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Fishing Practices Special Study
Advice to the
Strategic Action Programme

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Pollution Control and Other Measures to Protect Biodiversity in Lake Tanganyika (RAF/92/G32)

Lutte contre la pollution et autres mesures visant à protéger la biodiversité du Lac Tanganyika (RAF/92/G32)

Le Projet sur la diversité biologique du lac Tanganyika a été formulé pour aider les quatre Etats riverains (Burundi, Congo, Tanzanie et Zambie) à élaborer un système efficace et durable pour gérer et conserver la diversité biologique du lac Tanganyika dans un avenir prévisible. Il est financé par le GEF (Fonds pour l'environnement mondial) par le biais du Programme des Nations Unies pour le développement (PNUD)"	The Lake Tanganyika Biodiversity Project has been formulated to help the four riparian states (Burundi, Congo, Tanzania and Zambia) produce an effective and sustainable system for managing and conserving the biodiversity of Lake Tanganyika into the foreseeable future. It is funded by the Global Environmental Facility through the United Nations Development Programme.

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A BACKGROUND

A.1 Purpose of this document

This document updates the preliminary advice sent to the SAP for their meeting in January 2000 (entitled: *(Preliminary) Fishing Practices Special Study Advice to the Strategic Action Programme,* dated December 1999). Therefore this document provides the main conclusions for the Fishing Practices Special Study (FPSS) that relate to the strategic management of biodiversity and any threats fishing practices may pose to aquatic biodiversity.

Since the preliminary advice was formulated, further fieldwork has been undertaken and comprehensive analysis of the field programme and associated activities has been completed in the region. In addition, FPSS has held detailed consultations with the BIOSS team (completing their final analysis during the same period in Kigoma) and also the SESS team as their results and insights came in from field activities and analysis during this time.

FPSS has concentrated on activities taking place in the littoral zone; the fishing grounds with highest biodiversity and encompassing mostly small scale artisanal and subsistence fishing. The FAO/FINNIDA Lake Tanganyika Research (LTR) – has developed a fisheries management plan for the exploitation of Lake Tanganyika's commercial stock so any very detailed investigation of the commercial species in the pelagic zone is not within the FPSS remit. However, this document does draw on LTR reports due to the links between the pelagic fishery and biodiversity.

As a threat-based study, FPSS overlaps directly with both the biodiversity (BIOSS) and socio-economic (SESS) studies. BIOSS and FPSS both seek to determine if critical habitats and key species are under threat. While both SESS and FPSS aim to understand the importance of fishing practices (SESS has a wider livelihood focus) to riparian communities in terms of their livelihoods. The main premise guiding FPSS is that conservation of aquatic biodiversity should not be at the expense of sustaining livelihoods of riparian communities.

Advice from an early meeting of the transboundary diagnostic analysis group indicated two areas were of specific interest to them with respect to results from FPSS. They were:

- Assessment of excessive fishing, including beach seining in the littoral zone
- Assessment of fishing in sensitive areas

The remainder of this background section provides a brief summary of FPSS, fishing activity and fishing communities. FPSS recommendations fall into three categories: management of pelagic fishery, management of littoral fisheries and lakeside capacity to monitor.

A.2 FPSS activities and approach in the field

As a small special study, FPSS has teams of only one or two people in each country, primarily drawn from Fisheries Departments. Work has focussed on describing fishing practices in the littoral zone, with attention on the catch of non-commercial species. In all countries, the teams continue to finalise their reports. The final outputs of the FPSS are listed under each relevant recommendation.

The Tanzanian team have been operational the longest and have collected catch composition and length data for a variety of gears. That data is now being entered into a database, analysis of which will give detailed results on what length fish are caught by selected different gears operating in the littoral In addition, the team is completing reports on the fishing practices in the waters adjacent to Gombe and Mahale National Parks. The Fishing Gears of Kigoma District have also been surveyed.

The Congolese team have surveyed littoral gears on the coast close to Uvira and this data is supplemented with a more detailed market survey in Uvira providing estimates of the volume

of littoral fish being sold there from Lake Tanganyika. The Congolese team, working with some members of the BIOSS team, are also conducting a small study on size and maturity of fish caught by gill nets. In Burundi work is currently confined to detailed analysis of fishing villages close to Bujumbura, and near the National Park at Ruzuzi, with supplementary investigations of gear availability and prices, and some catch composition data is being collected. Due to logistic difficulties in Burundi and DR Congo, results from their work are still being finalised.

Zambia's national park on the lake, Nsumbu, has been visited by FPSS and a brief situation report regarding fishing practices there has been prepared. A full list of the fishing gears used in the Zambian zone of the lake has also been drawn up.
During February and March, FPSS actively sought overlap with BIOSS (final analysis occurring at the same time) and so recommendations for both studies were informed by results and conclusions of the other. The importance of this is perhaps most significant with respect to the conservation status of the waters off the national parks. Similarly, results and insights from the socio-economic study (SESS) have informed the development of recommendations from FPSS.

A.3 Fishing Practices in Lake Tanganyika - an overview

Over 50 fishing gears have been documented by FPSS. Of these, the following 12 are most significant in terms of management; the list provides a brief explanation of each.

- **Industrial purse seine** – used in the industrial fishery offshore (Zambian DoF figures indicate that this fishery takes 4-5,000 tons/year, roughly 3% of the estimated 167,000 tons/year of the whole lake fishery[1])
- **Light assisted beach seine** - targets sardines that are attracted to kerosene pressure lights at night. Usually has 8mm or 10mm mesh throughout. This gear can also be used in the day and not much escapes due to the mesh size. Banned in Tanzania (enforcement difficult). Each beach seine can employ as many as 20 people, including light boat crews and net pullers.
- **Beach seine** - catches & targets littoral fishes (Can be used day or night). Usually has a larger mesh in the wings than in the bunt or bag. Banned in Tanzania (enforcement difficult).
- **Ring net** = "Chiromila" seine as used in Zambia in Nsumbu region. Used offshore at night with lights.
- **Bottom set gill net** - set net, various mesh sizes and depths. Ubiquitous. Cheap. All countries have some mesh size restrictions.
- **Encircling gill net** = m'timbo or splashing water or tam tam (not a ring net). Like a gill net but deeper and used in a circle with draw lines from a boat with a frightening device. Catches different fish from the bottom set gill nets. Different mesh sizes for night and day. Banned in all 4 countries of the lake with enforcement only active in Zambia.
- **Lift nets** – which can be one, two or three boat. Each boat employs roughly 6 crew members and LTR estimated 3,200 boats acknowledging that this is likely to be an underestimate. A large percentage of the LTR estimated total catch is hauled by this gear – giving it a very high value in the region. Investment needed to set up a lift net operation is substantial.
- **Simple lines** – which includes vertical hand lines. Used everywhere round the lake. Baited hooks, targeting fish on or near the bottom
- **Jigged lines** – mainly for *Lates stappersii*. With 50 or more hooks. Used during the day in deep waters. Not baited. Very important for the economy of some villages, particularly N Tanzania. Found all round the lake as a subsistence activity.
- **Bottom set long lines** – which are lines with 40–400 baited hooks, which are laid along the bottom from a boat. Used everywhere where there is a snag free bottom substrate.

[1] Hanek G. 1994 Management of Lake Tanganyika Fisheries. FAO/FINNIDA Research for the Management of the Fisheries of Lake Tanganyika. GCP/RAF/271/FIN-TD/25 (En)

- **Pole and line** – used manly by children fishing the margins of the lake. Very important in terms of contribution to protein in the household diet, and to biodiversity in that there are vast numbers of them and they target juvenile littoral species.
- **Non-return traps** – used in swamps and reed beds. Very common in Rusizi in north of lake. Made from bamboo, wooden slats and wire mesh.

Each country adopts a slightly different categorisation of fishing activity. To provide regional consistency, FPSS has defined three main categories: industrial (diesel inboard powered and uses a purse seine for pelagic fish), artisanal (the catch is sold but the scale of operation varies from boats with outboard engines to paddled canoes), subsistence (catch is used for domestic consumption with opportunistic selling of any excess). The following table illustrates the distribution of practices within each category by fishing ground (pelagic, littoral and benthic).

Table 1 Pattern of individual gear use across fishing category and fishing ground

			Fishing Ground		
		Practice	**Deep benthic**	**Littoral**	**Pelagic**
Fishing Category	Industrial	Purse seine			■
	Artisanal	Lift Nets (engines and paddled)			■
		Ring net (Chiromila, Zambia)			■
		Light assisted beach seine		■	
		Pelagic jigged lines			■
		Beach seine (day)		■	
		Bottom set long lines	■		
		Bottom set gill nets		■	
		Traps		■	
	Subsistence	Simple lines	■		
		Pole and line		■	
		Pelagic jigged lines			■
		Bottom set long lines	■		
		Bottom set gill nets		■	
		Traps		■	

A.4 Fishing Communities – an overview

Fishing, along with farming, is an important livelihood option for lakeside communities. Fishing is undertaken by men and is an important source of protein and cash for households in the region. In addition, Lake Tanganyika's sardines are highly valued and are transported to areas distant from the lake, such as the copper belt in Zambia. LTR estimates[2] annual harvest levels in 'recent years' to have varied in the range of 165,000 - 200,000 t: volumes, which translate into annual earnings on the order of tens of millions of US dollars. Widening the perspective to include additional artisanal gears and the subsistence fishery it is clear that fishing makes a major contribution to the nutritional and financial well being of local and national economies.

The links between fishing and farming activities are important: many fishermen's households are also dependent on agriculture (a role largely taken by women). Demand for terrestrial resources (flat land for sun-drying and fuel wood for smoking) to support fishing also links the terrestrial and aquatic environment of the lake. The relative importance of fishing and farming to individual households changes according to factors such as the cycle of the moon, the season, short and long term returns from fishing or farming etc. SESS notes that fishermen have a strong sense of identity with fishing and as a consequence may undervalue

[2] Figures quoted in LTR's Regional Framework Planning For Lake Tanganyika Fisheries Management: (LTR - GCP/RAF/271/FIN)

the contribution of farming and other activities to their household livelihoods. Future workers with fishing households must be cognisant of this point.

People who are not personally active in the fishery often own the larger fishing gears, such as lift nets and beach seines. These wealthier owners may not even live in lakeshore villages. Arrangements for payment of crews vary and may be cash or a mixture of money and fish. Security is an issue for fishermen, particularly those relying on pelagic stocks. Piracy targets engines, boats and fuel and this risk is a disincentive for investment in the pelagic fishery.

Fishing provides a range of opportunities for associated activities including: provision of light boats (for light assisted beach seines and lift nets); boat building; rental of land for sun drying; fish smoking; transportation; marketing; even the provision of food to returning fishermen Processing of catch includes freezing (Zambia only), sun drying of clupeids (lake-wide), smoking of larger fish (lake-wide), while the bigger towns support fresh fish markets.

FPSS does not consider appropriate the use of micro-credit to encourage small-scale fishermen of the littoral zone into the pelagic zone. The risks of such a venture are great. Lack of security, lack of skills (e.g. managing money, crew, loans, larger nets etc.) and the scale of credit needed undermine the sustainability of such schemes. Upgrading fishing activity to fish the pelagic zone requires substantial investment. It is not a micro-finance opportunity; it requires greater investment and broader support, such as a small business development scheme, to be successful.

B RECOMMENDATIONS - FORMULATED FROM KEY FPSS RESULTS

B.1 Fishing In The Pelagic Zone – Implications For Management

This section highlights the importance of the pelagic fishery to the SAP, given this body's broader aim of sustainably managing the lake's biodiversity.

B.1.1 Narrative

As noted earlier, the study of fishing in the pelagic zone fell under the remit of the Lake Tanganyika Research project (LTR) that has developed a fish management plan covering the pelagic commercial species. The area of overlap between LTR's remit and LTBP's focus on biodiversity is however important for the SAP to consider.

In essence, the pelagic fishery supports large numbers of fishermen throughout the lake. The most 'visible' practices are the purse seine fleet, the light assisted beach seines and the lift net fleet and these fall within LTR's plan. However, the pelagic species fishery is also an important livelihood option for many smaller scale artisanal fishermen who paddle some distance from the shore and use jigged lines to target *Luciolates stappersi.*

Prediction of what all these fishermen would do should the pelagic stocks collapse, sharpens the focus of how important the sustainable management of the pelagic fishery is to achieving the biodiversity aims of the SAP. The effect of a failed pelagic fishery would be increasing pressure on the coastal zone through greater reliance on inshore fish resources and/or land for agriculture. This has serious implications for the sustainable management of the lake's ecosystem – the remit of the SAP.

Focussing the SAP's attention on the pelagic stocks and the livelihoods they support also recognises that, to riparian communities, these species are the most valuable part of Lake Tanganyika's biodiversity[3] Sustainable use of the lates and clupeid stocks is a key contribution to the maintenance of the 'higher profile' part of the lake's biodiversity - the species of the littoral zone. Therefore, both local and regional aims can be achieved through implementing a sustainable management plan for the pelagic fishery.

It is important to note that fishing pressure is not the only factor influencing the status of the commercial stocks. Environmental changes such as temperature are thought to contribute to the relative abundance of clupeids and perch species. These environmental changes and their effect on the fish stocks are not fully understood. Thus management of the fishery has to be undertaken within some uncertainty and be guided by the precautionary principle.

B.1.2 Recommendations for Managing the Pelagic Fishery

The SAP should **assess the status of the Fisheries Management Plan developed under LTR**, reviewing it in light of the broader biodiversity objectives of the SAP. It is important for the sustainable management of the lake as a whole that any plan to manage the fisheries is brought into the SAP process. This ensures major resource plans will be considered alongside other regional priorities and provides a mechanism to proactively promote adoption of sustainable fisheries management in the lake.

Post-harvest losses of clupeids cause significant loss in the value of the fishery. Studies of how to reduce wastage through improvements to processing, storage, transportation and marketing would be valuable. The implications (particularly environmental, social and institutional) of implementing improvements could be considered within the coastal zone management strategy.

[3] See the BIOSS submission to the SAP for a briefing on the importance of recognising differential valuation of biodiverse resources to various stakeholders.

B.2 Fishing In The Biodiverse Littoral Zone - Implications For Management

B.2.1 Narrative

Many inshore fishing grounds (0-50m depth) adjacent to areas of high population settlement bear heavy pressure from a range of gears. FPSS has documented more than 50 gears of which 12 are considered significant: industrial purse seine; beach seine; light assisted beach seine; ring net; bottom set gill net; encircling gill net; lift nets; simple lines; jigged lines; bottom set long lines; pole and line; and, non return traps.

These littoral fisheries are complex, as they are multi-species, multi-gear, involving both artisanal and subsistence fishermen whose pattern of effort is primarily dictated by the moon but with the rains also affecting fishing activity. Of the twelve significant practices the majority are deployed in the inshore area: light assisted and day beach seines; gill nets (bottom set and encircling); traps, and lines (simple, bottom set, pole). Each of these gears catches a range of species, (FPSS is compiling lists of all species recorded by specific gears for final reports). Both artisanal (i.e. sell catch) and subsistence (i.e. eat catch & sell any occasional surplus) fishermen operate in the littoral zone: this fishing ground is an important resource for the livelihoods of riparian communities.

As we noted in the preliminary advice to the SAP, this leads directly to the question of how to manage effort in a very complex fishery in a large, remote lake, which has few institutional resources to enforce legislative rules. Legislation to control effort and traditional reliance on enforcement mechanisms are perhaps not well suited to the characteristics of Lake Tanganyika (size, logistics, resources).

Our earlier points regarding the problems experienced with implementing the ban on use of beach seines provide a clear illustration of the constraints to this form of traditional fisheries management in a resource such as Lake Tanganyika. Tanzania have banned the use of beach seines using fisheries legislation another example is the banning of the encircling gill net with frightening device (or tamtam) by all four riparian countries. However, enforcement has been largely ineffective as both of these practices can still be widely seen on the shores of the lake.

The current trend in management of fisheries world-wide is to look toward partnership arrangements amongst groups of people with a stake in the fishery (e.g. fisher communities, NGO's and governments). This is often called co-management, a broad term used to describe a range of partnerships from those which are primarily community-led through to those in which governments retain more responsibility in managing a fishery.

Effective controls on a fishery require a particular set of physical, social and institutional characteristics. These can be seen most clearly in operation in the shores adjacent to national parks such as Gombe and Mahale Mountains in Tanzania and Nsumbu in Zambia. Characteristics such as: clearly defined boundaries; the nature of the relationship between the parks and resource users enabling exclusion of specific activities (and fining if rules are broken); and the national park philosophy of completely banning any use of a park's resources provides strong incentives to mobilise resources against incursion. These conditions do not apply to the remaining) 94% of the shoreline. Resources to enforce on the scale needed could not presently be mobilised by any institution or body in any of the 4 riparian countries. Therefore, we repeat our **recommendation that co-management options should be developed as the most appropriate mechanism to manage fishing activity in the littoral zone to benefit biodiversity and sustainable livelihoods**.

FPSS notes that this is a fundamental shift from the traditional approach to fisheries management of control and enforcement by government agencies. In addition, co-management should not be viewed a panacea to the problems of managing complex fisheries such as those in the Lake's littoral zone. This approach does require a major change in perspective towards increasing participation of local stakeholders and a changing role for the institutions formally charged with fisheries management (usually focussing

exclusively on enforcement). Experience from around the world indicates that increasing involvement of fishing communities in the management of the resource leads to improved sustainability.

Under the auspices of LTBP, riparian communities in Zambia have established village conservation and development committees. The shore has been divided into five strata, each of varying size. The training and environmental education component of the project has been working with these committees to improve their capacity to plan and manage projects. The committees are developed to varying degrees with the more remote being more developed than those in larger population centres. This initiative offers a potential mechanism to initiate co-management systems in the lake.

Protected areas
FPSS has prepared situation reports on fishing activity adjacent to each of the national parks on Lake Tanganyika's shores: a brief summary of its conclusions follows.

Gombe Stream National Park
The park boundary stops 100m short of the shoreline. Following implementation of the beach seine ban in Lake Tanganyika (August 1998), TANAPA withdrew permission for local villages to camp on Gombe's beaches and use beach seines. In general, the fishermen accept TANAPA's right to implement the ban, while highlighting that they bear substantial costs with the loss of such an economically important gear. Currently TANAPA issue less than 5 gill net licences for fishermen to access the water off Gombe. Results from BIOSS indicate that extending some form of protection from Gombe into the lake would be important for the regional conservation of aquatic biodiversity. Their recommendations for this zone to extend only far enough to cover the littoral zone and that the status need not be complete protection (i.e. some low level fishing activity could continue) have been discussed and agreed with FPSS. TANAPA's demonstrated ability to manage activity in the fishing grounds indicate that they could monitor a more flexible system in terms of gear use jointly with neighbouring communities.

Mahale Mountain National Park
The border of Mahale extends 1.6 km into the lake and all fishing activity is banned in this zone. The park's remoteness combined with the high penalty if found fishing in the park (gears are confiscated) provides enough disincentives for fishermen to not risk illegal fishing. Therefore the aquatic zone is adequately protected. Potential threat comes from Kalilani, the closest village, bounded on two sides by Mahale's northern border. The conflicts are due to the close proximity of the village to the park border and the nature of the relationship between this village and TANAPA (although improving has a difficult history over boundary disputes); the prime livelihood option in the village is fishing, with few alternatives due to land shortages.

Parc National du Rusizi
The water off Rusizi is not included within the park's boundary and provides an important and historic fishing ground for many people from Gatumba village. A wide range of practices have been recorded, but long lines, gill nets and beach seines are the most widely used gears in the lake, while traps are used extensively in the swamps within and bordering the park. The park is under intensive pressure from neighbouring settlements, illustrated by the recent de-gazetting of some park land for agricultural development. Clearly, extension of the park's boundary to take account of aquatic biodiversity is not viable at the moment. FPSS notes the important links between the fisheries in the lake and the swamps in terms of both fish species and fishermen who may move between the two fishing grounds. This link must be fully explored, as it will be central to any future management of fishing in and around the park. The framework of coastal zone management proposed and experience of implementing some form of co-management elsewhere in the lake will provide a good foundation of regional knowledge when this park can be managed for conservation.

Nsumbu National Park
The boundary of Nsumbu extends into the lake to a distance of 1.6 km, following the contours of the coastline. This presents a difficult boundary for both the park and fishermen,

particularly the deeply recessed Nkamba bay. The managers of the two tourist lodges (whose trade is dependent on sport fishing) largely defend the 'tongue' of permitted fishing ground extending into the bay. As this management errs on the side of the park by excluding fishermen totally, the entire bay is currently afforded full protection. The use of baselines (i.e. the point between two headlines) to define the boundary in the bay would remove ambiguity and provide a longer-term solution.

Nsumbu's water are under some pressure from fishing activity: nearby densely populated settlements (including refugees), importance of fishing as a livelihood options (compounded by lack of agricultural land), inadequate resources for managing the aquatic zone and the fact that the coastline contains many bays (increasing detection problems) all contribute to this problem. An earlier arrangement between Parks and Wildlife and a neighbouring village for seasonal fishing access to one of Nsumbu's beaches has recently been withdrawn. The bay is marked for tourism development and the impact of this change to local fishermen is not known.

B.2.2 Recommendations for Managing the Littoral Fishery

FPSS actively supports BIOSS recommendations for the SAP to adopt a **coastal zone management (CZM) strategy** as the basis for sustainable management of Lake Tanganyika.

The concepts of **co-management of fisheries** are complementary to the wider CZM strategy of prioritising objectives for a stretch of coast, agreeing which activities can be sustainably carried out and how that plan will be implemented. Fishing communities will be primary stakeholders in any CZM strategy for Lake Tanganyika. CZM also provides a framework, within which approaches to co-management of any natural resource can be developed so they are appropriate to the context of Lake Tanganyika. As a background document, Annex I provides a brief check-list of the core principles for successful co-management (drawn from the literature).

Within this zoning system, FPSS recommends that **management of Lake Tanganyika's inshore fisheries should reflect their complex nature**. That is, management should explicitly recognise the relative importance of different species in the littoral catch, the varying interests of the different stakeholders, differences in the patterns of gear-use and effort and marketing opportunities and constraints (e.g. banning of a single gear will not address threats to fish biodiversity conservation).

FPSS strongly recommends that fishing communities are active participants in establishing appropriate management of their inshore fishing grounds.

- Mechanisms to support fishing community's management of their local resources should be investigated (e.g. the fees gained from littoral fishing gear licences could be allocated to management groups within a coastal zone, rather than being sent to higher administrative authorities)
- The costs of any major change to fishing practice or level of effort borne by fishermen must be appropriately planned for and mitigated against.

FPSS proposes that, within the region, Zambia presents the best opportunity to begin developing this zoned approach to management of littoral fisheries. Therefore we recommend that the programme of capacity building undertaken by LTBP's training and environmental education team should be built upon to develop specific skills in managing fishing in the littoral zone in partnership with the Department of Fisheries.

FPSS recognises that the institutional and socioeconomic context within which zoned co-management could occur varies along the shore - within and between country borders. But strongly recommends that the lessons and experience of developing local capacity to co-manage inshore fisheries in Zambia is shared regionally through the SAP process.

BIOSS has highlighted the importance of the aquatic zones in national parks to regional conservation. Therefore fishing activity must be closely managed in these areas, which brings the conflict between conservation and sustainable development aims into sharp focus.

While conservation of these areas is a priority, it is theoretically possible to allow some fishing activity that does not overexploit the resource. The problems of implementing a scheme where some gears are allowed and others excluded is not to be underestimated and to date parks in the region have opted for total exclusion to simplify management. However, this is also hard to manage, particularly where resources are inadequate as the park comes under high pressure from people trying to maintain their livelihoods. An important point to note is that communities bordering parks bear the largest cost of conservation, with little to no understanding or benefit from the wider advantages of protected areas, which largely accrue nationally and internationally. The relationship between the parks and their neighbours holds the key to this conflict and **FPSS strongly recommends that implementation of any recommendations to change the status of aquatic zones is carried out with full recognition of the relative importance of these fishing grounds to fishermen, the costs they will bear and the likely outcome of any changed access (i.e. where will the pressure move to and what is the impact of this to biodiversity and livelihoods?). Implementation with full and meaningful consultation with the affected fishermen is the only solution to this**. This reflects the objectives of the Convention on Biodiversity (i.e. conservation, sustainable use and equitable benefit).

B.2.3 FPSS outputs

Final FPSS report entitled: Fishing Gears Of Lake Tanganyika 1999/2000
Situation report on fishing activity near national parks, with a regional summary

B.3 Capacity To Monitor The Effect Of Fishing Practices On Lake Tanganyika's Biodiversity

B.3.1 Narrative

FPSS has reviewed the status of existing programmes to monitor fishing in the lake. All countries have some programme for monitoring, but implementation and effectiveness vary.

Table 2 summarises capacity in the case of catch effort surveys in each of the four countries.

Table 2 Summary of current monitoring of fisheries in Lake Tanganyika

Stage of the monitoring process	Burundi (La department de Peche)	DR Congo (La department de Peche)	Tanzania (Dept of Fisheries)	Zambia (Dept of Fisheries)
Scope of Activities	Beach Survey Gear surveys Catch assessment Annual Whole country, main landing beaches	Licensing of fishermen Catch data Uvira and Fuzi districts. Main beaches	Licensing fishermen Boat registration Gear survey Catch assessment	Purse seine fishery catches. Dried fish markets Catch assessment in selected villages 10 year gill net catch survey
Data collection (completed years)	1999	1999	1999	PS & Market 1999 CAS 1997 Gill 1990
Data Collation (method)	Raw data to spreadsheets, compiled into an annual report	Raw data to spreadsheets	Compiled into an annual report (sent to HQ)	Raw data to spreadsheets, compiled into an annual report (sent to HQ)
Interpretation (who)	Central headquarters = Lakeshore	None	Central headquarters (no current feedback to lakeshore)	Central headquarters (no current feedback to lakeshore)
Use of results for management decisions				

B.3.2 Recommendations

Given the problems already experienced with monitoring fishing in the lake, **FPSS is hesitant to recommend additional monitoring burdens for these institutions**. **FPSS strongly encourages the 4 riparian countries to maintain their existing monitoring programmes whilst seeking to improve them.** A key point to make about existing survey programmes is the lack of capacity in lakeside institutions to analyse data and use the improved information base for management. A **regionally integrated training programme on monitoring is recommended**. This should address basic questions of monitoring, i.e. why, when, what, who and how to monitor, as well as skills in information management, interpretation of results and methods of implementing recommendations that arise from analysis of monitoring data.

Then the exact status and purpose of all fisheries monitoring needs to be reviewed against national and SAP-defined regional needs and a realistic assessment of sustainability.

Having made these general recommendations, FPSS believes that monitoring of the **status of the pelagic fishery is a priority for the SAP**, and systems to provide timely and accurate information for its better management should be established.

As resources and capacity increase these core monitoring activities could be expanded to include practices and species of more interest to the pressure exerted on the littoral zone. For example an established survey of, say, monthly pelagic catches from lift nets and beach seines could be extended so that once a year catches of all species for these gears and also from other gears are recorded and analysed. Thus at less frequency routine data on fishing in the littoral zone would be collected within the same monitoring programme.

B.3.3 FPSS outputs

Overview of national capacities to monitor fisheries in Lake Tanganyika with a regional summary.

Annex I - Core Principles For Successful Co-management

Devolution of responsibility to communities is not a simple task: a range of resource and community characteristics provide guidance to where the chances of success will be higher. The following list draws together the lessons and ideas from the literature (Ostrom, 1990, 1992; Pinkerton, 1989; and Pomeroy and Williams, 1994) to provide a comprehensive set of co-management guidelines appropriate for consideration of stakeholders in Lake Tanganyika. Points with common themes are grouped together under a single heading.

Advantages and Obstacles to Participatory Management

- Individuals are more likely to participate when it is clear to them that the **benefits exceed the cost** of their involvement. Therefore, it is very helpful if benefits are demonstrated early in the process of developing stakeholder capacity - this is a great incentive for future involvement.

Unit of Management

- The **boundaries** of the management unit must be clear and of a manageable size. This includes both: the *physical boundary* of the lake system, e.g. the agreed area covered by an management plan within a zone; and, *who* is part of the management unit, e.g. a list of legitimate/licensed fishers and the membership of management committees and their structure.

Operational Management – lakeside rules and regulations

- Rules that specify who can use the lake's resources, how, where and when must **reflect local conditions** (i.e. the fishery, other resource use in the catchment etc).

- Rules are **best made by the individuals** affected by them. This includes detailed fishing or collection rules as well as rules governing who can make and change the arrangements guiding management of the lake.

- Communities should set up a **system of penalties** to deal with people who break rules. The system should include a mix of light through to more serious penalties to make allowances for different levels of rule breaking and individual circumstances. The penalties are important to ensure that everyone keeps the rules and seeing that all others are obeying is a key incentive for individuals to actively support and maintain the management system.

- Communities should establish ways of **resolving conflict**. Mechanisms should be fast and low cost, relying on both formal (e.g. law courts) and informal (e.g. committee meeting) methods.

- The 'community' should live near the fishery and have a **common approach** to collective problems. A community with previous experience of solving problems facing many of its members and that has a shared understanding of key objectives, will have more chance of successfully meeting the challenges of managing a fishery than a community with lots of internal conflict.

Institutional Framework – capacity to manage

- It is helpful if the community has an **existing organisation** with management responsibility, even if not specifically covering management of aquatic resources of the lake. Previous experience of managing natural resources within a community provides a good foundation for stakeholders to take on responsibility for fisheries management.

- Communities must have **external recognition** of their right to manage. For example, government legislation may allocate tenure over a specific resource or government policy may delegate responsibility of a well defined management unit to an appropriate lakeside group.

- Management should be supported by a **nested arrangement of organisations**. This means there is an appropriate forum for people involved at all levels in the planning process, and that these fora are linked together.

- There should be a core group within the community that takes **leadership responsibility** for the management process. Individual resource-users should have incentives and be willing to commit time, money and effort into management of the lake.

- **Communication between government and the community** requires a joint body to be established. Membership should include representatives from both stakeholder groups (community and government) and should have a remit to monitor progress, resolve conflict and reinforce local decisions.

- Institutions governing common property resources should be **democratic and representative**. This means that procedures must be established to ensure all stakeholders have a voice on decision making committees and that representatives should be elected or nominated in an agreed way.

Monitoring

- Management needs **monitoring** of both the lake and the activities of stakeholders relying on the resources. Monitors must either be the resource-users themselves or at least accountable to them.

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