



**ICELANDIC INTERNATIONAL DEVELOPMENT  
AGENCY**

**AN EVALUATION OF THE PROJECT:**

**“Charting of Lake Malawi for the Safety of  
Navigation”**

**Monkey Bay 2001–2004**

Page intentionally left blank

AN EVALUATION OF THE PROJECT:  
“Charting of Lake Malawi for the Safety of Navigation”  
2001–2004

Internal evaluation

By Hilmar Helgason



Prepared for the Icelandic International Development  
Agency Reykjavík and Malawi Department of Surveys  
Monkey Bay April 2005

Page intentionally left blank

EXECUTIVE SUMMARY .....	7
The Project .....	9
Evaluation, methodology and work plan.....	9
Structure of report .....	10
PROJECT DESCRIPTION .....	11
Background to the Project.....	11
Previous activities at the Hydrographic Survey Unit.....	13
Planning and preparation of Project activities.....	13
Project management .....	13
Start of the Project.....	14
PROJECT RELEVANCE .....	16
Principles and priorities of ICEIDA.....	16
Improvement was important.....	17
Reaching IHO and IMO levels of competency .....	18
EVALUATION FINDINGS .....	19
Project obligation .....	19
Training personnel.....	20
The Survey .....	20
The Charting.....	21
The Sailing Directions.....	22
Unforeseen circumstances.....	22
EFFICIENCY and EFFECTIVENESS OF THE PROJECT .....	23
SUSTAINABILITY .....	24
CONCLUSIONS AND RECOMMENDATIONS.....	25
Conclusions .....	25
Recommendations .....	26
APPENDICES.....	29
Terms of reference for the evaluation .....	31
APPENDIX 2 .....	34
Printed Navigational charts. ....	34
Data collected for following charts. ....	34
APPENDIX 3 .....	35
Record of evaluation activities .....	35
APPENDIX 4 .....	36
Informants .....	36
APPENDIX 5 .....	37
Documentation: .....	37
Appendix 6.....	38
Plan for charts 1:100 000 .....	38
Appendix 7 .....	39
Plan for charts in 1:50 000 .....	39
Appendix 8.....	40
Financial Statement .....	40

Page intentionally left blank

## EXECUTIVE SUMMARY

This evaluation was carried out at the request of the Icelandic International Development Agency (ICEIDA) as a part of the Project “Charting of Lake Malawi for the Safety of Navigation” and was sponsored by ICEIDA. The evaluation is being undertaken in order to ascertain the extent to which the goals of the Project have been achieved. It is also intended that the evaluation should provide the staff of the Hydrographic Unit with information that could assist in planning and implementing activities.

The evaluation of the Project was carried out in Lilongwe and Monkey Bay, Malawi and is reported here. The Project activity and inputs have been supported by ICEIDA from February 2001 until 2005. Interviews were taken with some of the key informants. An extensive collection of documents was read and a meeting was held with the Project staff before the departure from Monkey Bay.

The Project was launched in February 2001 and it aims to ensure safety of navigation on Lake Malawi through the provision of updated navigational charts. The Project has been implemented in close collaboration with the Icelandic Coast Guard Hydrographic Service (ICG-HS) which has been providing technical expertise and supervises the training of local professionals.

The overall objective of the Project is:

To provide seafarers and fishermen in Malawi and from neighboring countries with an essential tool crucial for safety of navigation, this would in turn improve operational and training efficiency.

The main outputs are:

- Produce new nautical charts for Lake Malawi
- Modern equipment available in Malawi to do Hydrographic and cartographic work
- Trained personnel in Malawi to operate the equipment provided and in the whole sequence of surveying for and designing Nautical charts

This Project based at the “Charting of Lake Malawi for the Safety of Navigation”, is relevant to the mission and priorities of the development agency as they appeared in 1998.

The main focus of the Project has been on the progress of the productive sectors and with emphasis on the transfer of expertise.

The survey has been successful during these four years even though some problems have occurred like engine breakdown and grounding. The survey vessel Timba had a serious engine problem in October 2002 and it was not until early June 2003 that the vessel started surveying again.

The first two charts were printed in Iceland and were officially published in March 2003. At the same time, a trilateral Technical Agreement was signed between the ICG-HS, Malawi Survey Department and ICEIDA. This Technical Agreement encompasses the conditions under which ICG-HS should provide technical support to the Malawi Department of Surveys with financial support from ICEIDA. It enables close co-operation between the technical partners without the day-to-day involvement of the financial partner, ICEIDA. This Technical Agreement has now been extended until end of the year 2006.

Since March 2003 four charts have been published, all of them printed in Malawi. Four more charts are in various stages of processing.

Cartographic works were delayed due to scarcity of manual production materials. This problem has, however, been solved by installing computerized charting software. Chart production is a never-ending process since there is always a need for revision after the current charts have been published.

It has been realized that a lot of effort and time consuming work has been done for the personnel involved in the Project to keep pressure on the Government to fulfill their obligation of funding. The ICEIDA Project Coordinator and Chief Staff Surveyor have spent a lot of effort to keep the Project running.

Despite these problems, it is important to keep in mind that the Project has been successful.

The hydrographic community has noticed this Project and often mentioned on meetings what can be done without very much funding.

## INTRODUCTION

### The Project

This report presents an internal evaluation of the Project “Charting of Lake Malawi for the Safety of Navigation” in the Monkey Bay area. The Project is supported by ICEIDA from 2001 to 2004.

The overall objective of the Project according to the Project Document is to:

- Provide seafarers and fishermen in Malawi and from neighboring countries with an essential tool crucial for safety of navigation, which would in turn improve operational and training efficiency.

Main outputs:

- A new set of nautical charts for Lake Malawi
- Modern equipment available in Malawi to do Hydrographic and cartographic work
- Trained personnel in Malawi to operate the equipment provided and in the whole sequence of surveying for and designing Nautical charts

Malawi Contribution:

Malawi will provide all local facilities, including a Hydrographic Surveys vessel, needed for the Project as well as all necessary local professional, technical and support staff. The Malawi contribution is estimated at 230.000 US\$ or 29% of the total cost of the Project.

ICEIDA Contribution:

ICEIDA will provide technical expertise and training in Hydrographic surveying and cartography. ICEIDA will further provide funds for capital expenditure and operation during the implementation of the Project, ICEIDA contribution is to the tune of 560.000 US\$ or 71% of the total estimated Project cost.

### Evaluation, methodology and work plan

The evaluation was carried out in accordance with the Project Document, which was signed in December 2000 by the contracting parties, ICEIDA and the Ministry of Transport, in order to ascertain the extent to which the goals of the Project have been achieved and was sponsored by ICEIDA. In February 2005 the Consultant was appointed and Terms of Reference finalized (cf. Appendix 1).

The internal consultancy is being undertaken at the request of ICEIDA in order to assess the current results of the Project in view of the objectives and planned inputs and outputs of the Project in order to make recommendations which are expected to facilitate the satisfactory completion of the Project.

The Consultant shall also provide the ICEIDA advisers and the staff of the Malawi Government with information and advice in order to support and strengthen further planning and implementation of activities in the Project.

#### Scope and focus of the consultancy work

- The consultancy will focus on providing information for ICEIDA.
- The Consultant will consider the extent to which the partners have worked towards keeping the terms of the Project Contract.
- The Consultant will seek the involvement of the staff of the Hydrographic survey office in Monkey Bay and Project participants in order to give advice and provide information.
- The Consultant will consult with other relevant local and government authorities.
- The consultancy work will commence with preparing a new technical agreement between relevant partners for the next two years.
- The Consultant will check the equipment and update software

Preparations for the evaluation began in February 2005. Documents were assembled in Malawi and Iceland. The Consultant collected most of the data in Lilongwe and in Monkey Bay, from February 14<sup>th</sup> to February 22<sup>nd</sup>. Discussions and interviews with a range of people took place in Monkey Bay and Lilongwe (see Appendix 4).

A meeting was held with Project Management Group on 18<sup>th</sup> February 2005.

#### Structure of report

The report covers all areas specified in the Terms of Reference, following brief review of the Project and description of the Project in some detail.

Lists of informants and documents as well as the evaluation schedule are to be found in Appendices 1 to 5.

## PROJECT DESCRIPTION

### Background to the Project

In 1999 the former director of the Icelandic International Development Agency (ICEIDA) requested the Icelandic Coast Guard Hydrographic Service (ICG-HS) to provide a hydrographic surveyor for the study of a possible survey of Lake Malawi. The objective was to investigate the best-fit means to assist Malawi to replace the inaccurate and outdated nautical charts for Lake Malawi by originating new survey on Lake Malawi and produce new charts. The aim of the study was to prepare an outline of a strategic plan for surveying and updating of existing navigation charts for Lake Malawi and other navigable water bodies in Malawi.

The study report for the Project was prepared during 15<sup>th</sup> – 25<sup>th</sup> November 1999. The study was done by LT Asgrimur L. Asgrimsson of the Icelandic Coast Guard Hydrographic Service in co-operation with Mr. Michael Mzunzu of the Malawi Department of Surveys Hydrographic Unit and late Capt. Levi Mkawa of the Marine Services Department. The study team came up with four possible ideas to make charts of the lake:

#### Project Idea 1:

Reproduce the existing charts.

This was not acceptable because of today's requirements.

#### Project Idea 2:

Reproduction of four existing charts and new chart series in scale of 1:10,000 and 1:50,000. This option was based on reproducing the chart of the whole lake 1:625,000 and the three charts in the 1:250,000 series needed for general voyages between ports. A survey will be conducted for six harbor plans in the scale 1:10,000 and 8 approach charts in the scale 1:50,000.

This was not acceptable for same reason as 1.

#### Project Idea 3:

New chart series, 1:10,000, 1:50,000 and 1:250,000. This option was based on the same ideas as Project Idea 1 for the larger scale harbor plans and the approach charts but there will not be reproduction of the 1:250,000 series.

This was not acceptable for same reason as above.

#### Project Idea 4:

New chart series, 1:10,000, 1:50,000 and 1:100,000.

This option was based on the same ideas as Project Idea 2 and 3 for the larger scale harbor plans and the approach charts but there will not be reproduction of the 1:250,000 series or new construction for the same size series. Instead the whole lake will be surveyed for a new 1:100,000 series and after that it will be an easy task to produce a small scale chart that covers the lake as well. There will be the same amount of harbor plans and approach charts as in Project Idea 2 and 3 and additionally there will be 9 1:100,000 coastal navigation charts and one chart of the whole lake.

It was decided to make the charts as following:

1. Information for coastal navigation
  - Survey data and charts for harbor area at a scale of 1:10.000.
  - Survey data and charts for approaches at a scale of 1:50.000.
2. Information for fisheries and Pleasure Boating: Charts at a scale of 1:100.000
  - However sheets 1 and 3 will also be mapped at 1:50.000 because the lake is shallow in those areas, and also have high level of Tourist and Fishing activities.
  - (This is the most southern part of the lake.)
3. Navigation passage
  - Charts at 1:250.000.
4. Water Resources, Irrigation and Hydroelectric Power users
  - Smooth surveys / Bathymetric sheets of scales 1:100.000, 1:50.000 and 1:10.000.
5. Exploration and Exploitation Compilation Charts at 1:500.000 scale

For some reason, the Hydrographic Unit made a plan built on making the main charts on the scale 1:50 000 which was not on the plan. (See appendix 7)

The Project Document decision was later restated by the Consultant on a meeting in Lilongwe in March 2003 where it was agreed to follow the Project Document. (See appendix 6)

Expected outputs of the study were as follows:

1. Evaluation of existing technical capacity for hydrographic and topographic surveys and identification of necessary additional equipment needed to upgrade the capacity to present day standards.

2. Evaluation of human resources capacity for hydrographic and topographic surveys and necessary additional training needed to upgrade the capacity to present day standards.
3. Evaluation of existing charts and navigation aids.
4. Evaluate present capacity in preparing and publishing charts and other navigation aids.
5. Prepare an outline of a strategic plan for necessary hydrographic surveys on Lake Malawi and other relevant water bodies.
6. Prepare a preliminary Project plan indicating priorities, preliminary cost estimates where possible and a preliminary time frame.

In order to be able to do realistic up-to-date hydrographic surveys leading to construction of nautical charts it was necessary to upgrade all of the equipment (except the echosounder) and the software. More accurate equipment and easier to use was available on the market.

The Project focused on making Malawi self-sufficient in the production of charts used in shipping and other maritime related industries. The Malawi Department of Survey provided the 70-ton Survey Vessel Timba, the personnel to carry out the hydrographic survey task and all local facilities.

#### Previous activities at the Hydrographic Survey Unit

Marine safety standards on the Lake Malawi have been undermined due to lack of charts and navigational aids. This condition has exposed shipping to potential danger with considerable loss of lives and property. Therefore, in order to ensure safety of navigation and quality of service, availability and reliability of charts was essential.

The Hydrographic Unit is located in Monkey Bay and had only been involved with surveys related to special projects on the water bodies of Malawi. The Unit had not been involved in surveys that lead to the production of navigational charts. The skills of the staff were adequate to carry out a survey for navigational charts although the staff was lacking experience to transit the so called smooth sheet to a nautical chart.

#### Planning and preparation of Project activities

The Project Document was prepared in December 2000 after a formal approach to ICEIDA in early 1999. The Project was approved formally in early 2001 and shortly after the consultancy was appointed by ICEIDA.

#### Project management

In the Plan of Operations it is a requirement that all the major players in the Project, the Marine Administration (Director of the Marine Services Department), the ICEIDA Programme Manager<sup>1</sup> in Malawi, Surveyor General, The Head of Hydrographic Surveys Unit and any other officers requested by the Contracting Parties should form a Project Management Group (PMG). The responsibility of the PMG has been to manage the Project activities in order to ensure effective implementation.

The first meeting was held on 14<sup>th</sup> February 2001 and a total of seven meetings have been held, the last one was held on 18<sup>th</sup> February 2005. The Director of the Marine Services Department chaired the meetings which have been held on different places. The Principal Hydrographer acted as secretary of the meetings. During a typical PMG meeting, the major agenda item was a discussion on the progress of the Project activities. The ICEIDA Project Manager cooperated with the counterparts in preparing the reports and the Principal Hydrographer took a lead role in the presentation of the reports. The PMG was instrumental in resolving some issues and problems, considering Project plans and providing direction on Project implementation in general. The PMG therefore made decisions concerning implementation of the Project.

### Start of the Project

ICG-HS consultancy started to work on the Project in September 2000 by making decisions, in cooperation with former Programme Manager, how to modernize the equipment for hydrographic and cartographic work and how the training should be carried out. Equipment such as computers, printers, and navigational equipment from various suppliers was purchased.

The first plan for the Project was to:

- Install all the equipment onboard the survey vessel and the office and get it running.
- Complete the survey of 1/50 000 Monkey Bay chart (From Nkope to Malembo).
- Survey for 1/10 000 chart for the Monkey Bay harbor and surrounding area.
- Survey the coastline in detail with the DGPS system for the 1/50 000 chart.
- After the data collection and data processing would be finished a local cartographer should go to Iceland for training in cartography.

---

<sup>1</sup> In 2002 the title of the Programme Manager was changed to Country Director

- The first two charts would be printed in Iceland but all the following charts would be printed in Malawi.

To assist with installation of the equipment onboard the survey vessel, a field engineer from Racal Decca in South Africa was hired. The following equipment was installed onboard Timba:

- A survey computer with eight port communication board and a printer.
- Two monitors, one for the operator and the other for the helmsman.
- HYPACK MAX Survey software.
- Racal-Decca LandMark IV GPS navigation system with access to the SkySpot differential correction.
- Valeport Sound Velocity Profiler.

The Atlas Deso echosounder onboard S/V Timba had to be updated. Valeport water level gauge Model 740 an automatic pressure water level gauge was installed at the jetty at Malawi Lake Services dockyard.

For the Office, three computers were installed with the software “Hypack Max Office”. Plotter to plot from AO paper size and smaller, one printer and a digitizing table were installed and all connected through a local net. Internet connection was connected including e-mail. A base radio was installed at the Hydrographic office to communicate with S/V Timba. A power stabilizer had to be connected to all the equipment at the office. A digital camera for pictures to be used in a new Lake Malawi Sailing Pilot or Directions was supported.

A four by four twin cab vehicle was bought by ICEIDA for the Project and a driver hired.

Installation of the equipment and training of the staff in survey, processing and plotting out survey sheets took 38 days. The main difficulties with the installation of the equipment and training were due to power failures and telephone breakdowns. A power stabilizer was installed by ICEIDA. The actual survey started on 26<sup>th</sup> February 2001. Some additional equipment was brought such as Grab Corer for bottom sampling and a Voltage stabilizer was installed at the office to safeguard the equipment against erratic local electricity.

## PROJECT RELEVANCE

### Principles and priorities of ICEIDA

The mission of ICEIDA was defined in 1998 as follows: The development cooperation shall help people to be self-sufficient, in particular by transfer of knowledge and professional skills. The cooperation shall promote sustainable development, protection of the environment and natural resources, progress of the productive sectors, equality of individuals, democracy and human rights.

### Marine transport on Lake Malawi



Lake Malawi, third largest in Africa and fourth deepest in the world, stretches 585 kilometers long and is 80 kilometers wide. The lake offers the cheapest means of transport and is a major tourist attraction. Existing charts for the lake were produced in the early 1960s based on data collected from surveys of 1900s and 1950s. According to current international standards, information on existing charts lacks accuracy.

The Lake transport is the only mode of transport available to certain lakeshore communities to access markets. Efficient ferry services are therefore an essential social requirement as well as fundamental to the trade links for these rural areas.

One of the critical players in transport on the lake is Malawi Lake Services (MLS). MLS has two passenger ferries plying the lake, the Ilala and the MV Mtendere. The MV Ilala, a 620-ton vessel, provides an essential lifeline service to local communities along the

Lake. Every week, the MV Ilala travels the entire length of Lake Malawi (see figure 1) and back with up to 400 passengers and 100 ton of cargo. The Ilala's northbound round trip goes from Monkey Bay every Friday and makes stopovers in Chipoka, Nkhotakota, Metangula and Cobue in Mozambique before getting back to Malawi via Likoma and Chizumulu Islands. Then it proceeds to Nkhata Bay, Usisya, Rwarwe, Charo and Mlowe before berthing at Chilumba. For the southbound trip it traces its way back to Monkey Bay where it arrives on Wednesday. The round trip takes six days. MV Mtendere is on a new weekly route to Senga Bay and Meponda in Mozambique.

MLS also has other six vessels, four built for dry cargo MV Karonga, MV Nkhwazi, MT Viphya, and two vessels ML Ncheni, MV Katundu built for containers and MV Ufulu for fuel cargo.

Other lake users including the navy, marine police, fishing vessels, harbors, tourist industry, irrigation exploration and exploitation, among others, require charts for safe and efficient services.

#### Improvement was important.

Malawi is a member state to the international conventions of International Maritime Organization (IMO), which promotes maritime safety. This means that Malawi has to apply international standards and recommended practices of IMO and the International Hydrographic Organization (IHO) standard SP-No. 44.

At present, IMO SOLAS (The International Convention for Safety of life at Sea) does not specify Governmental responsibility for producing charts, but in 1983, IMO adopted a resolution referring to the importance of the provision of accurate and up-to-date hydrographic information to safety of navigation and to the fact that many areas have not been surveyed to modern standards. The Resolution invites Governments to conduct hydrographic surveys and co-operate with other Governments where necessary.

The Resolution was adopted after representation from the IHO, which had informed IMO of the inadequacy of nautical charts of many sea areas as a result of dependence on old hydrographic surveys and noted that, in order to develop up-to-date charts for these areas, substantial technical co-operation would be required between developed and developing coastal states on a regional basis.

Furthermore Malawi is a member state of Southern Africa Development Community (SADC) Protocol on Transport. In the sub-sector of maritime and inland waterway transport, the protocol urges SADC member states to update existing charts or to chart the coastline and inland waterways of the region, including all ports. The national shipping

legislation of Malawi likewise provides for the need to maintain updated charts on a regular basis.

As shown above it is mandatory for Malawi to produce up-to-date charts for safe navigation on the lake and to avoid environmental accidents.

#### Reaching IHO and IMO levels of competency

*All ships are required to carry "adequate and up-to-date charts" under SOLAS Chapter V (Regulation 20) to assist in navigation.*

Officials of the Department of Transport have a long-term objective of raising training and skills in the marine sector to satisfy criteria set by the IMO. The Project "Charting of Lake Malawi for the Safety of Navigation" is a way forward to fulfill this objective.

The Hydrographic Unit of the Department of Surveys has adequate human resources to carry out survey of the lake, however, due to lack of necessary equipment and training no charts were produced. This situation has of late been compounded by obsolescence of existing survey equipment and slow technology. Training in use of new technology and charting was therefore necessary.

This Project based at the "Charting of Lake Malawi for the Safety of Navigation" is relevant to the ICEIDA mission and priorities of the development agency as they appear in 1998. The main focus of the Project has been on the progress of the productive sectors and with emphasis on the transfer of expertise.

## EVALUATION FINDINGS

### Project obligation

The inputs into the Project are presented in the Project Document as contributions by the Malawi Government and ICEIDA. On the Malawi side the contributions included the provision of workers and payment of their salaries and office building for the Project. Inputs from ICEIDA included payment of allowances for the crew on survey vessel S/V Timba as well as providing administrative support. ICEIDA has had one Project Manager working on the Project half time who also has other responsibilities.

Financial resources, the original budget, for the Project was US\$800.000. ICEIDA was supposed to contribute 560.000 US\$ or 71% and the Malawi Government 230.000 US\$ or 29% over a period of four years.

It appears that the ICEIDA component of the Project obligations has been fulfilled and even more. The assistance from the Icelandic Coast Guard Hydrographic Service has been **in kind** when needed. It is anticipated that the equipment, which is in use will be sufficient to finish the survey work.

The Malawian Government, on other hand, has not been able to fund the Project in full. ICEIDA's Project Manager has in many cases handled things which originally were to be purchased by the Government. The bureaucracy in the Government seems to hinder normal advancement.

A rubber dinghy and a new vehicle have not been purchased during these four years. On the meeting in February 2005 it appears that the Water Department has four new and unused dinghies. There is now an intention to borrow one dinghy from the Water Department for the Hydrographic Unit.

No effort has been taken to purchase a lorry as set out in the Government's contribution to the Project.

The motor for the winch, for sediment sampling, has not been operational.

Digitizing the coastline of the lake at the Department of Surveys in Blantyre for easier planning, and more, has not been done but it was to be completed in June 2002. All land maps were scanned but digitizing work has not been completed.

In order to get the Project working smoothly Malawian Government has to be able to fulfill its obligation.

### Training personnel

The survey staff and crew on S/V Timba have shown their ability to assimilate new technology. The hydrographic personnel are getting more efficient at their job and have adapted the new technology. The Chief Staff Surveyor has trained the staff to work and maintain acceptable hydrographic survey standards as required.

Malawian candidate was accepted in 2002 for a six month long course in hydrography at the International Maritime Academy (IMA) in Trieste Italy which is an IMO agency. This training was partly funded by the Project. His conduct and academic achievement were reported to be exemplary. After his stay in Italy it should be easier for Malawi to apply for student enrolment in IMA. This candidate is now taking a degree at the Malawi Polytechnic of the University of Malawi in Blantyre. Malawi has sent an application to IMA and asked for a place for second student in 2004, no feedback has been received yet.

The cartographer from the office was sent for a two-week computer course in Blantyre. He was then sent to Iceland for three months for training from September through December 2001. During his stay he was trained by the ICG-HS in production of navigational charts and to make them ready for printing. The cartographic personnel have been increased last two years but in the beginning it was only one cartographer at the office.

### The Survey

These four years of hydrographic survey on the lake proves that survey staff and crew on survey vessel Timba have shown their ability. Six charts have been published and four more charts are in various stages of processing (cf. Appendix 2). The Hydrographic Survey Unit has also carried out special survey on the Shire River project. This indeed gives an idea that the Project has been successful even though some problems and breakdowns have occurred. In early 2003 it was recommended by ICG-HS to change the index of the charts from 1:50.000 to 1:100.000 (cf. Appendix 2). This concept was approved by all stakeholders.

To strengthen the survey section even more it has been decided to train one person abroad and applications for training have been made to Trieste, Italy and Goa, India using forms supplied by the International Hydrographic Bureau.

The Survey equipment is generally in good condition. The Grab Corer has not been acquired for sediment sample due to faulty winch.

The Chilumba charts are amongst the most important due to the nature of the area, which is tricky in terms of navigation. The plan is to commence surveys of Chilumba and proceed to Ruarwe, Bandawe and NkhotaKota.

It should be kept in mind that hydrographic survey takes a long time and is difficult work. The “Rule of thumb” is; that it takes about two years from the beginning of survey until the chart is published.

### The Charting

It has become more and more obvious that the cartography and printing item was somehow left out in the Project Document and this has created problems. The problem came up with cartographic work since the source for the old manual method was not practical. The materials for the “manual method” are not available anymore and are becoming scarce due to computerization worldwide. It became obvious that the Project had to look seriously in computerizing of the chart production sector. Therefore, a decision was made in late 2003 to purchase CARIS Marine GIS digital charting software, effective spatial analysis tool that permits the creation of digital paper charts to IHO standards.

Training in use of the CARIS Marine GIS took place in Monkey Bay in February 2004 by an instructor from CARIS B/V in Netherlands. The main problem with the training was that too many employees took part. Three or four employees should have been trained and they would then have been able to train additional personnel when needed.

On the other hand, the concentration has not been on CARIS production for a year and this causes problems because it is hard to remember how to use the software if none is working on it for a long time. However, the Hydrographic Unit is able to get support through the CARIS Subscription Program, which ICEIDA has paid for throughout the 2005. The cartographers within ICG-HS are also able to assist when needed and that has exactly happened when some Icelandic in-house manuals were translated to English in March.

### The Sailing Directions

Reproduction of the Sailing Directions in connection with the survey is a part of the Project, which has not been started yet. It was supposed to be a side product as the survey project of the lake was being carried out and information for it sought simultaneously by taking photographs and making notes. The old Sailing Directions were scanned by the ICG-HS Consultant in 2001 for easier update. Shortage of qualified personal might be the reason that this hasn't been done yet.

This part of the Project is an important component for people on pleasure craft that sail along the coast but are probable not those who buy charts. These people need information about the coast, dangers like rocks, rest areas, hotels etc.

### Unforeseen circumstances

In the hydrographic world vessel problems or groundings are not unusual. The Project has not been unaffected by this "rule". The survey vessel Timba had an engine problem for seven months in 2002 and 2003, and two weeks delay, which was caused by grounding in 2002. In the cartographic work there has also been delay. Two main key partners passed away during the Project, the late Mwenefumbo, Captain of the Survey Vessel Timba, and late Captain Levi Mkawa, Deputy Director Malawi Marine Administration. This caused an administration problem and a Project delay, mainly because the Government did not promptly identify personal for replacement. Due to those delays the Marine Department formally asked for 6 months extension of the Project which ICEIDA accepted midyear 2004.

## EFFICIENCY and EFFECTIVNESS OF THE PROJECT

The effectiveness of the Project was assessed based on the main activities, inputs, outputs and indicators as stipulated in the Project Document.

ICEIDA provided short-term consultancies equivalent to three or four months full time position. The ICEIDA part-time Project Manager and Chief Staff Surveyor have been working hard running this Project both in financing and managing.

Project activities have been effective in promoting training for the Hydrographic Survey Unit at a professional level.

The following inputs were specifically planned for the Project:

### Main input planned for the Project:

- Set up IHO standards
- Plan shorter courses and carry out training for the unit
- Train Malawian personnel
- Procure material and equipment

### Main outputs of the Project:

- A set of 27 new nautical charts for Lake Malawi
- Modern equipment available in Malawi to do Hydrographic and cartographic work
- Trained personnel in Malawi to operate the equipment provided and in the whole sequence of surveying for and designing nautical charts

It was unrealistic to set out that a set of 27 new charts would be produced over a four year period. The Hydrographic Unit had adequate human resources to carry out survey, however, due to lack of necessary modern equipment and training no charts were produced until the Project started. The Hydrographic Unit had only been involved with surveys related to special projects with old and outdated equipment. Today the Hydrographic Unit has the knowledge and modern equipment to do survey and produce charts. There is no question that the Project has been effective. The training of staff has had a positive impact and the competence has increased.

## SUSTAINABILITY

Sustainability is an indication whether the positive impacts of the Project are likely to continue after external assistance has come to an end.

The overall progress of the Project indicates that overall it has went on according to plan. Six charts have been printed by the end of year 2004 and it gives some encouragement that a lot can be achieved. It shows that with some persuasion and financial support great things can be achieved.

The neighboring country of Mozambique is in great urgency to extend the surveys on their part of the lake although this was not envisaged in the initial Project Document. The Mozambique Government is considering carrying out surveys on their part of the lake. The idea is for Mozambique to solicit funding support and proposing a new project. A draft document is now under preparation. This would certainly have to be considered since a survey of the whole lake is of mutual benefit to both countries.

There is a lot of goodwill surrounding the Project and it may be possible to develop sustainable by the setting of conditions for further support. The funds of the Project have been managed by the ICEIDA Project Manager who has also seen to most of the purchasing of Project equipment and materials. The ICEIDA is going to support the Project by some fund for the next two years and for that a special account has been established under the management of the Chief Staff Surveyor.

It is certain that the Hydrographic Unit is capable of keeping the Project running under the leadership of Chief Staff Surveyor if the Government support it with funding. It is very important for safe navigation on Lake Malawi to continue this work.

## CONCLUSIONS AND RECOMMENDATIONS

### Conclusions

There is no doubt that the Project is relevant to the Malawi Government in the context of its strategy for transportation on Lake Malawi. Project activities have been effective in developing and promoting training for surveying at a professional level.

Improved safety of navigation will be the direct result of this Project and will be translated by reduction of marine casualties that may be caused by uncharted obstacles in the lake.

Well charted Lake Malawi will be safe and then it stands to reason that marine accidents will be minimized and reduce the likelihood of marine pollution of oil from ships. Marine transport services should then be more cost-effective.

The most serious problem in the Project has been the financial problem. Although the Project started very well, the problems were not really over as Malawian Government faltered in its contribution to the Project and ICEIDA had to almost single-handedly get the Project through. The bureaucracy in the Government seems to hinder normal advancement. For example the recruitment of the Captain on Timba took months to fully employ him due to Government's requirement on minimum academic qualifications. This has also been the case when other personnel had to be employed.

The Hydrographic Unit of the Department of Surveys has adequate human resources to carry out survey and charting the lake, when funds are available they have shown that they are knowledgeable and experienced. It is always hard to determine how long it takes to survey for a chart and how long it will take to construct it. Some areas are just harder to survey due to reefs, shoals, weather conditions, technical problems and other factors that affect the survey.

Cartographic works were delayed by scarcity of manual production materials but by installing computerized charting software this has been solved. Chart production is a never-ending process since there are always revisions after the current charts have been published.

A link with the Hydrographic office is necessary for the Hydrographic Unit in Monkey Bay. This would preferably be by way of the Internet in solving day-to-day hydrographic or computer problems.

One of the major lessons learned from this Project is the option of focusing on short-term visits from Iceland instead of long-term stays in the partner countries. During these visits local experts benefit through the training they get and they may also use Internet communication between the visits. This is exactly what has been done in this Project and has proved to be more cost effective.

### Recommendations

As observed above, ICEIDA has supported the Project “Charting of Lake Malawi for the Safety of Navigation” for a period of four years. It is therefore expected that this support must have made a lot of impact in a number of cases as observed above. The developments that have occurred in the surveying and charting of Lake Malawi are great and must be continued. During these four years of the Project considerable progress has been made. Much of this development is attributed to ICEIDA support. ICEIDA has decided to withdraw or refocus on the support. However, a four year period of support in hydrographic world is not a long time. Even though ICEIDA will withdraw from everyday involvement it would be preferable to support the work with some financial assistance. The weaknesses of the Project are mainly in the financial part.

These recommendations should be looked at as suggestions to both parties for the future cooperation.

- 1) If the lake is to be completely covered the input from Mozambique is essential. It will be an interesting development if a multilateral Project with the neighboring country will become a reality and facilitate achieving the aim of a fully charted lake.
- 2) Due to lack of necessary navigational aids it is mandatory to install some lighthouses and buoys to increase safety. This could be done by a special funding from ICEIDA or some other international agency but is really important.
- 3) A system of Notices to Mariners should be implemented as charts of the lake become available. The base radio station might be used as a first step in propagating navigational warnings on Lake Malawi by broadcasting Maritime Safety Information (MSI), Navigational and meteorological warnings,

meteorological forecasts and other urgent safety-related messages. For further information, see IHO Special Publication 53 (SP53).

- 4) It is necessary to intensify the knowledge of the personnel in CARIS Marine GIS to handle the new cartographic technology. This can only be done inside the Hydrographic Survey Unit with assistance from ICG-HS as well as with Caris support.
- 5) Because of unstable power it is mandatory to buy a power generator for the office to be able to continue the daily work. Power failure in Monkey Bay can last for days. A power generator could be funded by the ICEIDA fund to be given to the office in the year 2005.
- 6) Continued training of personnel in surveying and charting is essential. There are two free international courses available in hydrography and cartography. One is provided by International Maritime Academy, in Trieste Italy and the other by the Indian National Hydrographic Office.
- 7) Training should be ongoing even for experienced personnel not to become stale in the event of new technologies.
- 8) The Malawian Government must contribute a new vehicle before the other one is worn out.
- 9) The Malawian Government must replace the Timba's rubber boat. It is worn out and needs to be replaced.
- 10) The Hydrographic Unit has a need to be in touch with local computer companies to maintain and solve network or general computer problems.
- 11) Cooperation with hydrographic office should be on a permanent basis.
- 12) Reproduction of the Sailing Directions is needed. That could indeed be done in cooperation with Marine Department.
- 13) The subscriptions for licenses for CARIS and the DGPS are needed to be updated every year. This could be paid for by the ICEIDA fund in 2005 and 2006.

Page intentionally left blank

## **APPENDICES**

Page intentionally left blank

Terms of reference for the evaluation

**Terms of Reference for the Internal Consultancy Work to Evaluate and Counsel the  
ICEIDA- Partly Funded Project  
“Charting of Lake Malawi for the Safety of Navigation”  
To be carried out in February and March 2005**

**Background and Introduction**

The project is specifically taken into consideration of the fact that, Lake Malawi has been without new publication of charts for over four decades due to lack of capacity to produce the charts. Existing charts for the lake were produced in the early 1960s based on data collected from surveys of 1900s and 1950s. According to current international standards, information on existing charts lacks accuracy.

Navigation on the lake is unsafe without updated charts. Since the last publications of the existing charts, the lake’s level, shoreline and physical features have changed considerably. Information on these current charts is therefore outdated. International standards command that charts must be regularly updated to take account of the changes in hydrographic survey information.

The main development objective of the project is to provide seafarers and fishermen in Malawi and from neighboring countries with an essential tool crucial for safety of navigation, which would in turn improve operational and training efficiency.

The project is focusing at making Malawi self-sufficient in the production of charts used in shipping and other maritime related industries.

The Project is jointly implemented by the Marine Department of the Ministry of Transport and Public Works and ICEIDA. The Hydrographic Surveys Unit of the Ministry of Lands, Housing Physical Planning and Survey will be technically responsible for the implementation on behalf of Malawi and the Hydrographic Unit of the Icelandic Coast Guard and the local based project coordinator are technically responsible on behalf of ICEIDA.

**Objective:**

The overall objective of the project is to provide seafarers and fishermen in Malawi and from neighboring countries with an essential tool crucial for safety of navigation, which would in turn improve operational and training efficiency.

**Main outputs:**

The main outputs of the project are to be:

- Produce new nautical charts for Lake Malawi

- Provide modern equipment to carry out hydrographic and cartographic work
- Train Malawian personnel to operate the equipment provided and in the whole sequence of surveying for and designing nautical charts

**Malawi Contribution:**

Malawi is providing all local facilities, including a Hydrographic Survey vessel, needed for the project as well as all necessary local professional, technical and support staff. The Malawi contribution is estimated at 230.000 US\$ or 29% of the total cost of the project.

**ICEIDA Contribution:**

ICEIDA is providing technical expertise and training in Hydrographic surveying and cartography. ICEIDA will further provide funds for capital expenditure and operation during the implementation of the project, ICEIDA contribution is to the tune of 560.000 US\$ or 71% of the total estimated project cost.

**Reasons for the Consultancy Work**

The internal consultancy is being undertaken at the request of ICEIDA in order to assess the current results of the Project in view of the objectives and planned inputs and outputs of the Project and in order to make recommendations which are expected to facilitate the satisfactory completion of the Project.

The Consultant shall also provide the ICEIDA advisers and the staff of the Malawi government with information and advice in order to support and strengthen further planning and implementation of activities in the Project.

**Scope and Focus of the Consultancy Work**

- The consultancy will focus on providing information for ICEIDA.
- The Consultant will consider the extent to which the partners have worked towards keeping the terms of the Project Contract.
- The Consultant will seek the involvement of the staff of the Hydrographic survey office in Monkey Bay and Project participants in order to give advice and provide information.
- The Consultant will consult with other relevant local and government authorities as well.
- Commence a new technical agreement between relevant partners for next two years.
- Check the equipment and update software

**Required expertise**

The consultant should have relevant experience in hydrographic survey and charting, with field experience and with a good knowledge on the subject.

**Plan of Work, Timetable and Reporting**

Interviews with key informants, including representatives of the Ministry for Land, Physical Planning and Surveys, Marine Department, staff of the Hydrographic office in Monkey Bay and ICEIDA's advisers will be carried out in Malawi during visit in February.

Preparation for the evaluation will begin in February 2005. Field work will be carried out in Malawi from 14<sup>th</sup> February to 22<sup>nd</sup> February 2005 with a draft report being prepared on-site. The draft will be commented on by ICEIDA and relevant authorities.

The final report will be submitted to ICEIDA in end of March.

(Prepared in January 2005)

## APPENDIX 2

### Printed Navigational charts.

<u>No.</u>	<u>Name</u>	<u>Scale</u>	<u>Published</u>
1. <b>C10 - 8</b>	<b>Monkey Bay and Approaches</b> LL <sup>2</sup> 14°06'50"S      34°54'30"E UR 14°01'42"S      34°58'06"E	<b>1:10 000</b>	<b>2003</b>
2. <b>C10 - 7</b>	<b>Chipoka</b> LL 14°01'54"S      34°34'18"E UR 13°56'54"S      34°30'48"E	<b>1:10 000</b>	<b>2004</b>
3. <b>C50 - 26</b>	<b>Nkudazi Bay To Malembo</b> LL 14°19'00"S      34°44'00"E UR 13°54'00"S      35°02'00"E	<b>1:50 000</b>	<b>2003</b>
4. <b>C50 - 27</b>	<b>Approaches To Shire River</b> LL 14°25'18"S      35°01'00"E UR 13°59'00"S      35°19'00"E	<b>1:50 000</b>	<b>2004</b>
5. <b>C50 - 24</b>	<b>Ndala Kwilasya To Cape Ncombo</b> LL 13°59'00"S      34°43'00"E UR 13°43'00"S      35°09'00"E	<b>1:50 000</b>	<b>2004</b>
6. <b>C50 - 25</b>	<b>Lumwira To Maleri Island</b> LL 14°18'00"S      34°28'00"E UR 13°53'00"S      34°45'00"E	<b>1:50 000</b>	<b>2004</b>

### Data collected for following charts.

<u>No.</u>	<u>Name</u>	<u>Scale</u>
C10 - 4	Likoma	1:10 000
C50 - 15	Likoma Islands	1:50 000
C100 - 10	Monkey Bay	1:100 000
C100 - 4	Nkhata Bay	1:100 000

---

<sup>2</sup> LL stands for Lower left corner of the chart, UR for the upper right corner of the chart.

## APPENDIX 3

### Record of evaluation activities

10 <sup>th</sup> – 11 <sup>th</sup> February	Preparations in Iceland and Malawi, documents assembled
12 <sup>th</sup> – 14 <sup>th</sup> February	Traveling to Lilongwe
14 <sup>th</sup> February	Short discussion with Mr. Msowoya, Director of Marine Services
15 <sup>th</sup> February	Short discussion with Mr. Mzunzu, Principal Hydrographer and working on Surveys computers
16 <sup>th</sup> February	Working on Surveys computers until electricity went off. Writing report.
17 <sup>th</sup> February	Working on Surveys computers until electricity went off.
18 <sup>th</sup> February	Working in Survey and ICEIDA Office. Meeting with PMG at Nkopola Lodge
19 <sup>th</sup> February	Day off
20 <sup>th</sup> February	Meeting with Mr. Mzunzu, Principal Hydrographer
21 <sup>st</sup> February	Working at Survey, driving to Lilongwe
22 <sup>nd</sup> February	Report writing
23 <sup>d</sup> and 24 <sup>th</sup> February	Traveling to Iceland
14 – March – 30 April	Report writing

## APPENDIX 4

### Informants

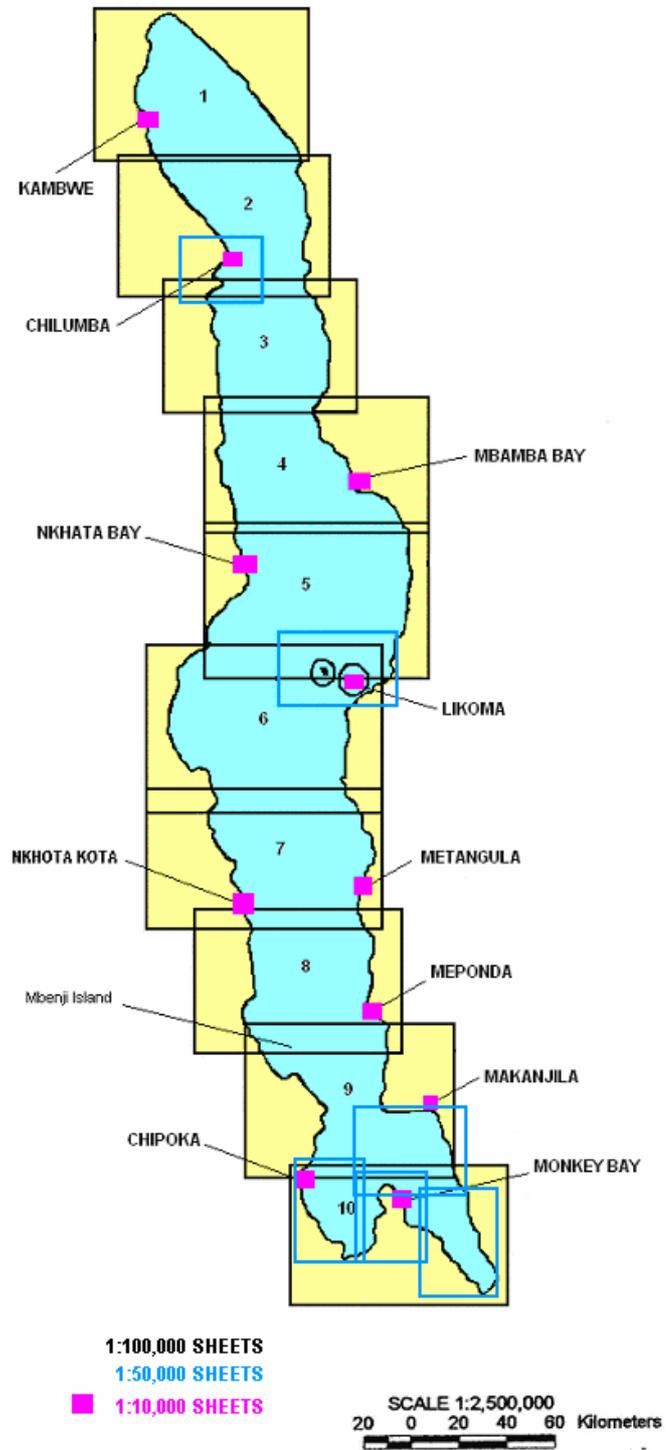
Ms Þórdís Sigurðardóttir	ICEIDA Country Director, Malawi
Mr A. D. B. Msowoya	Director of Marine Services, Marine Services Department.
Ms Margrét Einarsdóttir	ICEIDA Project Manager, Malawi
Mr Jóhann Pálsson	ICEIDA Project Manager, Malawi
Mr. D.O.C. Gondwe	Surveyor General, Surveys Department
Mr. G. Mkondiwa	Secretary for Lands, Physical Planning & Surveys
Mr. Magugu	Cartographer Malawi Dep. of Surveys Hydrographic Unit
Mr. Michael Mzunzu	Chief Staff Surveyor, Hydrographic Unit, Survey Department
Mr. Singini	Safety Division, Marine Department
Mr. P.C. Botomani	Chief Map Production Officer, Surveys Department
Capt. T.S. Kamanga	Chief Surveyor of Vessels, Marine Department
Mr. B. Chikungwa	Assistant Accountant, Surveys Department
Mr. Gift Chigona	Hydrographic Unit, Survey Department
Mr. Anthony Mweso	Hydrographic Unit, Survey Department

## APPENDIX 5

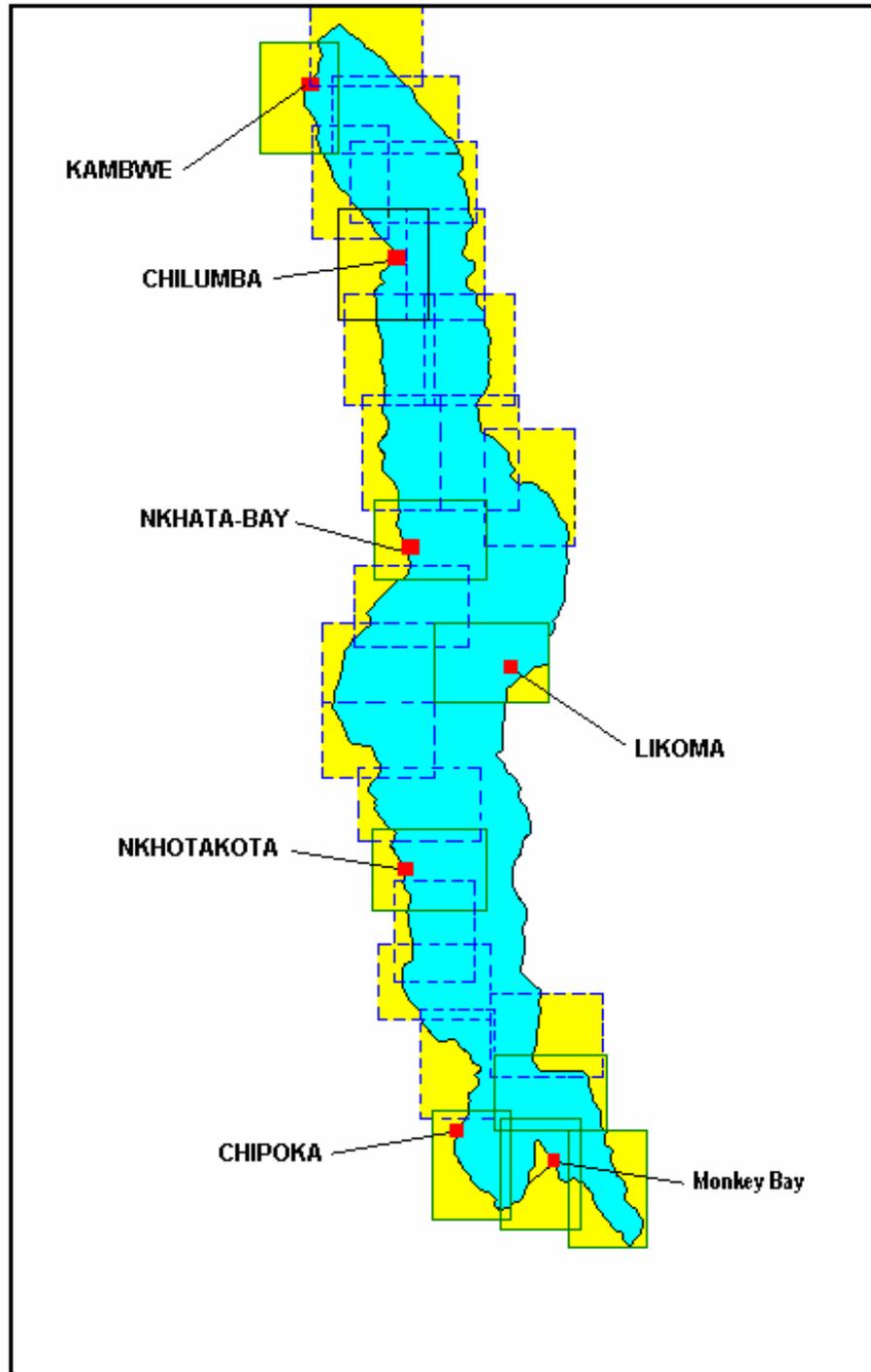
### Documentation:

- 1999 Study on charting of Lake Malawi for safety of navigation. LT Asgrimur L. Asgrimsson  
Icelandic Coast Guard Hydrographic Service
- 2000 Charting of Lake Malawi for the safety of navigation Malawi Marine Administration  
2001 – 2004 Project Document
- 2000 Plan of Operations for Project Charting of Lake Malawi for the Safety of Navigation  
Malawi Marine Administration 2001 – 2004, 15th December 2000
- 2001 - 2005 Project report from the Project Management Group (PMG) meeting.
- 2001 - 2004 Bi-annual reports,
- 2001 – 2005 Minutes of Project Progress meeting
- 2001 – 2004 Proceedings and letters concerning the Project.
- ICEIDA's Annual Report 2001, 2002 and 2003

Plan for 1:100 000 charts



Plan for charts in 1:50 000



**Financial Statement****ICEIDA, expenditure in the Charting of Lake Malawi Project**

Commitments as listed in the Project Document and MoU for the Project. Additional funds due to six months Project extension and cost of Caris software are included as well.

<b>Project</b>		<b>Commitment</b>	<b>Ministry</b>	<b>Tentative</b>
<b>Code</b>	<b>Project Name</b>	<b>Period</b>		<b>Contribution</b>
1113312	Charting of Lake Malawi	01.01.2001-31.12.2006	MoTPW	780,000 US\$

Actual disbursements as listed in ICEIDA accounts for the Project

<b>Year</b>	<b>Expenditure</b>
2000	49,757
2001	174,843
2002	158,061
2003	162,534
2004	156,871
2005	50,000
2006	40,000
<b>Total</b>	<b>792,066</b>

<b>Tentative contribution</b>	<b>780,000 US\$</b>
<b>Total expenditure</b>	<b>792,066 US\$</b>
<b>Balance</b>	<b>12,066 US\$</b>

## **GoM; Expenditure in the Charting of Lake Malawi Project**

Commitments as listed in the Project Document.

<b>Project</b>		<b>Commitment</b>	<b>Ministry</b>	<b>Tentative</b>
<b>Code</b>	<b>Project Name</b>	<b>Period</b>		<b>Contribution</b>
	<b>Charting of Lake Malawi</b>	<i>01.01.2001-30..06.2004</i>	<i>MoTPW</i>	<i>243,400 US\$</i>

Disbursements as listed in GoM accounts for the Project (interim accounts)

	<b>Expenditure</b>
<b>Human Resource</b>	<i>114,000</i>
<b>Operation of S/V Timba</b>	<i>60,000</i>
<b>Local Subsistence Allowance</b>	<i>10,000</i>
<b>Other Operational Costs</b>	<i>20,000</i>
<b>Total</b>	<i>204,000</i>

<b>Tentative contribution</b>	<b>243,000 US\$</b>
<b>Total expenditure</b>	<b>204,000 US\$</b>
<b>Balance</b>	<b>39,000 US\$</b>

It was not possible during the preparation of this document to get final statement from Malawi Government regarding actual expenditure. This statement is expected to be available at end of June 2005.

During 2002 and 2003, contribution from Malawi Government was very small due to various reasons. Still, it has to be borne in mind that the Malawi Government has always been able to pay salaries to local staff members of the Project. Therefore, the human resource component turned out quite in order. It was mostly the operational component of the Project that was suffering from the beginning until late 2004 when considerable funds were put in to the Project by the Government of Malawi.