

Operational Management Plan for Lo Go Xa Mat National Park, Tay Ninh Province, 2004-2008

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Attachment 1: Conservation Needs Assessment

1. Background

This Operational Management Plan was prepared by BirdLife International *in Indochina* in collaboration with the management board of Lo Go Xa Mat National Park, as an activity of the WWF Cat Tien National Park Conservation Project. The plan is based on a series of consultations with members of the national park management board and representatives of local communities held in August 2003.

Lo Go Xa Mat was included on Decision No. 194/CT of the Chairman of the Council of Ministers, dated 9 August 1986, which decreed the establishment of a nature reserve. In 1997, a Special-Use Forest management board was established. Subsequently, Lo Go Xa Mat was upgraded to national park status, following Decision No. 91/TTg of the Prime Minister, dated 12 July 2002. Until 2001, Lo Go Xa Mat was managed by the provincial Department of Agriculture and Rural Development; the national park is currently managed by Tay Ninh Provincial People's Committee.

Lo Go Xa Mat National Park is located in Tan Bien District, Tay Ninh Province, 30 km to the north-west of Tay Ninh Town. The national park is bounded by the coordinates 11°02' to 11°47'N and 105°57' to 106°04'E. The total area of the national park is 18,806 ha; in addition, there is a buffer zone of 18,600 ha.

Lo Go Xa Mat National Park supports a mosaic of lowland forest and wetland habitats, including lowland semi-evergreen forest, lowland deciduous forest, seasonally-inundated grasslands and forests, permanent lakes, and watercourses. The wetland habitats within the national park are important for a number of large waterbird species, including Sarus Crane *Grus antigone*, Lesser Adjutant *Leptoptilos javanicus*, Woolly-necked Stork *Ciconia episcopus*, and Asian Openbill *Anastomus oscitans*. The wetland habitats are also probably important for a number of plant species and communities that have declined or disappeared elsewhere in Vietnam, although these have yet to be fully documented. The forest habitats are equally important, and represent an important example of forest on level lowlands.

Rapid biodiversity assessments conducted in 1999 and 2001 recorded 34 mammal species and 177 bird species at Lo Go Xa Mat¹. Mammal species of conservation concern include Black-shanked Douc Langur *Pygathrix nigripes*, Silvered Leaf Monkey *Semnopithecus cristatus*, Bear Macaque *Macaca arctoides*, and Particolored Flying Squirrel *Hylopetes alboniger*. The 177 bird species include two species listed as globally-threatened (Germain's Peacock Pheasant *Polyplectron germaini*, and Sarus Crane) and two listed as globally near-threatened (Siamese Fireback *Lophura diardi*, and Great Hornbill *Buceros bicornis*)², and an additional four species listed in the Red Data Book of Vietnam: Asian Openbill, Woolly-necked Stork, Bar-bellied Pitta *Pitta elliotii*, and Stork-billed Kingfisher *Halcyon capensis*. Based on the habitats present and the suite of species recorded, a number of other species of conservation concern may possibly occur at Lo Go Xa Mat, including White-shouldered Ibis *Pseudibis davisoni* and Jungle Cat *Felis chaus*.

Lo Go Xa Mat National Park is situated within the Southern Vietnamese Lowlands Endemic Bird Area (EBA), and supports two of three restricted-range species of this EBA: Germain's Peacock Pheasant and Grey-faced Tit Babbler *Macronous kelleyi*. Additionally, Lo Go Xa Mat qualifies as an Important Bird Area³.

¹ Tordoff, A. W., Pham Trong Anh, Le Manh Hung, Nguyen Dinh Xuan and Tran Khac Phuc (2002) *A rapid bird and mammal survey of Lo Go Sa Mat special-use forest and Chang Riec protection forest, Tay Ninh province, Vietnam*. Unpublished report to the BirdLife International Vietnam Programme and the Institute of Ecology and Biological Resources.

² BirdLife International (2001) *Threatened birds of Asia: the BirdLife International red data book*. Cambridge, U.K.: BirdLife International.

³ Tordoff, A. W. ed. (2002) *Directory of Important Bird Areas in Vietnam: key sites for conservation*. Hanoi:

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The indigenous population of the buffer zone of Lo Go Xa Mat National Park is comprised of members of the Kho Me (5.3% of the total population in the buffer zone) and the Tay (0.2%) ethnic minorities. Kho Me people live near the border with Cambodia, and have a very close relationship with Cambodian peoples. Kho Me people cultivate wet rice and cassava plantations for their subsistence.

2. Issues and threats

2.1 Hunting and trapping

Relative to other threats, hunting is currently a major threat to overall biodiversity in Lo Go Xa Mat National Park, in part because the national park does not support a high diversity of large mammal species. Hunting and trapping are conducted by both local people and Cambodians, both for subsistence use and sale to local restaurants. Target species include civets, wild pigs, and snakes. In addition, birds are trapped within and around the national park, to supply the caged bird trade. Although little detailed information on the impacts of hunting and trapping at the national park are available, the species most susceptible to this threat potentially include primates (particularly Black-shanked Douc Langur), turtles, snakes, and galliforms, particularly Germain's Peacock Pheasant.

The national park staff have had some success in controlling hunting and trapping. During the Conservation Needs Assessment, the management board reported that hunting and trapping were much reduced in comparison with a few years ago. However, the easy access to the national park, and the presence of human settlements (including border army stations) within its borders, present obstacles to effective enforcement of national park management regulations.

2.2 Illegal timber extraction

Timber is being illegally extracted from the national park by local households in Vietnam, by Cambodians living across the international border, and by people working on behalf of wealthy outsiders. Market demand, subsistence needs for house construction, and population growth are the main forces driving illegal timber extraction. Limited resources are available from national programmes to help local communities to meet their subsistence needs and reduce their dependence on forest resources. In addition, a major buffer zone investment plan has been approved by the Ministry of Agriculture and Rural Development (MARD) and the Provincial People's Committee, although funds have not yet been allocated. Consequently, subsistence needs for timber remain high.

Even if subsistence needs were reduced, there would still remain a need for effective enforcement of national park management regulations in order to control timber extraction by Cambodians and people working on behalf of wealthy outsiders. The national park is situated in an area of level lowlands and flat topography, and contains an extensive network of roads and trails. It is therefore difficult to control human access to the national park. This is compounded by the fact that the enforcement capacity of the national park staff is limited in terms of personnel, equipment, and training. Moreover, controlling access to the national park requires effective coordination with the border forces of Vietnam and Cambodia.

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2.3 Conversion of seasonally-inundated grasslands to wet rice cultivation

As a result of population growth and a shortage of suitable land for irrigated rice cultivation, remaining areas of natural wetland habitat in Tay Ninh Province, and particularly seasonally-inundated grasslands, are under increasing pressure of conversion to wet rice cultivation. At Lo Go Xa Mat, this threat is compounded by a high level of in-migration into the buffer zone. In Tan Lap Commune, for instance, 50% of households are in-migrants from elsewhere in Vietnam.

In 2001, a scheme to resettle people into one of the largest wetlands in the national park and convert a large area of seasonally-inundated grassland to wet rice cultivation was initiated. While this scheme was halted after the provincial authorities were made aware of its potential environmental impacts, the potential for future similar schemes remains, unless decision-makers at all levels are made aware of the biological and socio-economic values of wetland habitats in the national park. In addition, the threat of small-scale unplanned conversion remains high.

2.4 Over-exploitation of non-timber forest products (NTFPs)

Several NTFPs are exploited within the national park by both local people and Cambodians, including the resin of dipterocarp trees, rattans, medicinal plants, and ornamental plants. Resin extraction has been significantly reduced from previous levels through the cooperation of national park staff, local authorities, and the local people involved. At the moment, some people get a small income from collecting the ornamental plant *Ochna integerrima*. However, in the opinion of the management board, if exploitation continues at current levels, the species may become locally extinct within a few years. Alternative income generation and awareness-raising programmes among local communities could be explored as positive ways to address this threat.

2.5 Conversion of forest land into agriculture

There are currently 88 households living (some of them illegally) inside the national park, comprising 12 households in the Strict Protection Area and 76 households in the Rehabilitation Area. Many of these households are practicing agriculture within or adjacent to the national park. Population increases, economic development in the international border region, and inequalities in household income create pressures to convert forest land into agriculture. In particular, some households have sold land cleared inside the national park to wealthy outsiders.

One issue constraining efforts to control conversion of forest land into agriculture is that, while the national park boundary is known to the local authorities, it is unknown to some local households, with eight kilometres of boundary in Tan Lap Commune not demarcated on the ground. If demarcation is carried out following the mapped boundary in this location, some households will lose their land. Another problem is the shortage of funds for organising demarcation workshops, setting boundary pillars, and constructing signboards.

The management board of Lo Go Xa Mat National Park has had some success in converting gardens and agricultural land into forest, using household contracts to plant native tree species under the national 661 Programme. This activity could be encouraged and strengthened until all gardens and agricultural land within the national park are converted to natural habitats (which may not necessarily mean conversion to forest).

2.6 Forest fire

To date, forest fire has had only a very small impact on forest habitats at Lo Go Xa Mat. The causes of forest fire include shifting cultivation practices of local people, planting of sugar cane on forest land, and deliberate burning to clear undergrowth for hunting or collecting scrap metal, or to promote

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the growth of understorey grasses for grazing livestock. The management board believes that this threat is now largely controlled, as a result of activities implemented in cooperation with local households in the buffer zone, such as signing forest protection contracts.

2.7 Limited capacity of national park management board

One very significant issue that represents a major obstacle to addressing the above threats is the limited capacity of the national park management board in terms of personnel, equipment, and training. A number of specific issues, identified during consultations with the management board and local communities, are listed below:

- The existing staffing level of the management board is insufficient for the management objectives of the national park to be met. For example, while the forest protection unit requires 37 members of staff, only 20 have been assigned.
- The national park infrastructure is relatively under-developed, particularly the forest guard stations, and forest guards do not have access to sufficient equipment, particularly communications equipment.
- The national park management board faces severe budgetary constraints, as the principle source of funding is currently the national 661 Programme. Investment plans for the national park and buffer zone have been approved by MARD and the Provincial People's Committee, but funds have not yet been allocated. Moreover, the funding approved in these plans is mainly for infrastructure development and rural development activities, with little available for operational conservation management.
- Since its establishment, the activities of the management board have focused on implementing forest protection activities. Consequently, the national park staff have limited training and experience in conservation management, particularly wetland management and wildlife management.
- Coordination mechanisms between the management board and other enforcement agencies, including the border army and the police, are under-developed. In addition, mechanisms to involve local communities in conservation are largely restricted to the forest protection contract system.

3. Management objectives

3.1 Goal

The goal of Lo Go Xa Mat National Park is to conserve and maintain biodiversity values of national and international importance, especial globally-threatened species, whilst providing benefits for local people living around the national park by involving local communities in forest protection contracts.

3.2 Management objectives

The management objectives for Lo Go Xa Mat National Park are to:

- 1) conserve all natural wetland habitats in the national park, especially those that provide habitat for large waterbirds;
- 2) conserve all lowland forest habitats in the national park;
- 3) maintain populations of globally- and nationally-threatened plant and animal species;
- 4) reduce negative human impacts on biodiversity within the national park;

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- 5) improve local understanding of the biodiversity and socio-economic values of the national park;
- 6) engage local communities in management planning and implementation of conservation activities; and
- 7) enhance the capacities of the management board so that it can manage effectively the natural resources of the national park, and implement successful conservation activities.

Attaining the seven management objectives will ensure the achievement of the goal of Lo Go Xa Mat National Park. Attaining the first three objectives will require the effective *in situ* conservation of species and habitats within the core zone of the national park. Necessary activities will include the introduction of appropriate management regimes for all key wetland habitats, the enforcement of national park management regulations, coordination with border guards, police, customs, and other enforcement officials, habitat and species research and monitoring, and liaison and extension with local communities in the buffer zone.

The focus of the fourth objective is human activities having a negative impact on biodiversity within the national park. These include both direct threats, such as hunting and trapping, illegal timber extraction, and conversion of wetland habitats to wet rice cultivation, and indirect threats, such as incompatible infrastructure development, human resettlement, and agricultural development schemes. In addition to effective enforcement of national park management regulations, attaining this objective will require integrating the management objectives of the national park into plans and projects of other sectors having potential impacts on biodiversity in the park.

The focus of the fifth objective is the awareness and appreciation of local stakeholders, including buffer zone households, local authorities, and the general public, of the biodiversity and socio-economic values of the national park. In order to attain this objective, necessary activities may include awareness-raising campaigns among buffer zone communities, environmental education in local schools, village meetings, coverage in the local media, and education and interpretation for visitors.

The focus of the sixth objective is to generate a foundation of support for conservation activities amongst local communities. Activities in pursuit of this objective may include the establishment of co-planning and co-management mechanisms involving local communities, the expansion of the forest protection contract system, and the initiation of joint forest protection groups, comprising forest guards and local villagers.

The focus of the seventh objective is to strengthen the capacities of the national park's management board in different fields through the provision of training courses, equipment, and improved infrastructure (e.g. forest guard stations).

3.3 Management zoning

According to the investment plan, the core zone of Lo Go Xa Mat National Park is divided into three management zones: a Strict Protection Area, a Rehabilitation Area, and an Administration Area. To attain the management objectives of the national park, each management zone should have a distinct management regime.

Strict Protection Area

The Strict protection area covers 8,594 ha, equivalent to 46% of the total area of the national park. The principal management objective of the Strict Protection Area should be the conservation of natural habitats and species of conservation concern. In particular, management activities in the Strict Protection Area should focus on:

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- Maintaining the integrity of seasonally-inundated grasslands, free from afforestation and conversion to other land uses.
- Protecting lowland forest from conversion, forest fire, and timber extraction.
- Controlling the exploitation of globally-threatened plant and animal species, particularly primates, turtles, snakes, and galliforms.
- Controlling human access to, and activities in, natural wetlands between October and March, which is believed to be the main period for visiting large waterbirds.

Table 1: Management Regime for the Strict Protection Area

Activity	Management regime	Effective
Logging or cutting timber	Strictly prohibited	Immediately
Conversion of wetland habitat to agricultural land	Strictly prohibited	Immediately
Practicing agriculture	Strictly prohibited	Immediately
Construction of roads, houses, and other infrastructure	Strictly prohibited	Immediately
Hunting with guns	Strictly prohibited	Immediately
Trapping	Strictly prohibited	Immediately
Poison and dynamite fishing	Strictly prohibited	Immediately
Fishing	Strictly prohibited	Immediately
Livestock grazing	Strictly prohibited	Immediately
Fire	Strictly prohibited	Immediately
Firewood collection	Strictly prohibited	Immediately
Ornamental plant collection	Strictly prohibited	Immediately
Rattan cane collection	Strictly prohibited	Immediately
Medicinal plant collection	Strictly prohibited	Immediately
Resin extraction	Strictly prohibited	Immediately
Honey collection	Strictly prohibited	Immediately
Planting trees in natural wetlands	Strictly prohibited	Immediately

Rehabilitation Area

The Rehabilitation Area covers 10,084 ha, equivalent to 54% of the total area of the national park. The Rehabilitation Area contains significant areas of secondary vegetation and agricultural land, and some wetlands. The main management objective of the Rehabilitation Area should be the restoration of natural forest and wetland habitats that have previously been converted to agricultural land, and the return of degraded habitats to a natural condition. The management board of Lo Go Xa Mat National Park should maintain and extend the system of signing forest protection contracts with local households.

Table 2: Management Regime for the Rehabilitation Area

Activity	Management regime	Effective
Timber extraction for sale	Strictly prohibited	Immediately
Timber extraction for household use	Strictly prohibited	Immediately
Resin extraction	Strictly prohibited	Immediately
Conversion of wetland habitat to agriculture land	Strictly prohibited	Immediately
Practicing agriculture	Strictly prohibited	Immediately
Construction of roads, houses, and other infrastructure	Strictly prohibited	Immediately
Hunting with guns	Strictly prohibited	Immediately
Trapping	Strictly prohibited	Immediately
Poison and dynamite fishing	Strictly prohibited	Immediately
Fishing	Limited and regulated	Within five years
Livestock grazing	Strictly prohibited	Immediately
Fire	Strictly prohibited	Immediately
Firewood collection	Limited and regulated	Within five years
Ornamental plant collection	Limited and regulated	Within five years
Rattan cane collection	Limited and regulated	Within five years

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Medicinal plant collection	Limited and regulated	Within five years
Resin extraction	Limited and regulated	Within five years
Honey collection	Limited and regulated	Within five years
Planting indigenous tree species	Encouraged	Immediately
Planting trees in natural wetlands	Strictly prohibited	Immediately
Allocation of forest land under protection contracts	Encouraged and funded	Immediately

4. Management actions

4.1 Maintain the integrity of all seasonally-inundated grasslands

Priority ranking: Critical priority

Justification

Lo Go Xa Mat National Park supports more than 2,000 ha of seasonally-inundated grasslands. This habitat, which is important for large waterbirds and migratory waterfowl, has disappeared from most other areas of Vietnam as a result of conversion to agriculture and afforestation with tree species. Following a series of workshops in Tay Ninh Province in 2001 to clarify the socio-economic and biological values of the wetlands in the national park, plans to resettle households into seasonally-inundated grasslands within the national park and to convert those grasslands to wet rice cultivation were shelved. However, the remaining areas of this habitat remain potentially threatened by small-scale, piecemeal conversion by local people, large resettlement and development schemes, and afforestation.

Management actions

- Conduct wetland management training for national park staff.
- Identify and map all key areas of seasonally-inundated grassland within the national park.
- Raise awareness of the biological and socio-economic values of wetlands amongst local communities and decision-makers at all levels.
- Conduct regular patrolling of wetland areas, particularly between October and March.
- Strictly enforce national park management regulations regarding conversion of natural habitats.
- Initiate an ecological monitoring programme for all key areas of seasonally-inundated grassland, and feed the results back into management processes.

4.2 Protect all lowland forest from conversion to other land uses

Priority ranking: High priority

Justification

In the Rehabilitation Area of the national park, in Tan Lap and Hoa Hiep Communes, many households are growing cash crops. Recently, there has been land trading and transfer between local people and in-migrants from other provinces. Consequently, areas of forest within the national park have been converted to other land uses. In order to address this problem, the national park management board, in cooperation with local households, has been gradually converting agricultural land within the national park into forest. However, this process still faces obstacles from those households who have land tenure certificates for agricultural land within the national park, and from poor households. In the Strict Protection Area, for example, 12 households are permanently settled, cultivating land and trading with Cambodians across the international border. The national park and a Vietnamese border guard unit have formulated a plan for submission to the Forest Protection Department for funding for resettlement of these households.

Management actions

- Continue the process of converting agricultural land within the national park into forest.

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- Closely monitor and support the on-going afforestation activities of local households who have signed contracts with the national park management board.
- Raise awareness amongst owners of agricultural land within the national park of the objectives and regulations of the national park, and the benefits they could receive from afforestation contracts.
- Strictly enforce national park management regulations regarding conversion of natural habitats.
- Fulfill existing commitments by MARD and the Provincial People's Committee to provide investment funding for the national park, including for the resettlement of 12 households living inside the Rehabilitation Area.

4.3 Demarcate the national park boundary

Priority ranking: Critical priority

Justification

The boundary of Lo Go Xa Mat National Park is clearly identified on the official topographic map, and has been approved by the relevant authorities. On the ground, however, boundary demarcation is not complete. In particular, a total of eight km has not been demarcated on the ground along the eastern boundary, in Tan Lap Commune, and along the south-western boundary, close to Border Guard Station No. 835. This lack of clarity of the boundary on the ground, and a lack of awareness of its location amongst some in the local communities, are factors contributing to the conversion of forest within the national park to agricultural land.

Management actions

- Organise boundary demarcation workshops attended by the national park management board, commune leaders, and representatives of local communities.
- Demarcate the remaining eight km of boundary on the ground with concrete pillars, and erect signboards showing the national park management regulations.
- Hold village meetings to introduce national park management regulations to local communities, summarising the management plan and explaining the location of the boundary.

4.4 Control illegal timber extraction

Priority ranking: High priority

Justification

The national park supports several high-value timber tree species, particularly members of the Dipterocarpaceae. Even within the Strict Protection Area, these species have been exploited to meet local subsistence needs and market demand. This problem is compounded by the location of the national park close to the international border with Cambodia. Many of the high-value timber species targeted by loggers are globally-threatened. In addition, timber extraction can result in habitat degradation, with implications for other plant and animal species.

Management actions

- Expand social forestry programmes in the buffer zone to meet subsistence needs for timber.
- Strictly enforce national park management regulations regarding timber extraction.

4.5 Control hunting and trapping of animal species

Priority ranking: High priority

Justification

Although the level of hunting and trapping of animal species within the national park has reportedly reduced in recent years, these activities remain a threat to a number of animal species, particularly primates, turtles, snakes, and galliforms. Hunting and disturbance are also a threat to large waterbird and waterfowl species, several of which are particularly susceptible due to their congregatory habits

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(for example, Asian Openbill). Trapping to supply the caged bird trade is a potentially severe threat to several bird species, particularly Hill Myna *Gracula religiosa* and parakeets *Psittacula* spp.

Management actions

- Intensify anti-hunting and trapping patrols in the Strict Protection Area, particularly along the tributary of the Da Ha Stream, and particular between October and February, which is the peak time for hunting following the harvest season.
- Coordinate with local authorities and other enforcement agencies to control the possession of guns and traps by local people.
- Strictly enforce national park management regulations regarding hunting and trapping in all areas of the national park.
- Conduct extension activities with hunters to raise their awareness of the objectives of the national park and its management regulations, and to encourage them to sign commitments not to hunt or trap wildlife.
- Conduct extension activities with local restaurants, and encourage them to sign commitments not to sell wildlife.

4.6 Control over-exploitation of NTFPs

Priority ranking: Critical priority

Justification

Several NTFPs are being exploited within the national park, most notably dipterocarp resin, rattans, medicinal plants, and the ornamental plant *Ochna integerrima*. Extraction of dipterocarp resin and the collection of *Ochna integerrima* are major sources of income for some local households. If these activities continue in an unregulated, unsustainable manner, they threaten to drive the species concerned to local extinction.

Management actions

- Raise awareness amongst local communities of the impacts of unsustainable NTFP collection, and the potential benefits of regulated, sustainable exploitation.
- Strictly enforce prohibitions on all forms of NTFP exploitation within the Strict Protection Area, particularly along the tributary of the Da Ha Stream near the Tan Phu Bridge.
- Study patterns of NTFP exploitation within the national park, in order to identify sustainable levels for each product.
- Negotiate agreements with local communities for sustainable, regulated exploitation of designated NTFPs from within the Rehabilitation Area.

4.7 Control forest fires

Priority ranking: High priority

Justification

In recent years, there have been no severe forest fires within the national park. However, there exist numerous potential causes of fire, including the agricultural practices of households who cultivate sugar cane and cassava, and fires set deliberately by people to clear understorey vegetation for hunting or collecting scrap metal, or to promote the growth of understorey vegetation for grazing livestock. It is important to bear in mind that regular, low-intensity fires may play an important role in maintaining certain habitats, particularly open deciduous dipterocarp forest and, potentially, some wetland habitats. Total cessation of burning may, over time, result in major changes to the structure and composition of these habitats. Consequently, a better understanding of fire ecology in the national park is required.

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Management actions

- Raise awareness amongst local communities about the dangers of fire.
- Sign agreements with local households cultivating land within or adjacent to the national park to prevent accidental fires.
- Continue the process of converting agricultural land within the national park into forest.
- Strictly enforce national park management regulations regarding the conversion of natural habitats.
- Train and equip local community conservation groups for fire prevention and control.
- Study the fire ecology of each natural habitat type, and develop appropriate fire management regimes.

4.8 Conduct targeted biological research

Priority ranking: High priority

Justification

To date, biodiversity research in Lo Go Xa Mat National Park has typically focused on general faunal and floral inventories, with few detailed studies of particular habitats and species. Such detailed information is required for a number of key habitats and species, particularly seasonally-inundated grasslands, lowland forest along the Da Ha Stream, primates, and large waterbirds, in order that action plans can be prepared for them. These action plans will ensure that conservation management at the national park is appropriate for key habitats and species.

Management actions

- Establish a scientific section within the national park management board, recruit new staff with academic qualifications in biology, and train existing staff in biodiversity survey and monitoring techniques.
- Conduct ecological studies of key habitats within the national park, particularly seasonally-inundated grasslands and lowland forest along the Da Ha Stream.
- Assess the population size, distribution, and ecology of globally-threatened plant and animal species within the national park, particularly primates and large waterbirds.
- Prepare action plans for key habitats and species, and incorporate the recommendations into conservation management.
- Initiate an ecological monitoring programme for key habitats and species in the national park.

4.9 Strengthen the capacity of the national park staff

Priority ranking: Critical priority

Justification

Since the establishment of the management board, its activities have been concentrated on forest protection, particularly the implementation of national forestry programmes. Consequently, the national park staff have limited training and experience in conservation management, particularly wetland management and wildlife management. Such capacity is necessary if conservation management at the national park is to be appropriate for all key species and habitats, and not narrowly focused on forest protection.

Management actions

- Provide training (including training courses, hands-on training, and study tours) for national park staff in biodiversity surveying and monitoring, wetland management, wildlife management, preparation and implementation of patrolling plans, record-keeping and reporting, law enforcement, community liaison, and awareness-raising.
- Provide Cambodian language training for national park staff, so that they can deal with Cambodians who violate national park management regulations.

4.10 Provide necessary equipment and infrastructure for the management board

Priority ranking: High priority

Justification

The infrastructure of the national park is relatively under-developed. In particular, facilities at the forest guard stations are not conducive to effective patrolling by forest guards. In addition, the national park staff do not have access to sufficient equipment to effectively perform their work, especially communications equipment.

Management actions

- Upgrade the existing forest guard stations.
- Provide personal equipment to forest guards, including GPS units, binoculars, compasses, protective clothing, hammocks, canvas tents, mosquito nets, notebooks, maps, and field guides.
- Establish a communications system between the national park headquarters and all forest guard stations.

4.11 Improve coordination with local authorities and other enforcement agencies

Priority ranking: High priority

Justification

As a border area, human access to Lo Go Xa Mat National Park is restricted. In addition to the national park management board, the border forces of Vietnam and Cambodia are responsible for controlling human access to the national park. Indeed, there are a number of Vietnamese border army stations within the national park. Moreover, a number of other enforcement agencies, including the customs and police, have a presence in the area. All of these agencies are stakeholders in the management of Lo Go Xa Mat National Park, and have resources and personnel that could potentially assist the national park management board to enhance the effectiveness of forest management and protection. To date, however, coordination mechanisms between the management board and other enforcement agencies are under-developed.

Management actions

- Improve the effectiveness of monthly coordination meetings amongst the representatives of the national park management board, the border guard forces of the two countries, and local communities from Vietnam and Cambodia.
- Establish joint forest patrol groups, with members from forest guard stations, border army stations, and commune militias. These groups should have specified patrolling plans, and receive training in patrolling, information collection, and law enforcement.

4.12 Implement an education and awareness programme

Priority ranking: High priority

Justification

Although the inhabitants of the buffer zone of Lo Go Xa Mat National Park are aware of the existence of the national park and its management regulations, their understanding is limited to the facts that there is a national park and that all exploitation of natural resources there is prohibited. It is necessary to increase the awareness of the objectives and management regulations of the national park amongst stakeholders at all levels. In particular, education and awareness activities should target local communities (in both Vietnam and Cambodia), local authorities at the commune, district, and province levels, enforcement officials (including police and customs), and border army personnel.

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Management actions

- Prepare an education and awareness strategy for the national park, targeting stakeholders at all levels.
- Develop awareness messages, and disseminate them via mass media (radio, film, television, newspapers, etc.).
- Prepare signboards, leaflets, and posters bearing environmental awareness messages.
- Implement environmental education activities for primary and secondary school pupils in the buffer zone.
- Sign agreements with local households to protect natural habitats and biodiversity.
- Conduct exchange visits for national park staff to other protected areas in Vietnam with established education and awareness programmes, in order to learn and exchange experiences.

4.13 Develop the economy of the buffer zone communities

Priority ranking: Medium priority

Justification

An investment plan for the buffer zone of Lo Go Xa Mat National Park has been approved by MARD and the Provincial People's Committee. The objectives of this investment plan are to improve the level of socio-economic development of local communities, and to reduce pressures on the natural resources of the national park. The national park management board has partial responsibility for implementing some of the activities under this investment plan.

Management actions

- Maintain and extend existing social forestry activities within and around the national park, particularly afforestation with native tree species by local households, providing these activities are not undertaken in areas of natural wetland habitat.
- Develop a nursery to provide saplings and technical assistance to local households for afforestation with native tree species.
- Sign forest protection contracts with poor households in the buffer zone, support these households to meet their commitments under these contracts, and monitor their implementation.
- Develop models for local community involvement in forest management, including joint forest patrol groups.
- Develop forest gardens for local households, in order to provide an alternative source of timber for subsistence uses, such as house construction and furniture manufacture.
- Support local households to establish fruit gardens.
- Use the education and awareness programme to promote positive examples of local community support for conservation activities, such as traditional cultural villages, excellent producers, or good family planning executors.
- Explore options for involving local communities in future eco-tourism development.

5. Implementation plan

This Operational Management Plan covers a five-year period, from 2004 to 2008. Certain management actions should be conducted throughout this period, while other actions should be conducted at a specific time, as outlined in Table 3. The major constraints on the implementation of the Operational Management Plan are budgetary. In particular, although investment funding for the national park and buffer zone has been approved by central and provincial authorities, it has not yet been allocated. In addition, there are significant gaps in the approved investment funding, particularly for operational management activities. Consequently, there will be a need to identify alternative funding sources, including but not limited to the Vietnam Conservation Fund (VCF), to fill these gaps.

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Table 3: Implementation Plan for the Operational Management Plan

Management action	Year				
	2004	2005	2006	2007	2008
1. Maintain the integrity of all seasonally-inundated grasslands					
1.1 Conduct wetland management training for national park staff	X				
1.2 Identify and map all key areas of seasonally-inundated grassland	X				
1.3 Raise awareness of the values of wetlands amongst local communities and decision-makers	X				
1.4 Conduct regular patrolling of wetland areas	X	X	X	X	X
1.5 Strictly enforce management regulations regarding conversion of natural habitats	X	X	X	X	X
1.6 Initiate ecological monitoring programme for all key areas of seasonally-inundated grassland	X	X	X	X	X
2. Protect all lowland forest from conversion to other land uses					
2.1 Continue the process of converting agricultural land into forest	X	X	X	X	X
2.2 Monitor and support the afforestation activities of local households who have signed contracts with the national park management board	X	X	X	X	X
2.3 Raise awareness amongst owners of agricultural land within the national park	X	X			
2.4 Strictly enforce management regulations regarding conversion of natural habitats	X	X	X	X	X
2.5 Fulfill existing commitments to provide investment funding for the national park, including the resettlement of 12 households	X	X			
3. Demarcate the national park boundary					
3.1 Organise boundary demarcation workshops	X				
3.2 Demarcate the remaining eight km of boundary on the ground	X				
3.3 Hold village meetings to introduce national park management regulations	X				
4. Control illegal timber extraction					
4.1 Expand social forestry programmes in the buffer zone		X	X	X	X
4.2 Strictly enforce management regulations regarding timber extraction	X	X	X	X	X
5. Control hunting and trapping of animal species					
5.1 Intensify anti-hunting and trapping patrols in the Strict Protection Area	X	X	X	X	X
5.2 Coordinate with local authorities and other enforcement agencies to control the possession of guns and traps by local people		X	X	X	X
5.3 Strictly enforce management regulations regarding hunting and trapping	X	X	X	X	X
5.4 Conduct extension activities with hunters to raise awareness and encourage them to sign commitments not to hunt or trap wildlife		X	X		
5.5 Conduct extension activities with local restaurants, and encourage them to sign commitments not to sell wildlife		X	X		
6. Control over-exploitation of NTFPs					
6.1 Raise awareness amongst local communities of the impacts of unsustainable NTFP collection, and the potential benefits of regulated exploitation	X	X	X		
6.2 Strictly prohibit NTFP exploitation within the Strict Protection Area	X	X	X	X	X
6.3 Study patterns of NTFP exploitation within the national park			X	X	
6.4 Negotiate agreements with local communities for sustainable, regulated exploitation of designated NTFPs from within the Rehabilitation Area				X	X
7. Control forest fires					
7.1 Raise awareness amongst local communities about the dangers of fire			X	X	
7.2 Sign agreements with local households to prevent accidental fires			X	X	
7.3 Continue process of converting agricultural land into forest	X	X	X	X	X
7.4 Strictly enforce management regulations regarding conversion of natural habitats	X	X	X	X	X
7.5 Train and equip local community conservation groups for fire prevention			X	X	
7.6 Study the fire ecology of natural habitats and develop appropriate fire management regimes				X	X

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Management action	Year				
	2004	2005	2006	2007	2008
8. Conduct targeted biological research					
8.1 Establish a scientific section, recruit new staff, and train existing staff in biodiversity survey and monitoring techniques		X	X		
8.2 Conduct ecological studies of key habitats			X	X	
8.3 Assess the population size, distribution, and ecology of globally-threatened plant and animal species			X	X	
8.4 Prepare action plans for key habitats and species, and incorporate the recommendations into conservation management				X	X
8.5 Initiate an ecological monitoring programme for key habitats and species				X	X
9. Strengthen the capacity of the national park staff					
9.1 Provide training for national park staff	X	X	X	X	X
9.2 Provide Cambodian language training for national park staff			X	X	X
10. Provide necessary equipment and infrastructure for the management board					
10.1 Upgrade the existing forest guard stations	X				
10.2 Provide personal equipment to forest guards		X			
10.3 Establish a communications system between the national park headquarters and all forest guard stations			X		
11. Improve coordination with local authorities and other enforcement agencies					
11.1 Improve the effectiveness of coordination meetings among the national park management board, the border guard forces, and local communities		X	X	X	X
11.2 Establish joint forest patrol groups			X	X	X
12. Implement an education and awareness programme					
12.1 Prepare an education and awareness strategy for the national park	X				
12.2 Develop awareness messages and disseminate via mass media		X	X	X	X
12.3 Prepare signboards, leaflets, and posters bearing awareness messages		X			
12.4 Implement environmental education activities for school pupils			X	X	X
12.5 Sign agreements with local households to protect biodiversity		X	X		
12.6 Conduct exchange visits for national park staff to other protected areas in Vietnam with established education and awareness programmes	X				
13. Develop the economy of the buffer zone communities					
13.1 Maintain and extend existing social forestry activities	X	X	X	X	X
13.2 Develop a nursery to provide saplings and technical assistance			X		
13.3 Sign forest protection contracts with poor households in the buffer zone	X	X	X	X	X
13.4 Develop models for local community involvement in forest management			X	X	X
13.5 Develop forest gardens for local households				X	X
13.6 Support local households to establish fruit gardens				X	X
13.7 Use the education and awareness programme to promote positive examples of local community support for conservation activities				X	X
13.8 Explore options for involving local communities in future eco-tourism development					X

6. Monitoring and evaluation

Monitoring and evaluation are essential for adaptive conservation management. The results of monitoring and evaluation should be incorporated into future revisions of the Operational Management Plan for Lo Go Xa Mat National Park, in order to ensure that future conservation management is effective, and addresses the key threats to biodiversity. Consequently, a programme should be initiated to monitor and evaluate the implementation of this Operational Management Plan. Three indicators should be used to monitor implementation of the Operational Management Plan:

- 1) reduction in threats to natural habitats and globally-threatened species;
- 2) increased management effectiveness of the national park management board; and

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- 3) the effectiveness of initiatives to involve local communities in the co-management of natural resources.

The first indicator should be monitored using the threat reduction assessment methodology. A threat reduction assessment scorecard was completed during the Conservation Needs Assessment, which defined a goal of 100% reduction for each of the direct threats to globally-important elements of biodiversity in the national park. The monitoring programme should first establish a baseline for each direct threat and then, annually, measure progress towards meeting the goal of 100% reduction.

The second indicator should be monitored using the management effectiveness tracking tool completed during the Conservation Needs Assessment. The tracking tool should be completed annually, to give an overall score (out of a maximum of 91) and, also, individual scores for particular aspects of management effectiveness (out of a maximum of three). In this way, the tracking tool can be used to identify particular areas in which the effectiveness of the national park management board needs to be strengthened.

The third indicator should be monitored using reports of initiatives involving local communities, such as afforestation with native tree species, signing of forest protection contracts, developing of agreements for sustainable NTFP exploitation, and initiation of joint forest patrol groups. These reports should be completed on a monthly basis, with annual summaries.

Over time, the monitoring and evaluation programme for the national park should be harmonised with the monitoring and evaluation programme of Tay Ninh Provincial People's Committee, and the nationwide programme of the Forest Protection Department of MARD. In addition, the results of the monitoring and evaluation programme should be fed back to the Vietnam Conservation Fund.

7. Budget

7.1 Summary

Table 4 contains a summary of the total funding requirements for implementation of the Operational Management Plan over a five-year period, from 2004 to 2008. Existing sources of funding are broken down into government funding and other sources, principally international donors. Government funding is based on investment funding approved in the national park and buffer zone investment plans; in many cases, the actual funding allocated to a protected area is significantly less than that approved in the investment plan. Finally, the shortfall in funding is calculated for each management action, by subtracting existing sources of funding from the total funding requirement.

Table 4: Summary of Funding Requirements for the Operational Management Plan (2004-2008)*

Management action	Total requirement	Government funding	Other sources	Shortfall
1. Maintain the integrity of all seasonally-inundated grasslands	25,000	0	25,540**	0
2. Protect all lowland forest from conversion to other land uses	53,644	47,644	0	6,000
3. Demarcate the national park boundary	18,000	33,548	0	0
4. Control illegal timber extraction	1,080	1,080	0	0
5. Control hunting and trapping of animal species	11,000	0	0	11,000
6. Control over-exploitation of NTFPs	8,000	0	0	8,000
7. Control forest fires	18,000	15,806	0	2,194
8. Conduct targeted biological research	38,000	80,645	0	0
9. Strengthen the capacity of the national park staff	31,000	32,258	0	0

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10. Provide necessary equipment and infrastructure for the management board	69,900	5,354	0	64,546
11. Improve coordination with local authorities and other enforcement agencies	16,800	0	0	16,800
12. Implement an education and awareness programme	32,800	0	0	32,800
13. Develop the economy of the buffer zone communities	101,327	535,935	0	0
Total	424,551	752,270	25,540	141,340

Notes: * = all figures are in US\$, based upon the calculations presented in Section 7.2, and on an exchange rate of US\$1 = VND 15,500; ** = small grant from the WWF Cat Tien National Park Conservation Project, with co-funding from BirdLife International.

The Asian Development Bank is currently preparing a rural development loan (No. 1598-VIE(SF)) to MARD for the development of the Phuoc Hoa Water Resources Project, a large water resources project to improve the allocation of water resources in Tay Ninh, Long An, Binh Duong and Binh Phuoc Provinces. One sub-project will be the expansion of the Dau Tieng irrigation scheme into Tan Bien District, Tay Ninh Province. The area identified for irrigation is located within the buffer zone of Lo Go Xa Mat National Park. The Environmental Impact Assessment identified the potential effects of the project on natural forests in Tay Ninh Province as a major negative and permanent environmental impact. Consequently, one of the mitigation measures proposed by the Environmental Impact Assessment is to design and facilitate a comprehensive buffer zone management and park protection programme. This programme would have four components: (i) capacity-building for national park staff; (ii) commune development plans; (iii) multi-stakeholder resource management; and (iv) biological, biophysical, and social surveys. The total budget for this programme would be US\$503,100 over a seven-year period, from 2003 to 2009. While neither the loan project nor its proposed environmental mitigation measures have currently been approved, if the programme were to be approved, it could meet almost the entire shortfall in the funding requirements of the Operational Management Plan.

7.2 Detailed breakdown

Maintain the integrity of all seasonally-inundated grasslands

Training course for management board staff in wetland management	US\$3,000
Study tours to Tram Chim and Cat Tien National Parks	US\$3,000
Development of an ecological monitoring manual and practical training	US\$4,410
Provision of essential equipment	US\$1,900
Workshops to raise awareness of wetland values amongst key decision-makers	US\$2,000
Village meetings (10 @ US\$200)	US\$2,000
Awareness and education materials	US\$1,500
Production of a map of key wetland areas	US\$2,500
Printing costs	US\$1,000
Coordination and administration costs	US\$3,690
Sub-total	US\$25,000

Protect all lowland forest from conversion to other land uses

Afforest agricultural land within the national park with native tree species (205 ha @ US\$225.8)	US\$46,289
Monitor and support on-going afforestation activities of local households	US\$5,000
Meetings with owners of agricultural land within the national park	US\$1,000
Resettle 12 households living inside the Rehabilitation Area	US\$1,355
Sub-total	US\$53,644

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Demarcate the national park boundary

Boundary demarcation workshops (2 @ US\$500)	US\$1,000
Demarcation of eight km of boundary on the ground (8 km @ US\$1,500)	US\$12,000
Signboards (20 signboards @ US\$150)	US\$3,000
Village meetings (10 @ US\$200)	US\$2,000
Sub-total	US\$18,000

Control illegal timber extraction

Allocation of forest land in the buffer zone to local households for afforestation (67 ha @ US\$3.23 per year)	US\$1,080
Sub-total	US\$1,080

Control hunting and trapping of animal species

Intensified anti-hunting and trapping patrols in the Strict Protection Area (60 mths @ US\$150)	US\$9,000
Meetings with local authorities and enforcement agencies to coordinate gun and trap control	US\$2,000
Sub-total	US\$11,000

Control over-exploitation of NTFPs

Village meetings (10 @ US\$200)	US\$2,000
Studies on NTFP exploitation	US\$4,500
Negotiation of agreements with local communities for sustainable exploitation of NTFPs	US\$1,500
Sub-total	US\$8,000

Control forest fires

Agreement-signing ceremonies (20 @ US\$250)	US\$5,000
Fire prevention training courses for local community conservation groups	US\$4,000
Fire-fighting equipment for local community conservation groups	US\$5,000
Studies of the fire ecology of natural habitats	US\$4,000
Sub-total	US\$18,000

Conduct targeted biological research

Ecological studies of key habitats	US\$12,000
Studies of globally-threatened plant and animal species	US\$12,000
Preparation of action plans for key habitats and species	US\$6,000
Initiation of ecological monitoring programme (2 yrs @ US\$4,000)	US\$8,000
Sub-total	US\$38,000

Strengthen the capacity of the national park staff

Training course and hands-on training in biodiversity surveying	US\$4,000
Training course and hands-on training in ecological monitoring	US\$4,000
Training course in wildlife management	US\$2,000
Training course and hands-on training in patrolling	US\$4,000
Training course in law enforcement	US\$2,000
Training course and hands-on training in community liaison	US\$4,000
Training course and hands-on training in awareness-raising	US\$4,000
Study Tour to Cat Tien National Park	US\$1,500
Cambodian language training	US\$5,500
Sub-total	US\$31,000

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Provide necessary equipment and infrastructure for the management board

Upgrading of forest guard stations (9 stations @ US\$3,000)	US\$27,000
GPS units (3 @ US\$500)	US\$1,500
Compasses (5 @ US\$20)	US\$100
Binoculars (5 @ US\$500)	US\$2,500
Camera (1 @ US\$ 800)	US\$800
Camera traps (10 @ US\$600)	US\$6,000
Field equipment (hammocks, mosquito nets, etc.)	US\$5,000
Field guides, maps, and other reference materials	US\$2,000
Radio system (10 units @ US\$2,500)	US\$25,000
Sub-total	US\$ 69,900

Improve coordination with local authorities and other enforcement agencies

Monthly coordination meetings with representatives of border guard forces and local communities (48 months @ US\$200)	US\$9,600
Joint forest patrol groups (2 groups @ 36 mths @ US\$100)	US\$7,200
Sub-total	US\$16,800

Implement an education and awareness programme

Preparation of education and awareness strategy	US\$2,000
Development of awareness messages, and dissemination via mass media	US\$800
Signboards, leaflets, and posters	US\$5,000
School-based environmental education activities (3 yrs @ US\$6,000)	US\$18,000
Agreement-signing ceremonies (20 @ US\$250)	US\$5,000
Exchange visit to Cuc Phuong National Park	US\$2,000
Sub-total	US\$32,800

Develop the economy of the buffer zone communities

Forest protection contracts with local households (5,000 ha @ US\$3.226 @ 5 yrs)	US\$80,650
Nursery for native tree saplings	US\$2,000
Models for local community involvement in forest management (3 yrs @ US\$1,000)	US\$3,000
Forest gardens	US\$9,677
Fruit gardens	US\$5,000
Study on potential to involve local communities in future eco-tourism development	US\$1,000
Sub-total	US\$101,327

GRAND TOTAL: US\$424,551

7.3 Budget breakdown year-by-year

Management action	Year				
	2004	2005	2006	2007	2008
<i>1. Maintain the integrity of all seasonally-inundated grasslands</i>	25,000				
<i>2. Protect all lowland forest from conversion to other land uses</i>	11,436	11,435	10,258	10,258	10,257
<i>3. Demarcate the national park boundary</i>	18,000				
<i>4. Control illegal timber extraction</i>		270	270	270	270
<i>5. Control hunting and trapping of animal species</i>	2,200	2,200	2,200	2,200	2,200
<i>6. Control over-exploitation of NTFPs</i>	800	600	2,850	3,000	750
<i>7. Control forest fires</i>			7,000	9,000	2,000
<i>8. Conduct targeted biological research</i>			12,000	19,000	7,000
<i>9. Strengthen the capacity of the national park staff</i>	5,100	5,100	6,900	6,900	7,000
<i>10. Provide necessary equipment and infrastructure</i>	27,000	17,900	25,000		

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Management action	Year				
	2004	2005	2006	2007	2008
<i>for the management board</i>					
<i>11. Improve coordination with local authorities and other enforcement agencies</i>		2,400	4,800	4,800	4,800
<i>12. Implement an education and awareness programme</i>	4,000	7,700	8,700	6,200	6,200
<i>13. Develop the economy of the buffer zone communities</i>	16,130	16,130	19,130	24,468	25,469
Total	109,666	63,735	99,108	86,096	65,946

Note: for detailed activities, refer to section 7.2.