis* (Bleeker, 1857)
28.28. *Apogon semiornatus* (Peters, 1876)
28.29. *Apogon sp.*
28.30. *Apogon taeniophorus* (Regan, 1908)
28.31. *Apogon ventrifasciatus* (Allen, Kuiter, and Randall, 1994)
28.32. *Archamia biguttata* (Lachner, 1951)
28.33. *Archamia fucata* (Cantor, 1850)
28.34. *Archamia macropterus* (Cuvier, 1828)
28.35. *Archamia zosterophora* (Bleeker, 1858)
28.36. *Cheilodipterus lineatus* (Forsskål, 1775)
28.37. *Cheilodipterus macrodon* (Lacepède, 1801)
28.38. *Cheilodipterus quinquqlineatus* (Cuvier, 1828)
28.39. *Fowleria abocellata* (Goren & Karplus, 1980)
28.40. *Fowleria variegata* (Valenciennes, 1832)

28.41. *Gymnapogon philippinus* (Herre, 1939)
28.42. *Rhabdamia cypselurus* (Weber, 1909)
28.43. *Rhabdamia gracilis* (Bleeker, 1856)
28.44. *Rhabdamia spilota* (Allen and Kuiter, 1994)
28.45. *Siphamia majimae* (Matsubara & Iwai, 1958)
28.46. *Sphaeramia nematoptera* (Bleeker, 1856)
28.47. *Sphaeramia orbicularis* (Cuvier, 1828)

29. Malacanthidae - Sand Tilefishes
29.1. *Hoplolatilus starcki* (Randall & Dooley, 1974)
29.2. *Malacanthus brevirostris* (Guichenot, 1848)
29.3. *Malacanthus latovittatus* (Lacepède, 1798)

30. Echeneidae - Remoras
30.1. *Echeneis naucrates* (Linnaeus, 1758)

31. Carangidae - Travallies or Jacks
31.1. *Carangoides ferdau* (Forsskål, 1775)
31.2. *Carangoides fulvoguttatus* (Forsskål, 1775)
31.3. *Carangoides plagiotaenia* (Bleeker, 1857)
31.4. *Caranx ignobilis* (Forsskål, 1775)
31.5. *Caranx melampygus* (Cuvier, 1833)
31.6. *Elegatis bipinnulatus* (Quoy & Gaimard, 1825)
31.7. *Gnathanodon speciosus* (Forsskål, 1775)
31.8. *Selar crumenophthalmus* (Bloch, 1793)

32. Lutjanidae - Snappers
32.1. *Aprion virescens* (Valenciennes, 1830)
32.2. *Lutjanus argentimaculatus* (Forsskål, 1775)
32.3. *Lutjanus biguttatus* (Valenciennes, 1830)
32.4. *Lutjanus bohar* (Forsskål, 1775)
32.5. *Lutjanus carponotatus* (Richardson, 1842)
32.6. *Lutjanus decussatus* (Cuvier, 1828)
32.7. *Lutjanus ehrenburgi* (Peters, 1869)
32.8. *Lutjanus fulviflamma* (Forsskål, 1775)
32.9. *Lutjanus fulvus* (Schneider, 1801)
32.10. *Lutjanus gibbus* (Forsskål, 1775)
32.11. *Lutjanus kasmira* (Forsskål, 1775)
32.12. *Lutjanus lutjanus* (Bloch, 1790)
32.13. *Lutjanus monostigma* (Cuvier, 1828)
32.14. *Lutjanus quinqelineatus* (Bloch, 1790)
32.15. *Lutjanus rivulatus* (Cuvier, 1828)
32.16. *Lutjanus rufolineatus* (Valenciennes, 1830)
32.17. *Lutjanus russelli* (Bleeker, 1849)
32.18. *Lutjanus vitta* (Qouy & Gaimard, 1824)
32.19. *Macolor macularis* (Fowler, 1931)
32.20. *Macolor niger* (Forsskål, 1775)
32.21. *Paracaesio xanthurus* (Bleeker, 1869)
32.22. *Symphorus nematophorus* (Bleeker, 1860)

33. Caesionedae - Fusiliers
33.1. *Caesio caerulaurea* (Lacepède, 1802)
33.2. *Caesio cuning* (Bloch, 1791)
33.3. *Caesio lunaris* (Cuvier, 1830)
33.4. *Caesio teres* (Seale, 1906)
33.5. *Gymnocaesio gymnoptera* (Bleeker, 1856)
33.6. *Pterocaesio digramma* (Bleeker, 1865)
33.7. *Pterocaesio marri* (Schultz, 1953)
33.8. *Pterocaesio pisang* (Bleeker, 1853)
33.9. *Pterocaesio tessellata* (Carpenter, 1987)
33.10. *Pterocaesio tile* (Cuvier, 1830)
33.11. *Pterocaesto trilineata* (Carpenter, 1987)

34. Nemipteridae - Coral Breams
34.1. *Nemipterus hexodon* (Qouy & Gaimard, 1824)
34.2. *Pentapodus emeryii* (Richardson, 1843)
34.3. *Pentapodus sp.* (see Russell, 1990, page 91)
34.4. *Pentapodus trivittatus* (Bloch, 1791)
34.5. *Scolopsis affinis* (Peters, 1876)
34.6. *Scolopsis bilineatus* (Bloch, 1793)
34.7. *Scolopsis ciliatus* (Lacepède, 1802)
34.8. *Scolopsis lineatus* (Qouy & Gaimard, 1824)
34.9. *Scolopsis margaritifer* (Cuvier, 1830)
34.10. *Scolopsis monogramma* (Kuhl & Van Hasselt, 1830)

34.11. *Scolopsis trilineatus* (Kner, 1868)
34.12. *Scolopsis xenochrous* (Günther, 1792)

35. Gerreidae - Silver Biddies or Majorras
35.1. *Gerres abbreviatus* (Bleeker, 1850)
35.2. *Gerres argyeus* (Schneider, 1801)

36. Haemulidae - Sweetlips
36.1. *Diagramma pictum* (Thunberg, 1792)
36.2. *Plectorhinchus chaetodontoides* (Lacepède, 1800)
36.3. *Plectorhinchus celebicus* (Bleeker, 1837)
36.4. *Plectorhinchus flavomaculatus* (Cuvier, 1830)
36.5. *Plectorhinchus gibbosus* (Lacepède, 1802)
36.6. *Plectorhinchus lessoni* (Cuvier, 1830)
36.7. *Plectorhinchus lineatus* (Linnaeus, 1758)
36.8. *Plectorhinchus abscurus* (Günther, 1871)
36.9. *Plectorhinchus polytaenia* (Bleeker, 1852)
36.10. *Plectorhinchus vittatus* (Linnaeus, 1758)

37. Lethrinidae - Emperors
37.1. *Gnathodentex aurolineatus* (Lacepède, 1802)
37.2. *Gnathodentex grandoculus* (Valenciennes, 1830)
37.3. *Ganthodentex griseus* (Schlegel, 1844)
37.4. *Lethrinus erythrocanthus* (Valenciennes, 1830)
37.5. *Lethrinus erythopterus* (Valenciennes, 1830)
37.6. *Lethrinus genivittatus* (Valenciennes, 1830)
37.7. *Lethrinus harak* (Forsskål, 1775)
37.8. *Lethrinus obsoletus* (Forsskål, 1775)
37.9. *Lethrinus olivaceous* (Valenciennes, 1830)
37.10. *Lethrinus ornatus* (Valenciennes, 1830)
37.11. *Lethrinus rubrioperculatus* (Sato, 1978)
37.12. *Lethrinus variegatus* (Valenciennes, 1830)
37.13. *Lethrinus xanthocheilus* (Klunzinger, 1870)
37.14. *Monotaxis grandoculis* (Forsskål, 1775)

38. Mullidae - Goatfishes
38.1. *Mulloidichthys flalineatus* (Lacepède, 1802)
38.2. *Mulloidichthys vanicolensis* (Valenciennes, 1831)
38.3. *Parupeneus barberinoides* (Lacepède, 1801)
38.4. *Parupeneus barberinus* (Lacepède, 1801)
38.5. *Parupeneus bifaciatus* (Lacepède, 1801)
38.6. *Parupeneus ciliatus* (Lacepède, 1801)
38.7. *Parupeneus cyclostomus* (Lacepède, 1802)
38.8. *Parupeneus heptacanthus* (Lacepède, 1801)
38.9. *Parupeneus macronema* (Lacepède, 1802)
38.10. *Parupeneus multifasciatus* (Bleeker, 1873)
38.11. *Parupeneus pleurostigma* (Bennett, 1830)
38.12. *Upeneus tragula* (Richardson, 1846)

39. Pempheridae - Sweepers
39.1. *Parapriacanthus ransonneti* (Steindachner, 1870)
39.2. *Pempheris mangula* (Cuvier, 1829)
39.3. *Pempheris vanicolensis* (Cuvier, 1831)

40. Toxotidae - Arsherfishes
40.1. *Toxotes jaculatrix* (Pallas, 1767)

41. Kyphosidae - Drummers or Sea Chubs
41.1. *Kyphosus cinerascens* (Forsskål, 1775)
41.2. *Kyphosus vaigiensis* (Qouy & Gaimard, 1825)

42. Ephippidae - Batfishes
42.1. *Platax boersi* (Bleeker, 1852)
42.2. *Platax pinnatus* (Linnaeus, 1758)
42.3. *Platax teira* (Forsskål, 1775)

43. Chaetodontidae - Butterflyfishes
43.1. *Chaetodon adiergastos* (Seale, 1910)
43.2. *Chaetodon auriga* (Forsskål, 1775)
43.3. *Chaetodon baronessa* (Cuvier, 1831)
43.4. *Chaetodon bennetti* (Cuvier, 1831)
43.5. *Chaetodon citrinellus* (Cuvier, 1831)
43.6. *Chaetodon decussatus* (Cuvier, 1831)

43.7. *Chaetodon ephippium* (Cuvier, 1831)
43.8. *Chaetodon guentheri* (Ahl, 1913)
43.9. *Chaetodon kleinii* (Bloch, 1790)
43.10. *Chaetodon lineolatus* (Cuvier, 1831)
43.11. *Chaetodon lunula* (Lacepède, 1803)
43.12. *Chaetodon lunulatus* (Qouy and Gaimard, 1824)
43.13. *Chaetodon melannotus* (Schneider, 1801)
43.14. *Chaetodon meyeri* (Schneider, 1801)
43.15. *Chaetodon ocellicaudus* (Cuvier, 1831)
43.16. *Chaetodon octofasciatus* (Bloch, 1787)
43.17. *Chaetodon ornatissimus* (Cuvier, 1831)
43.18. *Chaetodon oxycephalus* (Bleeker, 1853)
43.19. *Chaetodon punctatofasciatus* (Cuvier, 1831)
43.20. *Chaetodon rafflesi* (Bennett, 1830)
43.21. *Chaetodon selene* (Bleeker, 1853)
43.22. *Chaetodon speculum* (Cuvier, 1831)
43.23. *Chaetodon trifascialis* (Qouy & Gaimard, 1824)
43.24. *Chaetodon ulietensis* (Cuvier, 1831)
43.25. *Chaetodon unimaculatus* (Bloch, 1787)
43.26. *Chaetodon vagabundus* (Linnaeus, 1758)
43.27. *Chaetodon xanthurus* (Bleeker, 1857)
43.28. *Chelmon rostratus* (Linnaeus, 1758)
43.29. *Coradion chrysozonus* (Cuvier, 1831)
43.30. *Coradion melanopus* (Cuvier, 1831)
43.31. *Forcipiger flavissimus* (Jordan & McGregor, 1898)
43.32. *Hemitaurichthys polylepis* (Bleeker, 1857)
43.33. *Heniochus acuminatus* (Linnaeus, 1758)
43.34. *Heniochus chrysostomus* (Cuvier, 1831)
43.35. *Heniochus diphreutes* (Jordan, 1903)
43.36. *Heniochus singularius* (Smith & Radecliffe, 1911)
43.37. *Heniochus varius* (Cuvier, 1829)
43.38. *Parachaetodon ocellatus* (Cuvier, 1831)

44. Pomacanthidae - Angelfishes
44.1. *Apolemichthys trimaculatus* (Lacepède, 1831)
44.2. *Centropyge bicolor* (Bloch, 1798)
44.3. *Centropyge bispinosus* (Günther, 1860)
44.4. *Centropyge flavicauda* (Fraser - Brunner, 1933)
44.5. *Centropyge nox* (Bleeker, 1853)
44.6. *Centropyge tibicen* (Cuvier, 1831)
44.7. *Centropyge vroliki* (Bleeker, 1853)
44.8. *Chaetodontoplus melanosoma* (Bleeker, 1853)
44.9. *Chaetodontoplus mesoleucus* (Bloch, 1787)
44.10. *Genicanthus lamark* (Lacepède, 1798)
44.11. *Pomacanthus imperator* (Bloch, 1787)
44.12. *Pomacanthus navarchus* (Cuvier, 1831)
44.13. *Pomacanthus semicirculatus* (Cuvier, 1831)
44.14. *Pomacanthus sexstriatus* (Cuvier, 1831)
44.15. *Pomacanthus xanthometopon* (Bleeker, 1853)
44.16. *Pygoplites diacanthus* (Boddaert, 1772)

45. Pomacentridae - Damselfishes
45.1. *Abudefduf lorenzi* (Hensley and Allen)
45.2. *Abudefduf notatus* (Day, 1869)
45.3. *Abudefduf septemfasciatus* (Cuvier, 1830)
45.4. *Abudefduf sexfasciatus* (Lacepède, 1802)
45.5. *Abudefduf sordidus* (Forsskål, 1775)
45.6. *Abudefduf vaigiensis* (Quoy & Gaimard, 1825)
45.7. *Acanthochromis polyacantha* (Bleeker, 1855)
45.8. *Amblyglyphidodon aureus* (Cuvier, 1830)
45.9. *Amblyglyphidodon batunai* (Allen, 1995)
45.10. *Amblyglyphidodon curacao* (Bloch, 1787)
45.11. *Amblyglyphidodon leucogaster* (Bleeker, 1847)
45.12. *Amblypomacentrus breviceps* (Schlegel and Müller, 1839 -44)
45.13. *Amphirion clarkii* (Bennett, 1830)
45.14. *Amphirion melanopus* (Bleeker, 1852)
45.15. *Amphirion ocellaris* (Cuvier, 1830)
45.16. *Amphirion perideraion* (Bleeker, 1855)
45.17. *Amphirion sandaracinos* (Allen, 1972)
45.18. *Cheiloprion labiatus* (Day, 1877)
45.19. *Chromis alpha* (Randall, 1988)
45.20. *Chromis amboinensis* (Bleeker, 1873)
45.21. *Chromis analis* (Cuvier, 1830)
45.22. *Chromis atripectoralis* (Welander & Scheltz, 1951)
45.23. *Chromis atripes* (Fowler and Bean, 1928)

45.24. *Chromis caudalis* (Randall, 1988)
45.25. *Chromis cinerascens* (Cuvier, 1830)
45.26. *Chromis delta* (Randall, 1988)
45.27. *Chromis elerae* (Fowler & Bean, 1928)
45.28. *Chromis fumea* (Tanaka, 1917)
45.29. *Chromis lepidolepis* (Bleeker, 1877)
45.30. *Chromis lineata* (Fowler and Bean, 1928)
45.31. *Chromis margarritifer* (Fowler, 1946)
45.32. *Chromis retrofasciata* (Weber, 1913)
45.33. *Chromis scotochilopetra* (Fowler, 1918)
45.34. *Chromis ternatensis* (Bleeker, 1856)
45.35. *Chromis viridis* (Cuvier, 1830)
45.36. *Chromis weberi* (Fowler & Bean, 1928)
45.37. *Chromis xanthochira* (Bleeker, 1851)
45.38. *Chromis xanthura* (Bleeker, 1854)
45.39. *Chrysipetra bleekeri* (Fowler and Bean, 1928)
45.40. *Chrysipetra brownriggii* (Bennett, 1828)
45.41. *Chrysipetra cyanea* (Quoy & Gaimard, 1824)
45.42. *Chrysipetra parasema* (Fowler, 1918)
45.43. *Chrysipetra rex* (Synder, 1909)
45.44. *Chrysipetra rollandi* (Whitley, 1961)
45.45. *Chrysipetra springeri* (Allen and Lubbock, 1976)
45.46. *Chrysipetra talboti* (Allen, 1975)
45.47. *Chrysipetra unimaculata* (Cuvier, 1830)
45.48. *Dascyllus aruanus* (Linnaeus, 1758)
45.49. *Dascyllus melanurus* (Bleeker, 1854)
45.50. *Dascyllus reticulatus* (Richardson, 1846)
45.51. *Dascyllus trimaculatus* (Rüppell, 1928)
45.52. *Dischistodus chrysopoecilus* (Schlegel & Müller, 1939)
45.53. *Dischistodus fasciatus* (Cuvier, 1830)
45.54. *Dischistodus melanotus* (Bleeker, 1858)
45.55. *Dischistodus perspicillatus* (Cuvier, 1830)
45.56. *Dischistodus prosopotaenia* (Bleeker, 1852)
45.57. *Hemeglyphilidodon plagiometopon* (Bleeker, 1852)
45.58. *Lepidozygus tapeinosoma* (Bleeker, 1856)
45.59. *Neoglyphidodon erossi* (Allen, 1991)
45.60. *Neoglyphidodon melas* (Cuvier, 1830)
45.61. *Neoglyphidodon nigroris* (Cuvier, 1830)
45.62. *Neoglyphidodon oxyodon* (Bleeker, 1857)
45.63. *Neoglyphidodon thoracotaeniatus* (Fowler and Bean, 1928)
45.64. *Neopomacentrus azysron* (Bleeker, 1877)
45.65. *Neopomacentrus cyanomos* (Bleeker, 1856)
45.66. *Neopomacentrus neumurus* (Bleeker, 1857
45.67. *Neopomacentrusviolascens* (Bleeker, 1848)
45.68. *Plectroglyhidodon dickii* (Lièn ard, 1839)
45.69. *Plectroglyhidodon lacrymatus* (Quoy & Gaimard, 1824)
45.70. *Plectroglyhidodon leucozonus* (Bleeker, 1859)
45.71. *Plectroglyhidodon phoenixensis* (Schultz, 1943)
45.72. *Pomacentrus adelus* (Allen, 1991)
45.73. *Pomacentrus alexanderae* (Evermann & Seale, 1907)
45.74. *Pomacentrus amboinensis* (Bleeker, 1868)
45.75. *Pomacentrus auriventris* (Allen, 1991)
45.76. *Pomacentrus bankanensis* (Bleeker, 1853)
45.77. *Pomacentrus brachialis* (Cuvier, 1830)
45.78. *Pomacentrus burroughi* (Fowler, 1918)
45.79. *Pomacentrus chrysurus* (Cuvier, 1830)
45.80. *Pomacentrus coelestis* (Jordan & Starks, 1901)
45.81. *Pomacentrus cuneatus* (Allen, 1991)
45.82. *Pomacentrus lepidogenys* (Fowler & Bean, 1928)
45.83. *Pomacentrus littoralis* (Cuvier, 1830)
45.84. *Pomacentrus moluccensis* (Bleeker, 1853)
45.85. *Pomacentrus nagasakiensis* (Tanaka, 1917)
45.86. *Pomacentrus nigromarginatus* (Allen, 1973)
45.87. *Pomacentrus pavo* (Bloch, 1878)
45.88. *Pomacentrus philippinus* (Evermann & Seale, 1907)
45.89. *Pomacentrus reidi* (Fowler & Bean, 1928)
45.90. *Pomacentrus simsiang* (Bleeker, 1856)
45.91. *Pomacentrus smithi* (Fowler and Bean, 1928)
45.92. *Pomacentrus sp.*
45.93. *Pomacentrus tripunctatus* (Cuvier, 1830)
45.94. *Pomacentrus vaiuli* (Jordan & Seale, 1906)
45.95. *Premnas bialeatus* (Bloch, 1790)
45.96. *Pristotis obtusirostris* (Gunther, 1862)
45.96. *Stegastes fasciolatus* (Ogilby, 1889)
45.97. *Stegastes lividus* (Bloch & Schneider, 1801)

45.98. *Stegastes nigricans* (Lacèpede, 1802)

46. Cirrhitidae - Hawkfishes
46.1. *Cirrhitichthys aprinus* (Cuvier, 1829)
46.2. *Cirrhitichthys falco* (Randall, 1963)
46.3. *Cirrhitichthys oxycephalus* (Bleeker, 1855)
46.4. Cirrhitus pinnulatus (Schneider, 1801)
46.5. Cyprinocirrhites polyactis (Bleeker, 1857)
46.6. *Paracirrhites forsteri* (Schneider, 1801)

47. Mugilidae - Mullets
47.1. *Liza vaigiensis* (Quoy & Gaimard, 1825)
47.2. *Valamugil buchanani* (Bleeker, 1853)

48. Sphyraenidae - Barracudas
48.1. *Sphyraena flavicauda* (Rüppell, 1838)

49. Labridae - Wrasses
49.1. *Anampses caeruleopunctatus* (Valenciennes, 1840)
49.2. *Anampses melanurus* (Bleeker, 1857)
49.3. *Anampses meleagrides* (Valenciennes, 1840)
49.4. *Anampses twistii* (Bleeker, 1856)
49.5. *Bodianus anthiodes* (Bennett, 1831)
49.6. *Bodianus axillaris* (Bennett, 1831)
49.7. *Bodianus bilunulatus* (Lacepède, 1801)
49.8. *Bodianus diana* (Lacepède, 1802)
49.9. *Bodianus mesothorax* (Schneider, 1801)
49.10. *Cheilinus bimaculatus* (Valenciennes, 1840)
49.11. *Cheilinus fasciatus* (Bloch, 1791)
49.12. *Cheilinus trilobatus* (Lacepède, 1802)
49.13. *Cheilinus undulatus* (Rüppell, 1835)
49.14. *Cheilio inermis* (Forsskål, 1775)
49.15. *Choerodon anchorago* (Bloch, 1791)
49.16. *Choerodon zosterophorus* (Bleeker, 1868)
49.17. *Choerodon cyanopleura* (Bleeker, 1851)
49.18. *Cirrhilabrus filamentosus* (Klausewitz, 1976)
49.19. *Cirrhilabrus lubbocki* (Randall and Carpenter, 1980)
49.20. *Coris batuensis* (Bleeker, 1868)
49.21. *Coris dorsomacula* (Fowler)
49.22. *Coris gaimardi* (Quoy & Gaimard, 1824)
49.23. *Coris pictoides* (Randall & Kuiter, 1982)
49.24. *Diproctacanthus xanthurus* (Bleeker, 1856)
49.25. *Epibulus insidiator* (Pallas, 1770)
49.26. *Gomphosus varius* (Lacepède, 1801)
49.27. *Halichoeres biocellatus* (Schultz, 1960)
49.28. *Halichoeres chloropterus* (Bloch, 1791)
49.29. *Halichoeres chrysus* (Randall, 1980)
49.30. *Halichoeres hartzfeldi* (Bleeker, 1852)
49.31. *Halichoeres hortulanus* (Lacepède, 1802)
49.32. *Halichoeres margaaritaceus* (Valenciennes, 1839)
49.33. *Halichoeres marginatus* (Rüppell, 1835)
49.34. *Halichoeres melanurus* (Bleeker, 1839)
49.35. *Halichoeres ornatissimus* (Garrett, 1863)
49.36. *Halichoeres podostigma* (Bleeker, 1854)
49.37. *Halichoeres prosopeion* (Bleeker, 1853)
49.38. *Halichoeres purpurescens* (Bloch & Schneider, 1801)
49.39. *Halichoeres scapularis* (Bennett, 1832)
49.40. *Halichoeres schwarzi* (Bleeker, 1849)
49.41. *Halichoeres solorensis* (Bleeker, 1853)
49.42. *Halichoeres trimaculatus* (Griffith, 1834)
49.43. *Hemigymnus fasciatus* (Bloch, 1792)
49.43. *Hemigymnus melapterus* (Bloch, 1791)
49.44. *Hologymnosus annulatus* (Lacepède, 1801)
49.45. *Hologymnosus doliatus* (Lacepède, 1801)
49.46. *Labrichthys unilineatus* (Guichenot, 1847)
49.47. *Labroides bicolar* (Fowler and Bean, 1928)
49.48. *Labroides dimidiatus* (Valenciennes, 1839)
49.49. *Labroides pectrolis* (Randall and Springer, 1975)
49.50. *Labropsis alleni* (Randall, 1981)
49.51. *Labropsis manabei* (Schmidt, 1930)
49.52. *Leptojulis cyanopleura* (Bleeker, 1853)
49.53. *Macropharyngodon negrosensis* (Herre, 1932)
49.54. *Macropharyngodon ornatus* (Randall, 1978)
49.55. *Navaculichthys taeniourus* (Lacepède, 1802)

49.56. *Oxycheilinus celebicus* (Bleeker, 1853)
49.57. *Oxycheilinus diagrammus* (Lacepède, 1802)
49.58. *Oxycheilinus orientalis* (Günther, 1862)
49.59. *Parachelinus filamentosus* (Allen, 1974)
49.60. *Pseudochelinus evanidus* (Jordan & Evermann, 1902)
49.61. *Pseudochelinus hexataenia* (Bleeker, 1857)
49.62. *Pseudochelinus octotaenia* (Jenkins, 1900)
49.63. *Pseudocoris heteroptera* (Bleeker, 1857)
49.64. *Pseudocoris yamashiroi* (Schmidt, 1930)
49.65. *Pseudodax maluccanus* (Valenciennes, 1840)
49.66. *Pteragogus enneacanthus* (Bleeker, 1856)
49.67. *Stethojulis bandanensis* (Bleeker, 1851)
49.68. *Stethojulis interrupta* (Bleeker)
49.69. *Stethojulis strigiventer* (Bennett, 1832)
49.70. *Stethojulis trilineata* (Bloch and Schneider, 1801)
49.71. *Thalassoma amblycephalum* (Bleeker, 1856)
49.72. *Thalassoma haedwicke* (Bennett, 1828)
49.73. *Thalassoma jansenii* (Bleeker, 1856)
49.74. *Thalassoma lunare* (Linnaeus, 1758)
49.75. *Thalassoma purpureum* (Forsskål, 1775)
49.76. *Thalassoma trilobatum* (Lacepède, 1801)
49.77. *Xyrichtys pavo* (Valenciennes, 1839)
49.78. *Xyrichtys pentadactylus* (Linnaeus, 1758)

50. Scaridae - Parrotfishes
50.1. *Balbometopon muricatum* (Valenciennes, 1840)
50.2. *Cetoscarus bicolar* (Rüppell, 1828)
50.3. *Chlorurus bleekeri* (de Beaufort, 1940)
50.4. *Chlorurus sordidus* (Forsskål, 1776)
50.5. *Hipposcarus longiceps* (Bleeker, 1862)
50.6. *Leptoscarus vaigiensis* (Quoy & Gairmad, 1824)
50.7. *Scarus chameleon* (Choat & Randall, 1986)
50.8. *Scarus dimidiatus* (Blekeer, 1859)
50.9. *Scarus flavipectoralis* (Schultz, 1958)
50.10. *Scarus forsteni* (Bleeker, 1861)
50.11. *Scarus frenatus* (acepède, 1802)
50.12. *Scarus ghobban* (Forsskål, 1775)
50.13. *Scarus niger* (Forrskål, 1775)
50.14. *Scarus prasiognathos* (Valenciennes, 1839)
50.15. *Scarus quoyi* (Valencienne, 1840)
50.16. *Scarus rivulatus* (Valenciennes, 1840)
50.17. *Scarus rubroviolaceus* (Bleeker, 1849)
50.18. *Scarus schlegeli* (Bleeker, 1861)
50.19. *Scarus pinus* (Kner, 1868)

51. Opistognathidae - Jawfhishes
51.1. *Opistognathus rosenbergi* (Bleeker, 1856)

52. Pinguipedidae - Grubfishes
52.1. *Parapercis clathrata* (Ogilby, 1911)
52.2. *Parapercis cylindrica* (Bloch, 1792)
52.3. *Parapercis hexophthalma* (Cuvier, 1829)
52.4. *Parapercis millepunctata* (Günther, 1860)
52.5. *Parapercis multiplicata* (Randall, 1984)
52.6. *Parapercis sp. 1*
52.7. *Parapercis sp. 2*
52.8. *Parapercis tetracantha* (Lacepède, 1800)

53. Blenniidae - Blennies
53.1. *Aspidontus taeniatus* (Quoy & Gaimard, 1834)
53.2. *Atrosalarias fuscus holomelas* (Günther, 1866)
53.3. *Cirripectes auritus* (Carlson, 1981)
53.4. *Cirripectes castaneus* (Valenciennes, 1836)
53.5. *Cirripectes polyzona* (Bleeker, 1868)
53.6. *Ecsenius bandanus* (Springer, 1971)
53.7. *Ecsenius bathi* (Springer, 1988)
53.8. *Ecsenius bicolor* (Day, 1888)
53.9. *Ecsenius lividinalis* (Chapman & Schultz, 1952)
53.10. *Ecsenius melarchus* (Mcinney and Springer, 1976)
53.11. *Ecsenius namiyei* (Jordan and Evermann, 1903)
53.12. *Ecsenius oculatus* (Springer, 1988)
53.13. *Exallias brevis* (Kner, 1868)
53.14. *Istiblennius amboinensis* (Bleeker, 1857)
53.15. *Istiblennius edentulus* (Bloch & Schneider, 1801)

53.16. *Istiblennius periophthalmus* (Valenciennes, 1836)
53.17. *Meiachantus atrodorsalis* (Günther, 1877)
53.18. *Meiachantus ditrema* (Smith-Vaniz, 1976)
53.19. *Meiachantus grammistes* (Valenciennes, 1836)
53.20. *Meiachantus sp.*
53.21. *Petroscirtes brviceps* (Valenciennes, 1836)
53.22. *Petroscirtes mitratus* (Rüpperll, 1830)
53.23. *Plagiotremus laundandus* (Whitley, 1961)
53.24. *Plagiotremus rhinorhynchus* (Bleeker, 1852)
53.25. *Plagiotremus tapeinosoma* (Bleeker, 1857)
53.26. *Salarias fasciatus* (Bloch, 1786)
53.27. *Salarias guttatus* (Valenciennes, 1836)
53.28. *Salarias ramosus* (Bath, 1992)

54. Tripterygiidae - Triplefins
54.1. *Ceratobregma helenae* (Holleman, 1987)
54.2. *Enneapterygius hemimelas* (Kner and Steindachner, 1866)
54.3. *Enneapterygius tutuilae* (Jordan & Seale, 1906)
54.4. *Helcogramma sp.*
54.5. *Helcogramma striata* (Hansen, 1986)
54.6. *Norfolkia brachylepis* (Schultz, 1960)
54.7. *Ucla xenogrammus* (Holleman, 1993)

55. Callionymidae - Dragonets
55.1. *Anaora tentaculata* (Gray, 1835)
55.2. *Callionymus ennactis* (Bleeker, 1879)
55.3. *Callionymus pleurostictus* (Fricke, 1992)
55.4. *Synchiropus morrisoni* (Schultz, 1960)
55.5. *Synchiropus ocellatus* (Pallas, 1770)

56. Gobiidae - Gobies
56.1. *Amblyeleotris diagonalis* (Polunin and Lubbock, 1979)
56.2. *Amblyeleotris guttata* (Fowler, 1938)
56.3. *Amblyeleotris steinitzi* (Klausewitz, 1974)
56.4. *Amblyeleotris wheeleri* (Polunin & Lubbock, 1977)
56.5. *Amblygobius decussatus* (Bleeker, 1855)
56.6. *Amblygobius nocturnus* (Herre, 1945)
56.7. *Amblygobius phalaena* (Valenciennes, 1837)
56.8. *Amblygobius rainfordi* (Whitley, 1940)
56.9. *Amblygobius sphynx* (Valenciennes, 1837)
56.10. *Asterropteryx semipunctatus* (Rüppell, 1830)
56.11. *Asterropteryx sp. 1* (apparently undescribed)
56.12. *Bathygobius cyclopterus* (Valenciennes, 1837)
56.13. *Bryaninops yongei* (Davis & Cohen, 1968)
56.14. *Cryptocentrus cinctus* (Herre, 1936)
56.15. *Cryptocentrus fasciatus* (Playfair and Günther, 1867)
56.16. *Cryptocentrus nigocellatus* (Yanagisawa, 1978)
56.17. *Cryptocentrus octofasciatus* (Regan, 1908)
56.18. *Cryptocentrus singapurensis* (Herre, 1936)
56.19. *Cryptocentrus sp. 1* (pl. 243-L in Masuda et al, 1984)
56.20. *Cryptocentrus sp. 2* (pl. 243-M in Masuda et al, 1984)
56.21. *Cryptocentrus strigilliceps* (Jordan and Seale, 1906)
56.22. *Ctenogobiops pomastictus* (Lubbock & Polunin, 1977)
56.23. *Ctenogobiops tangaroai* (Lubbock and Polunin, 1977)
56.24. *Eviota bifasciata* (Lachner and Karnella, 1980)
56.25. *Eviota nigriventris* (Giltay, 1933)
56.26. *Eviota pellucida* (Larson, 1976)
56.27. *Eviota queenslandica* (Whitley, 1932)
56.28. *Eviota sebreei* (Jordan & Seale, 1906)
56.29. *Eviota sp. 1*
56.30. *Fusigobius longispinus* (Goren, 1978)
56.31. *Fusigobius signipinnis* (Hoese and Obika, 1988)
56.32. *Gnatholepis cauerensis* (Bleeker, 1853)
56.33. *Gnatholepis scabulostigma* (Herre, 1953)
56.34. *Gobiodon okinawae* (Sawada, Arai & Abe, 1973)
56.35. *Istigobius decoratus* (Herre, 1927)
56.36. *Istigobius ornatus* (Rüppell, 1830)
56.37. *Istigobius regillius* (Herre, 1953)
56.38. *Macrodontobius wilburi* (Herre, 1936)
56.39. *Oplopomus oplopomus* (Valenciennes, 1837)
56.40. *Pandaka pusilla* (Herre, 1927)
56.41. *Pleurosicya elongata* (Larson, 1990)
56.42. *Priolepis vexilla* (Winterbottom and Burridge, 1993)
56.43. *Signigobius biocellatus* (Hoese & Allen, 1977)
56.44. *Stonogobiops nematodes* (Hoese and Randall, 1982)

56.45. *Trimma "benjamini"* (undescribed species)
56.46. *Trimma macrophthalma* (Tomiyama, 1936)
56.47. *Trimma sp. 2* (D.F. Hoese species no. 36)
56.48. *Trimma striata* (Herre, 1945)
56.49. *Trimma tevegae* (Cohen & Davis, 1969)
56.50. *Valenciennea helsdingenii* (Bleeker, 1858)
56.51. *Valenciennea immmaculatus* (Ni Yong, 1981)
56.52. *Valenciennea longipinnis* (Lay & Bennett, 1839)
56.53. *Valenciennea muralis* (Valenciennes, 1837)
56.54. *Valenciennea puellaris* (Tomiyama, 1936)
56.55. *Valenciennea sexguttata* (Valenciennes, 1837)
56.56. *Valenciennea strigata* (Broussonet, 1782)
56.57. *Vanderhorstia ornatissima* (Smith, 1959)
56.58. *Yongeichthys nebulosus* (Forsskål, 1775)

57. Xenisthmidae - Flathead Wrigglers
57.1. *Xenisthmus polyzonatus* (Klunzinger, 1871)

58. Microdesmidae - Wormfishes and Dartfishes
58.1. *Aioliops megastigma* (Rennis and Hoese, 1987)
58.2. *Gunnelichthys curiosus* (Dawson, 1968)
58.3. *Gunnelichthys monostigma* (Smith, 1958)
58.4. *Nemateleotris decora* (Randall and Allen)
58.5. *Nemateleotris magnifica* (Fowler, 1938)
58.6. *Parioglossus formosus* (Smith, 1931)
58.7. *Parioglossus palustris* (Herre, 1945)
58.8. *Parioglossus raoi* (Herre, 1939)
58.9. *Ptereleotris evides* (Jordan & Hubbs, 1925)
58.10. *Ptereleotris heteroptera* (Bleeker, 1855)
58.11. *Ptereleotris microlepis* (Bleeker, 1856)

59. Acanthuridae - Surgeonfishes
59.1. *Acanthurus bariene* (Lesson, 1830)
59.2. *Acanthurus blochi* (Valenciennes, 1835)
59.3. *Acanthurus dussumieri* (Valenciennes, 1835)
59.4. *Acanthurus leucocheilus* (Herre, 1927)
59.5. *Acanthurus lineatus* (Linnaeu, 1758)
59.6. *Acanthurus maculiceps* (Ahl, 1923)
59.7. *Acanthurus mata* (Cuvier, 1829)
59.8. *Acanthurus nigricans* (Linnaeus, 1758)
59.9. *Acanthurus nigricauda* (Duncker and Mohr, 1929)
59.10. *Acanthurus nigrofuscus* (Forsskål, 1775)
59.11. *Acanthurus olivaceus* (Bloch & Schneider, 1801)
59.12. *Acanthurus pyroferus* (Kittlitz, 1834)
59.13. *Acanthurus thompsoni* (Fowler, 1923)
59.14. *Acanthurus triostegus* (Linnaeus, 1758)
59.15. *Acanthurus xanthopterus* (Valenciennes, 1835)
59.16. *Ctenochaetus binotatus* (Randall, 1955)
59.17. *Ctenochaetus striatus* (Quoy & Gaimard, 1824)
59.18. *Naso annulatus* (Quoy and Gaimard, 1825)
59.19. *Naso brevirostris* (Valenciennes, 1835)
59.20. *Naso hexacanthus* (Bleeker, 1855)
59.21. *Naso lituratus* (Bloch & Schneider, 1801)
59.22. *Naso lopezi* (Herre, 1927)
59.23. *Naso thynnoides* (Valenciennes, 1835)
59.24. *Naso unicornis* (Forsskål, 1775)
59.25. *Naso vlamingii* (Valenciennes, 1835)
59.26. *Paracanthurus hepatus* (Linnaeus, 1758)
59.27. *Prionurus sp.*
59.28. *Zebrasoma scopas* (Cuvier, 1829)
59.29. *Zebrasoma veliferum* (Bloch, 1797)

60. Zanclidae - Moorish Idols
60.1. *Zanclus cornutus* (Linnaeus, 1758)

61. Siganidae - Spinefeet or Rabbitfishes
61.1. *Siganus argenteus* (Quoy & Gaimard, 1824)
61.2. *Siganus canaliculatus* (Park, 1797)
61.3. *Siganus corallinus* (Valenciennes, 1835)
61.4. *Siganus fuscescens* (Houttyn, 1782)
61.5. *Siganus guttatus* (Bloch, 1787)
61.6. *Siganus puellus* (Schlegel, 1852)
61.7. *Siganus punctatus* (Forster, 1801)
61.8. *Siganus spinus* (Linnaeus, 1758)

61.9. *Siganus virgatus* (Valenciennes, 1835)
61.10. *Siganus vulpinus* (Schlegel & Müller, 1844)

62. Scombridae - Tunas and Mackerels
62.1. *Euthynnus affinis* (Cantor, 1849)
62.2. *Grammatorcynus bilineatus* (Quoy & Gaimard, 1824)
62.3. *Gymnosarda unicolor* (Rüpell, 1836)
62.4. *Rastrelliger kanagurta* (Cuvier, 1816)

63. Bothidae - Lefteye Flounders
63.1. *Bothus mancus* (Broussonet, 1782)

64. Pleuronectidae - Righteye Flounders
64.1. *Samariscus triocellatus* (Woods, 1960)

65. Soleidae - Soles
65.1. *Aseraggodes melanostictus* (Peters, 1876)

66. Balistidae - Triggerfishes
66.1. *Balistapus undulatus* (Park, 1797)
66.2. *Balistoides conspicillum* (Bloch & Schneider, 1801)
66.3. *Balistoides viridescens* (Bloch & Schneider, 1801)
66.4. *Melichthys niger* (Bloch, 1786)
66.5. *Melichthys vidua* (Solander, 1844)
66.6. *Odonus niger* (Rüppell, 1836)
66.7. *Pseudobalistes flavimarginatus* (Rüppell, 1828)
66.8. *Pseudobalistes fuscus* (Bloch & Schneider, 1801)
66.9. *Rhinecanthus aculeatus* (Linnaeus, 1758)
66.10. *Rhinecanthus rectangulus* (Bloch and Schneider, 1801)
66.11. *Rhinecanthus verrucosus* (Linnaeus, 1758)
66.12. *Sufflamen bursa* (Bloch & Schneider, 1801)
66.13. *Sufflamen chrysoptera* (Bloch & Schneider, 1801)
66.14. *Sufflamen fraenatus* (Latreille, 1804)

67. Monacanthidae - Triggerfishes & Leatherjackets
67.1. *Acreichthys tomentosus* (Linnaeus, 1758)
67.2. *Amanses scopas* (Cuvier, 1829)
67.3. *Cantherines dumerilii* (Hollard, 1854)
67.4. *Cantherines fronticinctus* (Günther, 1866)
67.5. *Cantherines pardalis* (Rüppell, 1866)
67.6. *Oxymonacanthus longirostris* (Bloch & Schneider, 1801)
67.7. *Paraluteres prionurus* (Bleeker, 1851)
67.8. *Pervagor janthinosoma* (Bleeker, 1854)
67.9. *Pervagor nigrolineatus* (Herre, 1927)

68. Otraciidae - Boxfishes
68.1. *Lactoria fornasini* (Bianconi, 1846)
68.2. *Ostracion cibicus* (Linnaeus, 1758)
68.3. *Ostracion meleagris* (Shaw, 1796)
68.4. *Ostracion solorensis* (Bleeker, 1853)

69. Tetraodontidae - Pufferfishes
69.1. *Arothron caeruleopunctatus*
69.2. *Arothron hispidus* (Linnaeus, 1758)
69.3. *Arothron manilensis* (de Procé, 1822)
69.4. *Arothron mappa* (Lesson, 1830)
69.5. *Arothron nigropunctatus* (Bloch & Schneider, 1801)
69.6. *Arothron stellatus* (Schneider, 1801)
69.7. *Canthigaster amboinensis* (Bleeker, 1865)
69.8. *Canthigaster bennetti* (Bleeker, 1854)
69.9. *Canthigaster compressa* (de Procé, 1822)
69.10. *Canthigaster coronata* (Vaillant & Sauvage, 1875)
69.11. *Canthigaster solandri* (Richardson, 1844)
69.12. *Canthigaster valentini* (Bleeker, 1853)

70. Diodontidae - Porcupinefishes
70.1. *Diodon hystrix*Linnaeus, 1758

Terrestrial and Marine Mammals

Family	Species	English	Indonesian	Site

Soricidae	*Crocidura montila*	shrew	cencurut	K
Pteropodidae	*Pteropus alecto*	flying fox	kalong	K, R
	Dobsonia peroni	fruit bat	kelelawar	K
	Cynopteris brachyotis	short nosed fruit bat		
Cercopithecidae	*Macaca fascicularis*	long-tailed macaque	kera biasa	R
Muridae	*Rattus arg*	rat	tikus biasa	P, R
	Rattus rintjanus	Rinca rat	tikus rinca	K, P, R
Canidae	*Canis famililaris*	dog	anjing	K, P, R
Felidae	*Felis* sp.	cat	kucing	
Equidae	*Equus* sp	horse	kuda	R
Mustelidae	*Paradoxurus hermaphroditus*	common palm civet	luwak biasa	K, R
	Herpestes javanicus	mongoose	luwak biasa	K, R
Dugongidae	*Dugong dugong*	dugong	duyung	M
Bovidae	*Bubalus bubalis*	water buffalo	kerbau	K, P, R
	Capra sp.	goat	kambing kampung	K, P, R
Cervidae	*Cervus timorensis*	deer	rusa	K, P, R
Suidae	*Sus scrofa vittatus*	wild pig	babi alang-alang	K, P, R
Delphinidae	*Delphinus delphis*	common dolphin		M
	Feresa attenuata	pygmy killer whale		M
	Grampus griseus	Risso's dolphin		M
	Lagenodelphis hosei	Fraser's dolphin		M
	Stenella attenuata	spotted dolphin		M
	Stenella longirostris	spinner dolphin		M
	Steno bredanensis	rough toothed dolphin		M
	Tursiops truncatus	bottlenose dolphin		M
	Peponocephala electra	melon-headed whale		M
Balaenoptera	*Balaenoptera acutorostrata*	minke whale		M
	Baleanoptera musculus	blue whale		M
	Kogia breviceps	pygmy sperm whale		M
	Kogia simus	dwarf sperm whale		M
	Physeter macrocephalus	sperm whale		M
		Cuvier's beaked whale		M

Key: K = Komodo, **P** = Padar, **R** = Rinca, **M** = marine

Terrestrial Plants

Family	Species	English	Indonesian	Use
Acanthaceae	*Asytasia* sp.			
Acanthaceae	*Barleria prionitis*			
Acanthaceae	*Blepharrs javanica*			
Acanthaceae	*Hypoestes populifolia*			
Acanthaceae	*Hypoestes rosea*			
Acanthaceae	*Lepidagathis backeri*			
Acanthaceae	*Strobilanthes* sp.			
Amaranthaceae	*Achyranthes aspera*			
Amaranthaceae	*Deeringra amaranthoides*			
Anacardiaceae	*Buchanania arborescens*			
Anacardiaceae	*Mangifera* sp.			
Anacardiaceae	*Spondias* sp.			
Anagraceae	*Ludwigia hyssopifilia*			
Annonaceae	*Annona squamosa*			
Annonaceae	*Uvaria rufa*			
Annonaceae	*Uvaria* sp.			
Apocaceae	*Ervatania* sp.			
Apocaceae	*Rauvolfia javanica*			
Apocaceae	*Voacanga* sp.			
Apocaceae	*Willaghbeia* sp.			
Apocynaceae	*Tabernemontana floribunda*			
Apocynaceae	*Wrightia pubescens*			
Aralaceae	*Scheffleras* sp.			

Arecaceae	*Arenga pinnata*			
Arecaceae	*Borassus flabellifer*	lontar palm	lontar	food,paper,roofing,building
Arecaceae	*Calamus* sp.			
Arecaceae	*Corypha utan*			
Arecaceae	*Rapidhopora* sp.			
Asclepiadeae	*Calotropis gigantea*			
Asclepiadeae	*Dichidia* sp.			
Asclepiadeae	*Telosma accadens*			
Asplenidae	*Asplenium nidus*			
Asplenidae	*Asplenium spp.*			
Asteraceae	*Blumea balsamifera*			
Asteraceae	*Eupatorium mulifolium*			
Asteraceae	*Pterocaulor cylindrostachjum*			
Asteraceae	*Pterocaulor spacelatum*			
Asteraceae	*Vernonia capitulifora*			
Asteraceae	*Wedelia montana*			
Azimaceae	*Azima sarmentosa*			
Bignoniceae	*Oroxylum indicum*			
Bombacaceae	*Bombax ceibada*		Kapuk hutan	food,medicinal,roofing
Borraginaceae	*Carmona retusa*			
Borraginaceae	*Trichodesma zeylanicum*			
Bursaceae	*Canarium sp*			
Cactaceae	*Opuntia migricans*			Rinca only
Caesalpiniaceae	*Caesalpinia bonducellaa*			
Caesalpiniaceae	*Cassia javanica*			
Caesalpiniaceae	*Cassia javanica*			
Caesalpiniaceae	*Lysiphllum binatum*			
Caesalpiniaceae	*Piliostigma malabaricum*			
Caesalpiniaceae	*Tamarindus indica/ indicus*	tamarind	asam	food,animal food, Komodo shelter
Cappaceae	*Capparis* sp.			
Capparaceae	*Cabada capparoides*			
Capparaceae	*Capparis seplaria*			
Capparaceae	*Capparis subaculata*			
Capparaceae	*Capparis sepiaria*			
Chenopodicae	*Salsola kali*			
Chenopodicae	*Tecticornia cinereae*			
Clusiaceae	*Calophyllum inophyllum*			
Clusiaceae	*Calophyllum spectobile*	wild kapok	gebang	medicinal, building
Clusiaceae	*Garcinia selatris*			
Clusiaceae	*Garcinia* sp.			
Combretaceae	*Lumnitzera racemosa*			
Combretaceae	*Terminalia zollingeri*			
Combretaceae	*Terminallia cattapa*			
Convolvulaceae	*Ipomeae gracilis*			
Convolvulaceae	*Ipomeae sp*			
Convolvulaceae	*Merremia densifora*			
Convolvulaceae	*Paederina foetida*			
Convolvulaceae	*Uncaria* sp.			
Cucurbitaceae	*Melothria*			
Cycadaeceae	*Cycas rumphiii*		Cicad, Cicus	food
Ebenaceae	*Diospyros javanicus*			
Ebenaceae	*Diospyros* sp.			
Ebenaceae	*Doryxylon* sp.			
Elaeocappaceae	*Elacocarpus sphaericus*			
Elaeocappaceae	*Elaeocarpus* sp.			

Euphorbaceae	*Cladogynos orientalis*			
Euphorbiaceae	*Euphorbia tirucalli*			
Euphorbiaceae	*Glochidion sp*			
Euphorbiaceae	*Jatropha curcas*		jarak	medicinal, use oil for flame
Euphorbiaceae	*Mellotus philipinensis*			
Euphorbiaceae	*Omalanthus giganteus*			
Fabaceae	*Acacia arabica*			
Fabaceae	*Acacia tomentosa*			Rinca only
Fabaceae	*Acacia* sp.			
Fabaceae	*Albizia chinensis*			
Fabaceae	*Albizia lebbekoides*			
Fabaceae	*Albizia* sp.			
Fabaceae	*Bauhimia* sp.			
Fabaceae	*Caesalpinia sappan*			
Fabaceae	*Caesalpinia* sp.			
Fabaceae	*Desmodium* sp.			
Fabaceae	*Entada* sp.			
Fabaceae	*Erythrina* sp.			
Fabaceae	*Mucuna* sp.			
Fabaceae	*Phanera* sp.			
Fabaceae	*Pithecellobium umbelatum*			
Fabaceae	*Saraca* sp.			
Icaceae	*Plateae* sp.			
Lamiaceae	*Callicarpa sappan*		sepang	
Lamiaceae	*Luececas javanica*			
Lamiaceae	*Ocimum sanctum*			
Lamiaceae	*Ocimum sanetum*	sanctum?		
Lauraceae	*Cassytha filiformis*			
Lauraceae	*Cinnamomum* sp.			
Lauraceae	*Lindera* sp.			
Lauraceae	*Litsea* sp.			
Lecythenaceae	*Planconia* sp.			
Malvaceae	*Abutilon atropurpurem*			
Malvaceae	*Abutilon muticum*			
Malvaceae	*Abutilon muticum*			
Malvaceae	*Doroxylon spinulosa*			
Malvaceae	*Gossypium acuminatum*			
Malvaceae	*Hibiscus tiliaceus*			
Malvaceae	*Malvastrum spicatum*			
Malvaceae	*Thespesia populneae*			
Meliaceae	*Dysoxylum* sp.			
Meliaceae	*Lansium* sp.			
Meliaceae	*Melia azedarach*			
Meliaceae	*Toona surenii*			
Moraceae	*Ficus fistulosa*			
Moraceae	*Ficus orupacea*			
Moraceae	*Ficus punctata*			
Moraceae	*Ficus septica*			
Moraceae	*Ficus variegata*			
Moraceae	*Ficus* sp.			animal food
Moraceae	*Machura* sp.			
Myristiaceae	*Ardisia humililis*			
Myristiaceae	*Knema* sp.			
Myrtaceae	*Syzygium* sp.			
Orchidaeceae	*Acampe* sp.			

Orchidaeceae	*Aerides spp.*			
Orchidaeceae	*Dendrobium crumenatum*			
Orchidaeceae	*Dendrobium linerifolium*			
Orchidaeceae	*Dendrobium spp.*			
Orchidaeceae	*Eria* sp.			
Orchidaeceae	*Pholidota imbricata*			
Orchidaeceae	*Polystachyia* sp.			
Orchidaeceae	*Pomatocalpa* sp.			
Orchidaeceae	*Pteroceras* sp.			
Orchidaeceae	*Saccolabium* sp.			
Orchidaeceae	*Sarcantus* sp.			
Orchidaeceae	*Sarcochillus spp.*			
Orchidaeceae	*Schoenorchis juncifolia*			
Orchidaeceae	*Tacophyllum hirtum*			
Orchidaeceae	*Taeiophyllum spp.*			
Orchidaeceae	*Thelasis trifolia*			
Orchidaeceae	*Thrixspermum spp.*			
Orchidaeceae	*Trichoglottis* sp.			
Orchidaeceae	*Vanda limbata*			
Orchidaeceae	*Vanda* sp.			
Oxilidaceae	*Brphytum sensitivum*			
Pandanaceae	*Pandanus* sp.			
Pandanaceae	*Pandanus tectorius*			
Papilionaceae	*Crolataria retosa*			
Papilionaceae	*Desmodium lasiocarpum*			
Papilionaceae	*Indigofera linifolia*			
Papilionaceae	*Psoralea corrylifolia*			
Papilionaceae	*Sesbania javanica*			
Papilionaceae	*Zornia retosa*			
Passiifloraceae	*Adenia het erophylla*			
Piperaceae	*Piper* sp.			
Poaceae	*Bambusa* sp.			
Poaceae	*Bambusa spinosa*			
Poaceae	*Brachiaria ramosa*			
Poaceae	*Chloris barbata*			
Poaceae	*Digitaria adscendeus*			
Poaceae	*Dinodoa sacandens*			
Poaceae	*Heteropogen contornus*			
Poaceae	*Imperata cylindrica*	alang	alang	
Poaceae	*Oplismenus compositus*			
Poaceae	*Scizostachyum* sp.			
Poaceae	*Spinifex littorius*			
Poaceae	*Spinifex litoralis*			
Poaceae	*Setaria adhaerens*			
Poaceae	*Setaria verticillata*			
Poaceae	*Themeda frondosa*			
Poaceae	*Themeda gigantea*			
Podocarpaceae	*Podocarpus nerifolia*			
Podocarpaceae	*Podocarpus* sp.			
Polyperaceae	*Nepllirolepis* sp.			
Rhamnaceae	*Zizphus horsfieldii*			
Rhamnaceae	*Zizyphus jujubi*	chinese apple	Bidara/jujubi	animal feed
Rhamnaceae	*Zizyphus rotundifolia*			
Rhizophoraceae	*Bruguiera* sp.			marine nursery, fuelwood
Rhizophoraceae	*Ceriops tagal*			marine nursery, fuelwood

Rhizophoraceae	*Ceriops condolleana*			
Rhizophoraceae	*Rhizopora mucronata*			marine nursery, fuelwood
Rhizophoraceae	*Rhizopora spp*			marine nursery, fuelwood
Rhizophoraceae	*Sonneratia alba*			
Rosaceae	*Rubus* sp.			
Rubiaceae	*Ixora* sp.			
Rubiaceae	*Paederina foetida*			
Rubiaceae	*Psychotria* sp.			
Rubiaceae	*Uncaria* sp.			
Rubiaceae	*Wendlandia densifora*			
Rutaceae	*Acronychia* sp.			
Rutaceae	*Citrus* sp.			
Rutaceae	*Glycosmis pentaphylla*			
Rutaceae	*Murraya paniculata*			
Salvadoraceae	*Azima sarmentosa*			
Sapindacea	*Allophyllus cobbe*			
Sapindacea	*Arytera xerocarpa*			
Sapindacea	*Schleichera oleosa*		Kesambi	food, building, fuel
Sapindaceae	*Mischocarpus sundaicus*			
Sapotaceae	*Mimusops elengi*			
Sapotaceae	*Palaquium* sp.			
Simarubaceae	*Harrisonia brownii*			
Slagnelaceae	*Slaginella* sp.			
Smilacaceae	*Smilax* sp.			
Solanaceae	*Daruta metel*			
Solanaceae	*Solanum junghuhnii*			
Solanaceae	*Solanum paniculata.*			fire adapted
Solanaceae	*Solanum verbascum*			
Sonneratiaceae	*Sonneratia alba*			
Sonneratiaceae	*Sonneratia caseolaris*			
Sterculiaceae	*Helieteres isoa*			
Sterculiaceae	*Pterospermum diversifolium*			
Sterculiaceae	*Pterospermum javanicum*			
Sterculiaceae	*Sterculia foetida*		Kepuh/kelumpang	food
Tiliaceae	*Colona* sp.			
Tiliaceae	*Grewia microcos*			
Tiliaceae	*Microcos paniculata*	Microcos		
Tiliaceae	*Microcos tomentosa*			
Tiliaceae	*Schotenia ovata*			
Tilifaceae	*Colona kostermansiana*			
Ulmitaceae	*Celtis* sp.			
Urtaceae	*Debregeasia* sp.			
Urtaceae	*Laportea stimulans*			
Urtaceae	*Pilea* sp.			
Urtaceae	*Villebruneae rubescens*			
Verbenaceae	*Avicennia marina*			
Verbenaceae	*Avicennia alba*			
Verbenaceae	*Clerodendrum inerme*			
Verbenaceae	*Gmelina* sp.			
Verbenaceae	*Vitex pubescens*			
Vicadacae	*Sensuvium portolacastrum*			
Zingiberaceae	*Zingiber* sp.			
	Pogonaterum tamborensis			
	Roffbachia eselbata			

???	*Moringa pterigosperma*	Pipe	decoration
???	*Garuga floribunda*	Kedongdong Hutan	food

Seagrasses and Seaweeds

Family	Species	Use
SEAGRASSES:		
Hydrocharitaceae	*Enhalus acoroides*	
	Halophila ovalis	
	Halophila minor	
	Thalassia hemprichii	
Cymodoceaceae	*Cymodocea rotundata*	
	Cymodocea serrulata	
	Halodule pinifolia	
	Syringodium isoetifolium	
SEAWEEDS:		
Div. Chlorophycophyta	*Boodlea composita**	
	Caulerpa brachypus	
	Caulerpa lentillifera	food
	Caulerpa peltata	food
	Caulerpa racemosa	food
	Caulerpa sertularioides	
	Caulerpa taxifolia	
	Caulerpa sp.	
	Dictyosphaeria cavernosa	
	Halimeda macroloba	
	Halimeda opuntia	
	Halimeda tuna	
	*Halimeda velasquezii**	
	Neomeris vanbossae	
	Ulva lactuca	food, high nutrient indicator
	Ulva reticulata	food
	Valonia aeggagrophila	
	Valonia ventricosa	
Div. Phaeophycophyta	*Dictyota dichotoma*	
	Padina minor	
	Padina sp.	disturbance indicator
	Sargassum sp.	alcohol, animal feed
	Turbinaria conoides	alcohol, animal feed
	Turbinaria ornata	alcohol, animal feed
Div. Rhodophycophyta	*Acanthopora specifera*	industry (carageenan)
	Actinotrichia fragilis	
	Amphiroa fragillissima	
	Ceratodict. spongiosum	
	Corallina sp.	
	Eucheuma spinosum	food, industry (carageenan)
	*Eucheuma cottonii**	food, industry (carageenan)
	*Euch. Denticulatum**	food, industry (carageenan)
	Eucheuma sp.	food, industry (carageenan)
	Gelidiella acerosa	agar
	Gracilaria coronopifolia	agar
	Gracilaria salicornia	agar
	Gracilaria sp.	agar
	Hypnea sp.	industry (carageenan)
	Jania sp.	
	Kappaphycus alvarezii	food, industry (carageenan)
	Laurencia sp.	
	Liagora sp.	
	Vanvoorstia sp.*	

***** tentative identification, needs confirmation