

Pollution Control and Other Measures to Protect Biodiversity in Lake Tanganyika

Strategic Action Plan

Zambia

Conclusions of the National Consultation Process
For the Regional Strategic Action Plan

4 September, 1998

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Summary

Zambia has now completed the two major stages of the national consultation process contributing to the development of the Lake Tanganyika Strategic Action Plan (SAP).

The process has involved two five day workshops attended by some forty participants, and has been supported by a major effort in preparing background materials analysing the resource base, management problems affecting the resource base and policy, legislation and regulations that guide management.

This document provides an overview of the conclusions that have come out of the national consultation process. The next stage will be for the team of Zambian delegates to present their conclusions to a regional Transboundary Diagnostic Analysis workshop (TDA), scheduled for November 1998¹. The team will be expected to give an overview of the most critical conclusions and to justify the reasons for setting priorities from the Zambian view of the main biodiversity problems of the lake.

The first part of this report gives a general background to the process of developing the SAP, as set by the Project Steering Committee in January 1998.

The report then reviews the objectives of the national consultation process, provides some details on the scope of the discussions, and on the range of individuals and institutions involved in the consultation.

The report provides details of the methodology used in developing the Analytical Problem Matrix - the agreed format that will be used in the four countries and subsequently in the TDA to present their conclusions. This is followed by a discussion of the logic behind the prioritisation of specific problems and hence a prioritisation of the proposed actions to address specific problems that are threatening the biodiversity of the lake.

The following table shows the first three priorities given to addressing specific problems in each general action area, contributing to counteracting one of the major threats to biodiversity. These and lower priorities problems are discussed in the text. Proposed actions are given in Annex 3 Analytical Problem Matrix.

Reduce Impact of Fishing	Control Pollution	Control Sedimentation
1. Use of Beach Seines	1. Disposal of Land Based Sewage from Mpulungu	1. Stream Bank Cultivation
2. Excessive Industrial Fishing	2. Disposal of Sewage and Solid Waste from Boats	2. Sand Extraction from Sensitive Areas
3. Use of Inappropriate	3. Dumping Waste in Lake	3. Encroachment and

¹ An agenda for the Transboundary Diagnostic Analysis workshop has not yet been prepared, but delegates should be prepared to make a presentation that should not exceed 20 minutes, and then be prepared for open discussion.

Gill Nets

and Catchment

Deforestation of
Protected Areas

1. Background - The Strategic Action Plan

The “Lake Tanganyika Biodiversity Project” - LTBP - is jointly owned by the four countries surrounding the Lake, Zambia, DR Congo, Burundi and Tanzania.

The full title of the project is “Pollution Control and Other Measures to Protect Biodiversity in Lake Tanganyika”. This emphasis is reflected in the project document, which has as the first immediate objective “...*establish a regional long-term management plan for pollution control, conservation and maintenance of biodiversity in Lake Tanganyika.*”.

Since the project document was prepared, the planning ideas incorporated in this immediate objective have been encapsulated in the concept of a Strategic Action Plan - SAP. Fundamental to this is the recognition that management plans have to be revised in response to changing circumstances, there can be no final plan. The SAP therefore establishes an agreed planning and management process, and prioritises initial interventions based on present knowledge.

1.1 Proposed Development of the SAP

Following the decision of the Steering Committee in January 1998 to proceed with the formulation of a regional Strategic Action Plan, the Environmental Council of Zambia held a special National Working Group Planning Meeting, (Lusaka 27/28 April).

The meeting fixed dates for the Zambian workshops, agreed on the scope of the discussions and proposed an expansion of the consultation process to include wider representation from the communities, from local government, from the private sector and from national and international organisations..

Zambian National Working Group Planning Meeting
(Completed April 1998)

Zambian National Sectoral Problem Review
(Completed June/July 1998)

Zambian National Environmental Priorities and Strategies Review
(Completed August/September 1998)

Regional Technical Advisory Committee Planning Meeting for the SAP
(Completed August 1998)

Regional Transboundary Diagnostic Analysis²
(Proposed November 1998)

Regional Draft Strategic Action Plan
(Proposed January 1999)

² The Project uses GEF terminology: a Transboundary Diagnostic Analysis, is a regional prioritisation focused on the management of threats to shared - i.e. *Transboundary* - resources.

Signed Strategic Action Plan
(Scheduled by the Steering Committee March 1999)

2. National Sectoral Problem Review and National Environmental Priorities and Strategies Review

The objectives of the two workshops can be summarised as a national preparatory exercise in advance of the regional process of developing a Regional Strategic Action Plan. This is to ensure that Zambia's concerns are fully understood and that her interests can be adequately presented by the national team delegated to participate in the regional consultation of preparing a Transboundary Diagnostic Analysis and Strategic Action Plan.

The specific objectives of the workshops are as follows:

1. To define the main biodiversity problems of the lake, identifying the sectoral causes of those problems in the management of the lake and catchment, and to review the management actions that Zambia can take to resolve those problems.
2. To define the potential and limitations of existing institutional mechanisms to counteract national priority threats and support priority actions to counteract them, with existing regulations and legislation, and existing environmental and sectoral policies.
3. To agree on the priority of the proposed actions and to determine a sequence of proposed actions that can be undertaken by the responsible institutions in Zambia.

As a preparatory exercise in advance of the Regional Transboundary Diagnostic Analysis, so that Zambia's interests, having been fully understood, can be adequately represented in the SAP.

The first workshop was held between June 29 and July 3, and the second between 31 August and 3 September 1998.

2.1 Participation in the Consultation Process

The need for wider consultation was accepted at the first National Working Group Planning Meeting, when a list of potential interested institutions and individuals were identified as possible contributors to the national consultation process.

To ensure as wide a participation as possible, both workshops were held in Lusaka. However, one of the major National Working Group preparation meetings was held at the Lake, and some 30 percent of the local national participants were from the lake area. Annex 1 lists the participants and the institutions represented.

In the end over 20 organisations were represented in the consultation process, including national and international NGOs, government agencies and parastatals, local councils, and academic and research institutions. The private sector was represented

by the Tourism input from Parks and through the participation of M Pearce, a consultant to LTBP and involved in the industrial fisheries at Mpulungu.

2.2 Background Materials

In order to ensure that all participants had a common understanding of the value of the lake biodiversity and fisheries resources and of the problems facing the management of the lake resources and the surrounding catchment areas, background papers³: were prepared in advance of the workshops.

As a starting point, authors could draw on the baseline reviews prepared for the Inception Workshop in September 1996. In addition authors reviewed critical policy and legislation, with respect to the specific problems and proposed actions that were identified.

The following topics were covered by background papers

Institutional Structures for Environmental Management; Mpulungu Port Pollution; Community Wildlife Management and Parks; River Water Quality; Pollution Problems; Settlement Patterns and Population Trends; Fisheries and Biodiversity; Mpulungu Council Environmental Issues; Cultural Heritage; Forest Management.

The reviews of policy. Legislation and regulation included:

Energy; Economic Liberalisation; Fisheries Act; Public Health Act; Land Act; Environmental Protection and Pollution Control Act; Water Pollution Control Regulations; Waste Management Regulations; Forest Policy, Forest Act, Timber Export Regulation; National Environmental Action Plan; Agricultural Policy; CITES, RAMSAR and BASEL Conventions; Inland Waterways Act.

3. Analytical Problem Matrix

As a key stage in the SAP process, it is clear that the methods used to assess and present information from the perspective of the four participating countries will have to be similar.

In effect, the Transboundary Diagnostic Analysis brings together the four National Sectoral Problem Reviews; there must therefore be consistency in the approach adopted by the four countries, and subsequently used in the TDA.

The workshops adopted a formal analytical matrix analysis that would be duplicated in all four countries, and subsequently in the regional TDA.

³ The papers from the first workshop have been compiled and are available as a separate report from the Environmental Council of Zambia; *Lake Tanganyika Biodiversity Programme - Papers Presented at the National Sectoral Problem Review Workshop 29th June - 3rd July 1998, Ndeke Hotel, Lusaka.*

The papers from the second workshop have not yet been compiled but are available individually from the Environmental Council of Zambia;

The complete matrix is given in Annex 3.

The matrix has three levels of analysis:

**Level 1: Main Threat to Biodiversity; Transboundary Implications;
Main Institutional Problems; General Action Areas.**

**Level 2 For Each Action Area: Specific Problems; Stakeholders;
Uncertainties; Proposed Actions;**

**Level 3 Proposed Action: Timing; Key Agency; Availability of Human /
Material Resources**

Level 1

The first matrix presents the main threats which are still effectively those identified during the inception workshop, and built into the project design; the *Main Threats to Biodiversity* are Unsustainable Fisheries; Increasing Pollution; Excessive Sedimentation; and Habitat Destruction (resulting predominantly from poor fishing practices and sediment deposition). No additional threats were identified by the workshop participants, that could not be related to one of these three aspects.

The *Transboundary Implications* highlights the rationale for a regional programme, addressing global biodiversity and international waters issues.

The *General Action Areas* address the identified problems and provide a focus for linked programmes.

However, the *Main Institutional Problems* are identified during the detailed appraisal of the specific problems and proposed actions addressed in levels two and three. The institutional problems relate to common themes such as inadequate institutional capacity or inappropriate legislation for local conditions.

Table 1 Analytical Problem Matrix Level 1

Main Threat to Biodiversity	Transboundary Implications	Main Institutional Problems	General Action Areas
Unsustainable Fisheries	Global Loss of Biodiversity	Lack of Resources Poor Enforcement of Existing Regulations	A) Reduce Impact of Fishing
Increasing Pollution	Loss of Shared Fisheries Resource	Lack of Locally Specific Regulations	B) Control Pollution
Excessive Sedimentation	Decline in Water Quality		C) Control Sedimentation
Habitat Destruction			

Level 2

At the second level, *Stakeholders* includes all parties that will need to be involved in resolving management issues addressing each *Specific Problem* identified within each General Action Area. *Uncertainties* highlights those areas where further information is required to improve management. On the basis of the Uncertainties column, a set of *Proposed Actions* which address a Specific Problem, can include proposals for further research and/or monitoring activities.

Level 3

At the third level, for each Proposed Action, the column *Timing* indicates whether an activity is “On going”, whether it could start “Now” - assuming resources were made available, or whether a Proposed Action has to be preceded by another Proposed Action (e.g. “Negotiate Boundaries of Additional Protected Areas” must be preceded by “Identify New Key Sites / Potential Protected Areas”).

Key Agency indicates the agency that would lead a particular Proposed Action; it will always be one of the Stakeholders from level 2. Finally the *Availability of Human / Material Resources* is an indication of whether the Key Agency could tackle the Proposed Activity with existing human and/or material resources. However this does not mean that these resources are already being directed to the action, merely that, given a priority by the agency, they could be made available now.

3.1 From Major Threats to Management Actions

The basic approach is that at level 2, the General Action Area is addressed through a number of Specific Problems, each one of which is a component of the Main Threats to Biodiversity. Subsequently a sequence of related Proposed Actions can be formulated addressing each Specific Problem.

In this way what appears to be an excessively ambitious and daunting objective such as Control of Pollution, can be broken into a series of manageable tasks, many of which can be done with available resources.

As an example, the general action area “Control of Pollution” includes the Specific Problem of Disposal of Waste Oil. This can be addressed through a series of Proposed Actions including a) raising awareness of the problem and b) promoting an existing and active recycling market, both for local use in treating timber and through the facilities offered by BP.

ECZ could start an awareness campaign “Now”, and subsequently the Local Council could promote the recycling exercise.

The exercise has shown that it is possible for many of the actions needed to counteract the threats to the biodiversity resources of the lake to be initiated by local institutions using available resources.

3.2 Review and Enforcement of Policy, Legislation and Regulations - as a Management Action

The management of Zambia's natural resources are guided by a whole series of policies, acts and regulations. The most obvious ones relevant to the management of the lake and catchment include the Fisheries Act and the Forestry Act. However, these instruments do not deal with the natural environment in isolation but incorporate social and economic goals.

In a similar manner the social and economic development of the country is also directed by policies and these economic policies may themselves have major impacts on the management of the natural environment.

However, given that national Policies, Acts and Regulations are designed to be generally applicable to the wider management of Zambia's resources, there will be local situations with unique local problems or environments where existing government policy and legislation may provide inadequate support, or even be contradictory to local requirements.

In addition, many of the existing policies are under review or have been suspended pending revision. There is therefore a degree of uncertainty as to how the incoming policy revisions may effect the future management of the lake and catchment⁴.

As a result of the review, it is clear that there are three levels of proposed action that relate to the existing policies, legislation and regulations:

Review of national instruments - where there is uncertainty as to the relevance to the local situation, or where they are in the process of change;

Establish local regulations - where a by-law can provide explicit local environmental management guidance;

Support enforcement of regulations - where existing or proposed regulations are felt to be sound, but the mandated authorities have inadequate resources.

3.3 Institutional Capacity to Undertake Proposed Actions

Although the matrix does not generally include specific requirements for capacity building, these requirements are implied in the structure of the matrix⁵.

Clearly where a key agency has indicated that it lacks human or material resources to carry out a proposed action, this indicates a need for capacity building - and a "No" will appear in the final two columns of the matrix.

⁴ As an example the Wildlife Policy, and hence the Wildlife Act which has implications for tourism, have been withdrawn, pending the publication of new government instruments later this year. Similarly the Forest Policy is under review as is the Land Act.

⁵ Specific institution building actions include "Enable Enforcement of Current Regulations" and "Strengthen Local Capacity to Monitor and Enforce Regulations"

Lack of human resources includes lack of personnel and/or lack of training to be able to carry out the proposed activity. Lack of material resources includes both lack of physical equipment, ranging from laboratories to vehicles, to lack of funds to cover subsistence or other field expenses.

Clearly where a “No” exists, the implementation of the action will require additional institutional capacity building, either through reallocation of Zambia’s own resources among the agencies, or through external donor support.

However, even where a “Yes” is indicated in the Human Resources column and a “Yes” in the Material Resources column, this does not mean that the key agency has the capacity to undertake the action “Now”, unless this action is made a priority and resources are diverted from other activities carried out by that agency.

As a result if the rate of progress that can be achieved using only existing resources is considered unsatisfactory, then despite a “Yes” in the two resources columns, there is still a case for capacity building.

It is worth noting that out of the 87 proposed actions, Zambian institutions felt that they had the resources to complete over 70% if priority was given to an individual action or sequence of actions.

In 20% of the cases it was only material resources that were lacking, and in only ten percent of the cases were human resources felt to be also inadequate.

4. Prioritisation

From the above discussion, it is clear that there is a need to set priorities in addressing the proposed actions, and that these priorities need to be directed to solving immediate specific problems, and hence addressing the major threats to biodiversity⁶.

The immediate focus of the national consultation was to identify the priority in which Zambia would like to address specific problems within each action area, whether or not resources were available for all the proposed actions needed to address the problem.

4.1 Priorities, Uncertainties, Now and Potential Problems

The approach taken by the team was to review the specific problems within each general action area and then to determine whether the problem was already a major threat and therefore required action “Now”, or alternatively a “Potential” problem.

“**Now**” problems, are specific problems that are known to be a threat or extremely likely to be a threat now (or in the immediate future)

⁶ The logic used in this approach focuses on threats that can be addressed by local and regional management interventions; hence threats from global warming or from natural catastrophes such as volcanic disturbances are not addressed.

“Potential” problems, are specific problems that occur now, but where there is uncertainty as to whether their impact is significant to biodiversity, or a future problem that may occur as a result of further developments in the catchment.

Although there may be uncertainties in both “Now” problems and “Potential” problems, requiring actions such as an assessment of the scale, trends and impacts, the “Now” case may already be followed by a sequence of proposed actions to address the problem.

In general where a problem is classified as a “Potential” problem, the proposed actions will stop at the assessment of the scale and impact and trends, leaving the proposal of management actions to a future iteration of the process of defining management interventions⁷.

4.2 The Prioritisation of Specific Problems

The following discussions give a brief introduction to the reasons for the priority placed on addressing each specific problem.

These priorities may change as a result of further information becoming available on the impacts of the problems on the biodiversity of the lake.

The Analytical Problem Matrix is therefore not organised according to priority, but remains in the original order in which the problems were discussed. The priority of each problem is indicated in the heading on each page.

4.2.1 Reduce Impact of Fishing

Priority 1 Use of Beach Seines

Known to have a major and indiscriminate impact on biodiversity, and in particular on the spawning and nursery areas of many species, including many of the pelagic species. Occurring throughout the Zambian coastal strip, and also understood to be a problem in the other riparian states. The practice is already banned, and the present emphasis is on developing acceptable methods of phasing out the use of this gear and introducing acceptable fishing practices. The present fisheries act may be reviewed to limit the use of this gear to an acceptable off-shore distance.⁸ (*“Now” Problem*)

⁷ Although the rationale of limiting proposed actions to assessment where there is uncertainty of the significance of the problem is clear, the participants in the consultation process did not always feel bound by this criteria and there are anomalies within the matrix.

⁸ It is worth noting that the conclusions of the Zambian prioritisation exercise concur with the LTR Management Framework which gives as the immediate priorities “...*phasing out of beach seining reduction of purse seining effort, by retirement or reallocation of units...*”. (Report of the Sixth Meeting of the LTR Coordination Committee, FINNIDA, FAO Bujumbura June 1998)

Priority 2 Excessive Industrial Fishing

Industrial catches have been steadily declining over the last decade, despite increasing catch effort. A number of commercial companies have already closed as a result of low financial returns. However the number of legal and illegal vessels operating is still considerably in excess of estimated optimum fleet size. The proposal to negotiate an interim fleet size is an immediate requirement, and will also show political will to tackle the problem both at the commercial level and through community interventions. (*“Now” Problem*)

Priority 3 Use of Inappropriate Gill Nets

Research is continuing to try to establish an optimum gill net mesh size, meanwhile the present regulations stipulate a mesh size of over 100mm. However Fisheries are in the process of negotiating an interim mesh size of around 70mm. The present practices include the use of mosquito mesh, a totally indiscriminate and damaging method of fishing. (*“Now” Problem*)

Priority 4 Inadequate Protection of Sensitive Areas

Focusing on spawning and nursery sites, spawning sites and biodiversity hotspots. The proposal deals with both total and seasonal exclusion zones, and may include limited community access rights. The exercise has been started and has support of LTBP. (*“Now” Problem*)

Priority 5 Uncontrolled Extraction of Ornamental Fish

Although little is known of the scale or impact of the problem, the fundamental nature of the business is based on targeting rare and potentially endangered species. The highly localised habitats of many of the cichlids make them particularly vulnerable. (*“Now” Problem*)

Low Priority Interventions

The following specific problems were given a low priority:

Illegal Fishing in Nsumbu National Park - although fishing continues in this area, it is not considered as being either a major biodiversity hotspot or under major threat from fishing as this already being limited by Parks interventions. (*“Now” Problem*)

Dependence of Local Communities on Fishing - research is on-going, but the economic options available in the area are limited and fishing is seen as remaining a major supplemental activity no matter what alternatives are introduced. (*“Now” Problem*)

High Market Demand for Fish - the potential for reducing market demand or for finding alternative sources seems to be limited; participants focused on reduction of supply. (*“Now” Problem*)

Introduction of Exotic Fish through Fish Farming - despite being covered by existing regulations, fish farming has concentrated on exotic species with the inherent risk of

escape into the lake environment. However, as yet the practice is limited. (*“Potential” Problem*)

4.2.2 Control Pollution

Priority 1 Disposal of Land Based Sewage from Mpulungu and Other Lake Shore Settlements

With the immediate problem related to Mpulungu Town, where the present system designed for 2000 people is dealing with a growing town of already some 15000. The system is discharging raw sewage into the lake and is a continual and major source of pollution. Interventions will both reduce stress on the lake environment, and would be a major health intervention, providing a win-win situation and engaging political support that could benefit other biodiversity interventions. (*“Now” Problem*)

Priority 2 Disposal of Sewage and Solid Waste from Boats

Of particular concern in the bay and harbour area, where the concentration of boats results in major localised pollution. It is worth noting that international regulations on disposal of waste would constrain the practice, however current design of boats operating on the lake relies on open disposal. Again interventions would receive local support. (*“Now” Problem*)

Priority 3 Dumping Waste in Lake and Catchment

Dealing with land based waste that should be disposed of in licensed sites, present practices include dumping spoiled cargo and spoiled plastic packaged fish in the lake, as well as contaminated run off from land sites within the town. (*“Now” Problem*)

Priority 4 Disposal of Waste Oil

Although this is a known problem and potentially highly damaging to biodiversity, the practice is intermittent and there are already formal and informal markets in recycling waste oil. The proposed actions include a review of the Waterways Act to specifically mention waste oil, and the active promotion of the recycling market. (*“Now” Problem*)

Priority 5 Inappropriate Handling of Hazardous Cargo by Small Transporters

The majority of goods move up and down the coast in small vessels, many operating from the unofficial harbour at Mpulungu. There is little or no control over the type of cargoes or how they are packaged and transported. However, the scale of the problem has to be ascertained as has the threat to biodiversity has yet to be demonstrated, however the focus of activity at the unofficial harbour indicates the potential for cumulative localised impacts. (*“Now” Problem*)

Low Priority Interventions

The following specific problems were given a low priority:

Major Marine Accident - requiring assessment before further actions taken and may need a regional solution. (*“Potential” Problem*)

Major Accident from Handling and Storage of Oil and Cargo at the Harbour - again requiring assessment, however the privatisation of the harbour facilities is expected to be accompanied by a phased upgrading of the port infrastructure (EU Funded) and would comply with standard safety regulations. (*“Potential” Problem*)

Use of Agrochemicals in the Catchment - at present very limited, and unlikely to become a major problem given poor infrastructure and access to supply and market. (*“Potential” Problem*)

Use of Chemicals for Disease Vector Control - at present very limited, and in addition the present approaches to environmental health / public health management are based on site specific solutions rather than widespread use of chemicals⁹. (*“Potential” Problem*)

4.2.3 Control Sedimentation

Priority 1 Stream Bank Cultivation

An immediate source of sediments to the lake system through bank destabilisation, while decreasing bank vegetation trapping efficiency and allowing greater sediment transport from the hinterland. The problem is increasing with land pressure, exacerbated by recent drought years. (*“Now” Problem*)

Priority 2 Sand Extraction from Sensitive Areas

Again an immediate source of sediments to the lake system through bank destabilisation, and expected to become more of a problem with increasing urbanisation. It has also led to conflicts with farm land. (*“Now” Problem*)

Priority 3 Encroachment and Deforestation of Protected Areas

Although more generally dealing with all protected areas, this is particularly significant in the “catchment forests” of Lungu, Kalambo, Mpulungu and Mwenze, all of which were gazetted to protect critical watershed areas. Run off and sediment transport from these steep areas are assumed to be particularly significant. (*“Now” Problem*)

Priority 4 Slash and Burn Cultivation

The most prevalent form of agriculture, based on traditional practices sustainable at low population densities, becomes unsustainable if fallow periods decrease beyond a certain point. The effect is to increase erosion and hence sedimentation, however the

⁹ Malaria control is being promoted through the use of impregnated nets rather than chemical control, however the nets can be adapted for fishing.

impact on increased sediment load and hence biodiversity, will depend on the distance to and transport by major streams. (*“Potential” Problem*)

Priority 5 Existing Roads and New Road Construction

Poor design and maintenance of existing roads has resulted in major destabilisation and erosion. The impact on sediment load will not be widespread, but may be locally significant. The newly created Environmental Unit in the Roads Department has the responsibility for dealing with both existing and new roads. Any interventions will obviously benefit both the transport network and decrease sediment input. (*“Now” Problem*)

Priority 6 Unsustainable Commercial Extraction of Charcoal and Fuelwood

Although clearly a problem from the forestry viewpoint, the scale of the impact on sediment load has yet to be assessed, particularly as the general pattern is not one of total land clearance but forest degradation with a fairly high proportion of vegetation cover remaining. (*“Potential” Problem*)

Low Priority Interventions

The following specific problems were given a low priority:

Unplanned Rural Settlement - the problems are largely associated with poor agricultural practices such as slash and burn and with settlement in protected/sensitive areas such as catchment forests. (*“Potential” Problem*)

Uncontrolled Bush Burning, Late Burning - associated with land clearance for farming, as well as encouraging dry season grass growth, tick control, hunting and honey gathering. Although a regional and indeed national problem, the impact on sediment load and hence biodiversity will depend on the particular site. (*“Potential” Problem*)

5. Further Development of the Strategy

The purpose of the national consultation process has been as an input to the Regional Strategic Action Plan.

The next stage of the process will be to take the results of the Zambian consultation to the regional Transboundary Diagnostic Analysis workshop, to be held in Arusha in November.

The Zambian delegates will be expected to provide an overview of the conclusions of the national consultation process and to ensure that Zambia's concerns are adequately represented in the regional consultation process.

Following this the Zambian delegates will be responsible for participating in drawing up a draft Strategic Action Plan, that will define both regional priorities and hence indirectly national priorities for Zambia within this regional framework.

There will therefore have to be a national process agreed within the SAP which will allow for the review of the Zambian analysis and for further prioritisation within this regional framework.

Although these aspects were discussed during the national consultation process, the further development of these concepts, with proposals for institutional capacity building within the framework of the regional Strategic Action Plan must follow the overall prioritisation that will be defined by the regional meetings

The concept can be best presented by posing the following questions:

Within the regional framework of the Strategic Action Plan:

Using only existing resources, what would be the first action that Zambia would carry out to protect the biodiversity value of the lake?

And then what would the second action be?...

However, one of the recognised functions of the SAP is to “leverage” additional funding for actions supporting the biodiversity conventions and the management of international waters.

It is expected that in general funding will go to national agencies, implementing national programmes, within and supporting the regional framework of the SAP.

In recognition of this the subsequent prioritisation exercise should also pose the following questions:

If a donor agency offers Zambia additional funding and resources to carry out just one action to protect the biodiversity value of the lake, what would it be?

And then what would the second action be?...

The Strategic Action Plan

“The SAP should establish clear priorities that are endorsed at the highest levels of government and widely disseminated. Priority transboundary concerns should be identified, as well as sectoral interventions (policy changes, program development, regulatory reform, capacity-building investments, and so on) needed to resolve the transboundary problems as well as regional and national institutional mechanisms for implementing elements of the SAP. a balanced program of preventive and remedial actions, support both investment and capacity-building, and identify key activities in the following areas:

- ***Priority preventive and remedial actions***
- ***Cross-cutting issues and linkages to other focal areas***
- ***Institutional strengthening and capacity-building needs***
- ***Stakeholder involvement and public awareness activities***
- ***Program monitoring and evaluation***
- ***Institutional mechanisms for implementation.”***

(Operational Strategy of the GEF; GEF 1996)

Annex 1
Participants involved in the National Consultation
Workshops

Participants involved in the National Consultation Workshops

Individual	Organisation	Based in:
E Bwalya J Mwilwa	District Council	Mpulungu
J Phiri S Nsongela C Kabumbu W Malambo A Muvwende P Banda M Phiri	ECZ	Lusaka
O Kalumiana	Energy	Lusaka
R Sinyinza L Mwape K Mazingaliwa	Fisheries	Mpulungu Chilanga
A Mphande	Food and Drugs	Lusaka
B Lukama M Musaba	Forestry	Kasama Lusaka
G Chikwama	Harbour Authority	Mpulungu
A Menz N Hodgson JP Ledant P Chipungu M Pearce	LTBP	Tanzania UK Belgium Lusaka Mpulungu
R Chiti L Mawele	MAFF	Lusaka
A Kabeleka	Maritime Services	Lusaka
G Chilukusha	MENR	Lusaka
S Chisamga F Nyirenda	Ministry of Health	Lusaka
G Mudenda S Siachoono	Museums	Mbala
M Nsomi	NISIR	Lusaka
G Zulu C Phiri	Parks and Wildlife	Kasama Chilanga
K Siame	PPU	Kasama
C Kabumbu W Malambo K Mungule H Sichingabula O Lungu	University of Zambia	Lusaka
P Kimena	Water Affairs	Lusaka
C Akashambatwa	Wildlife and Environmental Conservation Society	Lusaka
G Muwowo	WWF ZEP	Lusaka

Annex 3

Proposed National Team for the TDA and Draft Strategic Action Plan Consultation

The following table indicates the identified individuals, their institutions and alternates who would be able to support the regional process.

Name	Institution	Alternate	Institution
J Phiri National Coordinator	ECZ	To be Appointed Assistant National Coordinator	ECZ
L Mwape	Fisheries	R Sinyinza	Fisheries
H Sichingabula	UNZA	R Sinyinza	Fisheries
G Chilukusha	MENR	M Nsomi	NISIR
S Nsongela	ECZ	To be Appointed Assistant National Coordinator	ECZ

Annex 2
Analytical Problem Matrix
Formatted as Overheads

Level 1

Main Threat to Biodiversity	Transboundary Implications	Main Institutional Problems	General Action Areas
Unsustainable Fisheries Increasing Pollution Excessive Sedimentation Habitat Destruction	Global Loss of Biodiversity Loss of Shared Fisheries Resource Decline in Water Quality	Lack of Resources Poor Enforcement of Existing Regulations Lack of Locally Specific Regulations	A)Reduce Impact of Fishing B)Control Pollution C)Control Sedimentation

Level 2

A) Reduce Impact of Fishing Priority 3

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
1) Use of Inappropriate Gill Nets	Artisanal Fishers Commercial Fishers Communities and Local Leaders Fisheries Department Museums	Optimal Net Size	1.1) Establish Optimal Net Size 1.2) Negotiate Acceptable Interim Gill Net Mesh Size 1.3) Establish Acceptable Method to Replace Gear 1.4) Establish Local Regulations on Net Size and Materials 1.5) Enforces Local Regulations

Level 2

A) Reduce Impact of Fishing Priority 2

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
2) Excessive Industrial Fishing	Commercial Fishers Local Authorities Fisheries Department Boat Licensing Commission	Optimal Fishing Levels Present Total Fleet Size - Legal and Illegal	2.1) Raise National and Local Political Awareness 2.2) Negotiate Acceptable Interim Fleet and Means of Reducing Fleet 2.3) Establish Optimal Fleet Composition 2.4) Review Licensing Procedures 2.5) Strengthen Local Capacity to Monitor and Enforce Regulations

Level 2

A) Reduce Impact of Fishing Priority 5

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
3) Uncontrolled Extraction of Ornamental Fish	Commercial Fishers Local Authorities Fisheries Department Parks Museums Communities and Local Leaders Revenue Authority	Scale / Impact of Extraction	3.1) Ascertain Scale and Impact 3.2) Raise Public Awareness - Establish Aquarium 3.3) Define Levels of Extraction 3.4) Review License / Export Fees 3.5) Establish Local Regulations 3.6) Evaluate Potential for Captive Breeding 3.7) Review Inclusion of Species in CITES

Level 2

A) Reduce Impact of Fishing

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
4) Illegal Fishing in Nsumbu National Park	Parks Communities and Local Leaders Tour Operators Museums Fisheries Department	Impact of Present Fishing Levels Acceptable Levels	4.1) Establish Acceptable Levels, Methods, Areas for Fishing 4.2) Implement Public Awareness Campaign 4.3) Negotiate Access and Levels of Extraction with Communities and Tour Operators 4.4) Incorporate into Park Plan

Level 2

A) Reduce Impact of Fishing Priority 4

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
5) Inadequate Protection of Sensitive Areas - Spawning and Nursery Sites, Biodiversity Hot Spots	Communities and Local Leaders Fisheries Department Local Authorities Heritage Commission Parks Tour Operators Museums	Critical Sites Optimal Size of Protected Area Community Acceptability	5.1) Identify New Key Sites / Potential Protected Areas 5.2) Identify Potential Conflicts with Communities, Propose Mitigation 5.3) Implement Public Awareness Campaign 5.4) Negotiate Boundaries of Additional Protected Areas

Level 2

A) Reduce Impact of Fishing Priority 1

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
6)Use of Beach Seines	Communities and Local Leaders Fisheries Department Local Authorities	Consequence of Ban on Community Livelihoods	6.1) Identify with Communities Acceptable Fishing Practices 6.2) Negotiate Means of Introducing Total Removal of Existing Gear 6.3) Introduce Local Regulations

Level 2

A) Reduce Impact of Fishing

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
7) Over Dependence of Local Communities on Fishing	Communities and Local Leaders Fisheries Department Local Authorities Agriculture Department	Availability and Acceptability of Alternative Livelihoods	7.1) Identify Range of Appropriate Livelihood Options 7.2) Promote Introduction of Alternative Livelihoods

Level 2

A) Reduce Impact of Fishing

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
8) High Market Demand for Fish	Consumers Traders Transporters Fisheries Department Local Authorities Alternative Suppliers	Potential and Acceptability of Alternative Sources	8.1) Review Market Structure and Demand 8.2) Identify Options for Alternative Sources and Species

Level 2

A) Reduce Impact of Fishing

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
9) Introduction of Exotic Species through Fish Farming	Local Communities Fisheries Department Private Companies		9.1) Enforce Existing Regulations

Level 2

B) Control Pollution Priority 5

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
1) Inappropriate Handling of Hazardous Cargo by Small Transporters	Small Boat Owners Maritime Department Harbours Authority Police Traders Fisheries Department Local Authorities ZRA ECZ	Scale of Problem and Cumulative Impact	1.1) Review Type and Quantity of Cargo, Handling 1.2) Assess Impact on Biodiversity 1.3) Identify Alternative Handling, Potential Centralised Facility 1.4) Raise Awareness and Promote Better Handling 1.5) Improve Enforcement

Level 2

B) Control Pollution

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
2) Major Marine Accident	Large Transporters Passengers Maritime Department Harbours Authority Insurance Companies Fisheries Department Local Authorities ZRA; Police; Defence Disaster Management Unit Parks; ECZ	Impact on Biodiversity of Different Cargoes and Scenarios	2.1) Carry Out Risk Assessment 2.2) Review Potential Impacts on Biodiversity

Level 2

B) Control Pollution

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
3) Major Accident from Handling and Storage of Oil and Cargo at the Harbour	Mpulungu Population Water Affairs Maritime Department Harbours Authority Barge Owners; Fisheries Department Local Authorities Police; Defence; ECZ Disaster Management Unit	Impact on Biodiversity of Different Cargoes and Scenarios	3.1) Carry Out Risk Assessment 3.2) Review Potential Impact on Biodiversity

Level 2

B) Control Pollution Priority 4

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
4) Disposal of Waste Oil	Fishing Companies Water Affairs Boat Operators Maritime Department Harbours Authority Fisheries Department Local Population BP ECZ	Scale of Problem and Impact on Biodiversity	4.1) Assess Scale of Problem and Impact on Biodiversity 4.2) Raise Awareness of Proper Disposal and Recycling Procedures 4.3) Promote Local Marketing of Waste Oil and Sale for Recycling to BP 4.4) Review Inland Waterways Act to Cover Waste Oil

Level 2

B) Control Pollution Priority 2

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
5) Disposal of Sewage and Solid Waste from Boats	Fishing Companies Local Authority Water Affairs Boat Operators Maritime Department Harbours Authority Fisheries Department Local Communities District Health Management Team ECZ	Scale of Problem and Impact on Biodiversity	5.1) Assess Scale of Problem and Impact on Biodiversity 5.2) Develop Guidelines and Procedures for Disposal 5.3) Raise Awareness of Issues 5.4) Review Regulations 5.5) Extend Environmental Monitoring Programme

Level 2

B) Control Pollution Priority 3

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
6) Dumping Waste in Lake and Catchment; including Damaged Cargo, Fish Processing Waste	Transporters Fishing Companies Local Authority Water Affairs Zambia Revenue Authority Fisheries Department Local Communities District Health Management Team ECZ	Scale of Problem and Impact on Biodiversity	6.1) Assess Scale of Problem and Impact on Biodiversity 6.2) Raise Awareness of Issues 6.3) Enforce Regulations

Level 2

B) Control Pollution Priority 1

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
7) Disposal of Land Based Sewage from Mpulungu and Other Lake Shore Settlements	Local Authority Water Affairs Fisheries Department Local Communities District Health Management Team D-WASHE ECZ	Scale of Problem and Impact on Biodiversity	7.1) Assess Scale of Problem and Impact on Biodiversity (note Available Data) 7.2) Review Design of Existing Systems, Potential for Alternatives 7.3) Link with Existing D-WASHE Programme 7.4) Raise Awareness of Issues

Level 2

B) Control Pollution

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
8) Use of Agrochemicals in Catchment	Farming Communities Ministry of Agriculture - Field Services Suppliers Water Affairs Fisheries Department ECZ	Scale of Problem and Impact on Biodiversity	8.1) Assess Scale of Problem and Impact on Biodiversity

Level 2

B) Control Pollution

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
9) Use of Chemicals for Disease Vector Control	Communities Public Health Suppliers Fisheries Department ECZ	Scale of Problem and Impact on Biodiversity	9.1) Assess Scale of Problem and Impact on Biodiversity

Level 2

C) Control Sedimentation Priority 4

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
1) Slash and Burn Cultivation	Forestry Department Ministry of Agriculture Water Affairs	Scale of Problem and Trend; Cultural and Economic Viability of Alternative Farming Practices	1.1) Assess Scale, Trend and Impact

Level 2

C) Control Sedimentation Priority 1

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
2) Stream Bank Cultivation	Farming Communities Forestry Department Ministry of Agriculture Water Affairs Local Chiefs Chongololo Club Local Authorities Churches	Scale of Problem and Trend; Risks of Stream Bank Cultivation to Farmers; Cultural and Economic Viability of Alternative Farming Practices	2.1) Assess Scale, Impact and Risks 2.2) Review Alternative Practices including Irrigation 2.3) Review Relevance of Existing Regulations 2.4) Promote Appropriate Farming Practices 2.5) Identify Critical Erosion Sites and Remedial Measures

Level 2

C) Control Sedimentation Priority 3

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
3) Encroachment and Deforestation of Protected Areas (National Parks and Forest Reserves)	Local Communities Forestry Department Parks Water Affairs Local Chiefs Chongololo Clubs Politicians	Scale of Impact on Sediment Load	3.1) Assess Impact on Sediment Load 3.2) Negotiate Solution to Current Encroachment 3.3) Rehabilitate sensitive areas 3.4) Enable Enforcement of Current Regulations 3.5) Raise Awareness of Issues, particularly at the Political Level

Level 2

C) Control Sedimentation Priority 6

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
4) Unsustainable Commercial Extraction of Charcoal and Fuelwood	Local Communities Forestry Department Parks Water Affairs Local Authorities Traders; Consumers Transporters CARE Police; ZRA; National Council of Scientific Research	Scale of Impact on Sediment Load	4.1) Assess Legal and Illegal Extraction 4.2) Review Licensing System 4.3) Raise Awareness of Issues 4.4) Enforce Ban on International Export of Charcoal 4.5) Promote Improved Stoves, Sustainable Harvesting, Fuelwood Planting

Level 2

C) Control Sedimentation Priority 2

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
5) Sand Extraction from Sensitive Areas	Transporters Construction Companies Local Authority Water Affairs Ministry of Lands Department of Mines Forestry Department	Scale of Problem, Trends, Alternative Sites, Impact on Sediment Load	5.1) Assess Impacts and Trends 5.2) Locate Less Sensitive Sites 5.3) Land Reclamation in Critical Areas 5.4) Review Licensing Procedures 5.5) Assess Sources of Conflict

Level 2

C) Control Sedimentation Priority 5

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
6) Existing Roads and New Road Construction	Environmental Unit Roads Department Construction Companies Water Affairs Forestry Department Local Authority National Roads Board ECZ	Scale of Problem and Site Specific Impact on Sediment Load	6.1) Implement EIA of Existing and Proposed Roads 6.2) Agree Remedial Measures with Department of Roads. 6.3) Agree Design Specifications with Department of Roads for New Roads 6.4) Implement remedial Measures in Critical Areas

Level 2

C) Control Sedimentation

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
7) Unplanned Rural Settlement	Communities Local Chiefs Local Authorities Ministry of Lands Field Services Forestry Department Water Affairs Department of Resettlement Parks	Scale and Impact on Sediment Load of Settlement Pattern Change	7.1) Assess Scale, Impact and Trends, Critical Sites

Level 2

C) Control Sedimentation

Specific Problem	Stakeholders	Uncertainties	Proposed Actions
8) Uncontrolled Bush Burning - Late Burning	Local Communities Forestry Department Local Authorities Chiefs Chongololo Clubs Parks Field Services	Scale of Problem and Impact on Sediment Load	8.1) Assess Scale, Causes and Impacts

Level 3

A) Reduce Impact of Fishing Priority 3 - Use of Inappropriate Gill Nets

Proposed Actions	Timing	Key Agency	Human	Material
1.1.Establish Optimal Net Size	On Going	Fisheries Department	Yes	No
1.2.Negotiate Acceptable Interim Gill Net Mesh Size	On Going	Fisheries Department	Yes	Yes
1.3.Establish Acceptable Method to Replace Gear	1.2	Fisheries Department	Yes	Yes
1.4.Establish Local Regulations on Net Size and Materials	1.1	Fisheries Department	Yes	Yes
1.5.Enforce Local Regulations	1.3	Fisheries Department	No	No

Level 3

A) Reduce Impact of Fishing Priority 2 - Excessive Industrial Fishing

Proposed Actions	Timing	Key Agency	Human	Material
2.1.Raise National and Local Political Awareness	On Going	Fisheries (LTBP)	Yes	Yes
2.2.Negotiate Acceptable Interim Fleet and Means of Reducing Fleet	Now	Fisheries Department	Yes	Yes
2.3.Establish Optimal Fleet Composition	Now	Fisheries Department	Yes	Yes
2.4.Review Licensing Procedures	Now	Fisheries Department	Yes	Yes
2.5.Strengthen Local Capacity to Monitor and Enforce Regulations	2.4	Fisheries Department	No	No

Level 3

A) Reduce Impact of Fishing Priority 5- Uncontrolled Extraction of Ornamental Fish

Proposed Actions	Timing	Key Agency	Human	Material
3.1) Ascertain Scale and Impact	On Going	Fisheries (LTBP)	Yes	Yes
3.2) Raise Public Awareness - Establish Aquarium	Now	Fisheries (LTBP)	Yes	Yes
3.3) Define Levels of Extraction	Now	Fisheries (LTBP)	Yes	Yes
3.4) Review License / Export Fees	Now	Fisheries Department	Yes	Yes
3.5) Establish Local Regulations	3.3	Fisheries Department	Yes	Yes
3.6) Evaluate Potential for Captive Breeding	Now	Fisheries Department	No	No
3.7) Review Inclusion of Species in CITES	3.3	Parks	Yes	Yes

Level 3

A) Reduce Impact of Fishing - Illegal Fishing in Nsumbu National Park

Proposed Actions	Timing	Key Agency	Human	Material
4.1) Establish Acceptable Levels, Methods, Areas for Fishing	On Going	Parks (LTBP)	Yes	Yes
4.2) Implement Public Awareness Campaign	On Going	Parks (LTBP)	Yes	Yes
4.3) Negotiate Access and Levels of Extraction with Communities and Tour Operators	4.1	Parks	Yes	Yes
4.4) Incorporate into Park Plan	4.1/4.2	Parks	Yes	Yes

Level 3

A) Reduce Impact of Fishing Priority 4 - Inadequate Protection of Sensitive Areas

Proposed Actions	Timing	Key Agency	Human	Material
5.1) Identify New Key Sites / Potential Protected Areas	On Going	Fisheries (LTBP)	Yes	Yes
5.2) Identify Potential Conflicts with Communities, Propose Mitigation	On Going	Fisheries (LTBP)	Yes	Yes
5.3) Implement Public Awareness Campaign	On Going	Fisheries (LTBP)	Yes	Yes
5.4) Negotiate Boundaries of Additional Protected Areas	5.1/5.2	Fisheries (LTBP)	Yes	Yes

Level 3

A) Reduce Impact of Fishing Priority 1 - Use of Beach Seines

Proposed Actions	Timing	Key Agency	Human	Material
6.1) Identify with Communities Acceptable Fishing Practices	On Going	Fisheries (LTBP)	Yes	Yes
6.2) Negotiate Means of Introducing Total Removal of Existing Gear	Now	Fisheries (LTBP)	Yes	Yes
6.3) Introduce Local Regulations	6.2	Fisheries Department	Yes	Yes

Level 3

A) Reduce Impact of Fishing - Over Dependence of Local Communities on Fishing

Proposed Actions	Timing	Key Agency	Human	Material
7.1) Identify Range of Appropriate Livelihood Options	On Going	ECZ (LTBP)	Yes	Yes
7.2) Promote Introduction of Alternative Livelihoods	7.1	Dep't Community Development	No	No

Level 3

A) Reduce Impact of Fishing - High Market Demand for Fish

Proposed Actions	Timing	Key Agency	Human	Material
8.1) Review Market Structure and Demand	Now	Fisheries	Yes	Yes
8.2) Identify Options for Alternative Sources and Species	8.1	Fisheries (LTBP)	Yes	Yes

Level 3

A) Reduce Impact of Fishing - Introduction of Exotic Species through Fish Farming

Proposed Actions	Timing	Key Agency	Human	Material
9.1) Enforce Existing Regulations	Now	Fisheries Department	Yes	Yes

Level 3

B) Control Pollution Priority 5 - Inappropriate Handling of Hazardous Cargo by Small Transporters

Proposed Actions	Timing	Key Agency	Human	Material
1.1) Review Type and Quantity of Cargo, Handling	Now	Maritime (LTBP)	Yes	Yes
1.2) Assess Impact on Biodiversity	1.1	Fisheries (LTBP)	Yes	No
1.3) Identify Alternative Handling, Potential Centralised Facility	1.1	Maritime	Yes	Yes
1.4) Raise Awareness and Promote Better Handling	1.3	Maritime	Yes	No
1.5) Improve Enforcement	1.3	Maritime	Yes	No

Level 3

B) Control Pollution - Major Marine Accident

Proposed Actions	Timing	Key Agency	Human	Material
2.1) Carry Out Risk Assessment	Now	Maritime (LTBP)	Yes	No
2.2) Review Potential Impacts on Biodiversity	On Going	Fisheries (LTBP)	Yes	Yes

Level 3

B) Control Pollution - Major Accident Handling and Storage of Oil and Cargo at the Harbour

Proposed Actions	Timing	Key Agency	Human	Material
3.1) Carry Out Risk Assessment	Now	Maritime (LTBP)	Yes	Yes
3.2) Review Potential Impact on Biodiversity	3.1	Fisheries (LTBP)	Yes	Yes

Level 3

B) Control Pollution Priority 4 - Disposal of Waste Oil

Proposed Actions	Timing	Key Agency	Human	Material
4.1) Assess Scale of Problem and Impact on Biodiversity	Now	ECZ (LTBP)	Yes	Yes
4.2) Raise Awareness of Proper Disposal and Recycling Procedures	Now	ECZ (LTBP)	Yes	Yes
4.3) Promote Local Marketing of Waste Oil and Sale for Recycling to BP	4.2	Local Council	Yes	No
4.4) Review Inland Waterways Act to Cover Waste Oil	Now	Maritime	Yes	Yes

Level 3

B) Control Pollution Priority 2 - Disposal of Sewage and Solid Waste from Boats

Proposed Actions	Timing	Key Agency	Human	Material
5.1) Assess Scale of Problem and Impact on Biodiversity	Now	ECZ (LTBP)	Yes	Yes
5.2) Develop Guidelines and Procedures for Disposal	Now	Maritime	Yes	Yes
5.3) Raise Awareness of Issues	5.2	Local Council	Yes	No
5.4) Review Regulations	5.2	Maritime	No	No
5.5) Extend Environmental Monitoring Programme	5.1	Fisheries	Yes	No

Level 3

B) Control Pollution Priority 3 - Dumping Waste in Lake and Catchment

Proposed Actions	Timing	Key Agency	Human	Material
6.1) Assess Scale of Problem and Impact on Biodiversity	Now	ECZ (LTBP)	Yes	Yes
6.2) Raise Awareness of Issues	Now	Local Councils	Yes	No
6.3) Enforce Regulations	Now	Local Councils	Yes	Yes

Level 3

B) Control Pollution Priority 1 - Disposal of Sewage from Mpulungu and Other Lake Shore Settlements

Proposed Actions	Timing	Key Agency	Human	Material
7.1) Assess Scale of Problem and Impact on Biodiversity (note Available Data)	Now	ECZ (LTBP)	Yes	Yes
7.2) Review Design of Existing Systems, Potential for Alternatives	7.1	Local Council	Yes	No
7.3) Link with Existing D-WASHE Programme	Now	Local Council	Yes	Yes
7.4) Raise Awareness of Issues	On Going	ECZ (LTBP)	Yes	No

Level 3

B) Control Pollution - Use of Agrochemicals in Catchment

Proposed Actions	Timing	Key Agency	Human	Material
8.1) Assess Scale of Problem and Impact on Biodiversity	On Going	MAFF (LTBP)	Yes	Yes

Level 3

B) Control Pollution - Use of Chemicals for Disease Vector Control

Proposed Actions	Timing	Key Agency	Human	Material
9.1) Assess Scale of Problem and Impact on Biodiversity	Now	Public Health	Yes	Yes

Level 3

C) Control Sedimentation - Slash and Burn Cultivation

Proposed Actions	Timing	Key Agency	Human	Material
1.1) Assess Scale, Trend and Impact	Now	MAFF (LTBP)	Yes	Yes

Level 3

C) Control Sedimentation Priority 1 - Stream Bank Cultivation

Proposed Actions	Timing	Key Agency	Human	Material
2.1) Assess Scale, Impact and Risks	On Going	Water (LTBP)	Yes	Yes
2.2) Review Alternative Practices including Irrigation	Now	MAFF Research	Yes	Yes
2.3) Review Relevance of Existing Regulations	2.1/2.2	Water Affairs	Yes	Yes
2.4) Promote Appropriate Farming Practices	2.3	Field Services	No	No
2.5) Identify Critical Erosion Sites and Remedial Measures	2.1	Water Affairs	Yes	Yes

Level 3

C) Control Sedimentation Priority 3 - Encroachment and Deforestation of Protected Areas

Proposed Actions	Timing	Key Agency	Human	Material
3.1) Assess Impact on Sediment Load	On Going	Water (LTBP)	Yes	Yes
3.2) Negotiate Solution to Current Encroachment	Now	Forestry, Parks	Yes	Yes
3.3) Rehabilitate sensitive areas	3.2	Forestry, Parks	Yes	No
3.4) Enable Enforcement of Current Regulations	Now	Forestry, Parks	Yes	No
3.5) Raise Awareness of Issues, particularly at the Political Level	Now	ECZ	Yes	Yes

Level 3

C) Control Sedimentation Priority 6 - Unsustainable Commercial Extraction of Charcoal and Fuelwood

Proposed Actions	Timing	Key Agency	Human	Material
4.1) Assess Legal and Illegal Extraction	On Going	Forestry Department	Yes	No
4.2) Review Licensing System	4.1	Forestry Department	Yes	Yes
4.3) Raise Awareness of Issues	Now	Forestry Department	No	No
4.4) Enforce Ban on International Export of Charcoal	4.1	Forestry Department	Yes	Yes
4.5) Promote Improved Stoves, Sustainable Harvesting, Fuelwood Planting	Now	NISIR	Yes	Yes

Level 3

C) Control Sedimentation Priority 2 - Sand Extraction from Sensitive Areas

Proposed Actions	Timing	Key Agency	Human	Material
5.1) Assess Impacts and Trends	Now	Water (LTBP)	Yes	Yes
5.2) Locate Less Sensitive Sites	5.1	Water (LTBP)	Yes	Yes
5.3) Land Reclamation in Critical Areas	Now	Local Council	Yes	No
5.4) Review Licensing Procedures	5.1	Local Council	Yes	Yes
5.5) Assess Sources of Conflict	Now	Local Council	Yes	Yes

Level 3

C) Control Sedimentation Priority 5 - Existing Roads and New Road Construction

Proposed Actions	Timing	Key Agency	Human	Material
6.1) Implement EIA of Existing and Proposed Roads	Now	Environmental Unit, Roads Department	Yes	Yes
6.2) Agree Remedial Measures with Department of Roads.	6.1		Yes	Yes
6.3) Agree Design Specifications with Department of Roads for New Roads	6.1		Yes	Yes
6.4) Implement remedial Measures in Critical Areas	6.2		Yes	No

Level 3

C) Control Sedimentation - Unplanned Rural Settlement

Proposed Actions	Timing	Key Agency	Human	Material
7.1) Assess Scale, Impact and Trends, Critical Sites	Now	PPU (LTBP)	Yes	Yes

Level 3

C) Control Sedimentation - Uncontrolled Bush Burning

Proposed Actions	Timing	Key Agency	Human	Material
8.1) Assess Scale, Causes and Impacts	Now	Forestry (LTBP)	Yes	Yes