

**RAF/92/G32 - POLLUTION CONTROL AND OTHER MEASURES TO PROTECT  
BIODIVERSITY IN LAKE TANGANYIKA**

**Progress Report No. 14**

**June to August 1999**

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## **1. Project Co-ordination Unit**

### **1.1. Project Co-ordinator and Scientific Liaison Officer**

#### **1.1.2. General summary of key events**

Minutes of the May meeting of the Steering Committee were distributed in June followed by the minutes of the Tripartite Review meeting; slightly delayed because of the need for a review by UNOPS/GEF before distribution.

As requested at the TPR all remaining funds have been released to the project and NRI/UNOPS are formulating a revised budget based on the new figures and detailed workplans to the end of the project. Although the revised budget is not yet complete it is clear that available funds will not allow extension of this project beyond its current end date of 31 July 2000. The crucial question of how the task of further developing structures for the regional management of the lake can be pursued, beyond the current project, will be the main topic of discussion at the next meeting of the Steering Committee. It was proposed that this meeting be held in September, but this now appears unlikely. The PCU is making all efforts to arrange a date as early as possible that is convenient to all, although this is proving difficult owing to delegates many other commitments.

Two new field-based facilitators joined the LTBP team. Ms. Karen Zwick, based in Bujumbura, will be facilitating Socio-economic surveys in the region and Mr. Robert Lindley, also based in Bujumbura, will be co-ordinating the activities of the fishing practices special study.

After careful consideration it was agreed by all four countries that the recruitment of counterparts to the special study facilitators would not be pursued. This was due largely to the facts that the recruitment process would inevitably be long and expensive and the counterparts would thus be in post, at best, shortly before most of the special studies are due to end. Instead it was decided that the current national co-ordinators of each special study from each country would continue to be the most effective means of addressing this requirement raised in the MTE report.

With regard to the recruitment of the Regional Training Education and Communications Facilitator (RTECF) a letter was sent to all NCs on 1 July with job descriptions etc requesting that they advertise for the post and send the 3 best CVs to the PCU. To date none have been received and the value of this post is rapidly diminishing with the passage of time.

It is most gratifying to note that after several delays owing to insecurity in the region, the builders have completed the renovation of the Centre de Recherche en Hydrobiologie CRH in Uvira. Renovations included: replacement of the roof, refitting of all electrical installations, repair and refitting of plumbing, masonry, woodworking

and painting. When renovations were completed, LTBP transferred laboratory equipment and field gear to the station, including boats, motors, dive gear, computers and full limnology laboratory kit. Members of CRH and the project co-ordination unit celebrated the completion of renovations and the equipping of CRH with a re-inauguration party on 22 August, which many local dignitaries attended. This fine old building has been brightened up considerably as has the moral of the CRH staff that use it!

Thanks to funds provided by UNICEF it was possible this quarter for the project to arrange for an in-depth assessment of the oil pollution caused by the Kigoma power station and its impact on the local water supply. This power station situated very close to the lake uses diesel powered generators and has for several years been spilling both fresh fuel when filling the generator fuel tanks and waste oil from general maintenance operations, into the lake causing concern to LTBP as well as local health authorities. The study was carried out by an expert consultant, an engineer from the Tanzanian power company and the head of the Tanzanian LTBP pollution team. A draft report has been submitted pointing to a number of fairly straightforward ways of preventing further spillage. Once the final report is handed to the power company it is hoped that the recommended remedial measures will be instigated rapidly. Thankfully the report also indicated, based on extensive chemical analyses, that at least during the dry season, the town's water supply that is drawn from the bay into which the oil is spilled, is not contaminated. This threat to public health was, of course, the reason for UNICEF's intervention and provides a good example of how resources can be leveraged for lake management interventions from less obvious sources if there is mutual benefit.

In the two sub-regional legal workshops held in successive weeks this quarter the formulation of the Convention has been taken an important step forward. Delegations worked through the draft clause by clause agreeing and amending each. All delegations left the workshops with drafts of the document incorporating their recommended modifications. The legal consultants will rationalise these two documents into one, taking into account comments sent in by external reviewers (LTR and UNEP) and internal, i.e. LTBP, reviewers. The resulting document will be the focus of discussion at the regional workshop planned for early November. Overall, the delegations were complimentary about the draft Convention and agreed to consult widely within their governments before the next workshop. It is hoped that early and thorough consultation will considerably reduce the time to final signing by all four countries.

The major event for BIOSS in this quarter was the survey of Nsumbu National Park in Zambia. Owing to the high density of crocodiles and hippos in the park the team had to use a modification of the standard technique and viewed the substrate through a Perspex bottomed box rather than by towing a snorkelling team member behind the boat. The completion of this survey means that all existing protected areas on the lake shore have now been sampled and detailed information has been collated on the location of major habitats types as well as the distribution and abundance of fish and

mollusc species. The team also continues to conduct a habitat modification experiment in conjunction with SEDSS to assess the long-term impact on biodiversity of sedimentation deposition on rocky habitats.

Dr Sichingabula of UNZA who leads the Sediment studies in Zambia submitted his final report on the work. The report is of high quality both in terms of presentation and content and sets a high standard for others to try and emulate.

LTBP sponsored 3 students each from Burundi, DR Congo, Tanzania and Zambia to participate in the 1999 Nyanza Project, a six week intensive training course in tropical lakes based in Kigoma from 5 July through 13 August 1999. The course was a great success, with students gaining classroom, laboratory and field experience in the geology, limnology and biology of large tropical lakes.

In addition LTBP organised a “Training of Trainers” workshop in Bujumbura from the 7-17 July 1999. Led by Ms. Rachel Roland and Ms. Monique Trudel, four participants each from Burundi, DR Congo, Tanzania and Zambia, attended, representing NGOs and national institutions charged with environmental education. Project regional facilitators and SE coordinator also participated.

The workshop ran for 10 days between 7-17 July 1999 and was participatory in nature. The main aim of the workshop was that participants be introduced to and have the opportunity to practice training and communication skills so that they may improve their competence and confidence to use these skills when planning LTBP training, facilitation or management programmes and activities.

Subsequent to the SESS Facilitator taking up her post, she and the SESS Co-ordinator reviewed the SESS work undertaken to date, drafted a report summarising this, defined priorities for the rest of the study, and drafted a workplan. Following this, the gathering together of so many SESS and EE/T/C staff for the ToT workshop mentioned above, provided an excellent opportunity for SE related meetings and discussions in the evenings. By the end of the workshop period, SENCs for Burundi and DR Congo had been identified, and SESS workplans for Burundi, DR Congo, and Zambia discussed. In the following weeks, these were refined and formalised, along with a plan for Tanzania; all four countries now have SENCs in position and SESS workplans for the coming months.

David Silverside, LTBP Project Manager based in the UK, visited the Bujumbura and Uvira Stations 28 May – 5 June 1999. In addition to getting acquainted with project field activities, he was able to meet with administrative officers from Kigoma and Bujumbura to discuss methods of streamlining the accounting procedures.

Mr. Alan Mills visited Bujumbura, Kigoma, Dar es Salaam and Lusaka in a reconnaissance trip to identify national collaborators and collaborating institutions for the installation and expansion of LTBP’s GIS system in the region. Several

workshops and training sessions, for collaborators at all levels, will be organised when the GIS arrives in the region in November 1999.

The PC took leave from 7 to 28 July and visited Bujumbura and Uvira twice in late July and early August.

## **1.2. Strategic Action Plan**

### **1.2.1. Preparation of the Draft Outline Strategic Action Programme.**

The framework document for the Sap has been prepared and distributed for comment to senior project staff, prior to translation into French and distribution to the workshop participants

The purpose of this document is to provide a lead for the Regional SAP Workshop, indicating areas which may need further discussion and agreement before being incorporated into the Preliminary Draft SAP report.

This document presents a possible outline structure for the Draft SAP, and includes a number of aspects drawn from previous national and regional consultations.

### **1.2.2. Timetable for Action - Regional SAP Workshop**

The next stage in the development of the SAP will be undertaken at the Regional SAP Workshop which will take place following the extraordinary Steering Committee meeting scheduled for September/October 1999. The workshop is provisionally scheduled for the second week in December.

The Regional SAP Workshop will be responsible for ensuring that the Draft SAP incorporates the conclusions of the regional consultation process and presents these in a manner that is acceptable to national stakeholders. The workshop will be responsible for establishing what management proposals will be included in the Draft SAP, and what steps will be required to achieve management objectives. The workshop will provide detailed and explicit guidance to the project on the contents and structure of the Draft SAP.

Based on this, the project will draw up a Preliminary Draft SAP in both French and English for distribution and comment.

### **1.2.3. Goals for the Next Quarter**

The main output during the next quarter is expected to be the translation of the framework SAP, and preparation for the December Workshop.

## **Progress reports of special study groups**

### **2.1. Progress Report: June - August 1999 for "Biodiversity" Special Study and "Conservation Activities"**

#### **2.1.1. Overall Summary of Progress**

The major event for BIOSS in this quarter was the survey of Nsumbu National Park in Zambia. The Zambian team and Regional Facilitator deployed for 2 weeks to the park. The first phase of the survey was to map the habitats along the shoreline of the park. Owing to the very high density of crocodiles and hippos in the park the team used a modification of the manta board technique whereby the substrate was viewed through a Perspex bottomed box rather than by towing a snorkelling team member behind the boat. From the results of this procedure 20 sites were selected for more detailed survey. Again owing to the threat from crocodiles it was not possible to dive and alternative techniques were employed; grab sampling to determine the nature of the substrate, gillnets for fish sampling and dredging for mollusc sampling. The completion of this survey means that all existing protected areas on the lake shore have now been sampled and detailed information has been collated on the location of major habitats types as well as the distribution and abundance of fish and mollusc species. The Zambian team has also continued their regular monitoring programme carried out jointly with the Pollution and Sedimentation special studies, though consideration is currently being given to reducing the number of sites in order to ensure sustainability beyond the life of the project. The team also continues to conduct a habitat modification experiment in conjunction with SEDSS to assess the long-term impact on biodiversity of sedimentation deposition on rocky habitats.

In Burundi 11 potential monitoring sites were selected for surveying. The initial surveys are almost complete and final selection of the 4 long-term monitoring sites is expected early in the next quarter. The team have incorporated in some of these surveys the Full Species Census technique with a view to determining whether it would be a useful addition to the range of fish sampling methods employed by BIOSS. Two members of the team have also been assisting the BIOSS Literature database manager in identifying and extracting information on the biodiversity of the lake from the wealth of sources in the LTBP library in Bujumbura. As a result the rate of data entry has been greatly increased. The report on the terrestrial flora and fauna of Rusizi National Park has been completed by Mr Benôt Nzigidahera and Dr Gaspard Ntakimazi, this will now be incorporated into the report on the aquatic elements of the park before final distribution.

The Tanzanian team has identified 3 monitoring sites in the vicinity of Kigoma, a control site and two sites threatened by pollution in Kigoma Bay. The team will be making a short expedition to Gombe National Park with members of the Fishing Practices team in mid September in order to select a final site for joint monitoring with FPSS. The major refurbishment of the CRH in Uvira has caused a hiatus in the

activities of BIODIVERSITY SPECIAL STUDY (BIOSS) in Congo. This work was completed in late August and subject to the security situation remaining stable, it is envisaged that the team will commence the habitat mapping of the shoreline up to approximately 50km south of Uvira at the beginning of September.

All teams have continued the work of entering the data collected during the special study into the BIODIVERSITY SPECIAL STUDY (BIOSS) Survey database. This process led to the teams identifying further refinements to the database which would improve its effectiveness. These have been submitted to the IT specialists at MRAG and a revised version of the database is expected in the region shortly. Recommendations for integration of the BIODIVERSITY SPECIAL STUDY (BIOSS) databases with the TANGIS system have also been discussed between BIODIVERSITY SPECIAL STUDY (BIOSS) representatives and Mr Alan Mills who is leading the GIS component of the project.

During the next quarter the priorities will be to finalise the site selection and implement the long-term monitoring programme, as well as completing the technical reports from the Mahale and Nsumbu surveys. At the end of the quarter Dr E Allison, BIODIVERSITY SPECIAL STUDY (BIOSS) Co-ordinator will be visiting the region to oversee the writing of the final reports for the Biodiversity Special Study which will be used in the formulation of the Strategic Action Plan.

#### 2.1.2. Chronology of Activities

- June: Visit to region by Mr Alan Mills, GIS specialist at NRI. Discussions with BIODIVERSITY SPECIAL STUDY (BIOSS) facilitator and team members on integration of BIODIVERSITY SPECIAL STUDY (BIOSS) data with TANGIS system.
- June - Aug: Habitat modification experiment conducted off Mbita Island by Zambian BIODIVERSITY SPECIAL STUDY (BIOSS) team in conjunction with SEDSS team.
- June - Aug: Burundian, Tanzanian and Zambian teams enter data from previous BIODIVERSITY SPECIAL STUDY (BIOSS) fieldwork into Survey Database.
- July: BIODIVERSITY SPECIAL STUDY (BIOSS) Facilitator and BIODIVERSITY SPECIAL STUDY (BIOSS) National Co-ordinator, Congo participate in Training of Trainers workshop in Bujumbura.
- July: Manta habitat mapping of Nsumbu National Park by Zambian BIODIVERSITY SPECIAL STUDY (BIOSS) team
- July-Aug: Survey of potential long-term monitoring sites by Burundian and Tanzanian teams.
- July-Aug: Burundian BIODIVERSITY SPECIAL STUDY (BIOSS) team assist with Literature database entry.
- August: Survey of Nsumbu NP by Zambian BIODIVERSITY SPECIAL STUDY (BIOSS) team.

#### 2.1.3. Staffing Schedule

##### 2.1.3.1. *Burundi*

Dr Gaspard NTAKIMAZI, Burundian Co-ordinator  
Robert KUMANA, Responsable de la Base de donnees.

##### 2.1.3.2. *DR Congo*

Dr Muderhwa NSHOMBO, Directeur Général, C.R.H. – Uvira

*Regional Dive Team:*

Burundi	Celestin Bigirimana	Kamnyosha Secondary School	PADI Advanced open water
	Terence Hakizimana	Cibitoka Secondary School	PADI Advanced open water
	Libére Ndayisenga	INECN - Rusizi	BSAC-sport
	Félix Nicayenzi	LTBP – Bujumbura	BSAC-sport
	Albéric Rugirabirori	Univ Buj – Bujumbura	BSAC-sport
	Bernard Sinunguka	DEPP – Bujumbura	BSAC-sport
Congo	Constantin Amundala	CRH – Uvira	BSAC-sport
	Byeragi Bahane	CRH – Uvira	PADI Open water
	Alexis Bashonga	CRH – Uvira	BSAC-sport
	Patrick Buda	CRH – Uvira	BSAC-sport
	Donatien Muzumani	CRH – Uvira	BSAC-sport
	Igundji Watuna	CRH – Uvira	PADI Advanced open water
Tanzania	Fadhili Kimambo	TANAPA – Gombe	BSAC-sport
	Robert Kayanda	TAFIRI – Kigoma	PADI Advanced open water
	Bakari Mnaya	TANAPA – Gombe	PADI Advanced open water
	Robert Wakafumbe	TAFIRI – Kigoma	BSAC-sport
Zambia	Charles Lukwesa	DoF – Mpulungu	BSAC-sport
	Maybin Mwenda	DoF – Mpulungu	BSAC-sport
	Reuben Shapola	DoF – Mpulungu	BSAC-sport
	Robert Sinyinza	DoF – Mpulungu	PADI Open water
	Isaac Zulu	DoF – Mpulungu	PADI Advanced open water

**2.1.3.3. International**

Dr Ian Payne, MRAG Ltd, BIOSS Director

Dr Eddie Allison, MRAG Ltd, BIOSS Co-ordinator

Richard Paley MRAG Ltd, BIOSS Facilitator

Vicki Cowan, MRAG Ltd, BIOSS Management

2. John Pearce, Crag Jones, MRAG Ltd, BIOSS IT specialists

**2.1.4. Main Outputs and Achievements**

2. Survey of Nsumbu National Park, Zambia..
3. Short listing of potential monitoring sites in Burundi, Zambia and Tanzania.
4. Final amendments Survey Database submitted.
5. Further amendments to draft Standing Instructions submitted to BIOSS Co-ordinator and MRAG.
6. Completion of the report on the terrestrial flora and fauna of Rusizi National Park, Burundi.

### 2.2.1. Main Objectives for the Next Quarter

- Completion of long-term monitoring site selection and commencement of programme in all four riparian countries.
- Habitat mapping of DRC coast from border with Burundi to approx. 60km south of Uvira
- Completion and distribution of technical reports from survey of Mahale Mountains National Park, Tanzania and Nsumbu National Park, Zambia.
- Revision and distribution of Standing Instructions document.
- Final revision the Literature and Survey Databases
- Dr Allison to oversee final analysis and report drafting in region. Planned dates: 22<sup>nd</sup> November – 17 December 1999. Location to be Bujumbura unless security situation indicates Kigoma as an alternative.

## **2.3. Progress Report: June - August 1999 for "Fishing Practices" Special Study**

### **2.3.1. Overall Summary of Progress**

This quarter ended on a positive note as Mr Robert Lindley arrived in Bujumbura as regional facilitator in the last week of this reporting period. This offers this special study the opportunity to make the most of the time remaining in the project although the momentum lost as a result of the past 8 months without a full time facilitator on the lake is unlikely to be fully recovered. However, every effort is being made to ensure that each national team is part of the intensive programme to provide key contributions on fishing issues to the strategic action programme during its development in 2000.

In the short time Mr Robert Lindley has been in post, he has visited Uvira field station several times and has agreed a workplan with the National Co-ordinator, Mr Mulimbwa, for the newly established Congolese team. Progress has also been made in Burundi with the appointment of a National Co-ordinator, Ir Kiyuku, and a workplan is being agreed as the new quarter begins. Security issues are now the main constraint to progress in both of these countries, with curfews limiting time available for field work and safety limiting sites which can be included in the programme. At this early stage in his contract, Mr Lindley feels that within these constraints, constructive work can still be completed by the end of the project.

The Tanzanian team continued to work according to their field programme throughout this quarter and will be visited by Mr Lindley in early September. At this time, they will review their work to date and rationalise their programme in light of current time and budgetary constraints with Mr Lindley. Visiting Zambia is next on Mr Lindley's work plan for this quarter and a field programme will be established with Mr Mwape of DoF, Mpulungu.

The recent appointment of a regional facilitator for the socio-economic study (SESS) is of importance to FPSS. Discussions between Vicki Cowan and Kate Meadows, SSSL for the SESS, have started to develop potential for overlap in the field, with the aim of providing expedient advice to the SAP from these closely connected SS's, both of which have experienced unfortunate delay in the field without full time facilitator support. It is expected that this overlap will be developed by the two facilitators as they establish teams and their respective work programmes on the lakeshore. Similarly the potential overlap between FPSS and LTR will be explored by Mr Lindley as he visits each field station.

### **2.3.2. Chronology of Activities**

June-August: FPSS team in Tanzania continue field work and reporting to MRAG

July: First discussions with Mr Lindley about his potential involvement in FPSS

August: FPSS and SESS SSGL's meet with Mr Lindley to discuss potential for overlap

August: Mr Lindley's appointment is confirmed (with UNOPS approval) and he takes up his post in Bujumbura.

### 2.3.3. Staffing Schedule

#### 2.3.3.1. *Regional team*

##### *Tanzanian Team*

Mr Omari Kashushu (TAFIRI, Kigoma)

Mr Hamza Maboche (Community Development)

##### *Zambian Team*

Mr Leonard Mwape, National Co-ordinator (DoF, Mpulungu)

+ representative from DoF, Mpulungu

+ representative from DoF, Mpulungu

#### 2.3.3.2. *Burundian Team*

Ir antoine Kiyuku, National Co-ordinator, LTBP

+ a representative from the Departement des Eaux, Peche et Pisciculture (DEPP)

##### *Congolese Team*

Mr Mulimbwa, National Co-ordinator, CRH

+ representative from Centre for Hydrobiological Research

+ a representative from the Secteur Peche du Service de l'Environnement (SPSE)

#### 2.3.3.3. *International team*

Dr Ian Payne, MRAG Ltd, FPSS Director

Mr Robert Lindley, MRAG Ltd, Regional Facilitator

Ms Vicki Cowan, MRAG Ltd, FPSS Management

Dr E Allison, MRAG Ltd, FPSS consultant

### 2.3.4. Main Outputs and Achievements

- Regional facilitator appointed and operational on the lake
- Workplan for DRC and Burundi established
- Staff appointed to FPSS teams in DRC, Burundi

### 2.3.5. Main Objectives for the Next Quarter

- Work plans for Tanzania rationalised and Zambia established
- Staff appointed to FPSS team in Zambia
- Opportunities for overlap between FPSS and SESS in the field identified and developed

## **2.4. Progress Report: June - August 1999 for Legal and Institutional Component**

### **2.4.1. Summary of Progress**

The two sub-regional workshops to review the draft Convention were held in successive weeks this quarter. Delegations worked through the draft clause by clause agreeing and amending each. One of the consultants attended both workshops to ensure the comments and views of the first (Anglophone) were carried to the second (Francophone). All delegations left the workshops with drafts of the document incorporating their recommended modifications. The legal consultants will rationalise these two documents into one, taking into account comments sent in by external reviewers (LTR and UNEP) and internal, i.e. LTBP, reviewers. The resulting document will be the focus of discussion at the regional workshop planned for early November.

Overall, the delegations were complimentary about the draft Convention and agreed to consult widely within their governments before the next workshop. This is an important part of the strategy being promoted for this component of the project: on the premise that if key ministries (e.g. foreign affairs) are familiar with the draft the potential for problems at the negotiation stage will be lower, thus increasing the likelihood of each country signing the convention.

The staff of the PCU deserve mention for their excellent support of these two workshops, particularly Ritesh Bhandari and Maria Hirza.

### **2.4.2. Chronology of Activities**

June-July	Drafting text of convention and explanatory notes
August	Translation of two documents for workshop and circulation to delegations
Aug/Sept.	Two four-day sub regional workshops were held in Tanzania (Anglophone:

### **2.4.3. Current Staffing Schedule**

Delegations attending the sub-regional workshops this quarter.

#### **2.4.3.1. *Tanzania***

1. Mr. Rawson Yonazi – National Co-ordinator - DOE
2. Ms. Hawa S. Msham- Assistant National Co-ordinator - DOE
3. Ms. Verdiana Macha- Senior State Attorney- AG's Chamber
4. Ms. Alice Chinguwile- Senior State Attorney- Ministry of Nat. Resources & Tourism

#### **2.4.3.2. *Zambia***

1. Mr. George Munshimbwe Chitalu- Assistant National Co-ordinator – ECZ

2. Ms. Mulenga Punabantu- Draft Person, Ministry of Legal Affairs
3. Ms. Irene Mbewe-Legal Council, Mbewe and Mbewe Associates

**2.4.3.3. *Burundi***

1. Monsieur JeanBerchmans Manirakiz- Coordinateur National (L'INECN)
2. Monsieur Benoit Bihamiriza- Directeur des affaires juridique et du Contentieu
3. Monsieur Damien Nindorera- Conseiller juridique (L'INECN)

**2.4.3.4. *DR Congo***

1. Dr. Lunpungu Kalanbay, Professeur d'Universite, Universite de Kinshasa
2. Mr. Mbusu Ngamani, Secetaire General no. 1, Ministere de l'Environnement, Conservation de la Nature et Tourisme
3. Mrs. M. Mwakwilay,

**2.4.3.5. *International***

Dr Ian Payne, MRAG Ltd, Component Director  
Mr Cormac Cullinan, MRAG Ltd (Legal Specialist, Anglophone)  
Mr Stephen Hodgson, MRAG Ltd (Legal Specialist, Bilingual)  
Ms Vicki Cowan, Component Manager

**2.4.4. Main Outputs and Achievements**

- Two language versions of the draft Convention and explanatory notes circulated in advance of the workshops
- Both sub-regional workshops held and delegates left with a copy of the workshop output – their amended draft.

**2.4.5. Main Objectives Next Quarter**

- Rationalise comments from all reviews of first draft into one document
- Hold regional workshop 1<sup>st</sup> - 5<sup>th</sup> November, 1999.
- Secure steering committee meeting agenda item for presentation of 'final' draft convention

## **2.5. Progress Report: June - August 1999 for Special Study on "Sediment Discharge and Its Consequences"**

### **2.5.1. Overall Summary of Progress**

Zambia : Dr Sichingabula continued and completed successfully his work monitoring Zambian rivers during this quarter. Early in the quarter, he produced firstly a report (7<sup>th</sup>) of the work on high flows discharge measurements on the 5 rivers and initial analysis of the data. And secondly, he produced the draft of the Zambian final report (*'Analysis and results of discharge and sediment monitoring activities in the Southern Lake Tanganyika basin, Zambia'*) and submitted it to GP early in August.

A 5 month extension period of the work programme has been agreed with UNZA and the Department of Water Affairs by the project in order to complete a full year of measurements at the 5 hydrometric stations in Mpulungu area. This will take the Zambian SedSS until end of December 1999 for field activities and end of January 2000 for data analysis and report writing.

SedSS team at Department of Fisheries, Mpulungu continue their work on suspended matters and granulometry analysis and impacts of sediments on biota. The monitoring of the field experiment initiated by Erik Verheyen during his last visit is carried out by SedSS and BioSS teams on a monthly basis.

Mr Sinyinza participated in the successful survey of Nsumbu National Park along the other members of the BioSS team and the Biodiversity Special Study Regional Facilitator in August.

Burundi : DGGM - IGEBU teams and Dr E Nzeyimana, University of Burundi continued their work program. The 3 teams met at the National Working Group meeting on 23 July. DGGM and IGEBU produced a fourth quarterly report in July and their work is progressing well. Due to unstable security in some parts of the country, access to the lake was restricted to Bujumbura Bay for some time during this quarter, therefore the DGGM field team could not sample all the river mouths as part of their usual programme. The IGEBU team was able to carry out their normal discharge measurements programme but they had to provide their own transport to the sites. Tharcisse Songore (DGGM) met with Dr Ntakimazi and Dr Kelly West to develop a way of assessing the impacts on the biodiversity of excess of sediments (caused by landslides and earth moving grounds) entering the lake on sites identified on the third quarterly report. Dr E Nzeyimana (University of Burundi) and his research assistant (David Nahimana)'s trip to VUB to finalise their findings and to participate in the writing of the final report was cancelled. This was unfortunately due to the fact that Dr Nzeyimana disagreed with some project financial policy.

Tanzania : Dr Nkotagu (University of Dar es Salaam) travelled to University of Arizona to carry out isotope analysis on water samples collected in the 2 Gombe

catchments. He produced a quarterly report during this quarter on his work on the rivers of Gombe region. He is undertaking some further measurements in Gombe area till early September as part of the last phase of the study. Mrs Mbwambo (Tanzanian Bureau of Standards) continues her work on water analysis. Mr Rubabwa (student at University of Dar es Salaam) carried out some field work on Mitumba and Mwamgongo village streams and springs before returning to Dar es Salaam in August for a review of the work done and then travelled back to Gombe area for the second phase of the study. Mr Mpyalimi (Water Department) carried out discharge measurements and collected sediment samples on Luiche river till mid-July.

LARST reports (Kigoma) were produced for each of the three months of the quarter. Discussions have started about the future location of the equipment for the best sustainability of regional data measurements after the life of the project.

DR Congo : As the security situation around Uvira permitted field work during this quarter, the SedSS team at CRH Uvira continues the monitoring of the 3 rivers and river mouths and carried out analysis in the labs according to the workplan. Bombi Kakogozo and the team produced a report for each of the three months of the quarter, and a quarterly report is in preparation and should be available soon to Bujumbura station. OD met the team several times in July and the sites for the installation of the gauge plates in the rivers were selected. The team is expected to should proceed with the installation of the stations very soon in the next quarter.

### 2.5.2. Chronology of Activities

3 June : OD attended the Zambian National Working Group meeting in Lusaka, and presented the SedSS activities which took place in Zambia during the previous quarter.

8 - 11 June : OD and staff from Department of Fisheries, Mpulungu, Zambia installed successfully the HF radio at Mpulungu station, at PCU request. Communications with Kigoma station, Tanzania are now possible and of great use.

End of June : Mr Sinyinza attended a one week conference in Namibia where he presented a paper on the variations of water levels in Lake Tanganyika.

7 - 17 July : OD attended the 'Training of Trainers' workshop in Bujumbura, Burundi during which practical sessions on presentation and use of the project web site were made by Jerod Clabaugh and OD.

9 July : Dr Nkotagu (University of Dar es Salaam, Tanzania) returned from a 6 week period in the USA during which he undertook isotope analysis of water samples from Mitumba and Mwamgongo catchments, Tanzania with Dr Dettman (University of Arizona, USA).

12 July : OD met with Dr Nzeyimana (University of Burundi) (review of work done, possible VUB team's visit to the region to prepare the draft of final report).

18 July - 7 August : Ross Bryant (MSc student at King's College, London, UK, working under Martin Wooster's supervision) visited the region (Bujumbura and Kigoma stations) to carry out field investigations on sediments plumes entering the Lake. He met with Tharcisse Songore (DGGM) for his work in Burundi, with teams attending the Nyanza Project for field trips and presented the methodology and initial results of his study to the team operating the LARST station for his work in Kigoma, Tanzania. This work was at no cost to the project.

19 July - 4 August : OD toured Kigoma, Bujumbura and Uvira stations (meeting and fieldwork with Mr Rubabwa and Mr Mpyalimi at Gombe National Park and Mwamgongo village, Tanzania, work with the team at the LARST station, meetings with staff and field trip to Malagarasi river with students participated in the Nyanza Project, Kigoma, meetings with Tharcisse Songore (DGGM, Burundi), work with the teams at CRH, Uvira, DR Congo for the refurbishment of the CRH building and installation of the labs, selection of sites for the future installation of gauging stations on the 3 rivers monitored around Uvira, technical visit of the CRH building with Dr Menz, Dr West and Dr Cohen).

End of July : Mr Rubabwa (MSc student from University of Dar es Salaam, Tanzania) returned to Dar es Salaam after a 3 month period at Gombe National Park collecting groundwater samples from Mitumba and Mwamgongo catchments, before starting the second phase of his field work in the same area later in August.

6 - 16 August : Mr Sinyinza participated in the BioSS survey of Nsumbu National Park, Zambia.

12 August : H Sichingabula visited NRI during a visit to UK to discuss a strategy for work continuation beyond the life of the project.

17 August : OD met Dr Sichingabula at UNZA, Lusaka (distribution list of the draft of the final report for Zambia, extension of the work programme for Zambia (UNZA - Department of Water Affairs), planning for the next visit of the Lusaka team to Mpulungu area to carry out discharge measurements at the end of the dry season).

End of August : Dr Nkotagu (University of Dar es Salaam) travelled to Kigoma region to monitor with Mr Rubabwa the 2 Gombe region catchments.

### 2.5.3. Staffing Schedule

Main staffing changes over this quarter are listed below.

Zambia : a 5 month extension period of the work programme has started on 31 July involving the same staff (UNZA - Department of Water Affairs, Lusaka & Kasama).

Tanzania : Mr Gerva Shayo (School of Meteorology, Kigoma) retired at the end of July, however it was agreed that he continues his work operating the LARST station in Kigoma. He has been replaced by Mr William Chilambo as leader of the team.

DR Congo : Mr Mwenyemali (CRH, Uvira) attended the Nyanza Project in Kigoma and was replaced by Mr Kangele during that period.

The complete staff list for the SedSS is given below with institutional affiliation.

### 2.5.3.1. Local staff

Person	Institutional affiliation (or project direct employee)
Dr Hudson Nkotagu	University of Dar es Salaam
Mr. C. Rubabwa	University of Dar es Salaam
Mr. T. Mpyalimi	Tanz Water Dept.
Mr. H. Mdangi	TANAPA
Mr Shaban Shemdoe	Gauge reader – Project (Tanz.)
Mr George Shimba	Gauge reader – Project (Tanz.)
Mr Anatase Baletse	Gauge reader – Project (Tanz.)
Mr Shaban Haruna	Gauge reader – Project (Tanz.)
Ms K. Mbwambo	Tanz. Bureau of Standard
Ms E. Msaky	Tanz Petroleum Dev. Corp
Mr. Gerva Shayo	Tanzanian Met. Dept.
Mr William Chilambo	Tanzanian Met. Dept.
Mr Medard Madula	Tanzanian Met. Dept.
Mr Henry Mchomba	Tanzanian Met. Dept.
Mr Joseph Maliba	Tanzanian Met. Dept.
M. Mathias Sebahene	DGGM (Geomines), Burundi
M. Tharcisse Songore	DGGM (Geomines), Burundi
M. Manassé Nduwayo	IGEBU, Burundi
M. Gerard Ntungumburanye	IGEBU, Burundi
Dr Evariste Nzeyimana	Univ. Burundi
Mr. David Nahimana	Univ. Burundi
M. Bombi Kakogozo	Project (DRC)
M. N'djingu Kahindo	CRH (DRC)
M. Banamwezi Mwenyemali	CRH (DRC)
Mrs Mujinga	CRH (DRC)
Dr Henry Sichingabula	University of Zambia
Mr. Mugandi Nasitwitwi	University of Zambia
Miss Lucy Muwowo	University of Zambia
Mr. Happy Sikazwe	Zambian Water Affairs Dept.
Mr. Sunday Ng'ambi	Zambian Water Affairs Dept.
Mr J C Chama	Zambian Water Affairs Dept.
Mr J B Chipasha	Zambian Water Affairs Dept.
Miss Prisca Chakumanda	Gauge reader – Project (Zambia)
Mr Labson Mpepo	Gauge reader – Project (Zambia)
Mr Daniel Paka Matebele	Gauge reader – Project (Zambia)
Mr Edward Chifunda	Gauge reader – Project (Zambia)
Mr Alfred Mpondela	Gauge reader – Project (Zambia)
Mr Abram Mbao	Gauge reader – Project (Zambia)
Mr. Robert Sinyinza	Zam Fisheries Dept.
Mr. Mutanga Syapila	Zam Fisheries Dept.
Mr Whiteford Chomba	Zam Fisheries Dept.

Mr Kennedy Kaoma	Zam Fisheries Dept.
Mr Gideon Zulu	Zam Fisheries Dept.

### 2.5.3.2. *International staff*

Person	Institutional affiliation	Other non-regional support to these institutions (not listed above)
Dr G. Patterson	NRI	SS co-ordinator
Mr Olivier Drieu	NRI	SS facilitator
Dr Andrew Cohen	Department of Geology, University of Arizona	Dr A. Cohen, Dr M. Palacios-Fest, Dr D. Dettman, Dr D. Livingstone, Dr K. Lezzar, Mr J. McGill, Dr C Scholz and Dr B McKee
Dr Robert Duck	Department of Geography, University of Dundee.	Dr S Wewetzer
Dr Ken Irvine	Department of Zoology, Trinity College, Dublin	Mr Ian Donahue, Dr P. Tierney, Dr E Verhayen
Dr Leo Goeyens	Department of Chemistry, Vrije Universiteit Brussel.	Dr N. Brion, Dr W Baeyens
Dr Martin Wooster	Department of Geography, Kings College London.	Dr N Drake, Elias Symeonakis, Xiaoyang Zhang, Ross Bryant, R. Loftie

### 2.5.4. Main Outputs and Achievements

The main objectives for this quarter were given in the previous quarterly report (March 1999 – May 1999) as follows :

Dr Sichingabula (UNZA) to travel to Mpulungu for the monitoring of Zambian rivers (mid-March)

Erik Verhayen (Royal Belgian Institute of Natural Sciences) to travel to the Lake in April-May for 4 to 5 weeks to work on Impact of sediments on biota

Dr Nkotagu (University of Dar es Salaam) to travel to Kigoma region for the monitoring of the 2 Gombe region catchments and of the Luiche river

M Sebahene to organise regular meetings with the 3 SedSS teams in Burundi (DGGM – IGEBU – University of Burundi). This initiative was suggested by himself, cf. OD's BTOR Burundi – DR Congo

IGEBU team to install 5 hydrometric stations on the Burundian rivers and to recruit and train gauge readers

OD to implement workplan produced by Dr Irvine for SedSS in Zambia.

OD to supervise closely SedSS team at Department of Fisheries, Mpulungu during Mr Sinyinza's training course in Tanzania.

GP and OD to formulate plans for a windup meeting and reporting format for the Special Study.

As the completion of the Sedimentation Special Study approaches, during this quarter drafts of final reports produced by international consultants and by Dr Sichingabula from UNZA for Zambia were submitted to GP.

All the objectives for this quarter were achieved though details of the windup meeting have not yet been completed it has been proposed to be held 11-16 January 1999

During the period draft final reports were received from a number of participants in the study – these are being peer reviewed before being released in final format.

These are listed:

<b>Title of Report</b>	<b>Principal Authors</b>
Paleolimnological Investigations	Cohen, Palacios-Fest, Dettman, Msaky, Livingstone, O'Reilly and McKee
Side-scan sonar and echo-sounding surveys of the southern end of Lake Tanganyika	Duck and Wewetzer
Analysis and results of discharge and sediment monitoring activities in the southern lake Tanganyika basin, Zambia	Sichingabula and Sikazwe
Soil erosion modelling in the lake Tanganyika catchment	Drake, Wooster, Symeonakis and Zhang
Nitrogen dynamics in northern lake	Brion, Nzeyimana, Goeyens, Nahimana and Baeyens

#### 2.5.5. Main Objectives for the Next Quarter (Sept. – Nov. 1999)

SedSS team from the CRH, Uvira to install 3 hydrometric stations on the rivers around Uvira (if security situation permits).

Tharcisse Songore (DGGM) to finalise (report) with Dr Kelly West and Dr Ntakimazi (University of Burundi) their findings and data on the impacts of excess of sediments on the biodiversity of the Lake at sites identified by DGGM.

Ian Donohue (student University of Dublin) to travel to Mpulungu for the next phase of the study on the impacts of sediments on biota (for a 7 week period starting at the end of September).

Erik Verheyen (Royal Belgian Institute of Natural Sciences) to travel to Mpulungu to initiate the second phase of a field experiment survey to measure the impact of sediments on biota (for a 2 week period starting at the end of September).

Dr Sichingabula (UNZA) to travel to Mpulungu for the monitoring of Zambian rivers as part of the extension programme in Zambia (mid-October).

Mr Rubabwa (student at University of Dar es Salaam) to complete his hydrological study on Gombe National Park area by end of October.

Dr Nkotagu (University of Dar es Salaam) to produce the Tanzanian final report of the SedSS by the end of November.

OD to install the aquaria facility at Mpulungu station.

OD to finalise with Dr Sichingabula, the Director of Water Affairs, Lusaka and the Provincial Water Engineer, Kasama the future of the stations and the gauge readers possible employment by Water Affairs after the life of the project.

GP and OD to further formulate plans for a windup meeting and reporting format for the Special Study.

## **2.6. Progress Report: June – August 1999 for Special Study on Pollution and its Effects on Biodiversity**

### **2.6.1. Overall summary of progress**

The Pollution Special Study (PSS) continues to maintain its focus on 'ascertaining the nature and (where possible) the extent of pollution on biodiversity, and develop the human and equipment resources that will allow the work to be sustained after the end of this particular Project'.

This report summarises the progress made by the PSS teams led by Dr Francis Chale in Kigoma, Mr Mwape and Mr Makassa in Mpulungu, and Mr Gabriel Hakizimana in Bujumbura. All have generated more limnological information including aspects of chemical and phytoplankton water quality; this will ultimately allow us to provide a valuable contribution to the Strategic Action Plan on the future management of the lake. While by far the greater focus of the work comes under the umbrella of eutrophication, the laboratories in Bujumbura and Kigoma include e.g. heavy metals, and plans have been drawn up for an increase in attention to these pollutants as well as pesticides and hydrocarbons. Much awaited budgetary decisions are virtually completed following separate visits to Dr Bailey-Watts at the Institute of Freshwater Ecology (Edinburgh) by Mr David Silverside and Dr Kelly West. The detailed outcome of these meetings will be detailed in the next progress report, but early indications are that the PSS will be able to carry out the following:

- " in October, a 10- to 12- day visit by Mr Alex Kirika to the LTBP DroC laboratory based at the newly re-furbished Centre Recherche Hydrobiologique (Uvira) - to initiate limnological and pollution studies
- " a similar length visit by Dr Chris Foxall, later, to Bujumbura as part of a desk and field study to assess the nature and approximate amounts of the considerable outputs of a wide variety of pollutants, and
- " a PSS round-up meeting (hopefully including 4 personnel from each of the riparian countries); this would cover all PSS aspects rather than just a workshop on field and laboratory sampling practices and Analytical Quality Control (AQC) as indicated in the last report.

### **2.6.2. Brief chronology of activities and visits**

No visits have been made during this quarter, but Drs Bailey-Watts and Foxall and Mr Kirika have made further progress over the 'Standing instructions' for the large array of field and laboratory activities in the PSS programme; texts will soon be mailed to Bujumbura for translation into French.

### **2.6.3. Current staffing schedule**

The staff complement is now as follows:

In Burundi: Mr Hakizimana, Mrs Aline Irimbere (INECN), Ms Consolate Musanisoni and Mr Wilondja Kamalebo.

In Uvira, DRoC: Dr Tshibangu (PSS Co-ordinator in Congo) and Mukungilwa Kamalebo; two other appointments are still to be made.

In Kigoma, Tanzania: Dr Chale (PSS Co-ordinator in Tanzania) and Ms Lyoba, D (50% of her time), Messrs Lyoba, Mfilinge, Muhoza (90%), Tegulilwa, Kadula (80%), Wakafumbe (75%).

In Mpulungu, Zambia: Messrs Mwape, Chimanga, Kaweme, Makasa and Zulu. Messrs Sinyinza, Shapola and others contributing to the Biodiversity and Sediment Pollution Special Studies are associated with the PSS for the purposes of synchronising sampling activities. In ECZ, Lusaka, Zambia: Shadreck Nsongela (the PSS Co-ordinator in Zambia) is now the sole facilitator for the PSS..

#### 2.6.4. Main objectives for next quarter (September to December 1999)

1. To mount Mr Kirika's visit to Uvira (and Bujumbura).
2. Along with the national personnel, assess the PSS data and information base, finalise graphs and produce text of two types - one technical and the other expressed in terms more appropriate for policy-makers and administrators.
3. Incorporate the information where appropriate, into the NRI TANGIS system, as well as (hopefully) the University of East Anglia's system.

## **2.7. Progress Report: June - August 1999: Socio-economics (SE) Special Study, Environmental Education (EE), Training & Communication Components**

### **2.7.1. Overall summary of progress**

This has been a busy and exciting quarter. The biggest event was the regional Training of Trainers (ToT) workshop in Bujumbura which was attended by almost all of the Project's Environmental Education, Training, and Socio-economics staff and partners.

The workshop ran for 10 days between 7-17 July 1999 and was participatory in nature. A range of methods was used, including: games, role play, case studies, question and answer, discussion, peer group feedback on participant's practical experiences.

The main aim of the workshop was that participants be introduced to and have the opportunity to practice training and communication skills so that they may improve their competence and confidence to use these skills when planning LTBP training, facilitation or management programmes and activities.

This training workshop addressed a priority identified in the LTBP Training Strategy (Roland & Trudel, May 1998). In regards to the Training Strategy and the evaluation in section 6, this workshop was useful in terms of refreshing and giving participants & partners, tools to enable them to implement with accuracy their training, education and facilitation activities. The next step will be to give them the support needed in the field to follow up the lessons learned as recommended.

The SESS Facilitator took up her post, and she and the SESS Co-ordinator reviewed the SESS work undertaken to date, drafted a report summarising this, defined priorities for the rest of the study, and drafted her workplan.

The gathering together of so many SESS and EE/T/C staff for the ToT workshop provided an excellent opportunity for other meetings and discussions in the evenings. By the end of the workshop period, SENCs for Burundi and DR Congo had been identified, and SESS workplans for Burundi, DR Congo, and Zambia discussed. In the following weeks, these were refined and formalised, along with a plan for Tanzania; all four countries now have SENCs in position and SESS workplans for the coming months.

SESS work has already begun in Burundi, where the SENC has completed a literature review, and in DR Congo, where the SENC has identified a site for the pilot study, selected a team, and drafted questionnaires. In Tanzania and Zambia the SENCs are progressing with national reviews.

Following the ToT workshop the TECCs returned home and produced detailed proposals and workplans for EE and Training activities in each of the four countries; these are currently being reviewed and refined.

### 2.7.2. Chronology of activities

6 June	World Environment Day activities in Kiogoma
21 June	Appointment of SESS Facilitator
7 – 17 July	ToT workshop, Bujumbura
July – August	Report summarising SESS work undertaken to date drafted
July – August	Appointment of SENCs, drafting of SESS workplans for Burundi and DR Congo
15 August	EE/Training proposals and workplans submitted
August	Questionnaires for pilot study in DR Congo drafted
23 August	SESS workplan for Zambia drafted
24 August	SESS workplan for Tanzania drafted
31 August	Literature review for Burundi submitted

### 2.7.3. Staffing Schedule

#### 2.7.3.1. *Burundi*

Dr André Muhirwa	Université de Burundi	SENC
Mme Cecile Gakima	l'INECN	TECC

#### 2.7.3.2. *DR Congo*

M Gerard Kitungano	CRH	SENC
M Kwibe Assani	CRH	SE (Enquetêur)
M Byaya Kalondji	CRH	SE (Enquetêur)
M Mukirania Muke	CRH	SE (Enquetêur)
M Bulambo Mutete	CRH	SE (Enquetêur)
M Olivier Nshombo	CRH	SE (Enquetêur)
M Assumani Kimanuka	CRH/CADIC	TECC
M Ireng Bahizire	CRH/NOPTA	EE
M Mubake Kitungano	CRH	EE
M Bonginda Mangubu	CRH	EE
M Saleh Mukambilwa	CRH	EE
M Bwami Mukandilwa	CRH	EE
M Itulamy Walumona	CRH	EE

#### 2.7.3.3. *Tanzania*

Dr Claude Mung'ong'o	UDSM	SENC
Mr Bartholemew Tarimo	NEMC	TECC

**2.7.3.4. Zambia**

Mr George Mushimbwe Chitalu	ECZ	SENC
Mrs Ngula Mubonda	ECZ	TECC
Mr Frighton N'gandu	DoF	

**2.7.3.5. International**

Dr Kate Meadows	NRI	SESS/Overall Co-ordinator
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**2.7.3.6. Ms Monique Trudel EE Co-ordinator**

Ms Rachel Roland	CRDT	Training Co-ordinator
Ms Karen Zwick	LTBP	SESS Facilitator

**2.7.4. Main outputs and achievements**

- ToT workshop in Bujumbura
- SESS Facilitator in position
- SENCs in all four countries in position
- SESS work undertaken to date reviewed, priorities for the rest of the study defined, SESS Facilitator workplan drafted
- SESS workplans for all four countries drafted
- SESS work in Burundi and DR Congo begun
- EE/Training proposals and workplans from all four countries submitted

**2.7.5. Main objectives for the next quarter**

- SESS teams identified and trained, materials produced, and pilot studies carried out in all four countries; reports produced and reviewed, and at least one further study carried out in each country this quarter
- SESS working group meeting in Kigoma 9 – 13 November (provisionally)
- EE/Training proposals and workplans approved and implemented

**2.7.6. SESS Facilitator activities**

21 – 27 June	DSM	Administrative formalities, familiarisation
28 June – 5 July	KGM	Review of SESS work undertaken to date
6 – 22 July	BUJ	ToT workshop, meetings with Burundian, Congolese, and Zambian SENCs
23 July – 5 August	KGM	Report summarising SESS work undertaken to date, drafting of workplans
6 – 19 August	BUJ/UVR	Support to Burundian and Congolese SENCs
20 August	KGM	
21 – 25 August	DSM	Meetings with Tanzanian and Zambian SENCs
26 – 30 August	KGM	
31 August –	BUJ/UVR	Support to Burundian and Congolese SENCs

**Co-ordinator(s) activities, etc.**

4 – 20 July	Visit to Bujumbura by KM, MT, and RR for ToT workshop
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## **2.8. Progress Report: June to August 1999 for GIS and database management.**

### **2.8.1. Overall Summary of Progress**

The GIS component is now reaching its final active stage, when the GIS, database and metadatabase are passed to the region, and training is given at various levels. Work in this quarter has concentrated on starting this process approaching a provisional deadline for training and installation in November. This has largely involved assessments of resources and environmental information networks in place or in development in each country and subsequent tailoring of GIS outputs to satisfy current resource levels and needs.

#### *2.8.1.1. Region visit*

Implementation of the GIS component in the region commenced with a regional visit by A Mills (AMi) in June to three countries; Burundi, Tanzania and Zambia. The visit aims were to:

- Assess the current status of GIS in the region
- Demonstrate the database and GIS interface (TANGIS)
- Determine the support network necessary to sustain GIS activities for the Strategic Action Programme (SAP) of LTBP once the present project is completed.
- Determine training requirements for GIS in the region.

AMi visited eleven GIS centres, and met over twenty Special Studies' (SS) members (including the BIOSSE facilitator), LTBP project leader and scientific co-ordinator. AMi also met several national and regional co-ordinators or their deputies to update them on GIS activity and discuss the plan for geographical data storage.

AMi obtained a comprehensive picture of current GIS capability for the three countries visited, and sought methods for linking the LTBP GIS to national data initiatives to assist in maintaining its sustainability. The visit was an opportunity to liaise more closely with institutes and individuals working on the project in terms of data and GIS capability. New datasets were collected and methods of linking the Special Study databases to the GIS were discussed in detail. Other technical issues were discussed during the visit, including the usage and location of the LARST satellite receiving station and the transfer of the web pages to the region.

A series of recommendations on GIS implementation were proposed following the visit (see visit report "Geographical Information Systems and Remote Sensing Component, Visit to Region, 31<sup>st</sup> May to 20<sup>th</sup> June, 1999 by A Mills). It was recommended that the geographical information metadatabase be located at MINATE's Environmental Information Centre in Bujumbura from November. To manage the cataloguing of spatial data effectively, a centralised base in one country is necessary. However, because GIS resources elsewhere in the region are at a suitable

level, CD's of the TANGIS interface, including the current database and a simplified version of the metadatabase, will be shipped to several other institutes from October onwards.

To co-ordinate the passage of data, several national institutes are recommended to assist in the data flow from country to regional centre. It is recommended these be ECZ (Zambia), TANRIC (Tanzania), the LTBP Office, Uvira (DR Congo) and IGEBU (Burundi). The mechanism for data transfer and identification of data to be routinely updated have not been finalised but will reflect the information needs of the SAP.

Training and implementation of the GIS will occur in November and will be in a hierarchical structure:

- Presentations to directors of institutes and ministerial representatives
- Training of trainers workshops using the database and TANGIS
- GIS Theory and Application for scientific staff
- Metadatabase maintenance training for MINATE EIS centre.

The GIS still does not fully integrate SS databases as in many cases their analytical functionality has not been fully worked out. It is hoped that progress towards completion will be made before GIS installation in November, but this is dependent on other SS activities.

Several national environmental data strategies exist or are under discussion. It was recommended from the visit that LTBP should link in with the existing GIS community (identified by the established GIS Contacts Database) and these fledgling environmental information system (EIS) strategies.

#### *2.8.1.2. Datasets*

NRI have created new data or enhanced existing datasets, several datasets being obtained during the region visit.

- Copies of the current Tanzania BIOSS Survey Databases and data for FPSS were collected from Kigoma. A sample FPSS database has been created and sent to MRAG for evaluation.
- The GIS contacts database, revised following AMi's visit, is attached to the back of the visit report, and is available from NRI on request. It shows a diverse range of GIS capability in the region, with complimentary skills both within and between countries. Predominantly, Arcview, the project standard, is the main GIS software used.
- The project office locations have been added as a dataset in the GIS.
- During the region visit, AMi was able to pinpoint SS activities in the region more accurately, and datasets for the PSS study sites in both Burundi and Tanzania were identified, as were FPSS sites from previous work, and BIOSS sites for Tanzania were added. These data give a better picture of the extent of LTBP activity .

- Several Students have worked for NRI over the summer, giving LTBP an opportunity to enhance several of the datasets created for the project. These include:
  - 1: 50 000 coastline for Burundi, Tanzania and Zambia (Universal Transverse Mercator (UTM) Projection Zone 35)
  - 1: 50 000 map of the coast road from Uvira to Kigoma (UTM Zone 35)
  - Identification of all settlement names for catchment within Burundi and Tanzania
  - Naming of minor rivers along the lakeshore of Burundi.
  - Development of a gazetteer of place names along the lake including settlements, river mouths, headlands and bays around the lake from Uvira to Mpulungu via Kigoma. This has been sent to several SS Leaders and facilitators to check for spelling mistakes, alternative spellings and additions.
  - Mapping data collected for the FINNIDA 1993 Aerial Frame Survey of fishing boats in Congo, Tanzania and Zambia. Output maps from this show the number of boats at lakeshore locations and demonstrates an interesting pattern of concentration of boat resources. These maps will be available on the next GIS newsletter on the web at the end of the month

#### 2.8.1.3. *Programming.*

In the light of the region visit, AMi was able to make an improved assessment of the capability of LTBP institutions to use the TANGIS interface. AMi created several new programming tools after the visit (particularly to make sure that the interface is accessible to the widest number of software platforms).

Several new controls have been written into the interface. These allow users to turn off/on some of the large number of menus and buttons from TANGIS to leave a simpler interface (i.e. one allowing just adding and removal of data from the maps). There is a new tool allowing background layers (lake, rivers, boundaries, roads and settlements) to be drawn with one mouse click, so users have a simple background map to which data can be added.

TANGIS Arcview Projects now exist in Arcview versions 3.1 and 3.0. Because some Arcview installations do not have access to Spatial Analyst Extension, a cut down version of TANGIS has also been constructed. This allows people to look at image data (e.g. NOAA imagery or raster data of land cover or the digital elevation model), but does not allow the full manipulation of the datasets possible with Spatial Analyst.

A series of useful GIS tools gleaned from the Internet have been added in the general interface. These allow users to merge data together, extract the x,y, locations, project data and make unique ID numbers for each geographical feature. Arcview 3.1 allows for reprojection of datasets. It is now possible to change data from Geographic coordinate (Latitude / Longitude) datasets to the UTM Zone 35 (as well as other UTM zones) so all LTBP data can be transferred into any standard map projection.

The planning interface has been completed. This allows users to select data from a specific area (Country, district, sub-catchment or within a distance of a settlement) and then zoom into that area. This is meant to be used as a cross cutting interface and will be of specific interest to SAP regional activities.

#### 2.8.1.4. *Other activities*

The creation of a small atlas has had to be cut from our intended schedule for budgetary reasons.

Collection and archiving of NOAA satellite data has continued at the lakeside LARST station near Kigoma. AMi visited the station in June to assess its long-term sustainability. There has been a significant debate about its utility and sustainability post-project. A more coherent role for the LARST station should be identified, with more emphasis on its future sustainability in a larger EIS community. Options for sustainability of the LARST station are currently under discussion.

#### 2.8.2. Chronology of Activities

31<sup>st</sup> May – 20<sup>th</sup> June – region visit by AMi to assess sustainability, training and resources for GIS, and site visit to the LARST station, Kigoma

July/August – student support to NRI creates series of new datasets

July – extra programming.

August – schedule for November training visit completed.

August – versions of TANGIS for different computer specifications begun.

August – visit report published.

#### 2.8.3. Staffing Schedule

UK (NRI)

Alan Mills, Geographer; GIS developer

Anne Jackson, Data liaison officer

Valerie Obsomer, GIS specialist and trainer

Rupert Loftie – LARST co-ordinator

#### 2.8.4. Main Outputs and Achievements

Region visit to ascertain training needs, site for metadatabase and integration of LTBP GIS with other EIS.

Enhancement of existing datasets and creation of new data

Better picture of lakeside activity for project databases

New programs and Arcview Interfaces to satisfy diverse nature of GIS in region

Gazetteer of lakeshore place names completed

#### 2.8.5. Main Objectives for the next quarter (September to November 1999)

It is envisaged that the next quarter will be the last active quarter of the GIS component and subsequent support from NRI will be low level technical support and data advice to the SAP and SS.

1. Cut down version of TANGIS to be created (end September)
2. Training courses written (end September)

3. Final TANGIS manual written, approved and distributed (end October)
4. Newsletter (end September)
5. French version of TANGIS (end September)
6. Installation of TANGIS database and metadatabase in region (November)
7. Transferral of TANGIS machines to MINATE in Burundi (November)
8. Training courses and presentations in region (November)
9. Appointment of metadatabase manager, national centres of data assimilation and transfer of metadata responsibility to region (November).