Feasibility for a Community-Based Wildlife Monitoring System for the Srepok Wilderness Area, Cambodia

Richard Diggle

May 2006

iied
International Institute for Environment and Development

WWF
for a living planet®

Executive Summary

The Srepok Wilderness Area (SWA) project involves the Cambodian government, international NGO's, private sector and rural communities. The area falls within the Mondulkiri Protected Forest and is considered a high biodiversity priority. Uncontrolled hunting has decimated the wildlife, such as tiger, wild water buffalo and elephant. The project's primary purpose is to restore the once abundant large mammal populations and involved a number of components to address such factors as: local poverty, lack of local awareness, uncontrolled and over-exploitation, migration of non-resident people, government staff capacity building, lack of monitoring of wildlife, lack of protected area management planning and infrastructure development. Given the area's similarities with Southern African, i.e. large mammals, dwindling wildlife populations, and increasing human pressures, the SWA project is a pilot for implementing the Southern African approaches to sustainable utilisation of wildlife and community participation.

A key component of the project involves monitoring wildlife numbers, and law enforcement through ranger patrols. During the first two years the project deployed a combination of field monitoring techniques; infrared-based camera-traps and conventional patrolling. The data has confirmed the presence and distribution of a number of priority species, such as tiger and wild water buffalo, has monitored the types and numbers of illegal activities, and recorded the patrolling efforts. It is currently too early, (and in some cases data is inadequate), for trends or indices to be detected.

One objective of the project is to involve local communities in monitoring biodiversity, potentially through the establishment of a community-based monitoring system. Current monitoring techniques do not involve local communities directly, although the majority of rangers working for the project are from local communities, and are not government employees. The project is therefore considering using a devolved monitoring process first developed in Southern Africa called MOMS (**M**anagement **O**riented **M**onitoring **S**ystems). The process involves field staff and community members in designing a monitoring process and undertaking the data collection, recording and analysing with minimal support from external or senior technicians. It is a simple and cost effective approach that was initially developed for community managed conservation areas that have limited long term funds and resources to conduct high-tech monitoring systems. The paper based system provides sufficient data to guide management decisions and is ideally suited to: build capacity of field staff; stimulate discussion amongst local resource users; and encourage local participation. The MOMS process ensures that the monitoring objectives are clear, that the expectations and information needs are met, and that the end user of data is identified. The approach has been adopted with good results in the communal areas of Namibia and been expanded to other state protected areas in Namibia, Zambia, Botswana, and Mozambique.

Based on the Namibian experience of using MOMS as a catalyst to engage community support and involvement for conservation programmes, there is sufficient justification to warrant the deployment of an adapted MOMS version in the SWA. Specifically, the MOMS approach is ideally suited to meet one of the three objectives of the project: "To establish community-based monitoring of indicator species in order to track the progress of wildlife restoration and inform natural resource management efforts". It is

recommended that the project initially consider using MOMS only for those issues that can maximise the engagement of communities and for the time being leave the majority of monitoring of wildlife to MIST.

In the event that the project decides to implement a revised version of MOMS and the issues raised are satisfactorily resolved amongst all the partners, this feasibility report offers suggestions and a set of next steps. Each point is based on lessons learnt from personal experience on implementing a MOMS version in Namibia and on conducting a field visit to SWA. The general recommendations of this study are to:

1. *Define a monitoring strategy* – including identifying information flows and roles and responsibilities of project staff;
2. *Prioritise what needs to be monitored* - prioritise measures based on applicability to overall project goals and simplicity of implementation;
3. *Community involvement* - develop the capacity of community rangers already employed by the project, and increase community involvement and awareness of MOMS;
4. *Complement MIST* - MOMS should complement the nationally used MIST system, i.e., by focusing more on community and livelihoods issues than biodiversity. MOMS should also not add too much of an extra work load on rangers;
5. *Implement in each ranger outpost*- each outpost and ranger team in the SWA should have a clearly identified data filing system and would be responsible for data collection and analysis;
6. *Conduct study tour to Namibia* – providing an excellent opportunity to see MOMS being implemented first hand, and to learn from communities and protected area staff;
7. *External technical support* – maintain regular contact with MOMS designers from Namibia and utilise their technical expertise, especially during set up of MOMS in SWA;
8. *Timeline for implementation* – it is recommended that the MOMS is established over a 2 year phase with the aim of full implementation by the beginning of year 3;

Acknowledgments

This study was commissioned by IIED in collaboration with the WWF Conservation Programme in Cambodia as part of their efforts to restore the large mammal species in the Srepok Wilderness Area in Northeast Cambodia. I would like to thank all of those who have facilitated this study. Many people have generously contributed their time with ideas and material; a detailed list of contributors is provided in **Appendix 2** of the report. I would further like to acknowledge the staff of the WWF Cambodia office and the field staff in the Srepok Wilderness area who have all been very helpful, in particular Martin von Kaschke for hosting me on the field trip to the Srepok Wilderness Area and Seng Teak and Nick Cox for their ideas and time.

The study has drawn on published literature and internal reports which are referred to at the end of the report. Particular recognition goes to Greg Stuart Hill who has developed and supplied all the MOMS materials and has been its primary architect. Ivan Bond also deserves special thanks for commenting on early drafts and guiding the final product.

Table of Contents

List of Figures

List of Tables

List of Appendices

1 Introduction

A consortium made up of NGOs, government and private sector has identified the Mondulkiri Forest landscape in Northeast Cambodia as a high biodiversity priority. The area falls within WWF Global Ecoregion No. 54: the Lower Mekong Dry Forests. A project has subsequently been developed to protect the most important features of this landscape resulting in the establishment of the Srepok Wilderness Area (SWA) project in 2003 covering 402,392 ha. WWF Cambodia has entered into a 4 year cooperation agreement with the Ministry of Agriculture Forestry and Fisheries to assist the Cambodian Government with the management of the SWA. The project has a strong community based component with a view to increasing the success in conserving the biodiversity and broad habitat units within the protected landscape.

IIED, an independent, UK based non-profit organisation that promotes sustainable development, has, as one of the WWF Cambodia partners, successfully applied for a grant from the Darwin Initiative[1] to support the SWA project. The purpose of the grant is to secure community access to benefits generated through sustainable wildlife tourism in the SWA, based on the long term viability of key species. With the support of the grant, IIED will make use of best practises learnt from tourism development and community-based monitoring systems in southern Africa and build on those experiences in this project.

This consultancy, commissioned by IIED (see Appendix 1 for terms of reference), explores the feasibility and potential of a devolved monitoring system for SWA with the aim of:

i. Strengthening protected area management practices;
ii. Improving local awareness of key natural resource management issues, and;
iii. Increasing local level capacity in natural resource management.

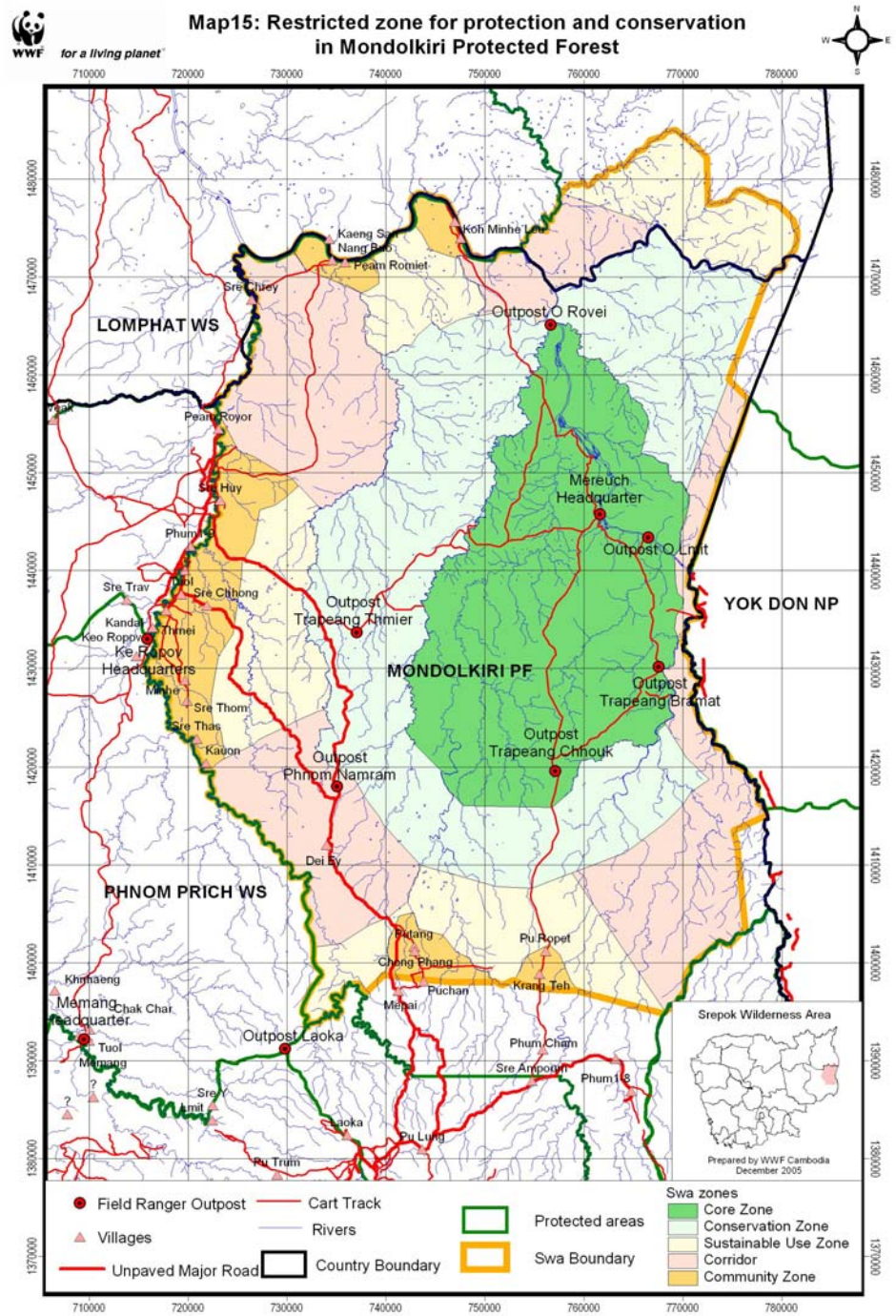
To kick-start thinking among the partners of the project, the MOMS (**M**anagement **O**riented **M**onitoring **S**ystem) approach is being used as a model for the SWA project to consider adopting, albeit a revised version. MOMS can be described as a devolved conservation monitoring system and has been used in different contexts in various southern Africa countries. During this consultancy, lessons learnt and best practices refer to a Namibian version of MOMS called the 'Event Book'; a system specifically developed for the empowerment of rural communities' in natural resource management.

This report starts with an overview of the project site providing factual background on the economic and environmental status of Cambodia. This is followed by a description of the biodiversity importance of the Srepok Wilderness Area and how by using a southern African sustainable utilisation management model the project seeks to include local communities in order to restore the natural resource status. The project structure and monitoring systems used to date are reviewed and is followed by a description of the MOMS approach developed for Namibian communities. Finally in the remaining two sections the report considers some of the prerequisites necessary for a MOMS approach

[1] The Darwin Initiative is a small UK government grant programme that promotes biodiversity conservation and sustainable use of resources around the world and is funded and administered by the UK Department for Environment, Food and Rural Affairs (DEFRA).

to work in the SWA and offers suggestions on how the SWA project could introduce a version of MOMS.

Figure 1: Map of the Srepok Wilderness Area



2 Description of Project Site

1.1 Cambodia's Economy and Environment

Situated at the heart of Indochina, Cambodia is a relatively flat, low-lying country dominated by the Mekong River that flows from Laos in the north to Vietnam in the south east and Tonle Sap (Great Lake) a vast lake lying in the central plains. Totalling 181,035 km2 (roughly one-third larger than England) Cambodia shares land borders with Laos to the northeast, Vietnam to the east and Thailand to the north and west. Cambodia has a 443 km coastline in the south. The government is a multiparty democracy under a constitutional monarchy established in September 1993. The population is estimated at 12,558,000 (2003) of which 1,157,000 live in the Phnom Penh, the capital. For administration purposes the country is divided into 20 provinces and 4 municipalities; the provinces being sub-divided into communes made up of villages.

In 1999, the first full year of peace in three decades, the government began to make progress on economic reforms. From 2001 to 2004, the economy grew at an average rate of 6.4 percent, driven largely by an expansion in the garment sector and tourism, yet in 2005 due to Chinese competition in the garment sector, this slowed to an estimated 3.8 percent. The tourism industry continues to grow rapidly, with foreign visitors surpassing one million for the year by September 2005. However, the long-term development of the economy remains a daunting challenge. More than 50 percent of the population is 20 years old or younger. The population lacks education and productive skills, particularly in the poverty-ridden countryside, which suffers from an almost total lack of basic infrastructure. It is estimated that 75 percent of the population remains engaged in subsistence farming (http://www.odci.gov/cia/publications/factbook/geos/cb).

The poor economic conditions are being compounded by the ongoing loss of biodiversity in the country. Over the past thirty years large-scale logging has persisted throughout much of Cambodia; estimates put the national reduction in forest cover at around one-third since 1970. The abundance of most large species has declined drastically through illegal hunting and loss of forest cover. Steps to improve the national conservation status have been adopted and aim to conserve viable populations of priority species and support economic development through sustainable natural resource use levels. The government has designated 23 protected areas across the country, which affords official protection to around 17 percent of Cambodia's terrestrial territory. The various levels of protection include national parks, multiple use areas, and wildlife sanctuaries.

1.2 Mondulkiri Protected Forest

The Mondulkiri Protected Forest (429,462 ha) was proclaimed by The Royal Government of Cambodia in July 2002 by Prime Ministerial Sub-decree. The area, which falls under the mandate of the Ministry of Agriculture Forestry and Fisheries (MAFF), is considered an important representative sample of the Lower Mekong Dry Forest Ecoregion. This is one of the WWF's Global 200 priority ecoregions (No. 54). These Dry Forests are generally open, typically dominated by deciduous dipterocarp forest (DDF) tree species and once supported a large mammal community, comparable to the wildlife typically found in the African savannah systems (Tordoff *et a*l 2004, Goodman *et al* 2003). The forests are home to a range of mammals, birds and reptiles that are considered globally threatened. Appendix 3 provides a list of priority species defined in a report that

summarises the findings on the globally significant conservation priorities in the Lower Mekong Dry Forests (Tordoff *et a*l 2004).

As a result of widespread poverty and lack of awareness regarding the importance of a balanced ecosystem there is increasing pressure from residents and migrants living on the borders of Mondulkiri Protected Forest. Loss of forest cover and encroachment on previously uninhabited forest, combined with the several years of national and regional turmoil, has has resulted in serious threats to its fauna and flora. Shifting cultivation and small scale illegal logging appear to be major drivers resulting in the fragmentation of habitat into blocks too isolated to conserve populations of many of the priority species. The situation is compounded by illegal subsistence and commercial hunting which is considered by the project to pose the greatest immediate threat to wildlife in the forests. People hunt for local consumption, internal meat and pet markets, and supply international wildlife trade[2], primarily via Vietnam to China. Importantly, not enough information is known about the specific source of these threats; particularly with regard to scale and types of threats distinguishable by the different ethnic groups inhabiting the area. While local Phnong are almost certainly contributing to the problems affecting local biodiversity, this change in behaviour has most likely been brought about through increased competition for resources by recently settled Cham communities. The Cham settlers are taking advantage of increased access brought about by the newly upgraded Highway 78 running north to south through the centre of Mondulkiri province and straight through the western section of Mondulkiri Protected Forest. Phnong traditions are closely tied to sustainable use principles. The concern is that these traditions are at risk of being rapidly eroded through increased competition with Cham settlers.

1.3 Srepok Wilderness Area Project

In response to these threats the Srepok Wilderness Area was identified in 2003 as a project site within Mondulkiri Protected Forest. The site was believed to represent the best combination of biodiversity conservation importance, ease of project management, and potential for tourism. A partnership was formed to support Forestry Administration (a department in the Ministry of Agriculture Forestry and Fisheries) with WWF Cambodia acting as the project coordinator. The partnership is supported with funding from WWF Netherlands, Habitat Group Empresarial (via WWF International) and Darwin Initiative (via IIED). Technical support is available from WWF International, IIED, and when the tourism development begins from Habitat[3]. The primary purpose of the project (see Figure 2 for project objectives) is to strengthen protected area management practices, increase community participation, and to ensure local economic development. The project will seek to address the unsustainable livelihood activities that threaten the forests, and contribute to the welfare of the local communities through sustainable land and resource usage.

Figure 2: Project Objectives of a WWF International Proposal for SWA

- To improve natural resource management through increased community participation in natural resource use decision-making and to ensure access and sharing benefits of the associated economic benefits;
- To initiate wildlife ecotourism activities in the Srepok Wilderness Area (SWA) and to provide a model for the development of sustainable ecotourism activities elsewhere in Cambodia;
- To establish community-based monitoring of indicator species in order to track the progress of wildlife restoration and inform natural resource management efforts.

In the project design document (Goodman *et al* 2003) it was proposed that the area be zoned into five sections (Figure 1). Within the heart of the Mondulkiri Protect Forest is the Core Protection Zone (90,734 ha) that permits no extractive use (resin collection being an exception) and no permanent settlement except for management employees. Instead, low impact high quality tourism development is envisaged. During the site selection and planning of 2003, conservative estimates were made of the population of large herbivores in the core area (Table 1). Based on two years' work in the wilderness area, resulting in live and spoor sightings and camera-trap photographs, some estimates have been made by the project Technical Advisor (Martin von Kaschke) for some of the species. However both the project selection and planning report (Goodman *et al* 2003) and the T.A stress that these are working estimates only and should not be used for status and reporting without considerable verification. The fallibility of the data stresses the importance of collecting data to indicate status and trend of species.

Table 1: Estimates of large herbivore species residing in Core Protection Zone

Species	Goodman *et al 2003* Carrying Capacity Estimate	Goodman *et al* 2003 Estimates	von Kaschke 2006 Estimates
Wild Water Buffalo	1000	10	40
Eld's Deer	5000	10	30-40
Wild pig	1500	240	
Elephant	250	10	
Gaur	1000	40	150
Banteng	4500	60	400
Muntjac	2300	500	
Sambar	2700	30	
Leopard			20
Tiger			4

The Sustainable Use Zone is divided into two sub zones. The Low Impact Zone (114,623) is the immediate buffer that largely surrounds the Core Protection Zone and where limited resource use can be allowed but where economic return from wildlife should be maximised. The High Impact Zone (76,712) is an area that can be used to maximise sustained harvests from permitted resources. The zone includes the Srepok River and hook and line can be allowed under permit but not gill netting. No permanent settlement is allowed except for management employees.

The Corridor Zone (90,605) is designed to act as a wildlife connector between the core and sustainable use zones of adjacent protected areas: Lomphat Wildlife Sanctuary, Phnom Prich Wildlife Sanctuary, and Phnom Nam Lyr Wildlife Sanctuary (and Yok Don

National Park in Vietnam). Various levels of controlled and sustained use are permitted provided it does not compromise the primary functional role of the zone.

The Community Zone (29,718) is specifically intended to accommodate the local communities living around the Mondulkiri Protect Forest. There are three community clusters with each comprising of villages and Communes (a sub administration unit that falls under Mondulkiri Province). The communities are allowed to conduct intensive agricultural activities in this zone and do have domestic animals. Table 2 presents a summary of people (including local residents and migrants) living around Mondulkiri Protected Forest (MPF). (See Appendix 4 for details on population numbers and village names as collected by the Community Extension Team during 2005). Note that an inflow of migrants have and will increase the numbers of families in all the clusters, increasing pressure on surrounding natural resources.

Table 2: Summary of the demographics around the MPF

Clusters	No. of Communes	No of Villages	No. of Families
Northern Cluster	1	4	458
Western Cluster	5	22	2,187
Southern Cluster	1	4	331
Total	**6**	**30**	**2,976**

While all zones have been delineated, the exact boundaries, with exception of the Core Protection zone are negotiable and need to be delineated in collaboration with local communities.

Based on the similarities between SWA and southern African, i.e. large free ranging mammals, dwindling species population and socioeconomic setting, the conservation and sustainable use models applied in southern Africa are considered to be appropriate. With this in view the project, entitled "Wildlife Conservation by Sustainable Use", will test the sustainable use approach[4] in a Cambodian context. An important component is developing a devolved monitoring system in order to track the progress of project management and increase community awareness and support for the forest area.

1.4 Project Organisational Structure

The project is divided into four organisational units. (See **Appendix 5** for Srepok Wilderness Area Project Organisational Chart). The Protected Forest Conservation and Law Enforcement Unit was established first. In the first two years they have hired, equipped and provided training for 22 rangers. The rangers are mostly selected from the communities by the project, with the border police and Forestry Administration–Wildlife Protection Office, seconding selected personnel who team up with the community rangers. The unit has built a headquarters at Merouch and has completed construction on three other outposts; a fourth one is being completed (see Figure 1 map of outposts). The outpost, equipped with radios linked to Merouch, act as a permanent base for the rangers. Other equipment includes two vehicles, seven motor bikes and three boats. In 2003 a regular daily patrol system was put in place, some on foot, some on elephant and others

[4] The project is currently in its second funding phase (the first phase was to identify and initiate the project) and is expected to end on the 30th June 2009. It is recognised by the project implementers that a further funding phase will be required if the long term goals are to be achieved.

on motor bike with the primary aim of determining the presence of wildlife, protecting the remnant populations of priority species, and in deterring illegal and unsustainable activities. In the first two years patrolling was concentrated within the inner core zone of the Protected Core Zone. The result was increased sightings of priority species and numerous apprehensions of illegal activities, including one shooting conviction.

The project has also established a Community Extension Team (CET) with a view to collecting crucial livelihoods data, and to promote positive attitudes amongst local people towards conservation. A five member team has been hired and is working in the three community clusters within the Community Zones of SWA. The team will use a combined approach to promote livelihood alternatives and to engage local communities with the management of SWA. The activities of the CET are still in their early stages though on schedule according to the project work plan. At the time of writing, they were holding their first awareness meeting on the SWA project with community elders representing the Commune Council. The CET were also conducting a survey to help identify which communities pose the greatest threats to the SWA in order to prioritise the areas in which to begin community extension work. Their approach will be to assist the chosen villages to form representative NRM committees that can negotiate and co-manage NRM issues with the SWA project.

Neither the Research, Monitoring, Data Management and Training Unit or the Ecotourism Unit have yet been established. The Ecotourism Unit plans to recruit in 2007/8 or when the project decides to implement its tourism development plans while the Research Unit will recruit when additional funds are made available. In the meantime responsibility for the monitoring and training is currently being managed by the Technical Advisor with the GIS department in WWF Cambodia providing support for the data management.

2 Monitoring Efforts of the Project

Monitoring is a process of providing data to evaluate and communicate performance. The information can provide managers with a tool to gauge project progress and assist with management decisions, and, when well crafted, reports can inspire and motivate employees and generate awareness and support from interested and diverse stakeholders. The importance of monitoring has been clearly established by the WWF project in project proposals with the following stated aim: "*to establish community-based monitoring of indicator species in order to track the progress of wildlife restoration and inform natural resource management efforts*". While a range of components that need to be monitored have been identified, such as rainfall and burning, the most pressing and immediate component is on the conservation of the larger mammals. It is envisaged that the recovery of these species will help underpin the success of the planned tourism development in the SWA which is seen as contributing towards both the conservation and rural development goals.

Despite the initial focus on building up project infrastructure and hiring of rangers, the project has also had time to set up monitoring techniques to record wildlife observations, illegal activities and patrolling efforts. This section provides a short review on:

i. How the monitoring and reporting is done, i.e. *the process*.
ii. What is monitored and for whom, i.e. *the product*.

2.1 Wildlife Abundance Surveys

The data collected for this monitoring component is mainly collected during foot patrols and in the wet season by elephant patrols (incidental observations from any reliable staff or contract staff member) with the primary objective of establishing indices of abundance and distribution. Determining actual estimates of population size is extremely difficult because of the low animal populations. By standardising the patrol routes, collection of data and measurements of patrol effort the project should be able to determine the spatial and temporal trends of key species. Incidental observation records are also collected by staff whilst going about normal daily activities which should add to the knowledge of the distribution and age structure of the animal populations. The value of all data is dependent on the skill and training of the rangers in identifying spoor and other signs and recording it diligently in the database that converts data into information and reports.

'Goodman' Observation Forms

The formative stage of the project used Wildlife and Illegal Observation forms (Figure 3). The forms originated from those developed for the Akagera National Park, Uganda and were recommended by the project selection and planning report (Goodman *et al* 2003). Basic formal and on-site training for using the forms was provided. Two years worth of data has been collected on key indicator species, illegal activities and patrolling efforts.

Figure 3: Wildlife and Illegal Activity Observation forms initially used by the project

Wildlife Observation

Patrol No.: _____ Wpt No.: _____
Date: _____ Time: _____

Observer/s: _____

Species: _____ Seen/Spoor/Dung/Carcass

	Juv	Sub-Ad	Adult	Unkn	Total
♂					
♀					
Unkn.					

Location: (S) _____ (Y)
(E) _____ (X)
Place Name: _____
If Mortality then: Time since death: ___
Cause of death: _____
If Predator then: Seen /Spoor
Problem Animal:
Complainants Name: _____
Remark: _____

Illegal Activity Observation

Patrol No.: _____ Wpnt No.: _____
Date: _____ Time: _____

Observer/s: _____
Illegal Activity: _____
Location: (S) _____ (Y)
(E) _____ (X)
Place Name: _____
Poachers caught: Y/N Origin: _____
Number: _____
Poaching Method (#): _____
Confiscations (#): _____
Other quantities: _____
Remarks: _____
_____

The following points on the monitoring process were noted during a field visit to SWA:

i. Data for two years has been collected and entered into an excel spread sheet .
ii. Distribution maps for wild cattle species (water buffalo, gaur and banteng) have been produced by the GIS department of WWF Cambodia. This has allowed the project to confirm the spatial presence of priority species.
iii. The patrolling presence of the rangers has been mapped and used by the Technical Advisor and Project Officer to help plan future patrols.
iv. With the exception of GIS mapping, there was no dedicated database programme or technician to undertake the data processing. As a result no trend reports have been produced for project management.

v. The forms used were developed for monitoring of an African park and no adoption and refinements were made to meet the specific needs of the project.
vi. According to the rangers, they found the forms cumbersome to fill out and after initial use, the Wildlife Observation Record Form doubled up as the Illegal Activities Record Form.

After two years the project evaluated its methodology and decided to change their monitoring approach to one that is more suitable for their management needs. The reason given for the change was that there was no dedicated database programme for the 'Goodman' forms and the results of monitoring were not being regularly returned to the rangers.

Spatial Management Information System (MIST)

In January 2006, the project introduced MIST, a spatial **M**anagement **I**nformation **S**ys**T**em developed for Akagera National Park in Uganda. The Wildlife Conservation Society (WCS) has adapted the original MIST version to suit the needs of the Cambodian situation. Data collected includes the location, date and time of effort and incident, the animal signs, human activities (whether illegal or not) and action taken when enforcing the law (Figure 4).

The data collected is converted into spatial and trend reports using the recorded GPS coordinates and a computer database programme. The report provides the manager with a standardised description, presence, distribution, and indices report of illegal activities and key species. It calculates the level of effort that includes number of patrols, time taken, and areas covered (see Appendix 6 for example of MIST report). It is based on a systematic, rigorous and standardised approach that (depending on the rangers' skills) should provide useful data on unlawful activities and wildlife presence, abundance and trend as well as monitoring the efforts of patrol activities.

In their most recent formal training (January 2006) 16 SWA rangers were given training in data collection for the new systems, including GPS, map reading and data recording. The immediate apparent advantages (no data yet collected and processed) of MIST are:

i. Customized database system that converts the collected data into reports,
ii. Formal training process designed for MIST,
iii. Sharing of experiences and best practices with WCS (MIST being used in other conservation project areas).

Figure 4: MIST forms

Patrol Movements

Site: Date: Patrol ID: Page …….. of ……..

Recorder: No People Transport

Run No	Time	Waypoint	Location	UTM- E	UTM-N	Observation	Observation Type	Number	Habitat	Notes

Observation: mammal, bird or reptile species; human activities: hunting, fishing, logging, land clearance, other/unknown; Feature: camp, saltlick, trapeang, village, seasonal village, road, bridge

Observation Type: animals: sighting, footprint, dung, call, scratch, nest, carcass; human activities: direct evidence (people), sign (no people)

Habitat: 1: primary forest with good visibility, 2: primary forest with low visibility, 3: secondary forest with good visibility, 4: secondary forest with low visibility, 5: grassland, 6: field/clearcut

Transport: foot, motorcycle, vehicle, none (fixed point), other (describe)

Patrol Code: _____ Waypoint: _____ Village: _____ Commune: _____

Protected Forest ☐ Concession ☐ Other: _____ Traditional Use ☐ Exploitation ☐

Human	Name: _____ Race: _____ Age: _____ Male ☐ Female ☐ Notes: _____ Local People ☐ Military ☐ Police ☐ FA ☐ PM ☐ Other: _____ Armed ☐ Seen, not Caught ☐ Confronted ☐ Warning Letter ☐ Taken to Police ☐ Re-Offender ☐
Fauna	Species: _____ Live ☐ Dead ☐ Parts ☐ Notes: _____ Confiscated ☐ Destroyed ☐ Number of Carcass: _____ Cause of Death: _____ Notes: _____
Flora	Species: _____ No pieces: _____ Total Amount (m^3): _____ Found ☐ Confiscated ☐ Destroyed ☐ Notes: _____
Weapon	Ammunition ☐ Weapon: ☐ Heard ☐ Observed ☐ Confiscated ☐ Notes: _____ Automatic Rifle ☐ Single Action Rifle ☐ Shotgun ☐ Hand Grenade: ☐ Other: _____
Material	Wire Snare ☐ Wire Tiger Snare ☐ Chainsaw ☐ Axe ☐ Other: _____ Confiscated ☐ Destroyed ☐ Notes: _____
Transport	Bicycle ☐ Bike ☐ Truck ☐ Other: _____ Confiscated ☐ From: _____ To: _____ Make: _____ Color: _____ Plate Number: _____ Notes: _____
Camp	Occupied ☐ Recently Abandoned ☐ Old, Abandoned☐ Unknown ☐ Notes: _____

There are three areas of concern with MIST. Firstly, it requires a skilled and dedicated technician to manage and process the data and return reports to interested stakeholders in the field on a regular basis. Secondly, there has been some refinement of the MIST data base in the Cambodian programme, it has not been refined for the needs of SWA, and according to WCS there will be little if any further flexibility in making changes and additions to the MIST system in the near future. Thirdly, without the possibility of further refinement it is unlikely that information will be presented to rangers and community members in a way that will encourage them to engage in analysing and debating trends and developments. Therein lies part of the justification for a simplified, yet complementary, monitoring system.

2.2 Village 'Tiger Contacts'

Two people have recently (November 2005) been selected from surrounding villages to serve as the project's 'Tiger Contacts'. They have been asked to gather and record all information in the villages related to tigers (and other species) throughout the year. Data will be collected on a semi-annual basis by the project staff and stored at the Merouch HQ and WWF Cambodia GIS Unit. The data should update the project on the diversity and distribution of tigers in SWA, which could help to improve management, planning and decision making of the protected area. The 'Tiger Contacts' are a useful way to involve communities with the project. Since their temporary employment no information has yet been collected to review its usefulness.

2.3 Camera-traps

The project has deployed 12 infrared-based camera traps of which four are reported to be beyond repair, two were burnt and one stolen. This leaves five remaining in the field with four new units on order. The purpose of the cameras is to confirm the presence of rare species that would not normally be detected by direct observation methods e.g. tiger. The camera sites are moved depending on spoor sightings or other evidence of wildlife presence. Once the methodologies in deploying the camera traps are standardised with data being recorded on datasheets, the information could help determine change in abundance for some of the species. Tiger numbers and possibly some of the other mammals are too low to provide much trend data and is compounded by having so few cameras deployed. However the photographs do give an indication of presence and distribution. The photographs of rare species are useful for attracting the interest and support of donors and government officials for the SWA and importantly for boosting the morale of project staff, including the rangers.

2.4 Summary

The implementation of a field based monitoring system is not an easy undertaking particularly at an early stage of a project, when there seem to be many other pressing priorities. Rangers have been gradually hired over a two year period, and all have to be trained to ensure that reliable data is collected. The management and processing of data collected required software and human resources unavailable in the early stages of the project. Similar problems may be encountered in managing and applying the MIST data if the project does not put in place a unit dedicated to providing the necessary technical support. With the possible exception of the spatial maps, the project staff are not receiving regular reports (species trends, illegal activities, and patrol efforts) thereby restricting the value of data collected and their ability to review the effectiveness of project efforts and decision making.

The project has been able to confirm the spatial presence of species. The information has generated excitement and interest from both government and partners fuelled by the maps and photographs produced. Later in the year there is also the possibility of having trends and indices information from the data currently recorded in excel sheets; though this will only happen once the MIST database programme has been set up. That this is not immediately available is not serious as trend data is more useful when collected over a number of years.

3 The Management Oriented Monitoring System Approach

3.1 CBNRM in Namibia

In 1999 rural communities in the northeast of Namibia in Caprivi approached NGOs for assistance in establishing a monitoring system to support them in managing their newly acquired rights over the natural recourses, in particular wildlife. Legitimising community involvement was made possible by Namibian legislation, passed in 1996. This allowed for the establishment of rural conservancies with certain rights being devolved to the residing communities that allowed them to manage wildlife and become beneficiaries. The communal area conservancy, a community-based natural resource management programme that is supported by government and conservation NGO's in Namibia, is the legal vehicle which unlocks opportunities for local economic benefits and promotes the concept of locally driven conservation and self-development.

In return for the rights, the communities are required to assume responsibilities and be held accountable to their members and government in implementing a sustainable natural resource management strategy. To provide community members with tools that assist with measuring output, managing inputs, and communicating results, a monitoring approach was specifically designed that could cope with some of the elements that a more conventional monitoring could not. The approach has been named as a management orientated monitoring system or in short MOMS (Stuart-Hill *et al* 2005) though other similar initiatives do exist (e.g. Danielsen *et al* 2000, Danielsen *et al* 2005).

3.2 Characteristics of MOMS

MOMS methodologies

MOMS has developed a set of specific methodologies that places emphasis on devolvement and empowerment at field based levels while retaining rigour and value of data collected. The first step was to clarify with the users and collectors the purpose of the data through a process of asking why, what, when and how and then to ensure that the chosen data is aligned with the management plans. To help facilitate this process a mind map was used (Figure 5).

The second step was to design data forms and a methodology of data collection (Figure 6) and then prioritise what should be monitored and which forms were to be used. For both steps it is important that the staff who are responsible for and are involved in the collection of data are the those that work through the tasks until they develop a system they are happy with. This encourages a sense of ownership as well as ensuring that what was introduced was practical and fully understood by the users.

Figure 5: Example of a MOMS mind map

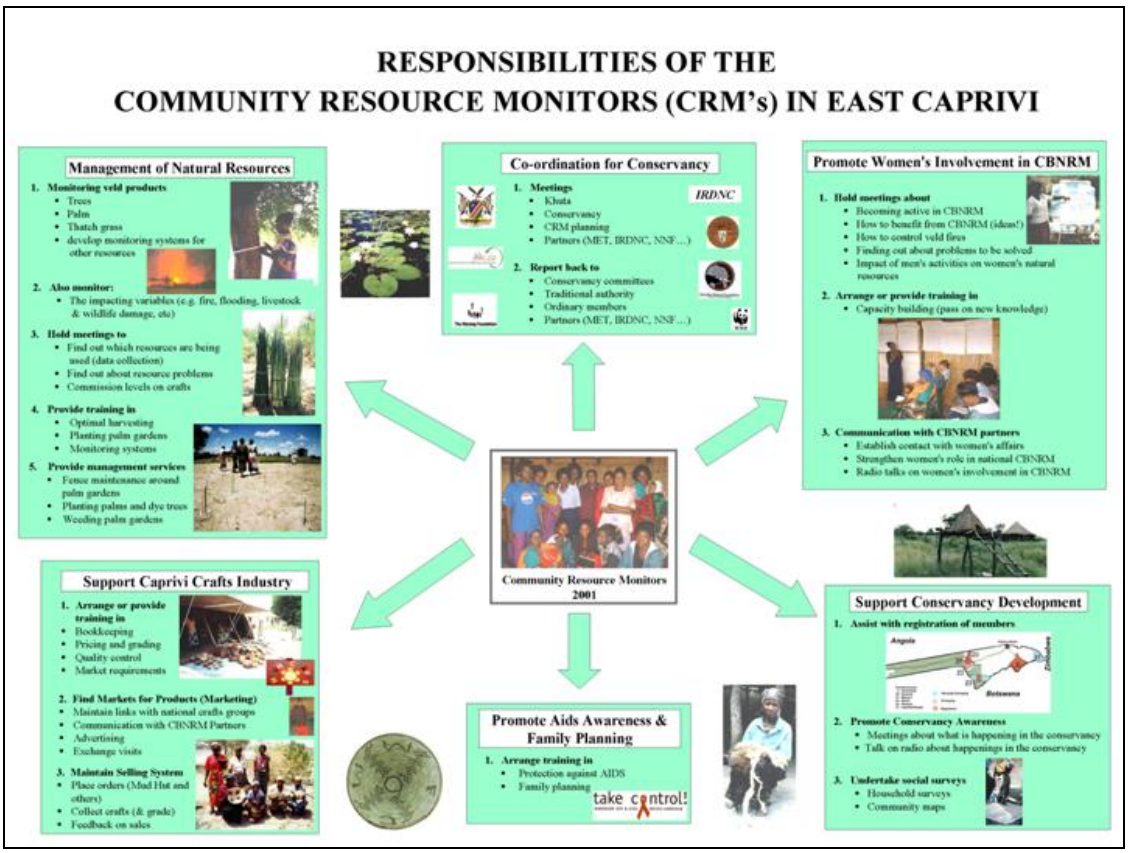


Figure 6: Examples of MOMS data forms and reports

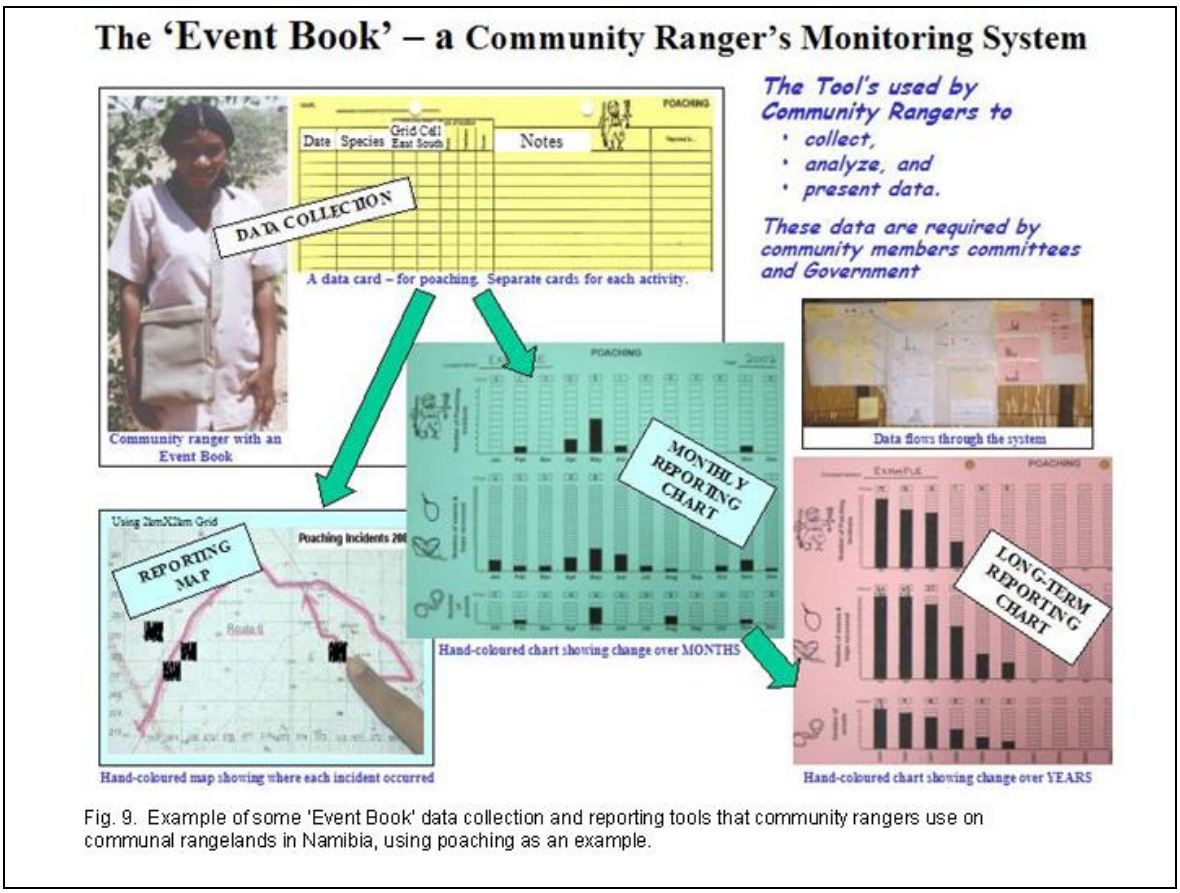


Fig. 9. Example of some 'Event Book' data collection and reporting tools that community rangers use on communal rangelands in Namibia, using poaching as an example.

The third step was to design visual aids that communicate clearly the data being captured (Figure 6). Mind maps can be a powerful way of expressing ideas and describing events, particularly for those less comfortable with the written word. Visual aids also overcome language barriers and can display detailed information in a clear and precise manner. By using images to display numbers and words, communities are encouraged to engage in topics being presented and are more likely to remember the facts and understand the situation.

The fourth step was to amalgamate all the data collected. Two levels were developed; the first level being the monthly meetings where field staff transfer data from collection forms to monthly reporting charts and maps. This allows for regular reflection on the events being recorded, confirms that the rangers were on duty, and determines whether any pre-emptive action need be taken. The second level is the annual meeting where data is transferred from monthly to annual charts. At this meeting a questionnaire is used to capture highlights of the year. The process has been called an 'audit' as a third party asks the questions and records the responses. All positive answers must be backed up with documentation. This process can give added credibility to the data and allows for efficient transfer of data from a paper based system owned and managed by the conservancy to a sophisticated computer programme. This data can then be circulated to a wider audience (Figure 7).

Figure 7: Example of MOMS electronic reports

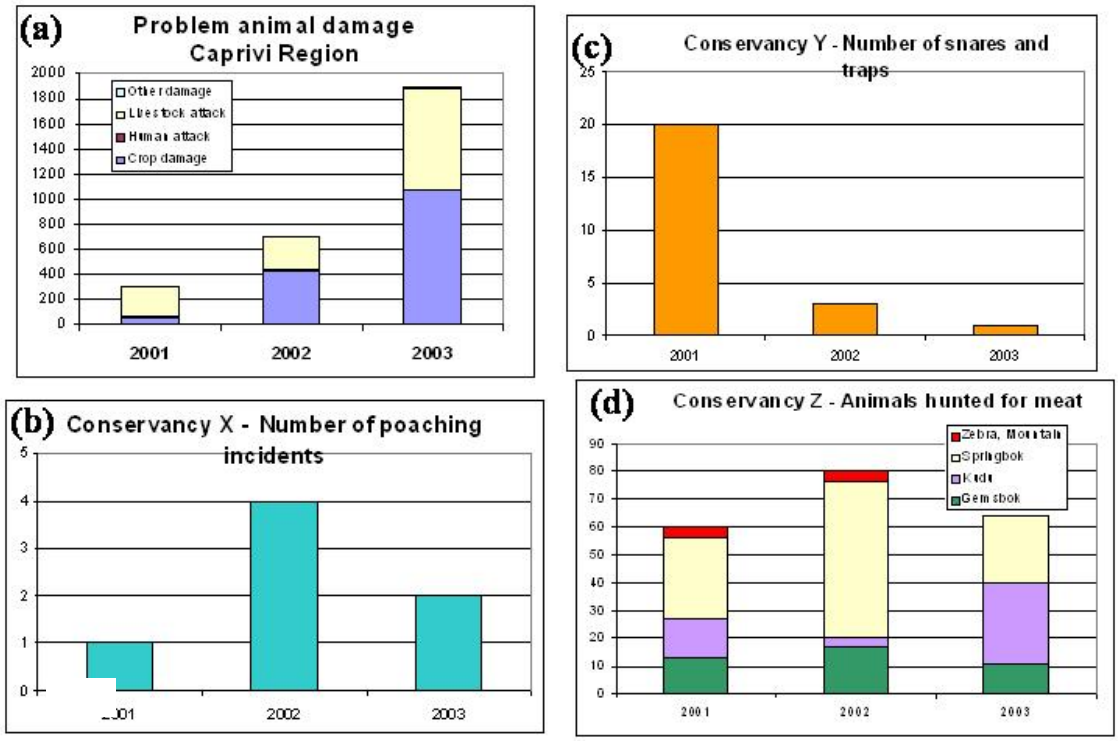


Fig. 9. Examples of trend data (change over years) that have been collected by Namibian communities using the 'Event Book' System. These data were copied from conservancy records and show: (a) aggregated 'problem animal' damage incidents in conservancies in the Caprivi region; (b) number of poaching incidents; (c) number of snares and traps recovered; and (d) number of animals hunted for meat in individual conservancies. Names of conservancies have been removed.

MOMS versus Conventional Monitoring

The MOMS approach differs in a number of ways from other conventional monitoring methods such as MIST:

i. The management units[5] decide on what is monitored so as to strengthen their ownership of the data collected but also in recognition of their understanding of the situation.
ii. The technicians provide support upon request from the management unit and facilitate the design. This should ensure the required rigour and appropriateness of the monitoring system.
iii. The management unit takes responsibility for the conversion of data into information (i.e. graphs and maps) and conduct their own analysis. This is contrary to many monitoring systems where the data forms are sent to 'experts' with sophisticated computer programmes.
iv. While it remains possible to record the MOMS data using digital technology allowing for a more sophisticated analysis, the immediate conversion and analysis of data is not dependent on external technicians and computer programmes. The area managers and rangers have their own paper based graphs, tables and maps (ideal for remote areas) where monthly, annual and if demand requires, quarterly, data can be transferred.

While it is the requirements and priorities of area managers that drive the MOMS approach, not all natural resource management aspects are necessarily covered as one may expect of a comprehensive biodiversity monitoring programme. If researchers and senior (office based) managers believe particular tendencies are worth monitoring, i.e. if a change in trend is not fully understood and more investigative research is required, and the field based mangers do not have the skill, then the collection and analysis of such data will need to be externally driven and supported. Importantly, MOMS should not be seen as competing with and challenging the more sophisticated monitoring approaches. Instead it should be seen as complementing the more high-tech approaches by filling a niche that increases the ownership and communication at site and grass root levels.

MOMS potential and challenges

MOMS has evolved from an improved measurement system to a core management system. It has the capacity to translate a conservation mission into a comprehensive set of performance indicators that provides the framework for a measurement, management, and communication system. With the right application, MOMS should be able to accomplish critical management processes, including:

1. Clarifying and translating vision and strategy
2. Communicating objectives and targets
3. Assist with planning, setting of targets and aligning of resources
4. Enhance feedback and learning for all concerned.

While the MOMS retains an emphasis on measuring and managing numbers, the future challenge is to adapt the system to capture the more intangible assets that need to be

[5] "Management Unit' in this case refers to the community rangers. In other instances the Management Unit comprises of the project Technical Advisor and Senior Project Officer.

measured and managed, for example monitoring the progress of internal processes and the capacity of the people making decisions. The ability of managers to mobilize and exploit its more intangible or invisible assets is as important as investing and managing the physical assets, i.e. money and wildlife.

3.3 A formative example of MOMS approach

In 1999 a MOMS approach was introduced in northeast Namibia[6]. The design was developed for rural conservancies being established in the Caprivi Region. Originally, local NGOs would hand out data sheets to community field staff to collect data identified by the experts as being of interest. Once the forms had been handed in, many communities rarely received feedback and even when the results were returned, communities never really understood the electronically developed graphs, tables, and maps. Moreover, lengthy delays in receiving the information increase the problem. As a result, the value of the data was questionable given that the information was rarely understood and not used for management or communication purposes.

Design of MOMS in Caprivi

From the beginning, community managers and rangers were involved in designing the monitoring processes. The design allowed the communities to collate, store, and analyse their own data in terms of trends and spatial distribution without requiring sustained external technical advice. Despite simplifying the design to enable community members to monitor their own data, the monitoring was technically sufficiently robust to allow for meaningful monitoring of events occurring periodically, e.g. illegal activities, human wildlife conflicts, and wildlife mortalities etc. The design also made provisions for more systematic and planned monitoring activities such as wildlife census and fixed patrols.

Modules have been designed for each theme selected for monitoring. This is made up of data collection cards, visual A3 monthly reporting posters for graphs of trends or maps of spatial information, and ends with long term reporting cards (Figure 6). Approximately 21 modules have been developed for the Namibian communal conservancy management units.[7] The approach has made data analysis for communities and managers relatively simple. It is also ideally suited for adaptive management as the monitoring results can be constantly reviewed by field managers and staff and when trends head in the wrong direction, immediate action can be taken to address the situation.

Success of the community monitoring

MOMS has now been adopted by more then 30 communal conservancies in Namibia covering almost seven million hectares. The information is increasingly enabling conservancy committee members to view information, i.e. temporal and spatial trends on human wildlife conflicts, wildlife observations, transects counts, wildlife off-take, and poaching, to make their own decisions, and report back to their members.

Whilst primarily designed and managed to meet local communities' needs, the information has also been used at national and international level. This has been made

[6] Locally the name given to the monitoring systems is the "Event Book System" with the understanding that the system was suited for community management. Other systems have subsequently been developed but called differently, for example the Incident Book System for Project Areas and managed by government staff in Ministry of Environment and Tourism.

[7] Electronic copies of Event book collection forms and graphs have been provided to the project

possible by using the annual audits to transfer all the information from paper into a digital database held at national level thereby allowing for a more sophisticated analysis by researchers and senior decision makers (Figure 7). The information has been used to compile the State of Conservancies Report and now forms a major component of the Namibian National CBNRM Monitoring and Evaluation record. The annual reports are also used to facilitate the compliance reporting that the conservancies are obliged to carry out for the government and in one particular case the human wildlife conflict data that was received by government was used to bolster their proposal at a 2001 CITES meeting in Chile. The success in communal conservancies of Namibia has prompted the Namibian Ministry of Environment and Tourism to pilot a similar approach in six national parks. Based on similar successes the devolved monitoring approach has now been adopted in Botswana, Mozambique, and Zambia with each country developing its own system based on a few common, yet critical principles of devolution.

Lessons learnt from Caprivi

There are a number of lessons that have arisen from implementation in Caprivi. Firstly, the system relies on the annual provision of materials, such as books, data forms, and chart templates that in the case of Namibia, has become a challenge (manpower and cost). This can be resolved initially by ensuring that a highly organized individual is dedicated to the logistical support and as the system grows the production can eventually be outsourced to the private sector.

Secondly, the demand for the system has at times exceeded technical capacity to provide support. This results in short cuts at the expense of the correct and thorough implementation at each stage of the process. If the system is to be implemented then there requires a long term commitment of 'light touch' facilitation and support.

Thirdly, with success, different stakeholders will be tempted to collect increasing amounts of information. This might eventually overload the system and possibly be 'hijacked' by third party stakeholders with the consequences that the 'golden rule' of local ownership be broken.

Finally, systems are only as good as the people that implement them. If the commitment and enthusiasm of the 'champions' and field based staff is weak, then the process will quickly breakdown.

Future of MOMS for communities

Despite these challenges and its humble beginnings, the design has shown the potential to become an innovative tool to mobilize communities to manage and communicate a collective (in this case a communal area conservancy) strategy. The emphasis lies on *potential*, as MOMS in its current form in Caprivi, still needs to evolve from what started as a paper based monitoring tool suited for communities with limited literacy and management skills, to one that can assist conservancies to:

i. Clarify conservancy strategies for clear communication
ii. Align resources of the conservancies to match their goals and objectives
iii. Expose gaps to take early corrective action through adaptive management.

4 Conditions required for selecting a MOMS approach

This section outlines several criteria to consider when deciding to implement a MOMS approach. The conditions are based on the Namibian experience and should not be considered as definitive.

4.1 Management Structure

MOMS should be housed within its own organisation with clearly defined goals, objectives and outputs. Without an internally developed structure any monitoring that is undertaken will become extractive, i.e. partners such as NGOs and scientists can take the data and convert it into information predisposed to suit their needs. While the information may be packaged professionally it is unlikely to meet the requirements for field based managers and local communities.

In SWA there are two separate entities: 1). Government has formed a management partnership with WWF Cambodia and other donor partners. This partnership clearly defines the respective roles and responsibilities for conservation efforts in the MPF. While a conservation management plan has not been finalized[8], objectives and outputs have been developed in various project proposals that will direct what a monitoring system should identify and track. In addition a management structure has been developed that will take responsibility for designing, developing, and implementing a monitoring system with appropriate budget considerations (see below for more on costs);

2). Three communes (administrative sub-units that make up a province) cover the three community clusters adjacent to the SWA. At the time of writing the communes had not been granted formal collective rights or responsibilities over natural resources. There are however, plans to mainstream natural resource management responsibilities to communes as part of the government decentralization programme in the Mondulkiri province. Once NRM committees, (the vehicle to legitimise the decentralisation), are established with clearly recognised rights and responsibilities over a defined area, it would be appropriate for the project to discuss the idea of introducing a community-based monitoring system, taking into consideration points presented below.

Therefore, at the present time the target group for introducing the MOMS should only be the project's community rangers that form part of the SWA Project management structure and should not be introduced in the community too soon. This will have to wait until the NRM committees have been established and communities have fully expressed a need to conduct their own monitoring. It is important to note here that given the increasing conflicts between the ethnic Phnong, local Khmer, and rapidly growing Cham populations, careful analysis of the ethno-political context of the NRM committees will be required prior to linking MOMS with NRM Committees and their parent Commune Council structures (MacInnes pers. comm.). One should not assume that just because Phnong are in the majority, and their traditional natural resource patterns are often compatible with biodiversity conservation goals, that the elected NRM committees are, and will be, representative of the Phnong, and their specific interests.

[8] At the time of writing, the Management Unit (Project TA, and Senior Project Officer) was drawing up a Management Plan at the request of the Forestry Administration.

4.2 Justification for a MOMS approach

There must be clearly articulated reasons for wanting to introduce a MOMS approach. The effort required to implement MOMS must be considered in relation to the results produced. MOMS is not the most suitable approach for the needs of the project if the need is for a rigorous scientific technique that monitors globally endangered species.

If the project purpose is to improve government management of a protected area with the combined results of recovery of wildlife populations and contribution to local community welfare, then the newly introduced MIST approach (see section 3.1) might be adequate. However, the project has emphasised that communities should not only become beneficiaries of SWA (MPF) but also be involved in the decision making and, where appropriate, the management of SWA. For this purpose, the MOMS approach is ideally suited. Even if the focus of the project is primarily the recovery of wildlife and the involvement of community is some years ahead, the MOMS approach - which is more adaptable and flexible than MIST - would still be valuable for field based management purposes.

Justifications for introducing a MOMS approach include:

i. Based on the Namibian experience, the MOMS approach has the flexibility to cover all the components that require monitoring as identified in the ranger's job description mind-map (Figure 8). There is no reason why it should be any different in the Cambodian context. While other monitoring techniques will be required for some of the rarer species such as tiger, most of the components chosen can provide meaningful data to monitor performance and measure impact of the project.

ii. Even though the key indicator species, illegal activities, mortalities, and patrolling performance could be satisfactorily captured by MIST, the other components such as fire/rainfall/flooding/clearings, human-wildlife conflict[9], and community meetings would not be. If the project decided not to use the MOMS approach, these components would then have to be dropped or another monitoring system designed.

iii. The MOMS approach is well suited to monitoring the utilisation agreement currently being drawn up between the government and local communities (see Appendix 7 for draft agreement). MOMS can be adapted to monitor the agreement and communicate the results to communities in a way that would stimulate discussion between project staff and community representatives.

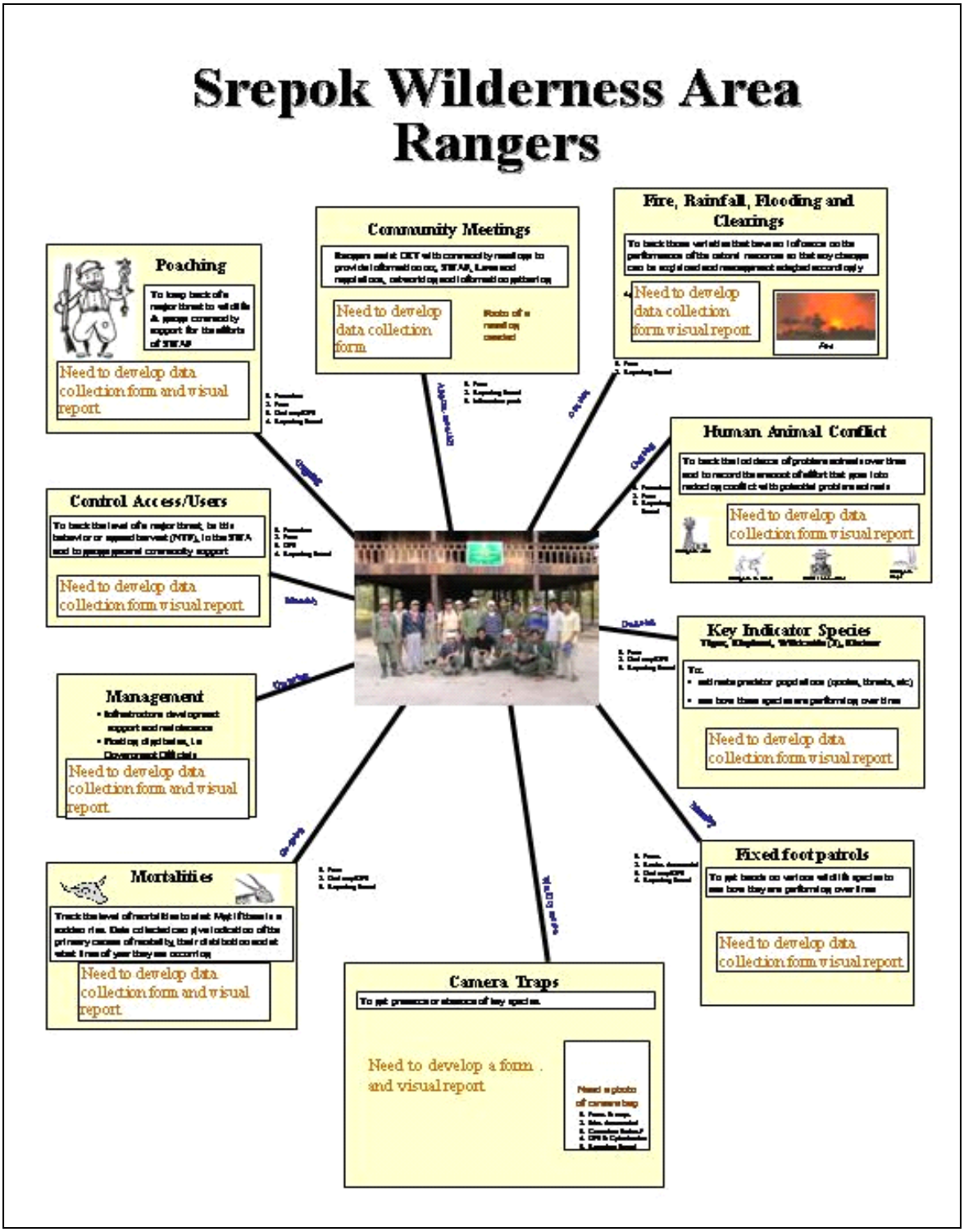
iv. The project area is remote, particularly in the raining season. This makes it difficult to maintain regular flow of data from ranger stations to computer departments and back in a timely and user-friendly fashion. By using the MOMS approach, the remoteness and conditions should not impede the collection, recording, analysis and use of data.

v. An added bonus of MOMS is its ability to support the Project Officer and Ranger Commander to manage ranger performance. The Namibian experience has shown how if introduced and managed appropriately, the MOMS approach can motivate the rangers to become skilled collectors and users of data.

[9] Monitoring human wildlife conflict is currently not a top priority due to lack of current incidents, though this might change depending on the recovery of species and increase of human population pressure.

There is enough justification to introduce MOMS so long as it does not compete with or replicate MIST, and so long as the information collected is of direct value to local communities. For example, MIST could be used exclusively for the monitoring of wildlife, and the MOMS approach used to monitor implementation of the Deika agreement/provincial announcement.

Figure 8: Mind map describing the duties of the SWA rangers



4.3 Cost of Monitoring

Overall costs should be relatively small, however, management must consider the cost implications, such as hiring and equipping the rangers, printing and photocopying of materials and processing and publishing of information. When considering the costs, it would be helpful if the project could differentiate between three cost categories:

i. Initial development costs, (i.e. study tour, training sessions, posters, start-up kit such as forms, files and file boxes);
ii. Ongoing costs at the management unit, (i.e. rangers) and;
iii. Ongoing costs at the central service provider, (i.e. material development).

While certain costs might be relatively high, i.e. the study tour to Namibia[10], the on-going costs should be covered within the existing support for the project. A more serious concern is if and when the devolved monitoring system is introduced at the community level, i.e. NRM committees. Who will fund the community rangers, or will they be volunteers? At present there are few opportunities to generate collective income to pay rangers and the materials required. In this scenario it would mean that individual community members would either be paid by the project or would have to volunteer to maintain the forms and aggregate the data for communal decisions. Before introducing the system, funding issues need to be discussed.

Eventually as external project financial support reduces, the project will need to consider alternative funding mechanisms to cover its conservation costs, including monitoring. While one mechanism is already being discussed with Forestry Administration that allows for a percentage of revenue[11] from the tourism lodge to cover conservation costs of the Protected Forest, it is likely to cover only a small proportion of the total costs. Other options include trust funds, and lobbying for allocation of central government funds.

Having discussed the cost vs. returns of the MOMS approach, the project management staff have concluded that MOMS is affordable, though some funds might have to be raised for the initial start-up. Further discussion is needed if and when the project decides to explore the option of introducing MOMS into the community structures.

4.4 Rangers Skills

In Namibia, experience has shown that a ranger needs to know his job and to understand why the chosen data is being collected. This is often taken for granted. It is important to customise the system based on the relative skills of the rangers. For example decrease or increase the level of detail being collected or adjust the complexity of data analysis.

From the observations made when accompanying the rangers on patrol, most showed sufficient skill and experience to participate in a MOMS process. They have been participating in annual training courses and are supervised by a trained South African National Park's manager, as well as by other experts in SE Asia. With such training, the

[10] If the tour was conducted in June/July 2006, then only two (project officer and ranger commander) air tickets would need to be purchased to Namibia, which should be about GBP 1,000 return for both. The technical advisor will already be in South Africa.

[11] The discussions on % for conservation costs and % to community projects have not yet been fully explored. The 'how' and 'who' questions have also not been discussed fully.

rangers should have the potential to become skilled in protecting wildlife and habitats, and with the collection and analysis of data.

While some literacy is required, illiteracy should not be prohibitive. A literate colleague can help out with maintaining an illiterate ranger's data form, or each patrol group need only have one data form to fill per patrol. As the analysis and reporting is primarily based on adding up incidents and colouring blocks on graphs or maps, we have found in Namibia that illiterate rangers and community members have been able to fully participate in the process of data analysis and discussion.

Harder to judge is the level of commitment required by the rangers to make the process work. The Namibian experience has shown that when rangers are enthusiastic and motivated then the devolved approach works. This kind of commitment is dependent upon a number of factors including levels of self-motivation of the rangers, general leadership qualities of the Project Officer and Ranger Commander, and facilitation skills to maximise the sense of ownership by the rangers.

4.5 Local 'Champion'

Successful establishment of the system ultimately depends on the management and motivation of the local practitioners. Despite having collective support and involvement during the design phase, the system is still implemented by individuals, who if not managed can drift away from their key responsibilities. It is critical to have a dedicated 'champion' that is committed to the approach and has the leadership skills to motivate rangers to adhere to the rigor and discipline that any effective monitoring system will require.

In the SWA there could be two main field based 'champions', though this will depend on how the project decides to implement the MOMS approach. The most obvious person is the Project Officer, seconded by Forestry Administration. He is responsible for the field implementation and an essential part of his duties is the supervision of all the rangers. The Project Officer has already observed that in addition to receiving monitoring reports, the MOMS approach would be a valuable tool to assist with management of the rangers and in assessing their performance.

A second 'champion' could be the Ranger Commander. He is the most senior ranger and equally important, he is the most senior community member of staff in the project. His involvement in the MOMS approach would increase if the project decided to introduce a system specifically for the community rangers. This would automatically give them an greater stake in the management of the core and conservation area. Under the leadership of the Ranger Commander, the rangers could use the information to contribute towards the project decision making process. They could also use the data to report back to their community.

The MOMS approach has succeeded in areas where a dedicated technical support person has been on hand. This individual is required to develop the forms and support the Project Officer with material development and data management. It is essential that the technical support given to the Project Officer and his rangers is sustained over a period of at least three to four years. A range of stages, skills, and methodologies must to be taught and supported over this period.. Only when one component of the system has been properly

understood and successfully implemented should the next stage commence. There are currently 17 clearly identified stages in introducing a MOMS approach (see Appendix 8) of which the SWA project has so far completed two: hiring of rangers (though more are planned), and provision of basic training. To provide this support, the Technical Advisor to the project is ideally suited for this task.

4.6 Technical Support for Material Development

Owing to the remoteness and lack of electricity in the SWA, the project does not have onsite printing and photocopying equipment to generate and distribute the basic monitoring materials (event book, reporting charts, and audit forms). It will therefore be necessary for the project to have a dedicated support unit that provides materials that can plan ahead in supplying the project with materials. An obvious place to initially house the central service is the Research, Monitoring and Data Management Unit. The job should not necessarily be too difficult or costly in the early days of supporting the Project Officer. However, it will become more complicated if and when community structures and other projects decide to have a similar version of MOMS. One way to streamline the support is to standardise materials and outsource printing to commercial companies. The costs would probably fall to government or a national NGO who can be a service provider to communities in return for data.

4.7 Summary

Before deciding on its implementation, the project will first need to resolve the following issues.

- Can the project manage the introduction of a MOMS approach without disrupting and jeopardising MIST, a more conventional system newly introduced (January 2006)?
- Is the current data being collected by MIST sufficient for the immediate needs of the project?
- Are there sufficient funds to cover the cost of deploying a MOMS approach, recognising that costs are already being committed to MIST and camera trapping?
- Will there be a commitment to fund and provide technical support for introducing the MOMS approach for the next four years?

To help review whether the conditions in SWA justify using a MOMS approach,

Table 3 has summarised the advantages and disadvantages. On the one hand the project will seriously have to consider the implications of running a dual monitoring system, particularly in terms of time, cost, and duplication of data. If successfully collected and managed, the MIST data might be considered adequate for the priority monitoring components of the project. On the other hand, MIST does not cater for empowering and engaging with the community and field rangers in the way that a MOMS approach can.

Table 3: Review of conditions at SWA for a MOMS approach to work.

Conditions	Advantages	Disadvantages
1. Structure in place	▪ Project has structure with plan	▪ Community still awaits structure and has no NRM plans
2. Justification in place	▪ Community involvement is not being provided by MIST ▪ Field based management would find MOMS useful ▪ MOMS can motivate the rangers to improve their work	▪ MIST is already collecting priority data.
3. Budget in place	▪ Budget should cover on-site and technical costs	▪ Cost implications of running two monitoring systems; MIST and MOMS. ▪ Start-up cost could be high and need to be discussed with project funders.
4. Skills in place	▪ Rangers are trained and enough are literate	▪ Community rangers are illiterate. It is the government rangers that are literate
5. Champions in place	▪ Technical Advisor and Project Officer are keen to have a MOMS approach.	▪ A concern if either leaves.
6. Back-up support in place	▪ WWF Cambodia GIS support exists for the project.	▪ Additional support required if MOMS is implemented in community or other projects.

A major conclusion is that a properly introduced MOMS approach will provide the catalyst to link the communities with management of the SWA (MPF) project. With this in mind, there is ample justification to introduce MOMS with the initial focus on monitoring the utilisation agreement between the communities and project (proposed Deika agreement). Many of the considerations related to wildlife monitoring, i.e. distribution, abundance, and mortalities can be adequately covered by MIST. While the project may eventually use MOMS to monitor wildlife in parallel to MIST, in the early stages MIST functionality should be given the opportunity to be tested properly, which would ensure that MOMS is not overloaded with numerous monitoring modules to manage.

5 Recommendations

Before beginning with plans to implement a MOMS approach, it is important that *all* partners first discuss the appropriateness of a MOMS approach for the project and the role each will have. Conditions identified in the previous section should be examined. The following recommendations suggest next steps for how to implement a MOMS approach. These are based on experiences of implementing the MOMS in Caprivi, and consideration of the practicalities in the SWA.

5.1 Develop a Monitoring Strategy

The first stage is to develop a monitoring strategy, including job descriptions of rangers, and proposed data flow diagrams; using a poster format. The Ranger Commander and Project Officer, and Technical Advisor should review the mind-map on rangers' duties (initial draft drawn up; Figure 8). The process of reviewing the mind-map should include discussions with rangers. This will increase their interest and understanding of what they should be collecting, why they should be collecting the data, and how. During the review more detail will be required, such as who will collect the data, how often, and when.

There is also a need for data flow diagrams which illustrate the aggregation of data from the various management units for the SWA as a whole. The flow diagrams should include data from all the SWA monitoring techniques, including MIST, and eventually should include the MOMS approach at community level. This will help clarify who the data is intended for; an important consideration when deciding what data needs to be collected. For example in the early stages of MOMS, the project might decide that MIST reports are communicated upward to donor, government officials and NGO's technical staff, while MOMS reports are used by field staff and communicated to community members. If this is the case, then it has considerable implications for the data sets, materials, and effort that is required.

Experience in Namibia has showed that putting all this information onto mind-maps and flow diagrams has been a useful visual tool when prioritising what needs to be monitored and for whom. In addition, the posters are valuable as both a communication, and training tool (see Appendix 9 for Namibian example).

5.2 Prioritising Data to be Monitored

After the review, the project management should prioritize what should be monitored. Generally data collected must contribute to decisions that need to be taken to meet project proposal outputs and other management targets identified for the SWA project.

However, the project should consider whether MOMS should be used only for community related issues and leave the wildlife monitoring to MIST. Taking this approach will help reduce the number of monitoring modules to the bare minimal, thereby not overloading the rangers with a multitude of new forms. To make easier the difficult decision of prioritising what needs to be measured, a worksheet (Table 4) has been designed to rank each component to be monitored. Award a score of one to each component and consider rating each out of a possible seven. In the formative years of MOMS, the project should consider only introducing a maximum of three monitoring components.

Table 4: Worksheet to justify components chosen for monitoring.

Components	Linkage to Strategy	Functional for Planning	Easily Understood	Frequently Updated	Cost Effective	Accessibility of data	Quantitative	Total
Measure 1								
Measure 2								
Measure 3								

If a proposed component is unlikely to make a significant contribution to achieving the aims, or if there is any doubt, then it should be left out as a typical field decision-maker needs only minimum information on a range of issues. The data collected should be just enough to give a simple increasing, decreasing, or steady state trend. If it is necessary to quantify the degree of change, then the project can ask specialists to investigate further.

Once it has been decided what needs to be monitored, a training manual (Appendix 10) can assist with implementing the monitoring modules. The document, which may require some adaptation for the Cambodian situation, provides detailed descriptions of all training stages necessary for introducing the MOMS approach.

Finally, all the data form cards designed for community structures have been provided electronically to the project and can be used to guide the design of materials.

5.3 Community Monitoring

While there is a clear emphasis in the SWA project documentation that states the project aims of including communities in the awareness and decision making process, it is perhaps premature to introduce a devolved monitoring system that is owned and managed by the community clusters in the SWA project at the present time. As described above, there are virtually no community structures that have been given formal rights and taken responsibilities for natural resources. However, where some of the monitoring *is* being 'outsourced' such as the current tiger sightings and resin utilisation, the community members can potentially be trained in the MOMS concept. This could be taken a stage further by facilitating a discussion between community members on what other conservation issues/priorities - in relation to community livelihoods - they would like to monitor.

Aside from gaining skills and thereby being better prepared for managing a devolved monitoring system if and when introduced, this could become a deliberate strategy for the project to proactively increase engagement in conservation issues by community members and leaders. By successfully engaging and participating in a monitoring system, this community involvement would also help with demonstrating to government authorities that specific communities are committed and capable of taking on certain NRM responsibilities, which in turn could help speed up the process of developing and clarifying certain formal use rights.

A second strategy to increase the sense of involvement of communities in the core and conservation area would be to introduce the MOMS approach specifically for the community rangers. The current Ranger Commander is the most senior community member of staff in the SWA project, is highly respected and able, and therefore best placed to demonstrate ownership and provide the right leadership of the MOMS. His illiteracy is actually an advantage as it provides the ideal opportunity to develop a system appropriate for other community rangers who are also illiterate, and will demonstrate that this is no major disability or barrier for their full participation. This will potentially give communities a greater sense of involvement in the management of the core and conservation areas.

Through increased ownership and understanding of information, more meaningful information will be taken back to the communities. Eventually the information could even be used by communities to 'peer review' their rangers' (positive) performance in their 'duty' to conserve the SWA.

5.4 MOMS and MIST Complementarity

Where possible, the MOMS approach, while remaining independent of MIST, should run in parallel. MOMS should not be considered as an approach that can replace MIST as they are designed for different roles. Some thought is needed on how to collect data for two independent monitoring systems. One recommendation is that in the initial stages, MOMS should focus on community issues and MIST on wildlife. If there is still the same data required then the managers and rangers should discuss and decide upon the best approach, as this level of detail is best decided at field level. It is important that both

systems have their own data forms; the MOMS being kept by the rangers and used to engage with communities, and the MIST being handed over to the project management staff that can use the information to track wildlife and related biodiversity trends.

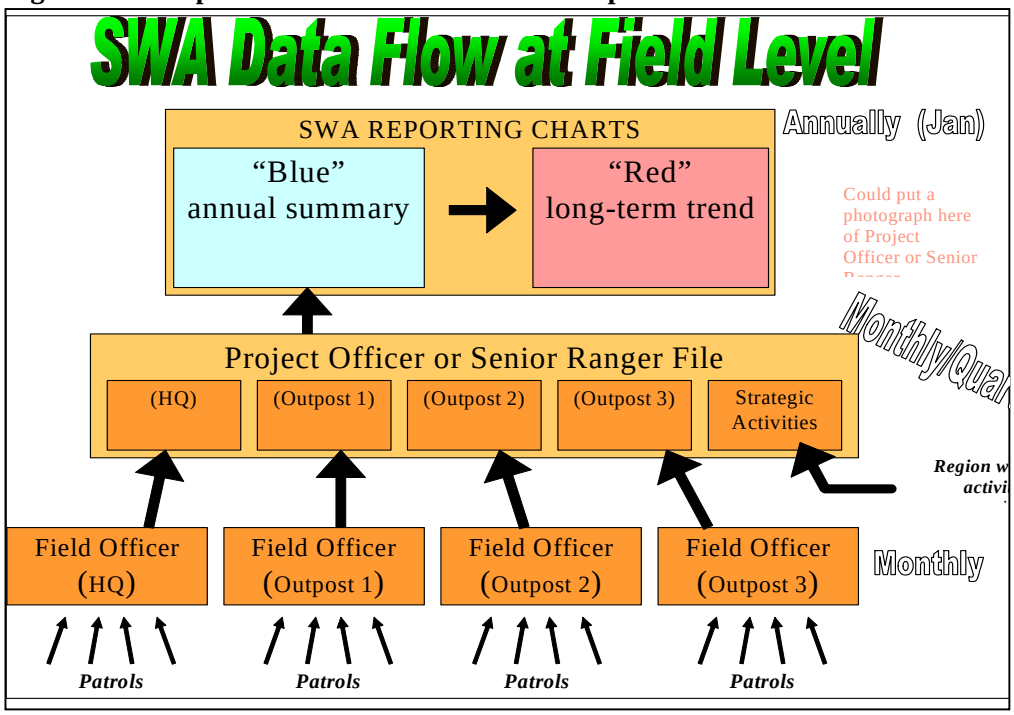
A further consideration for the project is that MIST has recently been introduced and the SWA project should be confident the rangers are comfortable with the collection of MIST data before they are introduced to a second system. The project may run into trouble with too many newly introduced systems and forms, with the potential result that neither are accomplished adequately. An important rule when implementing MOMS is to only introduce a new stage of the process once the rangers are proficient with the previous stages.

5.5 Implementation of a MOMS Approach

The initial focus of the MOMS approach should be aimed at the Protected Forest Conservation and Law Enforcement Unit. Each field post (currently 4 outposts and 1 HQ) with between four to eight rangers, should have their own system, including data collection forms, files and bags. On the outpost walls, A4 or A3 (detail field based staff should decide which) monthly and annual graphs can be mounted. Each post would be responsible for their own filing system, and at the end of the year the files can be brought to SWA HQ. There should be one form collected per patrol team, and not per ranger.

The Project Officer or the Ranger Commander would find it helpful to have his own reporting file to pull together all the data from each field post on a quarterly basis (Figure 9). The annual audit, an important component of the MOMS approach, would be conducted by the Project Officer, though with initial support by the Technical Advisor until he is satisfied that the Project Officer fully understands the system and is able to facilitate the meetings. Additional backup support should be made available by appropriate programme technical staff.

Figure 9: Example of a SWA field level data flow poster



The graphs and maps prepared by the rangers or the Project Officer should be taken to the community to start engaging them with trends and utilisation coverage. Not only should this stimulate engagement of communities, it will also set in motion greater understanding of monitoring techniques, preparing community members for a future similar devolved monitoring system.

5.6 Study Tour to Namibia

An exchange trip to Namibia for the Project Officer, Ranger Commander, and Technical Advisor would be extremely valuable. An appropriate time might be during the mid-term MOMS audits (June / July) being conducted in rural areas of Namibia. Keo Sopheak, Lean Kha and Martin v. Kaschke could accompany Dave Ward (periodically hired by WWF Namibia) and Beaven Munali (employed by a field based NGO called IRDNC) to review the progress of all the conservancies in Caprivi. They could accompany Dave Ward to the National Parks where the Ministry of Environment and Tourism are piloting their own version of MOMS (known as the "Incident Book"). This would be useful as the MOMS approach designed for parks management might initially be more suitable for the SWA project. During the trip it would be constructive to visit the WWF / LIFE Plus offices in Windhoek. They could review how the Namibian logistical and technical support systems are set up and work on finalizing forms and materials for piloting in the SWA project. If further support is considered necessary, then this would be an appropriate time to discuss possibilities and agree on specifics.

5.7 External Technical Support

If the SWA project requires further advice on or during the commencement of a MOMS approach (i.e. with ongoing strategic advice or with the technical design of materials), then discussions can be held with Greg Stewart-Hill and Richard Diggle. Such inputs will enable the MOMS approach in Cambodia to avoid some of the pitfalls experienced in southern Africa, as well as ensure that links remain to the original MOMS philosophy which in turn ensures the two-way sharing of best practices. This should not deter from the fact that if the MOMS approach is to be successfully implemented in Cambodia it will need to have local customization, strong ownership and full involvement by the SWA project.

5.8 Draft Implementation Plan

The following is a suggested timeline to consolidate the recommendations into a list of key phases and milestones.

		Year 1				Year 2				Year 3				Year 4	
	Phase	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**
1	Pre-event book phase														
2	Job description / data flow phase														
3	MOMS training phase														
4	'Monthly' reporting training phase														
5	Annual Audit and reporting phase														
6	Institutionalisation of the system														
7	Interpretation & use of results														

															Who			
Key Milestones															***MU***	***CR***	***PP***	***FA***
Review job description mindmap																		
Develop data flow diagram															SP?			
Agree with all partner on MOMS																		
Design data collection forms																RC		
Study Tour to Namibia for TA, PO & RC															SP?	RC		
Trial the data forms for minimum of 3 months																		
Review suitability of data forms at end of year															SP?			
Begin proper data collection																		
Monthly reporting begins, i.e. use of graphs																		
Mid year audit, review that process is on track																		
First annual audit completed															SP?			
First years data cards archived																		
Filing box implemented																		
Discuss with partners on progress with MOMS																		
Mid year audit (year 2)																		
Second annual audit completed															SP?			

MU Management Unit
PR Project Rangers
PP Phnom Pen based Technical Support
FA Forestry Administration
RC Ranger Commander
SP? Possibility of using Specialist

6 Documents and Papers Reviewed

Danielsen, F., Balete, B., Poulsen M., Enghoff, M., Nozawa, C. and Jensen, A. 2000. A simple System for Monitoring Biodiversity in Protected Areas of a Developing Country. Biodiversity and Conservation.9: 1671–1705.

Danielsen, F., Burgess, N. and Balmford, A. 2005. Monitoring matters: examining the potential of locally-based approaches.Biodivers.Conserv.14: 507 -542.

Goodman, P.S. 2003. A Wildlife Monitoring System for Ankagera National Park. A report written for GTZ advisors and staff of Akagera National Park.

Goodman, P.S., A.J. Conway and R.J. Timmins. 2003. Selection and Planning of an intensively Managed Wildlife Projection Zone in the Dry Forest Ecoregion of North-eastern Cambodia. A report written for WWF Cambodia, Phnom Penh.

IIED. 2005.Darwin Initiative Application for Grant Round 13 Competition: Stage 2. A funding proposal written for Darwin Initiative London.

Stuart-Hill, G., R. Diggle, B. Munali, J. Tagg, and D. Ward. 2005. The Event Book System: a community-based natural resource monitoring system from Namibia. Biodiversity and Conservation (2005) 14:2611-2631

Teak S. 2005. Proposal for the Srepok Wilderness Area Project. WWF Cambodia, Phnom Penh.

Tordoff, A.W., Timmins, R.J., Maxwell, A., Huy Keavuth, Lic Vuthy and Khou Eang Hourt. (Eds.) 2004. Biological Assessment of the Lower Mekong Dry Forests Ecoregion: Final Report. Publishers?

WWF International 2004. Using Wildlife Ecotourism for Sustainable Resource Management in Srepok Wilderness Area of North-eastern Cambodia.

7 Appendices

Appendix 1: Terms of Reference

This sub-contract forms part of the monitoring system work on the Darwin Initiative-funded *Sustainable tourism supporting species conservation in the Srepok Wilderness, Cambodia*. The consultant will be required to visit Cambodia to work with IIED's partners (including WWF-Cambodia, WCS, MOSAIC team and Dry Forests Coalition) and travel to Mondulkiri district where the SWA is located.

In general this project has three main aims:

- To kick-start thinking among partners on methodologies for conservation, sustainable management and sustainable tourism in the SWA
- To produce a baseline and feasibility study of the capacity and potential for developing a monitoring system for wildlife conservation in the SWA
- To start building capacity among partners on best-practice monitoring techniques and their implications.

The consultant will perform the following duties:

1. Work with WWF Cambodia in determining the logistics of a trip in January 2006 to Cambodia, and liaise with IIED over flight arrangements.
2. Develop a schedule for the trip with WWF Cambodia ensuring that meetings can be held with the widest possible cross-section of key stakeholders.
3. Provide materials and resources to WWF-Cambodia and partners in Cambodia on the event book system as used in Caprivi strip, Namibia. To include presentations, papers and actual materials used in the operation of the event book system.
4. Deliver a report Baseline and feasibility study of the capacity and potential for developing a monitoring system for wildlife conservation in the SWA that covers the following components: biology, people, management authorities, skills assessment.
5. Deliver a draft report to IIED and WWF-Cambodia by **mid-February 2006** for comments and review.
6. incorporate changes, suggestions etc that are provided by **end-February 2006** in a final report for delivery by **31 March 2006**.

Appendix 2: Itinerary and Meetings

Date	Place	Comments	People	Position
13 January 2006	Phnom Penh	Arrived 11 am		
	Phnom Penh	Debriefing with WWF Cambodia	Nick Cox	Programme Coordinator
	Phnom Penh	Meeting with WWF Cambodia Country Director	Teak Seng	Country Director
14 January 2006	Sen Monorum	6 hour drive to WWF Conservation programme office in Mondulkiri Province. Was met by Martin von Kaschle, Technical Advisor of SWAP		
15 January 2006	Merouch HQ	4 ½ hour drive to the Srepok Wilderness Area Project HQ		
	Merouch HQ	Background meeting on SWA	Martin v. Kaschle	
	Merouch HQ	Introduced to the rangers of SWAP and the trainer from WCS; Dr. Tony Lynam		
16 January 2006	Merouch HQ	Presentation on MIST, a spatial Management Information systems.	Pheakdey Sorn	Data Base Officer for Wildlife Conservation Society
	Merouch HQ	Provided materials and resources on Event Book systems, including posters, data collection sheets, manuals, papers and presentations (see Annex XX)	Martin v. Kaschle	
	Merouch HQ	Discussion with Martin and Sopheak Son, Project Officer on the concept and thinking behind MOMS	Martin v. Kaschle Sopheak Keo	Technical Advisor Project Officer
	Merouch HQ	Discussion about the compatablity between the MIST and MOMS	Martin v. Kaschle Tony Lynam	Technical Advisor Wildlife Conservation Society regional NRM Trainer
17 January	SWAP	4 hour practice patrol on MIST data gathering	SWA Rangers	
17th January	Merouch HQ	Facilitated a session on developing a mindmap of the rangers duties	Martin v. Kaschke Sopheak Keo	SWA Project Management Unit
18th January	Sen Monorum	4 hour drive back to WWF Conservation Office		
		Held meetings with the Community Extension Team for the SWA project	Amy Malin Kim Soar Em Pray	Team Leader for CET Provincial Coordinator Project Officer for CET
19th January	Sen Monorum	Meeting with Prak Mony, a technical advisor to the SEILA, a project to support decentralization process to Commune	Prak Mony	Technical Advisor to the SEILA project

		Councils.		
		Attended an awareness meeting between CET and Commune Council for Sre Sankun, representing 9 villages in the Eastern Cluster of the SWA project.	CET team and Committee members	
19th January	Phnom Penh	7 hour drive back to Phnon Pen		
20th January	Phnom Penh	Writing up the report		
	Phnom Penh	Debriefing with Country Director on the trip	Teak Seng	Country Director
24th January	Phnom Penh	Meeting with WCS on the MIST system	Joe Walston Tom Evans Tom Clemence	Country Director NRM Advisor NRM Advisor

Appendix 3: Priority Species in the Lower Mekong Dry Forests

System to assign priority scores to components of biodiversity

Global significance of the species in the Lower Mekong Dry Forests	Level of current or potential threat		
	Highly significant	Significant	Not significant
Irreplaceably globally significant	**1**	**2**	4
Globally significant	**2**	**3**	4
Not globally significant	4	4	0

Conservation foci are those components of biodiversity that scored 1, 2 or 3.

Irreplaceably Globally Significant Focal Taxa (Priority Score 1)

Birds	***Mammals***	***Reptiles***
Green Peafowl (Pavo muticus)	*Wroughton's Free-tailed Bat* (Otomops wroughtoni)	*Yellow-headed Temple Turtle* (Hieremys annandalii)
White-winged Duck (Cairina scutulata)	*Jungle Cat* (Felis chaus)	Asian Giant Softshell Turtle *(Pelochelys cantorii)*
Sarus Crane (Grus antigone)	*Hog Deer* (Axis porcinus)	Siamese Crocodile *(Crocodylus siamensis)*
Masked Finfoot (Heliopais personata)	*Kouprey* (Bos sauveli)	
Great Thick-knee (Esacus recurvirostris)	*Banteng* (B. javanicus)	
River Tern (Sterna aurantia)	*[Wild Water Buffalo* Bubalus arnee*]*[12]	
Lesser Fish Eagle (Ichthyophaga humilis)		
White-rumped Vulture (Gyps bengalensis)		
*Slender-billed Vulture(*G. tenuirostris)		
Red-headed Vulture (Sarcogyps calvus)		
*White-shouldered Ibis (*Pseudibis davisoni)		
Giant Ibis *(P. gigantea)*		
Woolly-necked Stork *(Ciconia episcopus)*		
Black-neckedStork		

[12] The genetic purity of any remaining Wild Water Buffalo is unknown, as there is potential for the species to hybridise with domestic water buffalo *Bubalus bubalis*.

(*Ephippiorhynchus asiaticus)*
Lesser Adjutant *(Leptoptilos javanicus)*

Globally Significant Focal Taxa (Priority Score 2)

Birds	***Mammals***	***Reptiles***
Siamese Fireback *(Lophura diardi)*	Northern Pig-tailed Macaque *(Macaca leonine)*	Asian Box Turtle *(Cuora amboinensis)*
Alexandrine Parakeet *(Psittacula eupatria)*	Indochinese Silvered Leaf Monkey (*Trachypithecus germaini)*	[Asian Leaf Turtle] *Cyclemys* [*dentata*] complex[13]
Yellow-footed Green Pigeon *(Treron phoenicoptera)*	[Black-shanked Douc *(Pygathrix nigripes)*] [14]	Giant Asian Pond Turtle *(Heosemys grandis)*
Green Imperial Pigeon *(Ducula aenea)*	Dhole *(Cuon alpinus)*	
River Lapwing *(Vanellus duvaucelii)*	Smooth-coated Otter *(Lutrogale perspicillata)*	
Indian Skimmer *(Rynchops albicollis)*	Large-spotted Civet *(Viverra megaspila)*	
Little Tern *(Sterna albifrons)* breeding	Leopard *(Panthera pardus)*	
Black-bellied Tern *(S. acuticauda)*	Tiger *(P. tigris*)	
Lesser Fish Eagle *(Ichthyophaga humilis)*	Asian Elephant *(Elephas maximus)*	
Grey-headed Fish Eagle (*I. ichthyaetus)*	Eld's Deer *(Cervus eldii)*	
White-rumped Falcon *(Polihierax insignis)*	Gaur *(Bos gaurus*)	
Oriental Darter *(Anhinga melanogaster)*	'Southern Annamite' Black Giant Squirrel *(Ratufa bicolor smithi)*	
Greater Adjutant *(Leptoptilus dubius)*		

Source from: Tordoff, A.W., Timmins, R.J., Maxwell, A., Huy Keavuth, Lic Vuthy and Khou Eang Hourt. (Eds.) 2004. Biological Assessment of the Lower Mekong Dry Forests Ecoregion: Final Report. Publishers?

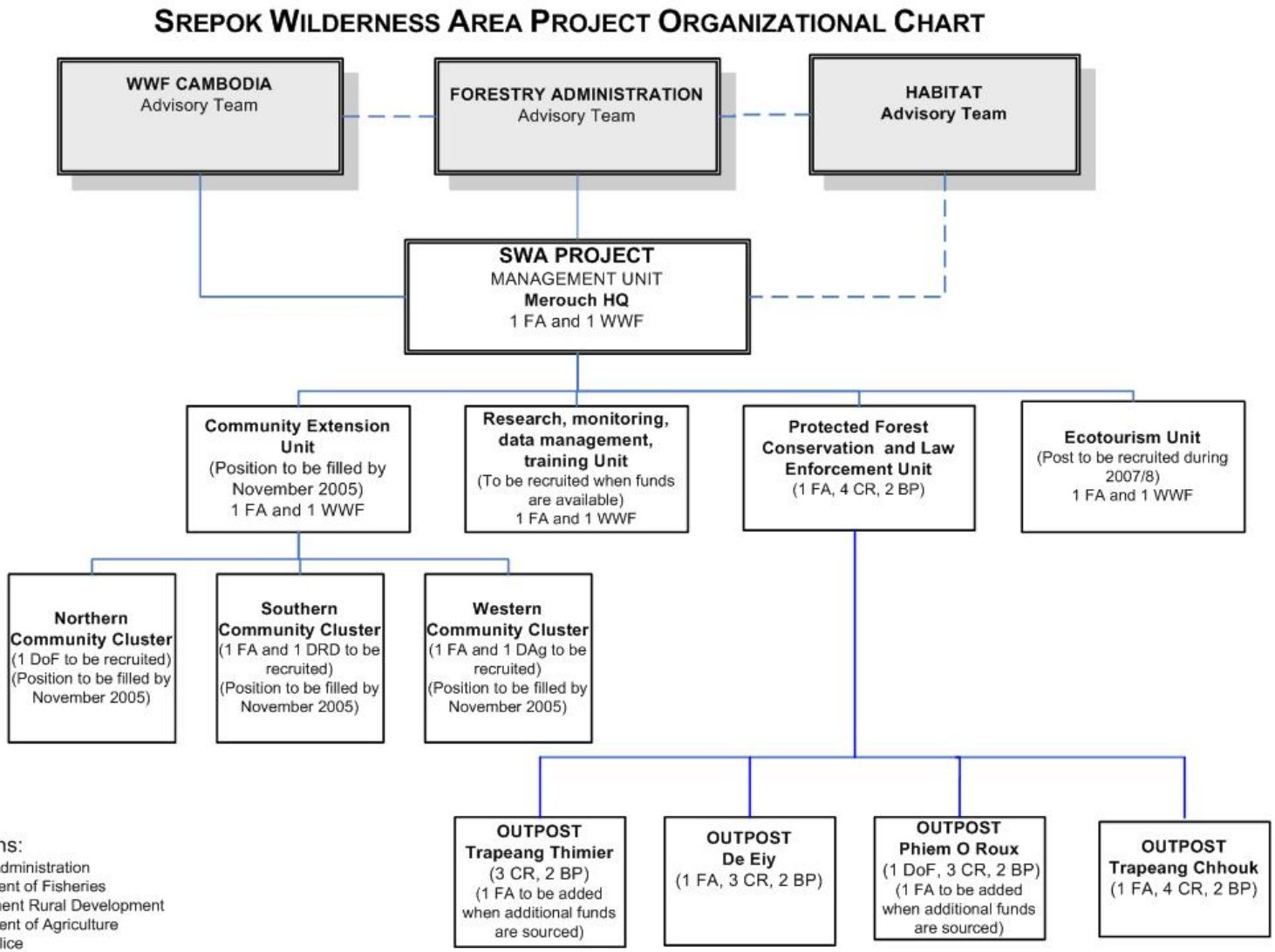
[13] Asian Leaf Turtle refers to a complex of recently recognised or described species. Pending further taxonomic investigation, the whole Asian Leaf Turtle complex was considered a conservation focus.

[14] There is uncertainty about the taxonomy of douc species recorded in Cambodia, therefore all the douc species are provisionally classed as *Pygathrix nigripes*.

Appendix 4: Village names and numbers collected in 2005/6 by Community Extension Team

Clusters	Commune	Villages	Groups	Total Village	VillageVisited	Population			Individual	Families	Total families
						Men	Women	Total			
Western Cluster											2187
	O Boun Leu	Toul		3	3	195	198	393	393	77	
		O Boun	Sre Chrey; O Boun			363	344	707	707	143	
		Antrieh				213	194	407	407	90	
	Sok San	kloang leay		4	0			0	409	75	
		Antchoarl						0	309	78	
		Checloak						0	970	119	
		Srey Thum						0	860		
								2548		186	
	Royor	Royor	Mochounga; Royor; Peim Royor	4	1	279	261	540	540	102	
		Memom	Toumpong, royor leu; srey roang; chekous			257	255	512	512	106	
		Kadoie				112	86	198	198	36	
		Roa weat				191	176	367	367	74	
	Sre Huy	Srey Huy		2	0	427	488	915	915	179	
		Choul				187	171	358	358	67	
	Sre Sankum	Mincheuy		9	9	0		0		133	
		Sereymeanrith								40	
		Sereymoungkoul								40	
		Chamran								84	
		Kabal Cherouy								56	
		Kabal Koah								70	
		Sereyrouth								58	
		Orouyea								111	
		Ryeangsrey								263	
						2806	2175	4981	4981		
Southern Cluster											331
	Krang Teih	Pourapet		4	3		738	1406	1406	331	
		Krangteih									
		Kbaldemrey									
		Tramkat									
Northern Cluster											362
	Nong Khelik	Nang Bou	Sre Chrey; Nang Bou	4	4				1281	220	
		Peam Chemiet							510	90	
		Roam Moyeul Leu							354	52	
		Khoas Moyeul Kraom							457	96	
								2602			
Total				***30***	***20***	***5030***	***5086***	***15934***	***15934***		**2880**

Appendix 5 : Proposed Organisational Chart for the SWA Project



Abbreviations:
FA – Forestry Administration
DoF – Department of Fisheries
DRD – Department Rural Development
DAg – Department of Agriculture
BP – Border Police
CR – Community Ranger

Appendix 6: Example of a first page MIST report

SBCA: Patrol Report
Inclusive Dates: 01/07/2004 to 30/06/2005

Report Date: 20/07/2005

Seima Biodiversity Conservation Area
Annual Report 2004-2005

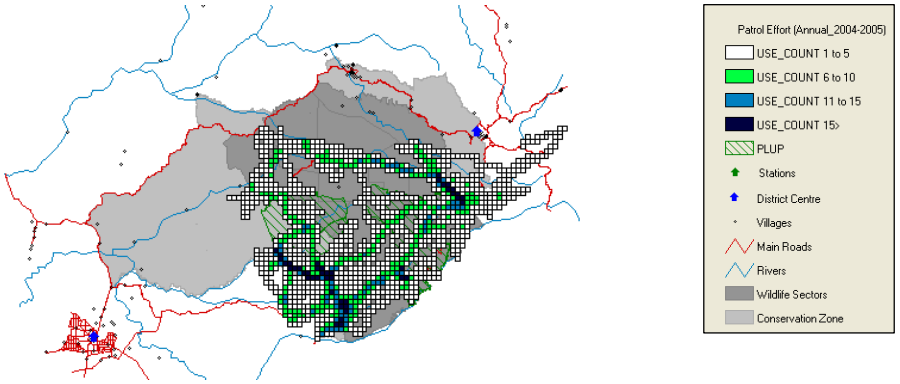
Number of Patrols	**223**	**Average Days on Patrol**	**1.13**
Patrol Days	**252**	**Average Nights on Patrol**	**0.13**
Patrol Nights	**29**	**Average Patrol Size**	**4**
Total Distance(km) Patrolled	**4897.32**	**Average Patrol Distance(km)**	**21.96**

1. Ranger Report

	Name	Patrols	Days	Nights	Distance (km)
12	Boeun,Bott	72	90	18	1930
14	Chab,Mao	106	123	17	2418
13	Chay,Meta	34	42	8	927
16	Cheng,Vuthea	1	2	1	41
5	Chhuon,Sery Vath	5	5	0	48
10	Chin,Proeung	42	46	4	1130
	count = 27	sum = 957	sum = 1111	sum = 154	sum = 21339

NB: This report shows data for any patrol days inside the period, even if the patrol begins or ends outside the period. Any days of a patrol outside the period are not included

Map 1: Patrol report: Patrol Effort



Appendix 7: Draft Deika

Draft Provincial Deca

This **draft** document outlines the actions that are needed to secure the Core and Conservation zones of the Mondulkiri Protected Forest.

0 – This Deka recognizes core and conservation zones within the Srepok Wilderness Area project site (located inside the Mondulkiri Protected Forest) as shown on the attached map.

Workshops will be conducted and signs will be erected at strategic SWAP Outposts, as well as in Villages, Communes and Districts.

1 – No fishing in streams that are located in core zone such as O Ten, O Rove, O Phlai, O Romiet and O Tramet , O Lmit and O Danh Preah..

Fishing may be permitted in streams that are located in conservation zone; using legal fishing methods and traditional practices like throw nets and traps. Legal fishing methods and traditional practices will be clarified at Workshop level when MOSAIC-EP is actively involved in SWAP.

2 – No fishing in the Srepok River from the Vietnam border to Peam O Rove.

Future actions to establish community fisheries for sustainable use in conservation zone will involve the Provincial Governor's Office, Department of Fisheries, Forestry Administration, other technical agencies and supporting organizations, and the local communities.

3 – No exploitation of any wildlife, wildlife products, vegetation or NTFP's is permitted in trapeangs and anlungs located in core and conservation zones.

4 – No domestic animals are allowed into the core or conservation zones, with the exception of elephants and cattle for transport purposes, and ducks, for personal (subsistence) use, by the SWAP and Border Police staff.

5 – No NTFP collection is permitted (by anyone, local or outsider) in the core zone, with the exception of resin collection by registered members of the local community, or their nominated representatives"

A Workshop will determine who the trees belong to, location of the trees, who collects the resin, how much is collected and a registration process will be conducted whereby some form of registration paper will be issued.

6 – All sizes of trucks are prohibited in the core and conservation zones during the wet season in order to prevent forest degradation and soil erosion. Wet season will be determined by project staff who will know the local conditions of the road.

7 – People from the community entering the conservation or core zone must sign in at dedicated SWAP Outposts (Trapeang Chhouk, Trapeang Thimier, Pheam O Rove and Mereuch Head Quarter's) in order to declare their intentions to use the area, and their exact schedule for using and leaving the area.

8 – District and Military Police and Military Forces entering SWAP core and conservation zones must have a dedicated Mission Letter for transporting or using any weapons/ammunition or explosives.

Border Police stationed within the SWAP are exempt from this process as the project Staff are familiar with all Border Police Staff.

Mission Letter must be approved by the Governors Office/or applicable Police/Military Chief and has to be produced at abovementioned Outposts before entering the area. This Mission Letter has to be shown to the Border Police who are on duty at the relevant Outpost.

9 – Community members traveling in or using the core and conservation zones are prohibited from setting fires, except small, controlled fires for cooking, and small controlled fires for collection of liquid resin .

Fire management regulations will be developed by the Forest Administration and MPF, but individual people are legally responsible for any damage caused by uncontrolled fires.

10 – No waste (plastic, bottles, cans, etc.), pollutants (chemicals or toxins), and non-native plant seeds are allowed to be left in the SWAP core and conservation zones.

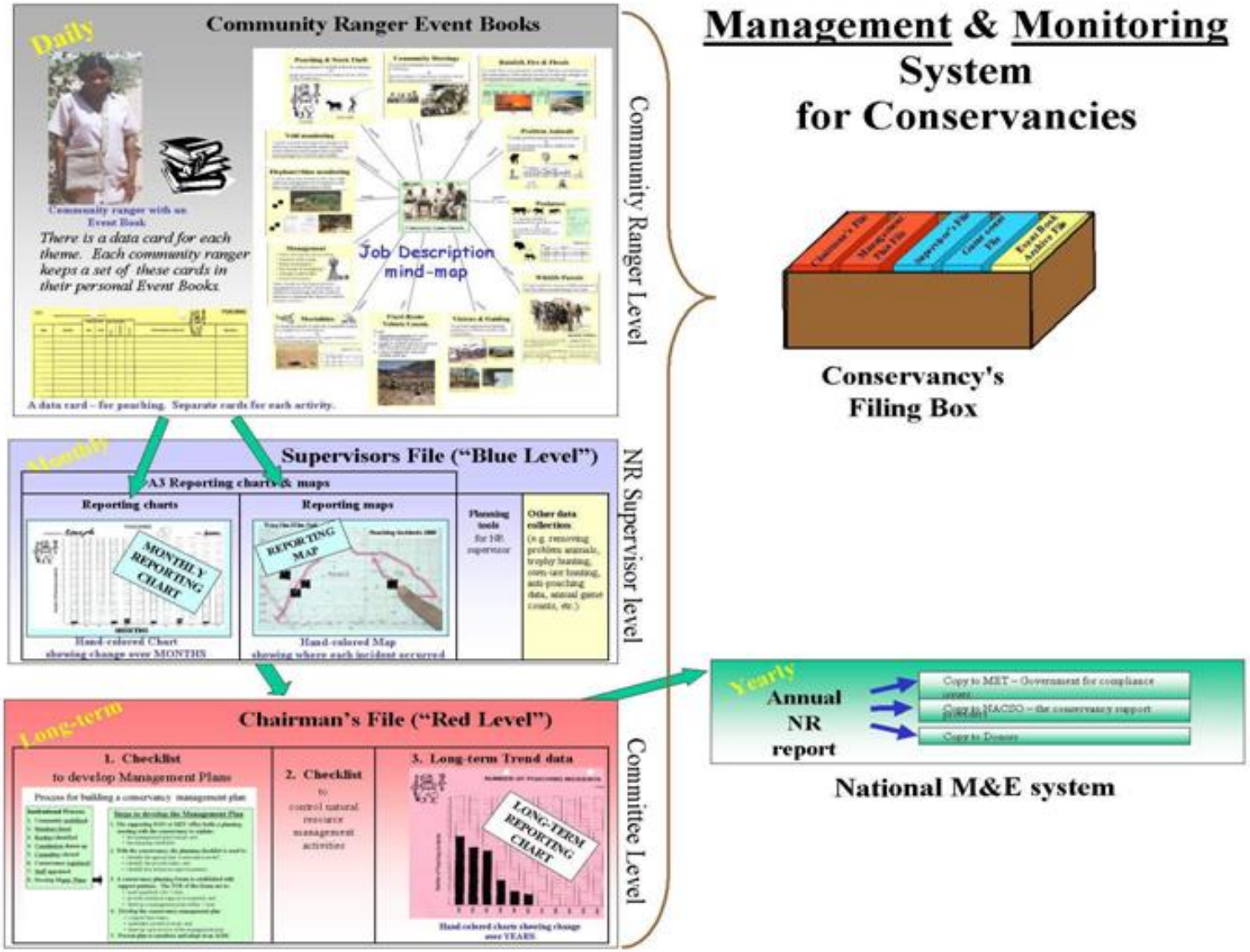
All waste must be taken out or burnt in a controlled manner when leaving SWAP core and conservation zones

11 – Any persons found violating any of the abovementioned articles will be subject to legal prosecution, and may loose their rights to use resources in Mondulkiri Protected Forest.

Appendix 8: Implementation Stages for the MOMS in communal areas of Namibia

	Year 1				Year 2				Year 3				Year 4			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Field Workers are appointed																
Field workers get basic training																
Job description poster developed																
Data collection forms developed																
Pilot data collection forms																
Proper data collection beginnings																
Monthly reporting beginnings																
Mid year audit																
Committee reviews system																
Annual audit completed																
First year cards archived																
Filling filing box implemented																
Map reporting system introduced																
Interpretation training																

Appendix 9: Example of a data flow poster used in Namibia



Appendix 10: Implementation and training manual used for MOMS in Namibia

IMPLEMENTATION MANUAL
for the CONSERVANCY MONITORING SYSTEM
(the 'EVENT-BOOK')

OVERVIEW

Full implementation of the Event-book system takes a number of years. This is because it need to be implemented incrementally building on small successes and importantly, the conservancy needs to go through at least two years of reporting cycles in order to experience all aspects of the system. This presupposes that the participants have basic skills in map reading, filling in data forms and in general knowledge regarding the natural resources being monitored. An absolutely essential principle for implementation is that there needs to be a commitment to follow-up on a fairly regular basis over the first two years. Depending on the level of skills at a given conservancy, the average follow-up interventions are every quarter during the first 12 months and every six months thereafter. Each intervention is kept short (max one day) so as to maintain interest.

There are a number of phases of implementation as follows:

1. Pre-event book phase – identification of persons who will be responsible for the system (institutional arrangements), basic skill training in resource management, map reading and data collection.
2. Identification of key resources to monitor ('job description' phase)
3. Event Book training
4. Monthly report training
5. Annual Audit
6. Institutionalisation of the system
7. Interpretation and use of the information

These phases do not need to run sequentially - i.e. more than one phase can be running at the same time as will be evident in the example time line below.

		Year 1				Year 2				Year 3				Year 4	
	Phase	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**
1	Pre-event book phase	x	x	x	X										
2	Job description phase			x											
3	Event Book training phase			x		x	x	x	x			x			
4	'Monthly' reporting training phase						x	x	x			x			
5	Annual Audit and reporting phase									x				X	
6	Institutionalisation of the system							x		x		x		X	
7	Interpretation & use of results									x				X	

Key Milestones														
Field workers in appointed	x													
Field workers have basic skills			x											
Event book practise begins			x											
Job description poster delivered					x									
Event book cards refreshed					x									
Proper data collection begins					x									
Monthly reporting begins						x								
Mid year audit (year 1)							x							
Committee training for the system							x							
First annual audit completed									x					
First years data cards archived									x					
Filing box implemented									x					
Mid year audit (year 2)											x			
Second annual audit completed													x	

TRAINING EVENTS

1. Workshop to identify key resources and define job descriptions of Community Rangers: with Committee, Community Rangers and Supervisor

OBJECTIVES:

1. Identify key natural resources that the committee requires information on (i.e. that need to be monitored)
2. Construct a draft 'job description' poster for the community rangers.

ASSUMPTIONS: That at the meeting participants represent all sectors of society in the conservancy and there is gender balance.

PROCEDURE:

1. Introductions & name tags
2. Provide the background - there are very many natural resources that are important and used by the community and that it is not possible to monitor all of these. There is a need to identify priorities and today the objective is to identify those priorities and define the job descriptions of the community rangers. Use the conceptual diagram showing that there is the full inventory list of all natural resources, we need to shorten this list to those that are important. Finally we need to make and even shorter list of those resources that the community wants monitored – i.e. wants regular information about.
3. Brainstorm the important natural resources
4. Identify their uses

5. Vote for the most important – i.e. those that the community is worried about and which they want regular information about (we are trying to identify information needs – which will determine that which should be monitored). This voting can be recorded by gender.
6. Review the outcome of the voting and make the point that the ones receiving the most votes are those that the community will expect the rangers to regularly report on.
7. Construct the job description poster on a flip chart and get this agreed.
8. Next steps - one of which is that the technical team will make a nice poster and bring this back to the conservancy next time. Also set dates for the next event – giving the community rangers the 'tools' (the event book) to do their job
9. End - Take a photograph of the community rangers for the poster

2. Basic Event Book training: with Community Rangers and Supervisor

OBJECTIVES:

1. To systematically introduce a number of event book cards
2. To train rangers to fill in these cards
3. To thoroughly explain the rules of the system
4. To launch the practise period
5. To demonstrate the reporting charts to the participants so that they know how the data will be used

ASSUMPTIONS: A draft job description poster for the community rangers has been compiled and the old flip chart poster from the job description workshop had been brought along. There is an event book bag, file and set of cards for each community ranger. All training posters have been brought along (i.e. practise data cards, practise reporting charts, example reporting charts, maps with grid squares, etc).

PROCEDURE:

1. Introductions & name tags
2. Present the draft poster – this is the poster that the technical team compiled following the 'job description' workshop. Present this along side the old flip chart poster that was compiled previously. Make the connection between the old and the new poster. Introduce the icons depicting each job.
3. Hand out the bags and files – give a bit of lecture on care of the bag and that it always should accompany them.
4. Select one task and begin training:
    a. Hand out the appropriate practice card – point out the icons and refer to the poster
    b. Demonstrate how the card is filled in – use a flip chart and the grid map
    c. Call up a number of volunteers get them to fill in some events as you call them out
    d. Now call out events and get each ranger to individually fill in the practise cards in their event books
    e. Individually check each card to ensure that they have been filled in correctly –correct as necessary

f. Play out a number of scenarios – e.g. where a number of rangers encounter a single event, etc – use these to high light the 10 commandments and rules of the event book system

5. Now repeat this for each card
6. Finally take one issue and show how this information will be used by demonstrating a reporting chart - this will be for next time!
7. End
    a. Close the meeting by reminding the participants that the event book and bag should always be with them and they must actively keep this up to date. Remind them that this is their tool to prove to their committee that they are doing their work and that they are valuable to the conservancy.
    b. Discuss next steps and set dates for the follow-up activity
    c. Close the meeting
    d. THEN – before everybody departs check that the community rangers get their meeting form signed off – if not, then call them back and use this as an practical example of using the event book actively.

3. Basic Reporting Training: with Community Rangers and Supervisor

OBJECTIVES:

1. To implement the monthly (blue book level) reporting charts
2. To provide community rangers with an insight as to how their data will be used
3. To motivate the community rangers
4. To expose the value of the community rangers to the committee
5.

ASSUMPTIONS: The event book has been running reasonably successfully for some three months and there is some data to report on. All community rangers arrive for the training together with their event books (vital requirement!). The blue file, blue data cards, carry bag, practise reporting charts, example reporting charts, the job description poster together with the data flow training poster has been brought along.

PROCEDURE:

1. Introductions & name tags
2. Review the job description poster
3. Discuss how the information being gathered in the event books can be reported. Ask whether the information gathered over the past three months has been reported to anyone in the community. If this has been done at all, then discuss the shortcomings. Discuss how one major incident that happened years ago still dominates discussion – i.e. lead into the value to timing in terms of information report back. Ask rangers if anyone in the committee has congratulated them on their work recently – i.e. expose the weakness of not reporting.
4. Introduce the reporting charts. Show a worked example
5. Begin training in compiling the reporting charts for each of the various issues being monitored.
    a. Take an easy reporting chart (e.g. poaching) and ask all rangers to turn their event book to the poaching card.

b. Month by month build up the reporting chart by colouring one block per poaching incident
c. Now discuss where mistakes can be made in the reporting system – specifically refer to the instance if one or more rangers are not present at the 'analysis' meeting, and refer to duplicated incidents (if more than one ranger reports on the same incident).
d. Discuss what the charts are saying as these emerge – i.e. introduce the concept of graphs through the practical work of compiling the charts.
e. Get a volunteer to present the chart – do a peer review on the presentation and discuss means of improving the presentation

6. Repeat this process for each reporting charts
7. Introduce the Supervisors Blue Meeting form
    a. Each community ranger must sign off on this from when their data has been captured onto the charts
    b. Note: this form is NOT an attendance register – it is to ensure that all rangers' events are captured onto the reporting charts – i.e. if a ranger is absent (or has left his event book behind) then he/she can catch up later on. Importantly, only allow a ranger to sign off if his incidents are included on the monthly reporting charts!
8. Review progress on the job description poster - tick off the areas that have been covered and highlight those that have not yet being addressed – these are for the future
9. End
    a. Get feedback from the participants
    b. Plan next steps
    c. Set dates for next event

4. Follow-up Event-Book and Reporting Training: with Community Rangers and Supervisor

OBJECTIVE: To follow up on basic event book and reporting training and ensure that the systems are being correctly applied.

ASSUMPTIONS: Basic event book training should have taken place some two to three months previously and the Community Rangers should already have collected some information. The supervisor should also have been filling in the Reporting charts. Ensure that the Rangers bring in their Event books and the Supervisor his A3 reporting flip file. If they have not then make this an issue because they are unable to perform their job if they do not have their tools with them at all times (remind them that the 'book never sleeps'). Allow considerable time for this event and be prepared for major problems. This event highlights mistakes and is where inexperienced trainers may loose confidence in the system.

PROCEDURE:

1. Introductions & name tags
2. Community Rangers report back: on work done and problems
    - Hear and record problems and suggestions for improvements
3. Housekeeping - go through each rangers event book and:

a. Throw out old practise forms and any other rubbish that should not be in there (Community Rangers have a tendency to horde any piece of paper with anything written on it)
b. Check – that incidents are not duplicated between rangers – rewrite cards if necessary.
c. Check – that only incidents that occurred with in the conservancy are recorded (especially important where there are joint patrolling efforts with neighbours)
d. Check problem animal incidents – if the problem animal was a predator, then the Predator form must also have been filled in.
e. Screen Event books for general arrangement of froms and any other housekeeping
f. Remind/introduce rangers to the Event book's 10 Commandments

4. Senior Community Ranger (Supervisor) displays A3 Reporting Charts.
   a. Poaching
   b. PAC
   c. Predators
   d. (Rainfall - if rain-gauge)

   Check that the data in the event books has been correctly captured
   Remind the Supervisor and the Community rangers about the Red-Blue system rules
5. Poster feedback.
   a. Present the Community Rangers with their personalized 'Job description poster
   b. Go through the poster and remind every the participants about their various job functions and make the connection with the Event book forms and Reporting Charts (use the Icons and pictures)
   c. Specifically:
      - Remind rangers about the various jobs (boxes) and discuss their importance
      - Discuss the timing of each job and why this is important
      - Discuss the 'tools' and hear any suggestions to improve them
      - Discuss jobs not currently being done and remind them that one day these will also have to be included
6. Now start to talk about the fixed foot patrols
   a. Explain why these are important (for monitoring trend!)
   b. Explain why 'effort' must be same each month – give examples of implications if effort is varied
   c. Discuss fixed routes (have they got any, are they mapped, how many). Encourage them to be realistic one route per month, max 4 hours - about 10 km and the route should represent the key wildlife areas
   d. Go through the Patrol Data-book:
      - Show the self duplication system
      - Discuss what happens with the tear out copy (goes to data capture facility), remind participants that the copy stays with the conservancy
      - Show the reporting charts for the fixed foot patrols – discuss trend and how the charts will be used
      - Discuss the notion of "the book sleeps" - i.e. these patrols are only done once a month and the forms only filled in when on an official patrol.
   e. Plan and set dates for the route to be walked the first time and tracked with a GPS
7. Prepare the senior ranger to properly present the reporting charts.

5. Institutionalisation Training: with Committee and Supervisor (Community Rangers can also attend)

OBJECTIVES:

1. To ensure that the committee knows what their rangers are doing
2. To introduce them to data flows that lead to decision making
3. To stimulate an information demand that will ensure that the rangers continue to perform their duties - this is essential for ensuring sustainability of the event book system.
4. To provide the committee (chairman) with the tools (red file & checklist) to control and manage the rangers

ASSUMPTIONS: Historical PAC data from a number of years has been collected and is available on reporting charts before the meeting starts. If there is no such data then use PAC reporting charts from another conservancy – blank out the Conservancy's name (example data are available).

PROCEDURE:

1. Introductions (name tags)
2. Report-Back on Community Ranger work
   a. Discuss the Job description of the rangers and show the community ranger poster
      - Indicate the various jobs on the poster
      - Indicate that some jobs are on hold – for the future!
      - Discuss the timing of each activity (some yearly, monthly and daily, whilst some are 'event' driven)
      - Describe the need for 'tools' to undertake each job: emphasise (i) data collection and (ii) reporting tools
   b. Describe each of the 'Tools'
      - Forms (for data collection), the event book file and the bag
      - Reporting charts (and maps) to communicate to Committee and Community information
      - The rules and 10 commandments
3. Demonstrate the reporting systems
   a. Senior ranger presents A3 charts of data collected in recent time
   b. Work with the committee to understand charts
   c. Ensure that the committee understands that they should demand these charts on a monthly basis
   d. Now show the Data flow Poster emphasising the crucial role of the senior ranger
      - explain carefully the dataflow for each activity;
      - start with the CGG Poster (e.g. point out 'Poaching'
      - then show (using the data flow Poster) how the information is :
        - captured into the Event-book form
        - how it then flows to the Monthly Supervisor charts, and
        - finally how the information flows to the Yearly charts
        - now discuss the importance of such data
   e. Introduce the Red, Blue, Black Poster
      - explain the colour coding system

- explain in more detail the differences of the Red Book, Blue Book, Black Book

f. Explain to the Committee that, as an example, we will examine in the PAC reporting system
   - Show old PAC charts (from old historical data) – Blue Charts
   - Get the audience to add up, for each year, the number of incidents on the Charts
   - Get the Chairman to fill in red charts (careful not to embarrass him/her when mistakes are made)

g. Again emphasise the difference between
   - Blue charts (monthly)
   - Red charts (long term)

4. The Chariman/Committee control checklist
   a. Introduce the Chariman/Committee control checklist
   b. Explain its importance in giving the committee control over their rangers
   c. Explain its benefits in demonstrating to donors and potential investors the level of management control that the conservancy has over its staff and affairs
   d. Carefully go through the checklist and tick off recent jobs completed. Ensure that the committee checks to see that the job has actually been completed.
5. Introduce the filing box
6. End
   a. Remind the conservancy that the system is theirs but that there is a legal obligation to annually report to MET.
   b. Point out that they can also use this information for own decision making, to impress potential investors and to meet donor requirements.
   c. Describe how the information can also be used to lobby government for support.
   d. Point out that for the system to work, it is essential that the committee demand to regularly see the reporting charts.
   e. Discuss and record next steps, if any

Mid-Year Audit:

Community Rangers and Supervisor

OBJECTIVES:

1. To provide impetus to the system during the initial phases whilst it is not fully institutionalised
2. To ensure that the data is being collected properly
3. To ensure that the reporting charts are being filled in monthly and correctly.

ASSUMPTIONS:

PROCEDURE:

1. Introductions (name tags)
2. Review event books and correct mistakes as necessary
3. Review reporting charts and correct mistakes as necessary
4. Discuss what the reporting charts are saying
5. Remind participants that the next visit will be to assist them to compile their annual audit report

Annual Audit:

Community Rangers, Supervisor and Key Committee Members

OBJECTIVES:

	Done
1. To archive the last years data cards	
2. To put in new data cards for the new year	
3. To implement any new improvements	
4. To evaluate the performance of the participants and plan any necessary stop-gap training	
5. To complete the long term tend charts – in the red book	
6. To compile an annual report (the "questionnaire") and feed this into the M&E system	
7. To provide training in interpreting and using the long term trend results	

ASSUMPTIONS:

1. All new cards, reporting charts, reporting maps and the audit questionnaire are available
2. That the conservancy has been well informed that this is the most important event book activity of the year and that at least one senior member of the committee should attend
3. The conservancy will bring along the filing box which should contain:
   a. the Chairman's control file ("red book")
   b. the monthly reporting charts ("flip file")
   c. the Supervisors file ("blue book")
   d. the archive file

4. all event books must be brought along - if a ranger cannot make the meeting his book should be brought along by someone else
5. The trophy hunter must have submitted his trophy record cards for the year
6. The audit takes place at the beginning of the year

PROCEDURE:

1. Introductions (name tags)
2. Put up System poster – discuss the objectives and point out the Annual NR report
3. Review event books and correct mistakes as necessary
4. Review reporting charts - correct mistakes as necessary and add up the total number of incidents for the past year
5. Fill in the long-term trend charts in the Red-Book
6. Introduce the questionnaire - explain that the questionnaire will constitute the conservancy's annual natural resource report and that it represents the only way that data should ever leave the conservancy i.e. nobody should come and take away the conservancy's event book cards or charts – they should only be allowed to copy the information because the materials belongs to the community and nobody else.
7. Fill in the questionnaire – ask the various questions, if the response is yes, then fill in the necessary summary data. These are obtained from totals on the reporting sheets, the trophy hunters card and from the yellow cards in the supervisors file.
8. Update the "Tracking" card (section 3 of the red file) – by ticking all of the NR Activities that were conducted during the year. Only those that were properly implemented should be ticked off. Use the completed questionnaire to determine if an activity was properly implemented.
9. Archive the following: *Done*
    a. all the old event book cards ☐
    b. the A3 reporting charts ☐
    c. the data cards from the supervisor's file ☐
    d. the monthly control card in the Chairman's file. ☐

Place the archive file in the filing box. Remind everybody that this file should never leave the conservancy. Explain that these data should be kept because MET or other stakeholders could one day question the validity of the summary figures or someone may wish to obtain more detailed information on a particular event.

10. Refill the following with fresh cards and charts for the new year
    a. event books ☐
    b. the reporting-chart flip file ☐
    c. the supervisor file ☐
    d. the chairman's control file. ☐
11. Update the new cards - with any incidents or activities that have taken place since January 1st
12. OPTIONAL: Capture all event cards onto computer for later GIS analysis
13. Next steps
    a. Discuss how many copies of the report should be made, to whom the copies should be sent, who will report back to the wider community at the AGM.
    b. Discuss and plan next support interventions, if any.

Follow up Institutionalisation training: with Committee and Supervisor (Community Rangers can also attend)

OBJECTIVES:

1. To refresh the committee on the event book system
2. To deploy the conservancy filing box
3. To review the long term tend charts – in the red book
4. To review the annual report and discuss implications and necessary follow-up actions
5. To provide training in interpreting and using the long term trend results
6. To evaluate the performance of the system and review the natural resources that are being and not being monitored

ASSUMPTIONS:

PROCEDURE:

1. Introductions (name tags)
2. Review the management plan: Poster, vision, zonation, development plan, annual work calendar and the management plan file
3. Review the monitoring system: - event book, reporting charts (blue level and red level), the poster, etc
4. Explain the role of the conservancy filing box – explain each file in turn
5. Review the long term charts – discuss the implications of each trend and what, if anything should be done about it
6. Review the annual report – highlight any issues of concern and discuss what, if anything should be done about it
7. Review the chairman's control checklists - correct if necessary, if a new chairman is in place then provide training on how these should be used – try to involve all committee members in this so as to broaden the skill base.
8. Evaluate the performance of the system – discuss adequacy of reporting, review the job description poster and see if any gaps exist, develop a strategy to fill the gaps.
9. End – next steps