

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

**Summary of Progress for the Period  
August 1995 to February 1996**

**Circulation:**

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PCU (3 copies)**

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

## **Summary of Progress for the Period August 1995 to February 1996**

### INTRODUCTION

This report covers the period from 7 August 1995, the official start date of the contract between NRI and UNOPS, and 29 February 1996. This and future progress reports will be kept as concise as possible drawing attention only to those activities and events which have a significant bearing on project progress toward its overall purpose. Inevitably during the start up period of such a large and complex project early progress was intermittent as the various components of the team and its logistical support structure have been brought together in the UK and in the region.

The report is divided into three main sections:

- Report of administration and project management activities at NRI
- Report of activities of the Project Coordination Unit and main events in the region
- Report from each of the main special study groups, and in future reports, any other *ad-hoc* studies that may be commissioned by the project

### NRI ADMINISTRATION AND MANAGEMENT

*(Insert here.....)*

### PROJECT COORDINATION UNIT (PCU)

#### General

The principal role of the PCU is to coordinate, support and facilitate project activities in the region. The unit is based in Tanzania rather than Burundi as originally intended owing to the security situation in Burundi prohibiting, under UN regulations, the establishment of new projects of this type in that country. The unit currently consists of the Project Coordinator (Dr A. Menz), based in Dar es Salaam and the Scientific Liaison Officer (Dr Keith Banister), based in Kigoma on the lake shore.

#### Office accomodation

The office in Dar es Salaam is currently based in the building of the British Council (BC) under a letter of intent with the BC which should lead to a more formal

agreement to provide office space, furniture and service plus certain administrative support services. This was seen as the most cost effective and efficient way of starting project activities in the region and has most definitely proved to be the case. The office in Kigoma will be housed in an annex to the house rented for the SLO. The annex is currently being refurbished and telephone line installed.

#### Support staff

The following support staff have or are in the process of being recruited:  
Accountant/General duties officer and PA to the Project Coordinator in the Dar Office. A secretary/general duties officer and driver in Kigoma.

#### Equipment

Vehicles for Dar and Kigoma (Land Rovers) were purchased locally ex-bond and were delivered on 16 February. Orders for computers and other office equipment and supplies have not been processed with the alacrity expected and have yet to be delivered. NRI are being pressed to investigate and remedy the causes to the delays which are unacceptable.

A full list of spares for refurbishment of the engine on the R/V Echo (a 12m TAFIRI boat at Kigoma) has been drawn up and ordered from UK. The ordering of scientific equipment and field vehicles will await firm work plans and details of requirements from the special study groups.

#### Principal activities

Once formally assigned to the project by NRI the Project Coordinator and Scientific Liaison Officer took an active role in the preparation for project start up whilst in the UK. This included a major management meeting involving NRI, MRAG, IFE and PCU took place at NRI on 5 September 1995 and a planning workshop on biodiversity organised by MRAG on 1-2 November.

From 2 to 25 October 1995 the PC and the SLO (25 September to 15 October 1995). undertook a mobilisation visit to the region. (This has been reported on more fully in a separate report to NRI and UNOPS). Apart from advancing the setting up of project bases in Dar and Kigoma, it provided an early opportunity for the PC and SLO to visit many of the important institutions in the region and make contact with some of the principal individuals likely to be involved in the project and generally inform them of progress regarding project implementation. This was particularly important as the UNDP system had not kept the lead organisations in the region informed of developments since the signing of the project document in 1994 and this had led to a feeling of dissatisfaction and even resentment in some quarters. In particular the Burundi government was in strong disagreement with the decision to move the project HQ from Burundi to Tanzania. Nevertheless throughout the reporting period the security situation in Burundi has been uncertain and for a period the ferrys did not run from Kigoma and the border with Uvira was closed. These events are becoming more frequent and fishing activities may be curtailed in the future because of army fears that rebels are using fishing boats to transport raiding parties.

On return to UK the PC specified the first tranche of equipment for approval by UNOPS and carried out a technical review of the proposed interagency agreement between FAO/University of Kuopio and UNOPS, for the production of the Lake Tanganyika circulation model to be used by the project. The PC took a series of intensive French lessons.

On 15-17 November, en route to taking up post in Kigoma, the Scientific Liaison Officer attended the joint meeting of the FAO/FINNIDA Lake Tanganyika Research project's coordination and international scientific committees. Representatives from all four riparian states were present as well as observers from FAO, University of Kuopio (Finland) and University of Burundi. All delegates were contacted and informed of project progress. In addition a formal paper on the project was presented to the meeting.

On 17 November the Scientific Liaison Officer arrived in Kigoma together with Ian Downey (NRI) and Tony Baily-Watts (IFE) who were visiting in relation to baseline reviews. With some difficulty a house was rented with a small annex suitable for a project office after some refurbishment which has now been complete. Although architects plans for the office/lab block on the TAFIRI site envisaged in the project documents have been drawn up and costed, and permission to use the space, if deemed advisable, obtained. No work will be started until the scope and intensity of project scientific activities at Kigoma are better established. Quite extensive facilities exist both at TAFIRI and the laboratory of the Water department.

Since arrival the Scientific Liaison Officer has spent a good deal of time and effort getting to know key individuals and organisations in Kigoma. This involves mainly TAFIRI and the Fisheries Department staff, and LTR staff based in Kigoma. Directors of both institutions have been helpful and willing to cooperate. In addition contacts have groupse been established with the local expatriate aid organisations (UNHCR, IRC), various missionary groups (run hospitals and have flights), local NGOs, Jane Goodall Institute and TACARE and local/regional governmental bodies such as Meteorology office, water office, Agriculture officer, planning dept and land use department, Port Authorities and Air Tanzanian officials. This has resulted in very good relations having been established and cemented with local institutions and individuals.

In December a visit was made by the SLO to Bujumbura to discuss project matters with staff at CRRHA (Zaire) and LTR as well as to peruse the LTR library and collect copies of useful documents for the project in general and the baseline reviews in particular.

The PC arrived in Dar-es-Salaam on 15 December 1995. Since then the main effort throughout the reporting period has been directed toward sensitising the main players in the region to the project, illicit nomination of national coordinators, describe and explain the purpose of the baseline reviews and discuss how they should be

handled once received. This was interspersed with activities related to setting up the project office, purchasing vehicles and other equipment for PCU .

The national coordinators were finally established as follows:

Lead agency in <b>Burundi</b>	Institute for the Environment and Conservation of Nature
National Coordinator	Dr Gaspard Bikwemu - Director General, INECN
Lead agency in <b>Tanzania</b>	Division of Environment, Office of Vice-Pres.
National Coordinator	Mr Toziri Lweno - Division of Environment
Lead agency in <b>Zambia</b>	Environmental Council for Zambia
National Coordinator	Mr James S. Phiri - Director, ECZ
Lead agency in <b>Zaire</b>	Dept. for Management of Renewable Natural Resources.
National Coordinator	Mr Mady Amule - Director, GRNR

It is unfortunate despite efforts to avoid it, that the Director of the Division of the environment in Tanzania chose to delegate the role of National Coordinator to a more junior staff member rather than taking on the role, at least nominally, himself as this has led to an imbalance of authority within the group.

The PC was invited to join an “Informal donor group on the Environment” the invitation was gratefully accepted and the PC attended the meeting on 16 January held at the Dutch Embassy. The group is very active being formed in May 1993 at the instigation of the Netherlands Embassy. Its current chairman is Bob Hensen, Second Secretary, aid and development at the Netherlands Embassy. It is comprised of representatives from virtually all the bilateral donors and multilateral organisations such as UNDP, FAO and World Bank as well as individuals from specific projects such as Dr Alan Rodgers of the regional FAO/GEF Biodiversity support project. The group meets monthly and discusses matters concerning the environment in direct dialogue with Tanzania Government Departments such as Division of Environment, Planning Commission, Ministry of Lands, Ministry of Agriculture and the National Environmental Management Council. It is an extremely useful forum for exchange of information and a summary of the Lake Tanganyika project was given in writing and orally to the members present.

From February 3 to February 7 the PC and SLO visited Bujumbura. A summary of the visit report follows.

Saturday Met with Luc de Vos and Alain Vandelannote, the two Belgians running the Centre Regional de Recherches en Hydrobiologie Appliquee (CRRHA) at Bujumbura. They had been ordered out of the country by the donors - the Belgian government- for

security reasons. Current funding runs out in April 1996 and it was thought unlikely that more would be forthcoming.

Monday. No word from the NC Gaspard Bikwemu and unfortunately a public holiday. Met with de Vos, Vandelannote and Prof. Gaspard Nkatimaze to discuss options for use of CRRHA facilities or staff. Obtained details of staff and salaries. Visited Department of Fisheries and Hydrobiology at the Univ. of Burundi with Prof. Nkatimaze.

Met with Roger Kanyaru, Director of Fisheries who had not been told by NC of our visit.

Finally contacted Gaspard and arranged meeting for Tuesday. In spite of having faxed Gaspard prior to our visit requesting him to convene a national working group meeting, no working group meeting had been arranged because he claimed he did not receive the fax until shortly before our visit. There is a tendency for Dr Bikwemu to keep project dealings contained within a small group of associates.

Tuesday: Visited UNDP and spoke to Mr Jean Kahibizi, programme officer and M Christophe Boutonnier, the UNDP security officer. He said that the security situation had improved (more recently it has deteriorated again) and confirmed we would need walkie-talkies linked to the UNDP security system when working here. The Burundian part of the lake was deemed fairly safe but no guarantees of safety existed elsewhere. Outside Bujumbura car theft and general robbery are a greater threat than death for whites.

Met with George Hanek (coordinator LTR) and Dr Nshombo Muderwa the new Director General of the station at Uvira. General discussion about LTR cooperation and forthcoming workshop. Mr Muderwa to be invited.

Met with Gaspard Bikwemu who yet again raised GoB objections to the project HQ moving to Tanzania. He then proceeded to quote chapter and verse from the Project Document regarding allocation of all posts and equipment. He insisted, although he has since ameliorated his view, that posts and equipment should be exactly as indicated in the document. We pointed out that there had been some modifications to the project document already and these were indicated in the NRI proposal, of which he has a copy, and that although equipment and staffing allocation would indeed be based largely on the project document and NRI proposal fine tuning would be required. We also confirmed that all regional, as opposed to country specific, technical posts would be recruited from the region but that administrative support staff to the PCU would of necessity be recruited in Tanzania. In discussing the Baseline Reviews we explained that they would, at least in the first instance, be in English only but with executive summaries in French; he accepted this.

Met with Prof Ndimaku (Univ of Burundi) and Mr Kinyomovyi (private coffee farmer) of the NGO, ODEB (Organisation pour la Defense del' environment Burundi).

A small but enthusiastic group who have carried out various clean up campaigns in urban areas. They will be invited to the Inception workshop

Summary of contiguous visit to Kinshasa , 7 - 9 February 1996.

Fortunatley we were met by UNDP at the somewhat chaotic airport - highly recommended. We first had a meeting with Mr Austin Amulu, programme officer and Mr Aiov Diallo, the Resident Representative. Both gentlemen were extremely helpful, interested in the project and offered all the support at their disposal. We were then escorted by Mr Amulu to a prearranged meeting at the Ministry of Environment, Nature Conservation and Tourism with the secretary general Mr Kena Mwauke and Mr Amule, their designated National Coordinator. We handed them copies of the NRI proposal which they had not seen and discussed the project in general. We agreed to meet on the following day when they had had chance to read the proposal.

The following day we met with Kena Mwauke, Amule and Ir Makombo Bwanga (Coordinator technique charge d'amenagement et planification de la Peche - SENADEP. Main points from a very cordial meeting were:

- No offence was taken at the fact that the baseline reviews would be in English with a French summary. They understood the rush to get them out and said they were used to dealing with technical documents in English.
- They appreciated our concern about security for project personnel working in Zaire as said they would arrange permission and conduct passes for us to (in theory at least) work freely around the Zairois coastline and inland if needed. The exact form of this pass was not clear but it is essential that we acquire some substantial document for staff working in Zaire to carry with them. PC and Scientific Liaison Officer will follow up.
- They were happy with the idea of trying to establish Kalemie as the more logical base in Zaire rather than Uvira.
- They were keen to have the University and NGOs involved in the project and provided a list of universities, departments and appropriate people. The list was based on those involved with the Rio World Summit of 1992.
- The best way to contact the National Coordinator would be through UNDP with whom they have good relations.

In general a very useful visit which established the project more firmly in the official sphere of Zaire than any number of visits to Uvira would have achieved.

The principal activities in the forthcoming quarter will be the organisation of the Inception Workshop and compilation of the Inception report. Other activities will centre consolidation of offices and administration arrangements in Dar es Salaam and

Kigoma and planning the financial and administration procedures for control and operation of field station activities.

## SPECIAL STUDIES

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### **Sediment Discharge and Its Consequences**

The special study 'Sediment Discharge and Its Consequences' is under the management of the Natural Resources Institute (NRI). It was originally managed by Dr. I. Grant but this duty was passed over to Dr. G. Patterson on 1 December 1995.

Within the reporting period the principal objective was the production of the baseline review of the special study. This was completed on 14 February 1996 in ample time to be distributed to those taking part in the Inception Workshop commencing on 25 March 1996 in Dar es Salaam, Tanzania.

Based on the original UN project document the study breaks down into a number of subgroups with balance of effort between the subgroups dictated by the amount of person months envisaged for each sub-component.

This is as follows:

Land Use	4.5 pm
Sedimentology	9.0 pm
Plankton biology	9.0 pm
Limnology	9.0 pm
Fish biology	9.0 pm

The first two categories address the origin and nature of the sediment input to the lake and the latter three categories address the impact of the sediment input on the biota and factors which affect biotic processes. Effort was made within the baseline study to reflect this balance. Considerations of how the study can be refocused based on the baseline review will be considered at the inception workshop.

**Land Use.** This part of the baseline review was completed by J. Bennett, I. Downey and M. Holland of NRI. Though a relatively small component it was felt that this study depended heavily on archived data and involved trips to the region by I. Downey (in combination with his role on establishing a GIS and remote sensing programme) as well as for him and J. Bennett to Belgium to assess the archived data at the Musee Royal de l'Afrique Centrale. They also visited Pierre-Denis Plisnier in Belgium who has three years experience as limnologist on the FAO/FINNIDA project on Lake Tanganyika. Details of the Information gathered are included in the baseline review. Back to Office reports of these visits are also available.

**Sedimentology.** This baseline study was carried out by R. Duck and J. McManus of the University of St. Andrews, U.K. They obtained base data from the Institute of Hydrology UK who have archived much of the data from the Tanzanian and Zambian catchments of the lake (river gauging etc.). They also gained access to the kinds of data held in Belgium on the Burundian and Zairian catchments.

**Limnology.** The baseline review of this aspect of the special study was completed by P. Coveliers of the International Bureau for Environmental Studies, Belgium. Coveliers has spent a number of years at Lake Tanganyika working specifically on the impact of sediment input to Lake Tanganyika and its affects on the physical and chemical properties of the water column.

**Plankton biology & Fish biology.** It was decided that these two areas be simply combined as 'Impact of sediments on biota'. The baseline review considers impact of sediment on production, algae, aquatic macrophytes, zooplankton, benthic invertebrates and fish. This involved a number of experts in the field (C. Cocquyt., P. Coveliers, K. Irvine, K. Martens, J. McManus, G. Patterson, L. Risch, J. Snoeks and E. Verheyen). It should be noted that many of these contributors exist in an informal group (contact point K. Martens) who are named 'the Lake Tanganyika biodiversity assessment group'. The principal objectives of this group are to study aspects of the extant biodiversity of Lake Tanganyika. Their incorporation into the project at this early stage is a particularly useful asset.

All the important players within the sediment special study met in London on 15 January 1996 to discuss priority areas which should be considered by the Inception Workshop. A summary of these discussions was added to the baseline review. Also present at this meeting were representatives of the other special study groups.

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## **Pollution and Its Consequences**

**This report covers three main aspects - meetings in UK, a visit to Burundi and Tanzania, and miscellaneous matters and proposals.**

### **UK meetings**

I attended meetings of the project's Steering Group/Management Committee on 5 September 1995 (London), 16 January 1996 (London) and 8 March 1996 (Chatham). The first two of these were concerned primarily with the start-up of the project and attention to the scheduling and integration of the various work components - and the Special Studies Baseline Reviews in particular. The March meeting focused very much on the forthcoming Inception Workshop in Dar es Salaam. In being ultimately responsible for the Special Study on 'Pollution of International Waters' I examined firstly the areas of overlap between the this Study and those on Sediment Pollution and Biodiversity. Secondly, with the preparation of the review on pollution and its effects on biodiversity in mind, I also contributed to meetings (1-2 November 1995,

15 January 1996 and 7 March 1996 - all in London). I proposed that the pollution programme includes work on the effects of pollution on the lower biota (i.e. 'below' fish, with fish being attended to under the main Biodiversity study). I have involved in a number of the scientific meetings, my main co-consultant (Dr Chris Foxall of the Centre of Environmental Risk Management, School of Environmental Sciences, University of East Anglia). Chris, myself, and one of my colleagues in the Institute of Freshwater Ecology, Edinburgh Laboratory (Miss Nicola Wiltshire) prepared the Baseline Review on pollution and its effects on the lower organisms; we submitted the document to NRI on 24 January 1996.

### **Visit to Burundi (7-15 November 1995) and Tanzania (16-21 November 1995)**

My main reason for visiting to Bujumbura (Burundi) was to scan the quite unparalleled library of Lake Tanganyika publications and reports in the FAO FINNIDA's Lake Tanganyika Research (LTR) Documentation Centre. I also had my first view of the northern, industrialised and populated end of the lake. George Hanek (LTR's coordinator) was very helpful, and his scientists, librarian and associated administrative staff also could not have been kinder or more accommodating. I met some very interesting (and interested) Uvira (Za#rian) scientists associated with the FINNIDA project, and Drs Luc de Vos (fish biologist) and Alain Vandelannoote (limnologist) from the Centre Hydrobiologique de la Cooperation Belgo (CRRHA next door to LTR). Everyone allowed me 'free rein' with their reprint collections. My thoughts on my particular areas of interest in the GEF project were generally well-received. African and European investigators alike, thought that the proposals were feasible as regards e.g. lake-wide coverage, and in aspiring to assess - at a few selected sites at least - 'all' biota. I was especially encouraged by confirmation of my impressions regarding the general scarcity of data on pollution and its biological effects. We also agreed over another point that I raised and viewed as having a considerable bearing on the GEF project. This relates to the fact that while there is no shortage of data on many aspects, there is (with few exceptions) no information on the 'effort' (sample size) involved in generating species lists. As a consequence, it will be difficult to compare previous findings with the new data. A major feature of the new project is the generation of data in a manner that will allow straight comparisons in the future and thus, real measures of change (or lack of change) to be established. Discussion with GH confirmed that much of the pollution to the lake is centered around the north end. Examples are Bujumbura with its beer factory, and the terrible state of the roads and the canalisation of sewage. However, there are a number of other centres of pollution around, and constituting pressure on, the lake. Examples are the Kalemie Cement factory, gold and salt mining on the north-east side of the lake, sugar cane plantations (with very rich waste liquor) and agricultural fertiliser and pesticide runoff in the Rusizi catchment. The FAO FINNIDA project has generated some impressive data - on hydrological behaviour and fisheries in particular I visited (and worked with lap-top) on the r. v. 'Tanganyika Explorer'; this is a very clean and extremely well-appointed, arranged and equipped vessel. I also caught up with Dr John and Mrs Hilary Craig. John is FAO FINNIDA's Statistician and Scientific Coordinator, and an old colleague from the Freshwater Biological Association (UK). Along with Dr Banister, I attended the 4th Joint meeting of the FAO FINNIDA Lake

Tanganyika Research Project, which involved FAO representatives and Finnish Scientists. I gave a short talk on my thoughts as they stood at that time, regarding the GEF Pollution-Biodiversity Special Study. I also suggested that the GEF pollution study should draw on, rather than attempt to repeat the basic work being done under the LTR, but integrate and collaborate in every aspect; this seemed to be well-received.

I travelled by boat to Kigoma to meet the staff of the Tanzania Fisheries Research Institute (TAFIRI) and the FAO FINNIDA LTR project there. Mr Chitambebwe (Director, TAFIRI) is very interested in the GEF project, and was extremely accommodating in showing Dr Banister and myself the existing office, store and laboratory facilities. He also much of the weekend showing us a range of lake shoreline habitats (pebbly, sandy, muddy) in and around the Kigoma area. This was valuable in gaining an impression of the types of sampling equipment that will be needed for assessing pollution status and associated biota in such areas. I spent much of my last day in Kigoma with the Finnish group, their Tanzanian counterparts, and Mr Chitambebwe demonstrating (i) how they can obtain a good 'soup' of phytoplankton (even from the lake's Kigoma Bay which contained only 0.3 ppb chlorophyll at the time) for studies on copepod generation times, and (ii) how to estimate the population densities of phytoplankton.

### **Miscellaneous**

More recently in the period covered by this report, I have explored with NRI the possibility of placing two UK graduates (Nicola Wiltshire from my laboratory and Dawn Ives from UEA) in Africa for the duration of the Pollution-Biodiversity study. Ideally, they would be involved with local staff even in establishing laboratory and field facilities, and executing synoptic sampling and analytical programmes. These placements would obviously strengthen the links between the local consultants and Dr Foxall and myself. More importantly, however, they would enhance the collaboration at the field and laboratory levels (of the sort already exercised as indicated above) that is crucial to the success of this Special Study. It is stressed, that this resource input would be additional to, not a substitute for, the inputs by Dr Foxall and myself.

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## **BIODIVERSITY AND LEGAL STUDIES (MRAG)**

Preparatory visit of Dr Ian Payne, MRAG Programme Leader to Tanzania. Exploratory discussions were held with Water Development and sections of Ministry of Environment in Dar-es-Salaam and the regions.

### **August - September 1995**

Preparatory meetings with partners to establish structure and organisation of project. Dialogue with NRI culminating in signing letter of agreement between MRAG and NRI. Definition of the contribution of MRAG includes responsibility for the conduct of special studies in Legal Aspects, Biodiversity and Fishing Practices and

Biodiversity along with the relevant Baseline Reviews and inputs to the overall environmental planning.

### **October 1995**

Baseline reviews were discussed and commissioned to a deadline of December 1995. Visits were made to Tanzania by MRAG personnel, I Payne and V Cowan, where further contacts with the Water Department were explored and additional contacts were made with the regional offices of the Wildlife Department and Tanzania National Parks (TANAPA), particularly with a view to understanding the mechanisms by which national parks and conservation areas are established and administered. An institutional appraisal was also made of the administrative operations at regional, district and community levels in Tanzania. It was clear that the Community Development Officer system bridges these levels of administration and can articulate with the Planning Services, a system highly appropriate to facilitating the need for bringing the local communities into the planning process and the final consensus for any strategic plan.

During the month a workshop, bringing together the most prominent international experts on Lake Tanganyika, was organised by MRAG specifically to begin the planning of the Biodiversity special study.

Advantage was taken of the presence of George Coulter in UK to have two days of discussions between him and MRAG staff (IP, VC) and also Rosemary Lowe-McConnell, in order to bring that extensive experience to bear in the planning of the project.

### **November 1995**

A two day international workshop was held by MRAG within Imperial College, London which brought together some of the most experienced people on Lake Tanganyika, including Frits Roest, Rosemary Lowe-McConnell, Andy Cohen, Jacques Moreau and the views of George Coulter were also presented. The planning groups of NRI and IFE also attended. The Agenda is appended. A summary document is being produced.

### **December 1995**

Draft of sections of Baseline reviews were received and editing commenced.

### **January - February 1996**

Baseline reviews were finalised and planning of special studies continued. Planning meetings of MRAG teams conducted to finalise work plans. Rosemary Lowe-McConnell has been included in these meetings as an independent authority.

1. Work is well underway, through a number of external sub-contracts and internal commissions. The report will be quite complex (see outline structure) since it covers a number of different sectors. Any comments on emphasis and priority to be given in different sections would be appreciated. It will be a source document for future work, resulting primarily from a comprehensive desk review of available materials, plus limited in-region investigation.

### **Progress to date**

2. A **regional socio- economic overview** and a **full bibliography** have been prepared by **APEX Ltd**, through a sub-contract with NRI. They have also gathered material on the Tanzanian side of the Lake basin from Uppsala University Centre for African Studies (the most comprehensive African Studies collection in Europe). This will be fed into a **review of land use and agrarian change in the Malagarasi catchment** (the major river feeding the Lake from the east; the catchment is the greater part of the lake basin land area. Contacts in Belgium have been explored to identify francophone literature on Burundi and Zaire; very little relevant material has been identified however.

3. A **Kenyan researcher (Sarah Bottelberg) based in Tanzania** has been hired through the British Council in Dar. She will feed material gathered in Dar into the land use / agrarian change review, making contacts and arranging **meetings with socio-economic and natural resource research institutions in Dar and Morogoro**, plus some NGOs, for my trip to Tanzania. We shall attempt to review the capacity of these institutions and their possible contributions to the project next week (however this will **not** provide a review of the capacity of the implementing government institutions)

4. APEX Ltd are also providing a **review of environment policy and strategies in Zambia and Tanzania**, although there is no parallel source material available for Zaire and Burundi. They are also preparing a section of the report on **refugees in the lake basin area** (mainly around Kigoma and Uvira), the environmental impacts, with up-to-date figures and a **prognosis on the security situation in Rwanda and Burundi, and its implications for the basin area**.

5. On **Fisheries socio-economics**, SSD did a literature search at Portsmouth University. Key materials have been obtained from FAO/Bujumbura, and these are being reviewed, with other available documentation, by **Ann Grey, an economist recently recruited to SSD** with Mozambique fisheries experience.

6. **Conservation and protected area policies, and experiences of participation** to date in the four lake states are being reviewed by **Richard Zanre (SSD Research Assistant)** with guidance from Cathy MacKenzie, of SSD, and myself. As a tourism specialist, Richard has also **reviewed tourism in the lake basin and the prospects for tourist development** (his draft review was previously circulated).

7. **Information on forestry and deforestation** in the lake region is highly scattered, but a list of contacts has been assembled; these should also provide sources of information on terrestrial biology and conservation in the region if other team members need it. I shall attempt to review available information on forestry and fuelwood issues on my return from Tanzania.

8. A baseline **review of resources, institutions and prospects for Environmental Education in the region** has been commissioned from **Paul Vare, of ICCE** a specialist on environmental education in Africa. He has prepared some background notes, gathered information from contacts in Zambia, and is visiting Tanzania this week, where he will meet various environmental NGOs. In Dar we shall begin work on a draft programme for project education work with Peter Llewellyn of the British Council. He shall submit his report in the week of 18 December.

#### **Schedule for report production**

9. I expect that all the different elements of the report will be assembled and given a first edit to produce a draft report by 22 December. My understanding is that we would aim for completion, and circulation of the baseline reports by mid- January 1996, to allow time for circulation and preparation of the inception workshop to take place in late February 1996. Outstanding tasks for early January will be:

- final edit of the document
- some further work on baseline maps to accompany the report
- review and rewrite the “discussion” section on prospects for participation in lake basin management, gaps in knowledge and the role of socio-economic work in the project
- preparation of a detailed draft workplan for special studies for years 1-2

10. The second point will require some further work with ESD (Ian Downey /Martin Rothery). The last two points will require some dialogue with the rest of the project team, including feedback from Andy and Keith in Tanzania, and consideration of the proposals for the special studies as a whole. As proposed earlier, the workplan for the special studies would not be finalised until after the inception workshop, which would review the draft proposals.

#### **Recruitment of socio-economic liaison officer**

11. SSD will need to get to work on this in January. So far we have identified a few potential candidates in Tanzania, but are yet to canvass relevant institutions, or fully specify the job description, or identify where this person would operate from. I shall explore these questions further in Dar-es-Salaam next week. Following Andy Menz’s discussions in New York we understand that we have the flexibility, to recruit an international member of staff for a limited period, while training in a national of the region, if we judge this to be the best approach. However the options need to be reviewed on my return from Tanzania, and the financial implications considered.

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## Remote Sensing and GIS Components

The technical inputs on remote sensing and GIS to support the "Pollution Control and Other Measures to Protect Biodiversity in Lake Tanganyika" project are under the management of the Natural Resources Institute (NRI). The coordination of these inputs is being managed by Mr. I. Downey.

There are two separate components:

- Remote sensing and GIS integration to support the project overall
- Installation of a LARST NOAA receiver

Within the reporting period the principal objective was the production of the baseline review of capabilities and data sources to support the special studies. This was completed on 14 February 1996 with sufficient time to be incorporated into the relevant special studies (particularly Land Use - Sediment Discharge) and be distributed to those taking part in the Inception Workshop commencing on 25 March 1996 in Dar es Salaam, Tanzania.

Based on the original UN project document the remote sensing and GIS technical inputs break down into equipment and manpower requirements. The demands on these resources from the respective special studies are to be clarified in light of the baseline reviews. The inputs are quantified as follows:

Item	\$
RS/GIS Manpower (5 pm)	20,230
Visits	4,678
GIS Systems	46,800
LARST System	60,000
Data Archives	52,200
<b>Total</b>	<b>159,000</b>

Information on suitable archived remote sensing and GIS data has been collected in preparation for the start of the special studies. Consideration of how the remote sensing and GIS inputs will be integrated with the special studies will be developed at the inception workshop. A visit was made to the region by Mr. Downey in November 1995 to assess capabilities and data sources in support of the baseline reviews. The visit covered Burundi, Tanzania and Zambia and key institutes were visited in Bujumbura, Dar es Salaam and Lusaka. A separate visit report is available on request.

A LARST NOAA site inspection was made at the TAFIRI sites in Kigoma in preparation for the installation of a NOAA satellite receiver system. A suitable site

was identified. It was agreed that training in data acquisition and processing will involve all the TAFIRI scientists with two of them given special responsibility for running the installation on a routine basis. The LARST specification has been completed and the equipment can be mobilised promptly. A separate, detailed site inspection report is available on request.

A visit was made to the Musée Royal de l'Afrique Central, Belgium by I. Downey and M. Holland to assess the archived data there. The remote sensing and GIS inputs will depend heavily on access to archived data and there a number of different materials of relevance held there. They also visited Pierre-Denis Plisnier in Belgium who has recently returned from a three year tour as limnologist on the FAO/FINNIDA project on Lake Tanganyika. Details of the Information gathered are included in the baseline review. Back to Office reports of these visits are also available.