

1 Malawi Hydrographic Office

The Malawi Hydrographic Office was started 30 years after the federal government hydrographic surveys. In the year 1989 the 70-ton ship RV Timba was assembled with assistance from the French government. An Atlas Deso 22 echo sounder was also procured during this time. The Hydrographic office objective was to carry out surveys of Lake Malawi including the lesser lakes of Malombe, Chilwa and Chiuta and also the Shire River. By the same token the French government aid included the training of one hydrographer at EPSHOM in Brest, France. The ship; RV Timba was fully functional thus equipped with crew members who could go on voyages at any time required.

In 2001 the project “Charting of Lake Malawi for the Safety of Navigation” was embarked on funded by ICEIDA (Icelandic International Development Agency) and the Malawi Government using mostly modern equipment and software for data acquisition and processing.

2 Hydrographic Surveys

Lake Malawi is the third largest lake in Africa and has an approximate area of 24000km². Since the launch of the “charting of Lake Malawi for the Safety of Navigation” project that was embarked in 2001, a substantial amount of bathymetric data has been acquired and several charts have been produced. Significant investment in equipment and modern software was instrumental in the production of charts. To date 40% of the total area has been surveyed.

Problems

Over the past years the Hydrographic Office has met greater outstanding challenges in its endeavors. One cited such example is the breakdown of the ship’s propulsion engine which brought idleness in the acquisition of survey data and other significant survey operations. The Research Vessel Timba broke down her engines while carrying out survey operations for Lake Niassa on a joint operation (Malawi Mozambique ICEIDA Project in August 2005). The Malawi Government has recently made commendable strides and tremendous efforts to repair the vessel by purchasing two C7 New Caterpillar Marine Diesel Engines from Barloworld Company. Developments to fully accomplish the maintenance work are at an advanced stage as engineers are timelessly working on the boat. In fact there are just a few activities and technicalities remaining to fully prepare the vessel for seaworthiness. By fully maintaining the vessel, the Hydrographic office shall be brought to life and most programmes shall take a new stance.

On the other hand the office has been using the Racal DGPS receiver for quite a long time before it malfunctioned. There were signs of ageing of equipment. A better alternative of an up to date model could have been sourced in order to replace the obsolete and malfunctioning equipment. Hydrographic Office lacks such a reliable and vital piece of GPS equipment.

On a note of success, the Hydrographic Office managed to procure a hydrographic launch. This was on its long term plans. The launch has replaced an old model and intended purposely to serve and outreach the surveying of coastal and shoal areas.

Without multi-beam echo sounder it is not possible to achieve 100% bottom coverage in harbor and critical areas however side scan sonar could assist if it is purchased as an interim measure.

3 Charts and Publications

a. Charts

Several new charts have been produced, these are:

i. Data acquired

- **1:100,000 Series**

ii. Data acquired and validated

- **1:10,000Series**
 - a. C10-3
 - b. C10-2

- **1:100,000 Series**
 - C100-5 (few profiles to be redone in the field)

iii. Charts ready for printing

The following charts are ready for printing, and currently are printed on demand using CARIS Software:

-1:10,000 Series

C10-4

-1:50,000 Series

A.C50-15

iv. Charts printed

-1:10,000 Series

- a. C10-8
- b.C10-7

-1:50,000Series

- c. C50-24
- d. C50-25
- e. C50-26
- f. C50-27

The chart index is attached as Annex I.

ENCs-the development of ENC is yet to be embarked on and should commence when resources and infrastructures become available.

RNCs (Raster navigation Chart)-these can simply be produced by scanning at high resolution the original reprints. Not yet available at present. No INT and pleasure Craft Charts have been produced as yet.

Problems Encountered

Printing press is still not available. The department is looking into purchasing a printing press which is also required for production of new topographic maps that are currently outdated. A suggestion to print charts on demand has been made by SAIHC advisory team and also to use color fast and powder.

b. Publications

No new or updated publications have been made; the office will embark on revising Lake Malawi Pilot in 2012.

This is important to detail information about the coast and highlight dangers and show places of interest to tourism, for example. There will be close cooperation with the Department of Marine Services for this input.

Problems encountered

Lack of trained or experienced personnel in the preparation of the sailing pilot.

4 Maritime Safety Information (MSI)

Nation/Area	INT Region	Local Warning	Coast Warning	Navarea Warning	Port Info	Master Plan
Malawi	H	Partial Lake Malawi pilot update	No	No		

The transmission of safety information to Mariners is the responsibility of Marine Services Department.

Problems Encountered

Marine Safety Information is not so well developed. Information on the weather is broadcast on the local radio and television. Generally during the months of June to August, South Easterly winds are prevalent which blow up the length of the lake. This can go up to a week.

The Marine Safety Channel (Channel 16) is a dedicated international channel for distress alert messages but is not obvious if most navigators use it effectively. However the marine administration has its own local radio channel which most mariners are able to access.

Maintenance of navigation lights is again the prerogative of the Marine Department. Some maintenance work is now being carried out. There are plans to replace the lights with robust ones, which are almost “theft proof”. All lights will be surveyed, coordinated and heightened. In addition other useful features and

transit marks will be included in a new “sailing directions”. A system of notices to Mariners is not fully operational; this again awaits implementation by Marine Department.

5 Capacity Building

Achievements have been registered in the sense that surveys have been carried out and charts have been produced using the available personnel. However, it is obvious that they are no ready replacements for the staff. Thus more opportunities for training are still being sought in order to achieve continuity. Shortage of staff exists both in the hydrographic surveys and cartographic section. Staff recruitments have recently been managed as a means for covering up gaps and staff deficiencies.

Government is making all efforts to maintain a trained staff and in this sense one staff member from the Hydrographic Office has now been trained at the STC in Netherlands which training was fully financed by the Malawi Government. Training is also sought for CAT A training in Hydrography. As of now a member of staff is finalizing a degree course in surveying and mapping at the university of Malawi, the Polytechnic.

Training in Nautical Cartography is required especially in view of advances in automated Cartography. A course in Electronic Navigation Charting organized by the IMO was attended in Durban, South Africa. Similar courses of Data Design, Management and Marine Spatial Data infrastructure (MSDI) and Ports and Shallow Water Surveys have also been attended internationally. It is still hoped that the International community can look favorably once again on matters of training for our upcoming hydrographic concern so that they are equipped with new technological advancements.

The cooperation between Malawi and Iceland brought with it such equipment as DGPS receiver, computer hardware and software. Printers, plotter, scanner automated pressure tide gauge, sound velocity profiler and in data acquisition, Hypack data acquisition and processing software. In addition the CARIS chart processing software was a landmark towards achieving modern digital chart production capabilities.

Formal multilateral agreement between Malawi, Mozambique and Iceland (ICEIDA) through Charting of Lake Malawi (Niassa) project has provided professional development whereby Malawian Hydrographers interacted with the new data acquisition system i.e. RTK GPS and multibeam echo sounder. The survey work was completed in the year 2007. Our colleagues in Mozambique have now submitted two harbor charts of Metangula Bay and Meponda bay at 1/10,000 and 1/15,000 scale respectively which were done in conjunction with the Icelandic International Development Agency ICEIDA; however Malawi has yet to carry out surveys on its side of the border due to funding problems. The aim is to accurately determine the median line between Malawi and Mozambican waters in order to install floating marks / buoys for physical identification and reaffirmation of the lake border.

Meanwhile there is Shire-Zambezi waterway project under study that will benefit Malawi as well as the SADC region in the shipping industry. We therefore await completion of a feasibility study in order to realize this navigation project. The study hasn't been done yet.

6 S-55

The charts are at scales 1:10000, 1:50000 and 1:100000

With the resources at hand the status of hydrography and nautical cartography may be ranked as fairly good. As mentioned above 40% of the whole lake has been surveyed. Two charts at 1:10000 and four charts at 1:50000 scales have been printed. One chart at 1:10000 and one at 1:50000 chart scales are being printed on demand.

See attached Annex II (extracted from IHOCBC Malawi Visit Report 2008)

7 Oceanographic Activities

A network of staff tide gauges running the whole stretch of the western coast of Lake Malawi including Lake Malombe and Shire River are maintained by the Ministry of Water and Irrigation department.

One automated pressure tide gauge located at Monkey Bay Harbor was installed in 2001 and is maintained by the Malawi Hydrographic Unit. Proposed sites for additional automatic pressure tide gauges are at Nkhota Kota, Nkhata Bay and Chilumba ports.

A sound velocity profiler model 650 is used to calibrate the echo sounder. In case of failure of this equipment a bar check is used.

For sediment sampling and description of the lake bottom characteristics, a Grab Corer was acquired.

Problems encountered

- Lack of a current meter prevents the inclusion of water current information on the charts
- The Grab Corer is still not operational due to problems of the winch motor. The motor has not yet been replaced due to other priorities.

On a sad note we lost a very experienced diver on the lake in the month of July. He dived in the vicinity of Mbenji island geographical location 13Deg 26 Min 13 sec S, 34Deg 29 Min 20 sec E at a presumed depth of 80m deep with two air cylinder and after freeing a fishing net at that depth, never came up to the surface himself and since no one is able to go to that depth hope of ever finding his body is lost.

8 Concluding Remarks

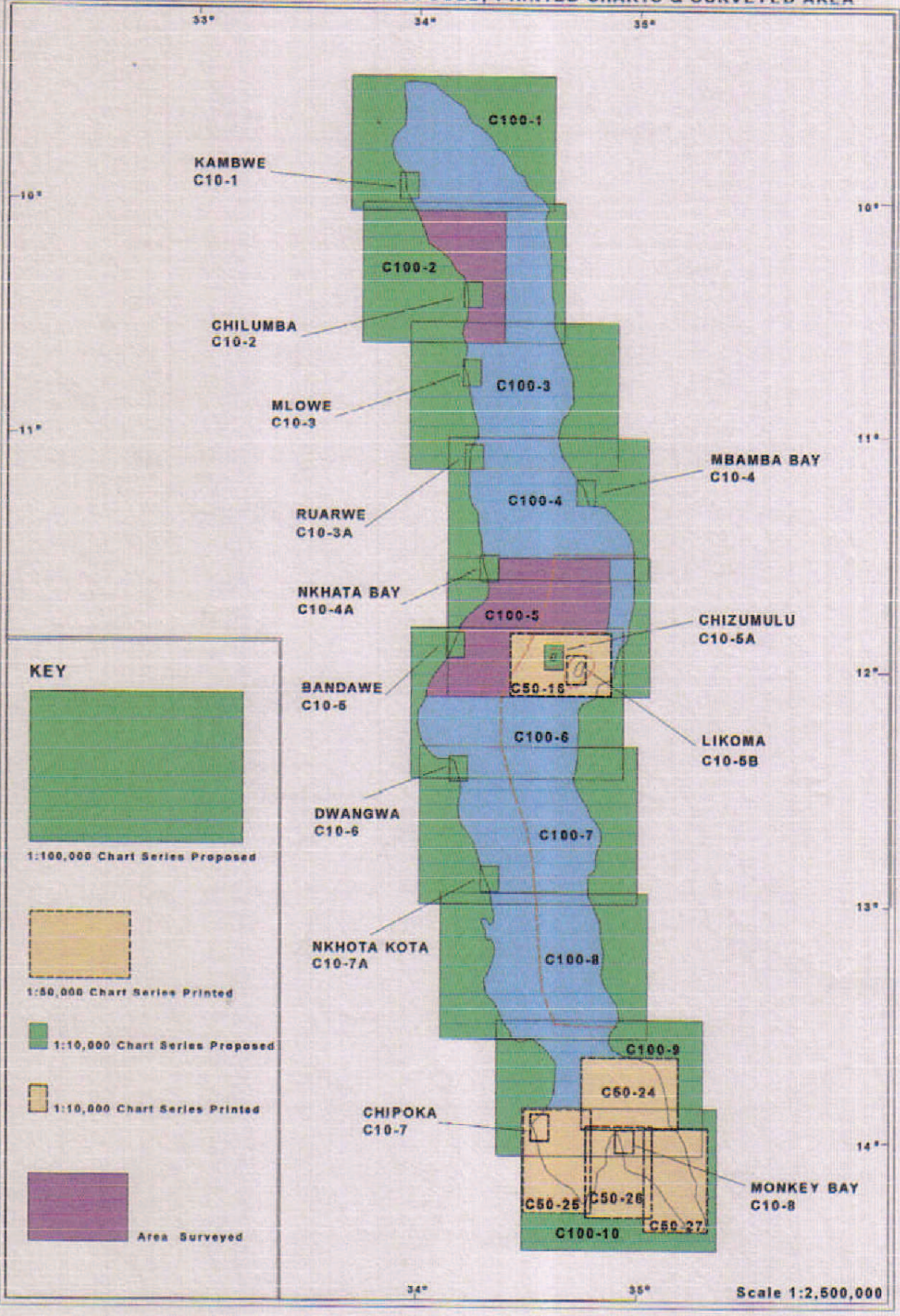
Successes have been registered by the Malawi Hydrographic Unit, however a lot more still remains to be done in order for the HO to succeed in its endeavors of producing modern navigation charts, revising the Lake Malawi Pilot, providing a survey revision facility and monitoring services of the lake environment.

There is therefore need to invest in human resource and infrastructure development in order to overcome the problems mentioned above. To varying degree success the Malawi government has made efforts to overcome these problems. Malawi completed port construction at the port of Nsanje in expectation of the Shire Zambezi waterway project and the Hydrographic offices both in Malawi and

Mozambique will play prominent roles during the feasibility studies to give advice to various players. It is envisaged that the sustainable activities on the waterway will sustain the region surrounding this waterway in a significant manner in an area which is currently underdeveloped and faces various challenges, socioeconomic challenges which it is hoped will become a thing of the past once the project commences. We aim to model ourselves on the other renowned and remarkable waterways in the world such as the Mississippi in the United States of America which is a viable example of integrated waterway management.

The government of Malawi has shown commitment to its hydrographic endeavours by purchasing and installing 2 new engines for the ship and carrying out major maintenance works on the hydro ship. It is still hoped that the international community can come forward to give support to enable us to forge ahead in hydrographic surveying and charting of Lake Malawi which is to us our most significant natural resource harbouring a variety of endemic fish species and important economic needs of the country.

MAP OF LAKE MALAWI SHOWING PROPOSED, PRINTED CHARTS & SURVEYED AREA



IHO Special Publication S-55 Update (Visit Malawi: Apr / May 2008)

Page 32
 Basic Data

Maritime Nation/Area	Nation or Area Code	Region ID	Nation or Area (N or A)	PEZcoast km x 1000	Length of Coastline (km)	Data for S-55 Edition No.	Latest Update	IHO View State
Malawi	GW	AF	N	24.0	1200	3	May 2008	H

Page 40
 Hydrographic Resources

Maritime Nation/Area	Hydrographic Survey Vessels				Hydro. Staff		Positioning Methods		
	>100m	30m-100m	20m-30m	<20m	Specialists	Aviataints	Long 1-40km	Medium 5-40km	Short RTK
Malawi				1	1	2		RTK	RTK

Page 48
 States of Hydrographic Surveys

A1 = % which has been adequately surveyed
 B1 = % which requires re-survey at large scale or to modern standards
 C1 = % which has never been systematically surveyed
 An entry of 1 in column A1 indicates inland waters

Maritime Nation/Area	Data	State of Hydrography d<80m			State of Hydrography 80m-d<200m Surveys for areas between 0 and 200m			State of Hydrography d>200m		
		% adequate	% re-survey	% unsurveyed	% adequate A1	% re-survey B1	% unsurveyed C1	% adequate	% re-survey	% unsurveyed
Malawi		20	0	72	35	0	65	0	0	0

IHO S-50

Summary Report on MARITIME SAFETY INFORMATION (MSI)

Nation / Area	INT Region	Local Warning	Coast Warning	NAVAREA Warning	Part Info	Master Plan	A1 Sea Area	A2 Sea Area	A3 Sea Area	NAVTEX	SafetyP
Malawi	B	Partial	NO	NO	Partial						

IHO S-55

Summary Report on the Status of RNCs

In the table below, -1 has been used for Inland Waters

Nation / Area	INT Region	Small Scale	Medium Scale	Large Scale
Malawi	B	0	0	0

IHO S-64

Summary Report on the Status of ENC

In the table below, -1 has been used for Inland Waters

Nation / Area	INT Region	Small Scale %	Medium Scale %	Large Scale %
Malawi	B	0	0	0

IHO S-55

Summary Report on the Status of INT Charts

In the table below, -1 has been used for Inland Waters

Nation / Area	INT Region	Small Scale	Medium Scale	Large Scale
Malawi	B	0	0	0