



IHO Capacity Building Programme

The State of Hydrography and Nautical Charting in The Republic of the Seychelles



September 2012

Intentionally blank

Contents

Contents	3
Abbreviations	5
Executive Summary	6
Recommended Actions	7
1 Introduction	9
2 Technical Visit Programme	9
3 General Assessment	10
3.1 <i>National Hydrographic Awareness</i>	10
3.2 <i>National Maritime Structure</i>	10
3.3 <i>Maritime Safety Information</i>	10
3.4 <i>Hydrographic Surveying</i>	11
3.5 <i>Nautical Charting</i>	12
3.6 <i>National Hydrographic Resources</i>	13
4 Options for the Way Ahead	13
4.1 <i>Bilateral Arrangements for the Production and Maintenance of Charts and Publications</i>	13
4.2 <i>National Hydrographic Authority</i>	13
4.3 <i>National Hydrographic Committee</i>	14
4.4 <i>National Maritime Safety Information Coordinator</i>	14
4.5 <i>Chart Improvement and Maintenance Programme</i>	14
4.6 <i>Re-establishment of the National Hydrographic Capability</i>	15
4.7 <i>Temporary Hydrographic Adviser(s)</i>	15
5 Technical Visit Conclusions	16
6 Recommended Actions	16
Annex A – List of Contacts	18
Annex B – US NAVOCEANO Mobile Training Team Program	19
Annex C – Seychelles’ Dependency on Hydrography and Charting	20
1. <i>Introduction</i>	20
2. <i>Seychelles Islands</i>	21
3. <i>Ports and Harbours</i>	21
4. <i>Inter-Island Communication Routes</i>	21
5. <i>Cruise Ship Operations</i>	21
6. <i>Shipping Routes including Navigable Channels</i>	21
7. <i>IMO Adopted Areas to Be Avoided</i>	22
8. <i>Marine Parks and Reserves</i>	23
9. <i>Vigias</i>	23
10. <i>Offshore Oil and Gas</i>	23
11. <i>Maritime Claims</i>	23
12. <i>Defence including Coastguard</i>	25

13.	<i>Environment</i>	25
14.	<i>Fishing</i>	25
15.	<i>Tourism and Coastal Recreational Amenities</i>	25
16.	<i>Education and Science</i>	25
17.	<i>Planned Maritime Developments in Seychelles Waters</i>	25
Annex D – Existing Hydrographic Data for Seychelles		26
1.	<i>General</i>	26
2.	<i>National Data</i>	26
3.	<i>India</i>	26
4.	<i>United Kingdom Hydrographic Office</i>	26
5.	<i>Summary of Current State of Surveys</i>	26
Annex E – Charting Analysis of Seychelles’ Waters		28
1.	<i>Seychelles Chart Coverage</i>	28
2.	<i>Indian Naval Hydrographic Department Charts</i>	28
3.	<i>British Admiralty Charts</i>	28
4.	<i>UKHO and INHD Charting Comparison</i>	29
Annex F – Nautical Charting Review		30
Annex G – IHO Yearbook		33

Abbreviations

ALB	Airborne Laser Bathymetry
AtoN	Aids to Navigation
BA	British Admiralty [Chart]
dwt	Dead Weight Tonnage
Ed	Edition
EEZ	Exclusive Economic Zone
ENC	Electronic Navigational Chart
ICZM	Integrated Coastal Zone Management
IHB	International Hydrographic Bureau
IHO	International Hydrographic Organization
IMO	International Maritime Organization
Lidar	Light Detection and Ranging
LOA	Length overall
MBES	Multi Beam Echo Sounder
MoU	Memorandum of Understanding
MSDI	Marine Spatial Data infrastructure
MSI	Maritime Safety Information
MSP	Maritime Spatial Planning
NE	New Edition (of a navigational chart)
NtoM	Notice to Mariners
RHC	Regional Hydrographic Commission
RNC	Raster Navigational Chart
SAIHC	Southern Africa and Islands Hydrographic Commission
SANHO	South African Navy Hydrographic Office
SBES	Single Beam Echo Sounder
SCG	Seychelles Coast Guard
SMSA	Seychelles Maritime Safety Administration
SOLAS	[United Nations] Convention of the Safety of Life at Sea
ToR	Terms of Reference
TTW	Territorial Waters
UKHO	United Kingdom Hydrographic Office
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nations Environmental Programme
WMO	[United Nations] World Meteorological Organization

Executive Summary

The Seychelles government became a State Party to the SOLAS Convention on 10 August 1988 and appears well versed with the provisions in SOLAS Chapter V Regulations 9 and 4 to ensure that appropriate hydrographic and charting services are made available. The technical visit increased the awareness of national hydrography, the relatively poor state of hydrography and nautical charting in the Seychelles and its potentially adverse impact on economic growth, safety of navigation and protection of the marine environment.

There is no recognised Maritime Safety Information (MSI) infrastructure in place in Seychelles to promulgate urgent navigational and meteorological warnings including urgent charting information or to feed new and updated information to the United Kingdom Hydrographic Office (UKHO) as the Primary Charting Authority (PCA) such that it can be incorporated into the existing charts, thereby keeping them up to date and fit for purpose.

Currently there is no national mechanism to determine priorities for surveys or charting or to communicate changing conditions or circumstances to the PCA (UKHO). Similarly the national data gathering programme is suspended due to a lack of trained hydrographers and hydrographic equipment. The former is being addressed with officers currently under training; the matter of equipment should also be addressed urgently such that these officers can conduct the urgent work required and for which their training has prepared them.

For historical reasons, the production of nautical charts and publications required under SOLAS for the Seychelles is produced by the UKHO as the PCA. Notwithstanding their modern appearance, four of the five charts covering the Seychelles are based on old and generally imprecise survey information; the exception is that covering Mahé and Port Victoria. A comprehensive chart updating programme is required if the chart coverage of Seychelles is to meet national needs and international obligations.

The gathering and forwarding of new and relevant chart information must be actively encouraged under a national programme for chart improvement and maintenance. An urgent local review of existing charts is required to identify discrepancies and to provide up to date information to the UKHO. This should in the near future be supplemented by the reestablishment of a basic level in-country capability for hydrographic surveying.

The improvement of charts covering Seychelles should be a matter of particular concern to the Government of Seychelles. Every effort should be made to work with the UKHO, which is the producer of the only comprehensive collection of nautical charts and publications covering Seychelles, with vital new and revised information to help improve these charts and keep them up to date.

The less than ideal state of nautical charting in Seychelles and the lack of a coherent MSI service to promulgate navigational and meteorological warnings, search and rescue information and other urgent safety-related information, including urgent information related to charts is potentially having an adverse impact on the Seychelles economy as well as putting the safety of life at sea and protection of the marine environment at increased risk. This is because of the inherent risk of maritime incidents and the adverse effect on efficient and effective shipping operations.

The appointment of a National Hydrographic Authority and a National Maritime Safety Information Coordinator is absolutely essential to support charting through the UKHO and to ensure that the charts of Seychelles are improved. The National Hydrographic Authority should be supported by the establishment and active participation of a National Hydrographic Consultative Committee.

The Seychelles, as a State Party to the SOLAS Convention, is required to ensure that appropriate paper charts, ENCs and maritime safety information are available in accordance with Regulations 9 and 4 of Chapter V of that Convention. In this regard Seychelles is not meeting in full its treaty obligations. An improvement in the flow of MSI data to the NAVAREA Coordinator and the UKHO is a simple and vital first step in improving the country's SOLAS obligations. Through the reinvigoration of a national hydrographic capability the Seychelles government is taking steps to address the urgent need for hydrographic data and this initiative should be encouraged. For the provision of charts and publications it is considered to be in the Seychelles government's best interest to maintain and foster its links with UKHO for the provision of nautical charts and publications. By taking these steps the Seychelles can demonstrate its commitment to and compliance with the delivery of hydrographic services as required by SOLAS.

Recommended Actions

The following recommended actions are provided for consideration by the relevant authorities:

- (1) **The Government of the Seychelles** should:
 - a. formally designate a **National Hydrographic Authority** to be responsible for coordination and ensuring the provision of appropriate nautical charting services for the Seychelles in accordance with the requirements of the International Convention on the Safety of Life at Sea (SOLAS), and in accordance with the principles established by the IHO;
 - b. allocate regular funding and travel support for the **National Hydrographic Authority** to fulfil the duties of the Office and to represent the Seychelles in appropriate forums, and in particular, to attend relevant meetings of the SAIHC and NOIHC;
 - c. ensure that a **Maritime Safety Information (MSI) Coordinator** position is established as soon as possible to fulfil the Seychelles' treaty obligations under SOLAS V/4 - *navigational warnings*;
 - d. ensure that the **Maritime Safety Information (MSI) Coordinator** is nominated and able to attend the Phase One Chart Awareness Course in South Africa in November 2012, a SAIHC Capacity Building course.
 - e. ensure the development and execution of a **National Maritime Safety Information Plan** – by ensuring that field checks are carried out on the current charts and publications and the results are forwarded promptly to the PCA (UKHO);
 - f. Negotiate with the Indian Government for the release of Indian Naval Hydrographic Department (INHD) data from the Indian Navy surveys of the Seychelles past and in the future;
 - g. Review all previous foreign hydrographic data gathering programmes in Seychelles' waters and request the resulting data be passed to the government of the Seychelles for national use;
 - h. to provide all hydrographic data gained through f. and g. above to the PCA (UKHO) for use in the compilation or revision of the existing charts of the Seychelles;
 - i. actively promote cooperation with the hydrographic offices of India and the United Kingdom;
 - j. ensure that any future foreign government hydrographic data gathering programmes within Seychelles' waters are conducted with the express agreement that data arising from such programmes is passed to the Seychelles' government for national use..
- (2) **The National Hydrographic Authority** should:
 - a. liaise with Regional Team 3 at the UKHO to ensure that new navigationally significant information is forwarded and included in existing charts of the Seychelles;
 - b. apply, through the SAIHC or NIOHC, for training for the MSI Coordinator under the IHO Capacity Building Program;
 - c. apply, through the SAIHC or NIOHC, for the short term assistance of an established hydrographic office to develop a National Hydrographic Structure for the Seychelles;
 - d. organise an urgent national programme of review of all the published charts of the Seychelles and inform the PCA (UKHO) of all detail that is incorrectly shown on these charts. Such a national programme should encourage all mariners and other interested parties to report discrepancies on existing charts together with as much information as possible on what should actually appear in the charts;
 - e. review the existing **bilateral arrangement** with the **Primary Charting Authority (UKHO)**;

- f. establish and chair a **National Hydrographic Committee** or forum that coordinates national hydrographic requirements including input to a **National Charting Plan**, a **National Hydrographic Survey Plan** and a **National Maritime Safety Information Plan**. This group should include representatives from all stakeholder sectors, including but not be limited to: shipping, environmental protection, survey and mapping, national infrastructure development, coastal zone management, marine exploration, resource exploitation – minerals, fishing, maritime boundary delimitation, maritime transport, maritime defence and security, disaster management and tourism.

(3) **The Government of the Seychelles** should

- a. actively support existing hydrographic surveyors in the enhancement of national hydrographic surveying; provide funding to re-equip the Seychelles Coastguard Hydrographic Unit with modern, portable survey equipment, including sidescan sonar, to conduct surveys in up to 100m depth;
- b. provide on-going funding for the regular maintenance and routine replacement of hydrographic and cartographic equipment and for the training and requalification of operators;
- c. establish and fund a national marine cartographic capability such that the Seychelles can provide specialist chart products for national use and to be sufficiently informed to participate in decisions regarding chart coverage and availability;
- d. engage overseas hydrographic advice to guide and assist the **National Hydrographic Authority** and stakeholders to enhance in-country hydrographic data gathering capability and to foster close liaison and possible support from recognized national hydrographic authorities in other countries.



REPORT



1 Introduction

The International Hydrographic Organization (IHO) is an intergovernmental technical organization, currently comprising 81 Member States. The IHO seeks to ensure that all States with coastlines and maritime interests provide adequate and timely hydrographic data, products and services, thereby advancing maritime safety and efficiency in support of the protection and sustainable use of the marine environment. The IHO is the recognised competent authority of the United Nations for hydrography and nautical charting. The International Hydrographic Bureau (IHB), based in Monaco, is the secretariat of the IHO.

A proposal for a technical and advisory visit to Seychelles to help assess the current status of charting and hydrography in the country and to provide advice to the government and to stakeholders on a way ahead was raised at a meeting of the NIOHC. As a result the Capacity Building Sub Committee approved and funded a visit to Seychelles to assess the current status of hydrography and to raise awareness in the country of the importance of hydrography and nautical charting.

Captain Abri Kampfer SAN from the South African Navy Hydrographic Office (SANHO) and Mr Bob Wilson, seconded from the United Kingdom Hydrographic Office (UKHO) carried out a hydrographic awareness and technical assessment visit to Seychelles between 9 and 12 September 2012.

This resulting report has been written with the express intention of assisting the government of the Seychelles to arrange and strengthen its hydrographic effort to meet its current and future needs and in turn, to meet its international maritime obligations under the UN Convention on the Safety of Life at Sea (SOLAS). The report comprises a description of the visit, a detailed analysis of the needs and current status of charting, major conclusions and a number of recommended actions for consideration by the relevant authorities.

2 Technical Visit Programme

The IHO Technical Team arrived in Mahé, Seychelles, on Sunday 9 September and left for Mauritius to conduct a further technical visit on the following Wednesday. In-country arrangements for the technical visit were arranged by Captain Joachim Valmont, Director General Seychelles Maritime Safety Administration. Meetings, in the form of individual visits, discussions and a stakeholders meeting were arranged with as many hydrographic and nautical charting stakeholders as possible. The details of those attending the various meetings are shown in Annex A – List of Contacts.

The national economic benefits of reliable charting and hydrography were presented to each meeting together with discussions on the current status of hydrography and charting in Seychelles. From these meetings various options to improve the current situation were explored.

A concluding meeting of stakeholders was used to reinforce the importance of MSI and national hydrography. This meeting of stakeholders was taken as reformation of the defunct National Hydrographic Committee with the intention of having the status of the committee formalized at a later date. Amongst other relevant IHO documents the team passed an electronic copy of the IHO *Inter-Institutional Agreement for the Establishment of a Hydrographic and Oceanographic Committee* to the interim committee for consideration to formalize the workings of the committee.

3 General Assessment

The following is a general assessment of the situation in Seychelles regarding hydrography and nautical charting services. A discussion of available options, several conclusions and recommended actions, supported by a number of Annexes then follows.

3.1 National Hydrographic Awareness

The visit increased the awareness of national hydrography, the relatively poor state of hydrography and nautical charting in the Seychelles and its potentially adverse impact on economic growth, safety of navigation and protection of the marine environment.

The Seychelles' authorities are aware of the treaty obligations under the UN Convention on the Safety of Life at Sea (SOLAS) Chapter V Regulations 9 and 4 to ensure that appropriate hydrographic and charting services are made available. Seychelles became a State Party to this Convention on 10 August 1988.

Currently there is no mechanism in place to determine local priorities for surveys or charting or to communicate changing conditions or circumstances to the Primary Charting Authority (PCA) which is the United Kingdom Hydrographic Office (UKHO). The PCA (UKHO) published and maintains the nautical charts and publications that mariners require to navigate safely and effectively in Seychelles waters. It is believed that this will change post the technical visit.

An explanation of the many benefits that hydrography provides to a coastal State such as the Seychelles was explained in detail with the technical team referring the various Seychelles authorities to IHO Publication M-2 – *The Need for National Hydrographic Services*.

3.2 National Maritime Structure

The Ministry of Transport has the responsibility for SOLAS the majority of which are carried out by the Seychelles Maritime Safety Administration (SMSA). The responsibility for hydrographic surveying matters has been devolved to the Seychelles Coast Guard Hydrographic Brigade (SCGHB) although this unit has, in the immediate term, effectively ceased to exist. Other organisations with a direct interest in hydrographic matters are the Seychelles Ports Authority (SPA) the Geomatic Division of the Ministry of Land Use and Habitat (GDMLUH), the Seychelles Meteorological Service (SMS) and the Seychelles Fishing Authority (SFA). Regardless of its status as an Administration rather than an Authority SMSA represents the Seychelles at IMO. The SCG is in the process of re-establishing the SCGHB which it hopes to have operational in mid to late 2013 using the two IHO Cat B surveyors currently under training.

Seychelles is not a Member of the IHO but is an Associate Member of both the Southern Africa and Islands Hydrographic Commission (SAIHC) and the North Indian Ocean Hydrographic Commission (NIOHC). The Seychelles has an extant hydrographic Bilateral Arrangement with UKHO, the primary Charting Authority for the Seychelles.

3.3 Maritime Safety Information

Maritime Safety Information (MSI) consists of the promulgation of navigational and meteorological warnings, search and rescue information and other urgent safety-related information, including urgent information related to charts. IHO Publication S-53 - *Joint IMO/IHO/WMO Manual on Maritime Safety Information* provides detailed information about MSI. In addition MSI in its broadest sense includes navigational chart and publication maintenance.

There is currently no recognizable Maritime Safety Information (MSI) organization in the Seychelles. This means that the existing charts published and maintained by the UKHO do not necessarily contain the latest navigational significant information, nor are mariners arriving from overseas aware of new navigational significant information through the WNNWS.

The routine maintenance of charts and publications, to include changes in buoyage and man-made topography for example, is as important as new survey data if charts are to be maintained to the standard required for safe navigation. This information has to come from the nation State and be passed to the PCA (UKHO) for action. In the case of the Seychelles, little local information has been provided since the demise of the SCGHB. Chart corrections, based on information supplied to the UKHO, average less than one per annum. The following table shows the current publication date of charts covering the Republic of the Seychelles, together with a reference to

the last notice to mariners (NtoM) that has been issued and the total number of NtoMs that have been applied to each chart since its publication. The table is correct to 04 October 2012.

BA Chart	Title	Year of Chart Publication (Last NtoM/Year)	NtoMs issued since Publication
721	Southern Approaches to the Seychelles Group	NE 10 Aug 1990 4540/12	9
722	Mahé – Port Victoria and Approaches	Ed 4 15 Jan 2009 Nil	0
724	Anchorage in the Seychelles Group and Outlying Islands	Ed 4 31 Jul 2008 5236/10	1
740	The Seychelles Group	Ed 3 8 May 2003 4540/12	4
742	Seychelles Group – Mahé, Praslin and Adjacent Islands	Ed 3 9 Jun 2011 4540/12	2

For all practical purposes, there is no effective communication between the maritime authorities in the Seychelles and the UKHO's chart compilers and maintainers in Regional Team 3 – the section responsible for producing and maintaining the charts of the Seychelles. This means that new information, such as changes in navigation aids or new port developments do not appear on the charts as updated information.

Similarly there appears to be no linkage in-country for government agencies to feed information through to the mariner via chart and publication amendments or navigational warnings. One example is that of the minor data gathering by the Seychelles National Parks Authority (SNPA), where staff, working in the marine reserves and parks regularly identify uncharted or incorrectly charted shoal areas and reefs, are unaware of the need to forward on this information and no mechanism for doing so.

In addition to establishing a regular MSI service, the government of Seychelles is strongly urged to organise a review of all the published charts of Seychelles as soon as possible and to inform the PCA (UKHO) of all the differences from what is shown on the charts. The UKHO produces a Code of Practice giving guidance on the information required and the format in which it should be sent to UKHO. A digital copy of the Code of Practice was passed to SMSA during the IHO visit.

To improve the MSI situation in the Seychelles the country has been allocated a place on the Phase One Chart Awareness Course in South Africa in November 2012; this is a SAIHC Capacity Building event. The potential benefits of the course were highlighted along with the requirement to select a suitable candidate who will be responsible for MSI in the Seychelles.

3.4 Hydrographic Surveying

In the period up until the mid-1970s the United Kingdom had a survey ship on station in the region conducting surveys for chart production programmes, since this time large area medium scale to large scale survey operations, other than those conducted in more recent times by the Indian Navy and USNOO, have all but ceased. The SCGHB conducted a valuable survey data gathering programme at predominantly large scales until 1995 after which hydrographic surveying went into a steep decline. There is currently no national hydrographic capability in the Seychelles.

The Geomatic Division of the Ministry of Land Use and Habitat (GDMLUH) employs a number of land surveyors familiar with digital data manipulation, map making and geographic information systems (GIS). These surveyors could make a valuable contribution to hydrographic surveying by supplementing the skills of the reformed SCGHB. GDMLUH is the repository for a miscellaneous archive of digital bathymetric data little, if any, of which has been passed to the PCA (UKHO) for inclusion on navigational charts.

It was noted that much hydrographic data has been gathered within Seychelles' waters by a number of foreign governments or under regional development or research programmes. The government of the Seychelles, when granting permission for survey operations within its territorial waters, should stipulate that one condition of this permission is for the final processed data set to be forwarded to the Seychelles for use by the PCA (UKHO) and strengthening of the national database. Similarly the government should request that data arising from surveys

within its Exclusive Economic Zone (EEZ) should similarly be forwarded. A review of hydrographic data is at Annex D - *Existing Hydrographic Data for Seychelles*.

It became clear during the visit that there is a significant quantity of hydrographic data covering Seychelles' waters either in country with government agencies or abroad with the foreign organizations that conducted various survey campaigns. Whilst it might not be possible, or practical, to develop one unified national hydrographic database it is strongly recommended that a national hydrographic data register be established showing survey area, survey methods, date of survey, originator of the survey and repository such that this vital national data can be used to its fullest extent and possibly without the need for expensive resurveys. Within this register should be included all data held at the UKHO archive. The register should be readily available both in the Seychelles and particularly to the PCA (UKHO) such that uncharted data can be brought into the charting programme.

3.5 Nautical Charting

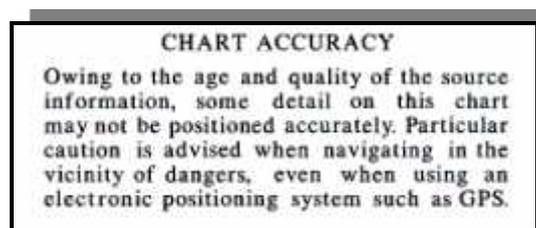
There is no national capacity for either paper or digital chart production nor is there any intention to establish such a capacity. The government of the Seychelles appears satisfied with the current service provided by the PCA (UKHO).

The UKHO provides paper INT chart coverage of the Seychelles at both small and large scales (7740, 7741, 7742 and 7060), national paper coverage and ENC coverage. It is clear that the Indian Navy Hydrographic Service has been very active in producing paper charts over the entire Indian Ocean including charts of the Seychelles. Copies of these charts, which incorporate original Indian Navy hydrographic data, are used by the PCA (UKHO) to update the Seychelles' national charts; original Indian Navy survey data has not been received by UKHO. It can be seen from the IHO ENC Catalogue that the UKHO ENC coverage is extensive and, besides local coverage in the area of Mahé Island, extends to Madagascar and the East African coast.

There is no nautical chart production facility or sales outlet in Seychelles. Charts must be obtained from agents in Durban (South Africa), Fremantle (Western Australia), Mumbai (India) or elsewhere in the world.

It was apparent during the IHO visit that a comprehensive chart updating programme is required if the existing chart coverage of the Seychelles is to meet national needs. The improvement of existing charts and plans should in the first instance incorporate the extensive changes to Port Victoria and the depiction of the many marine parks and fisheries areas. Some of the information included on BA 742 is taken from details found on the internet.

The nautical charts of Seychelles published and maintained by the PCA (UKHO) on behalf of the government of Seychelles have all been modernised. This means that depths are shown in metres, modern chart symbols are used and the charts can be used directly with GNSS. However, because much of the data on which the charts are based is old and a warning note may be displayed on the charts such as the example below shown on chart BA724 *Anchorage in the Seychelles Group and Outlying Islands* which is based on survey data from between 1875 and 1975.



The process of chart improvement to meet contemporary requirements relies on the availability of new and revised information both hydrographic and topographic. Much of this information can be collected relatively inexpensively by local authorities, stakeholder organizations and individuals and be forwarded to the PCA (UKHO). Other information is likely to exist locally that could be included in revised charts. However, it must be found and forwarded to the PCA (UKHO). Dedicated surveys will nevertheless be required for certain key areas.

A comprehensive analysis of the existing charting situation in Seychelles is contained in Annexes E and F.

3.6 National Hydrographic Resources

There are no hydrographic specialists currently practicing within the government of the Seychelles nor is there any effective hydrographic equipment. The former SCG Hydrographic Brigade is being reformed with two officers undergoing IHO Cat B training; one in Japan and another in the Netherlands. Vested in the Seychelles Fishing Administration is a well equipped 35m Fisheries Research Vessel which, with the addition of a hydrographic echo sounder, could provide a valuable survey platform.

The current reliance on foreign assistance for hydrographic surveys, given the country's previous hydrographic capability, is regrettable; however, this situation is set to improve in the near future with the plans now in place. That there is no national hydrographic charting capability is not considered by the technical team to be an issue and recommends that the Seychelles continues with the pragmatic arrangement to use the facilities and assistance provided by the PCA (UKHO) under the current bilateral arrangement.

Established tide gauges at Mahé airport and on Îles Denis and monitored by the National Meteorological Centre are important hydrographic resources. The gauge at the airport has been established since at least 2004 and has been recording continuously since then. In the event that no other permanent gauge is established this gauge would be ideal as the national gauge to monitor sea levels and develop the necessary tidal constituents for improved tidal predictions.

4 Options for the Way Ahead

4.1 Bilateral Arrangements for the Production and Maintenance of Charts and Publications

It is vital that where there is no in-country chart production or maintenance facility, a coastal State must establish and maintain close liaison with its PCA. In the case of the Seychelles this is the UKHO. Subject to the continuing mutual agreement between the Seychelles government and the UKHO, the Seychelles should continue to rely on the UKHO to publish its charts and nautical publications. Currently the Seychelles government has a credit balance of £2,205.91 which has been accrued since 2006. The breakdown of the SCG Hydrographic Brigade has meant that UKHO has not had a contact within the Seychelles' government with whom to discuss this issue.

However, if the PCA (UKHO) is to publish and maintain charts of Seychelles successfully there is a fundamental requirement for Seychelles to ensure that the PCA is provided with all the relevant information required for inclusion in charts covering Seychelles. Currently, this is not happening.

The establishment of a National Hydrographic Authority and a National Maritime Safety Information Coordinator is absolutely essential to support the PCA (UKHO) and the NAVAREA VIII Coordinator. This should also be supported by input from a National Hydrographic Committee. The gathering and forwarding of new and relevant chart information must be actively encouraged under a national programme for chart improvement and maintenance.

4.2 National Hydrographic Authority

The IHO recommends that every coastal State should designate a National Hydrographic Authority responsible for coordinating hydrography and charting in the country. The role of the National Hydrographic Authority is to be the principal national and international point of contact and to act on behalf of the government to ensure that the State meets its international obligations that proper MSI and nautical charting services are available to mariners. The National Hydrography Authority is the first point of contact for in-country stakeholders and for maintaining relations with relevant international organisations. In the case of Seychelles, these contacts would include the IHO, SAIHC, NIOHC, the PCA (UKHO) and other countries and agencies that might support hydrographic development and assistance in the Seychelles.

In the Seychelles the SMSA may be the most appropriate body to be the National Hydrographic Authority. Such an arrangement is similar to that most recently put in place in Papua New Guinea and in the Solomon Islands, whereby the national Maritime Safety Administration/Authority has responsibility for the development and coordination of the provision of hydrographic surveying and nautical charting services in those countries. Many other countries have adopted a similar arrangement. Whilst the responsibility for hydrographic surveying is still vested with the SCG, the lack of a hydrographic capability makes this impractical and thus it is recommended that

in the short term SMSA, as an administration under the SOLAS responsible ministry should assume this responsibility until the SCG is ready to resume its role.

4.3 National Hydrographic Committee

Ensuring that a State's charts contain all relevant information requires the support of all in-country stakeholders. Similarly, to ensure that the national chart coverage and associated services meet the needs of all the stakeholders requires wide input. For this reason, the IHO recommends the establishment of a National Hydrographic Committee to provide input to the hydrographic programme and setting national charting and surveying priorities. In this way, the stakeholders are in a position to assist in the continuing maintenance of the charts, longer term planning and perhaps also to the programme budget.

A National Hydrographic Committee should include representatives from all relevant stakeholder sectors, including, but not limited to:

- Shipping
- Environmental protection
- Survey and mapping
- National infrastructure development
- Coastal zone management
- Marine exploration
- Resource exploitation – minerals, fishing
- Maritime boundary delimitation (UNCLOS, others)
- Maritime transport
- Maritime defence and security
- Disaster management
- Tourism

All hydrographic stakeholders need to be involved in contributing to the Seychelles national hydrographic program. This is not only to identify and prioritise national requirements, but also to contribute to the execution of the programme. This could be through help in-kind, such as the provision of boats, or personnel or through contributions to enlist contract support – for example for surveys of areas targeted for development. A key role for the stakeholders is to educate and encourage everyone to forward all relevant new or changed hydrographic information to the national coordinator for hydrography and charting.

It is recommended that in the interim the Chair and convenor of the National Hydrographic Committee should be the National Hydrographic Authority, in this case SMSA.

4.4 National Maritime Safety Information Coordinator

The IHO recommends that every coastal State should designate a national MSI coordinator. In the absence of an effective element within the SCG it is suggested that, at least in the short term that SMSA assumes the role of national MSI coordinator. This would ensure that MSI services are the direct responsibility of the National Hydrographic Authority. This, in turn, would enable navigationally significant information to be collected efficiently and reliably and subsequently promulgated both through immediate warnings to shipping when warranted and through the incorporation of new or revised information in existing published charts.

4.5 Chart Improvement and Maintenance Programme

For coastal States that do not have an in-country chart production and maintenance capability, the IHO considers that an active national programme of information gathering is vital. This programme must encourage all mariners and other interested parties to report all discrepancies in the existing charts and to provide as much information as possible on what should actually be shown on the charts. For the Seychelles, such information can be reported directly to the PCA (UKHO) using a hydrographic note, or by any other mechanisms that alert the PCA (UKHO) that changes are required to existing charts. The method and format for providing the information is much less important than ensuring that the PCA (UKHO) is alerted in the first place. The UKHO produces a Code of Practice giving guidance on the information required and the format in which it can be sent to the PCA (UKHO).

As there is no in-country capability to undertake systematic surveys for chart improvement purposes, assistance should be sought from regional neighbours or by engaging survey assistance under commercial contract.

4.6 Re-establishment of the National Hydrographic Capability

The re-establishment of the national hydrographic capability is seen as moving forward on several fronts. The first, most obvious, low cost and potentially very rewarding front is the establishment and active encouragement of the National Hydrographic Committee. This committee should have two initial aims: to review and make best use of the current archives of hydrographic data and to develop a sustainable plan for national hydrography in the Seychelles. The second front should be the establishment of a national MSI structure to ensure the swift dissemination of urgent hydrographic information to the mariner to safeguard the integrity of the marine environment. This course of action can also be achieved quickly and at no additional cost to government. The third front is the support and re-equipping of the SCG hydrographic capability. The first two of those discussed here can be achieved within a very short time; weeks or months. The third, the SCGHB, should be achievable by the end of 2013 at the latest.

To aid the programme outlined above there are limited opportunities for internationally recognised hydrographic training. A list of courses is contained in IHO publication C-47 - *Training Courses in Hydrography and Nautical Cartography, 6th Edition*. This can be downloaded from the IHO website. Short courses in the fundamentals of hydrographic data gathering are available through the IHO Capacity Building Programme and should be bid for through either or both of the Southern Africa and the Islands Hydrographic Commission (SAIHC) or the North Indian Ocean Hydrographic Commission (NIOHC).

Training may be available through the US NAVOCEANO Mobile Training Team program (NMTT). This would enable in-country training, thereby reducing travel and other expenses for participants. Training costs depend on the length of the course and whether it can be provided under an aid programme. A pamphlet at Annex B contains information about NMTT training. The SCG's close relationship with the Indian Navy may also prove a useful training opportunity either in India or onboard Indian navy vessels operating in the Seychelles.

4.7 Temporary Hydrographic Adviser(s)

The IHO recommends that it is highly desirable to engage hydrographic advisers when an in-country hydrographic capability is being established. There are no local personnel in the SCG that have current hydrographic expertise to be able to mentor the newly trained IHO Cat B surveyors when they return home. The participation of hydrographic advisers from IHO member states could assist in establishing an in-country hydrographic capability and would help foster close liaison and potential assistance from recognized hydrographic services in the regional hydrographic commissions. The support of advisers would require the allocation of suitable funding. Alternatively, established hydrographic offices may be able to provide seconded officers for limited periods of time. This could be requested through under the auspices of the SAIHC, NIOHC or through bilateral discussions with other hydrographic offices. If requested the PCA could provide short term assistance to develop an in-country hydrographic programme when the two IHO Cat B surveyors return home.

5 Technical Visit Conclusions

Based on discussions and the facts obtained, the following principal conclusions have been reached:

- (1) The current lack of coherent MSI services could be having an adverse impact on the Seychelles economy as well as putting the safety of life at sea and protection of the marine environment at increased risk.
- (2) Whilst the cooperation of the foreign governments through the provision of hydrographic services to the Seychelles is applauded, the failure to pass hydrographic data - other than printed charts - to the Government of the Seychelles for national use and the updating of charts provided by the Primary Charting Authority (UKHO) is seriously hampering the improvement of the safety of navigation within Seychelles' waters and the business of national hydrographic stakeholders.
- (3) The improvement of charts covering Seychelles should be a matter of particular concern to the national government. Every effort should be made to work with the Primary Charting Authority (UKHO) to enable an effective charting service to be delivered.
- (4) The release of existing but hitherto unavailable bathymetric data, e.g. that held by the Indian Navy hydrographic Department, to the Primary Charting Authority (UKHO) can provide a basis for the immediate improvement of some charts.
- (5) An urgent local review of existing charts is required to identify discrepancies and to provide up to date information to the PCA (UKHO).
- (6) The re-establishment of an in-country hydrographic capability within the SCG to provide local input to the Primary Charting Authority (UKHO) to assist in the maintenance of the existing charts is important to enable the provision of appropriate and up-to-date nautical charts of Seychelles.
- (7) Seychelles, as a State Party to the SOLAS Convention must recognise and act upon its treaty obligations to ensure that appropriate paper charts, ENCs and maritime safety information are available in accordance with Regulations 9 and 4 of Chapter V of that Convention. In this regard, Seychelles does not appear currently to be meeting its obligations. This is because there is no infrastructure or capability in place to provide information to the Primary Charting Authority (UKHO) so that the relevant charts can be kept up to date and fit for purpose.
- (8) The absence of up to date charts and a very limited MSI capability to satisfy the requirements of the SOLAS Convention, threaten the likelihood of Seychelles passing the hydrography section of the IMO Member State audit scheme which is likely to become mandatory around 2015.

6 Recommended Actions

The following recommended actions are provided for consideration by the relevant authorities:

The Government of the Seychelles should:

- a. formally designate a **National Hydrographic Authority** to be responsible for coordination and ensuring the provision of appropriate nautical charting services for the Seychelles in accordance with the requirements of the International Convention on the Safety of Life at Sea (SOLAS), and in accordance with the principles established by the IHO;
- b. allocate regular funding and travel support for the **National Hydrographic Authority** to fulfil the duties of the Office and to represent the Seychelles in appropriate forums, and in particular, to attend relevant meetings of the SAIHC and NOIHC;
- c. ensure that a **Maritime Safety Information (MSI) Coordinator** position is established as soon as possible to fulfil the Seychelles' treaty obligations under SOLAS V/4 - *navigational warnings*;
- d. ensure that the **Maritime Safety Information (MSI) Coordinator** is nominated and able to attend the Phase One Chart Awareness Course in South Africa in November 2012, a SAIHC Capacity Building course.
- e. ensure the development and execution of a **National Maritime Safety Information Plan** – by ensuring that field checks are carried out on the current charts and publications and the results are forwarded promptly to the PCA (UKHO);

- f. Negotiate with the Indian Government for the release of Indian Naval Hydrographic Department (INHD) data from the Indian Navy surveys of the Seychelles past and in the future;
- g. Review all previous foreign hydrographic data gathering programmes in Seychelles' waters and request the resulting data be passed to the government of the Seychelles for national use;
- h. to provide all hydrographic data gained through f. and g. above to the PCA (UKHO) for use in the compilation or revision of the existing charts of the Seychelles;
- i. actively promote cooperation with the hydrographic offices of India and the United Kingdom;
- j. ensure that any future foreign government hydrographic data gathering programmes within Seychelles' waters are conducted with the express agreement that data arising from such programmes is passed to the Seychelles' government for national use.

The National Hydrographic Authority should:

- k. liaise with Regional Team 3 at the UKHO to ensure that new navigational significant information is forwarded and included in existing charts of the Seychelles;
- l. apply, through the SAIHC or NIOHC, for training for the MSI Coordinator under the IHO Capacity Building Program;
- m. apply, through the SAIHC or NIOHC, for the short term assistance of an established hydrographic office to develop a National Hydrographic Structure for the Seychelles;
- n. organise an urgent national programme of review of all the published charts of the Seychelles and inform the PCA (UKHO) of all detail that is incorrectly shown on these charts. Such a national programme should encourage all mariners and other interested parties to report discrepancies on existing charts together with as much information as possible on what should actually appear in the charts;
- o. review the existing **bilateral arrangement** with the **Primary Charting Authority (UKHO)**;
- p. establish and chair a **National Hydrographic Committee** or forum that coordinates national hydrographic requirements including input to a **National Charting Plan**, a **National Hydrographic Survey Plan** and a **National Maritime Safety Information Plan**. This group should include representatives from all stakeholder sectors, including but not be limited to: shipping, environmental protection, survey and mapping, national infrastructure development, coastal zone management, marine exploration, resource exploitation – minerals, fishing, maritime boundary delimitation, maritime transport, maritime defence and security, disaster management and tourism.

The Government of the Seychelles should

- q. actively support existing hydrographic surveyors in the enhancement of national hydrographic surveying; provide funding to re-equip the Seychelles Coastguard Hydrographic Unit with modern, portable survey equipment, including sidescan sonar, to conduct surveys in up to 100m depth;
- r. provide on-going funding for the regular maintenance and routine replacement of hydrographic and cartographic equipment and for the training and requalification of operators;
- s. establish and fund a national marine cartographic capability such that the Seychelles can provide specialist chart products for national use and to be sufficiently informed to participate in decisions regarding chart coverage and availability;
- t. engage overseas hydrographic advice to guide and assist the **National Hydrographic Authority** and stakeholders to enhance in-country hydrographic data gathering capability and to foster close liaison and possible support from recognized national hydrographic authorities in other countries.

Annex A – List of Contacts

Name	Organization	Contact No <i>Direct</i> <i>Mobile</i>	Email Address
Capt Joachim Valmont Director General	Seychelles Maritime Safety Administration	+248 422 4866 +248 272 2956	Dg@smsa.sc
Lt Col George Adeline Acting Commanding Officer	Seychelles Coast Guard	+248 461 0293 +248 271 8090	Georgesad1@yahoo.com
Cdr Nehi Indian Navy Maritime Security Adviser	Seychelles Coast Guard	+248 271 6551	msaseychelles@gmail.com
Capt Percy Laporte Harbour Master Mahé	Seychelles Ports Authority	+248 429 4710 +248 272 2458	hm@seychellesports.sc
Mr Franky Laporte Project Manager	Seychelles Ports Authority	+248 429 4726 +248 722 182	pm@seychellesports.sc
Mr Rodney Quarte Research Manager	National Parks Authority	+248 422 5114 +248 272 6104	r.quarte@scmrt-mpa.sc
Mr Calvin Gerry	Seychelles Fishing Authority	+248 467 0300	cgerry@sfa.sc
Mr Francis	Centre for GIS, Ministry of Lands and Housing		
Ms Cynthia Adrienne	Centre for GIS, Ministry of Lands and Housing	+248 428 6975	cadrienne@gov.sc
Mr Marcel Belmont Assistant Meteorological Officer	National Meteorological Service (Climate Centre)		m.belmont@meteo.gov.sc
Mr Vincent Amelie Director	National Meteorological Service	+248 272 2957	v.amelie@meteo.gov.sc
Capt Abri Kampfer SAN	South African Navy Hydrographic Office	+27 21 787 2412 +27 (0)825 545 218	hydrosan@africa.com
Mr Bob Wilson	United Kingdom Hydrographic Office	+44 (0)1823 723415 +44 (0) 777 181 0114	Robert.wilson@ukho.gov.uk

Annex B – US NAVOCEANO Mobile Training Team Program



NAVOCEANO Mobile Training Team and Tailored Maritime Geospatial Training

NMTT Tenets

The Naval Oceanographic Office (NAVOCEANO) Mobile Training Team provides tailored formal and on-the-job training to USA partners, friends and allies while simultaneously collecting maritime geospatial and environment (MGE) information to describe the coastal and littoral environment. Information and knowledge from these surveys are used to generate in-country interoperable products for rapid, safe manoeuvrability of U.S. and host nation military vessels during joint combat operations and exercises, and Safety of Navigation and SOLAS for commercial and military vessel operations.

NMTT Core Competencies

Using the host nation's personnel and vessel, NAVOCEANO provides professional personnel and state of the science commercial off-the-shelf equipment to conduct highly accurate MGE surveys. With 80 hours of formal classroom training and up to 450 hours of practical field MGE, the program provides students with the fundamentals of MGE surveying through practical training in mathematics, computer science, physical sciences, geodesy, GPS for navigation, hydrography, oceanography, meteorology, Geographical Information System for nautical cartography, remote sensing and resource management.

Students

The NMTT is designed for three to five students and is open to both military and civilian personnel. At the end of the training period, students will receive a certificate of completion and will have the capacity to assist hydrographers and oceanographers in MGE surveys from a naval and international perspective.

Faculty

NMTT instructors and surveyors are highly qualified personnel with education and experience in the subjects they teach.

Skill Level

Prospective students must have successfully completed trigonometry, calculus and physics. In addition, students should have some knowledge and experience in maritime navigation and electronics. Students from non-English speaking countries must have an English comprehension level of at least 70%. Classroom instruction in Spanish may be provided for additional costs.

Requests for NMTT

Requests for NMTT should be sent to the Security Assistance Officer at the U.S. Embassy in the host nation. The course is listed in the Military Articles and Service Listing (MASL) under the title Hydrographic Management and Engineering Program and MASL number P-309027 or course identification number MTT-PNO.

Contact Information

Commanding Officer, Fleet Survey Team IMSO Stennis Space Center, MS 39522 Telephone: (228) 688-5844 Fax: (228) 688-5020

Annex C – Seychelles’ Dependency on Hydrography and Charting

1. Introduction

The Republic of Seychelles is an archipelago occupying the western part of the Indian Ocean between 4°S and 10°S with an Exclusive Economic Zone (EEZ) of approximately 1.3 million square kilometres. The total land area of the country is 452 square kilometres. Some 40 islands are of granite origin, including the main island of Mahé with its central massif rising up to 905 m. The other 60 or so islands are of coralline origin and are typically flat and rise only a few metres above sea level.¹

The climate is humid tropical with an annual mean temperature of about 27°C. Relative humidity is high at about 80% through out the year. Annual rainfall on Mahé varies from 1.7m in the south to about 3.0m in the hills, with the outer islands receiving less rain than Mahé. Two main seasons are recognised; a wet season from November to April, characterised by intense downpours, high humidity and higher temperatures and a dry season from May to October with cooler temperatures, a steady breeze and lower humidity.²

The population of the Seychelles is estimated at about 90,000 (July 2012).³ Tourism is the main industry, contributing about £77 million Sterling annually to the economy, about two thirds of all hard currency earnings and employing 18% of the workforce. GDP for 2011 was estimated at US\$1.014 billion. Fish is almost the sole natural exported resource of the Seychelles.



Islands forming the Republic of Seychelles⁴

The islands of the Republic of Seychelles rely almost solely for their existence on the import of goods by sea. The islanders have throughout their history relied on the sea for sustenance; life in the modern world has made this reliance even more essential.

A short summary of each island and atoll forming the Republic of Seychelles, taken primarily from Admiralty Sailing Directions (NP 39), is at Annex F Nautical Charting Review.

¹ <http://www.fao.org/fileadmin/templates/agphome/documents/PGR/SoW1/africa/SEYCHELL.pdf> [accessed 6 September 2012]

² <http://www.fao.org/fileadmin/templates/agphome/documents/PGR/SoW1/africa/SEYCHELL.pdf> [accessed 6 September 2012]

³ <https://www.cia.gov/library/publications/the-world-factbook/geos/se.html> [accessed 6 September 2012]

⁴ <https://www.cia.gov/library/publications/the-world-factbook/geos/se.html>

2. Seychelles Islands⁵

The Republic of Seychelles comprises the Seychelles Group of islands, on Seychelles Bank, and outlying islands up to 600 miles SW and S; they are:

- Assumption Island.
- Aldabra Island.
- Astove Island.
- Cosmoledo Group.
- Farquhar Group.
- Providence Group.
- Alphonse and adjacent islands.
- Les Amirantes.
- Île Plate.
- Coëtivy.

3. Ports and Harbours

The port of entry for the Republic of Seychelles is at Port Victoria (17°45S 168°18E) on Mahé (4°37'50S 55°28'00E) stands at the head of a bay on the NE coast of the island of Mahé. Victoria, with a population of approximately 25,000 in 2009, is the State capital and seat of government for the Seychelles. It is a commercial and fishing port and is considered the most important tuna fishing base in the Indian Ocean. All imports and exports for the Seychelles pass through Port Victoria. The Seychelles Port Authority is under the Seychelles Ministry of Transport, Marine Division (PO Box 47, Mahé - email: portcontrol@seychellesports.sc).

There are two minor ports; Port Sainte-Marie (17°00'.00S 49°51'.15E) at La Digue and Grand' Anse (4°19'.62S 55°43'.00E) on Praslin Island. These ports are only suitable for small trading vessels and ferries.

4. Inter-Island Communication Routes

Inter-island communication for both passengers and freight is primarily by sea using local cargo and ferry vessels between the main islands of Mahé, Praslin and La Digue. This service is supplemented by air services. Freight for the Seychelles enters the country solely through Port Victoria as the shipment hub for other islands.

5. Cruise Ship Operations

Cruise ship activity falls into two categories - international and local - however, as a result of piracy activity in the region international cruise ship and super yacht visits to the Seychelles has markedly decreased in the past three years and is unlikely to return until the piracy issue is finally resolved. Figures supplied by SPA show that 16 cruise ships visited in 2011 which is approximately 25% of the pre-piracy level. A small number of what are termed 'boutique' cruise vessels operate throughout the Seychelles islands obtaining access to less frequented bays and inlets away from the normal tourist areas.

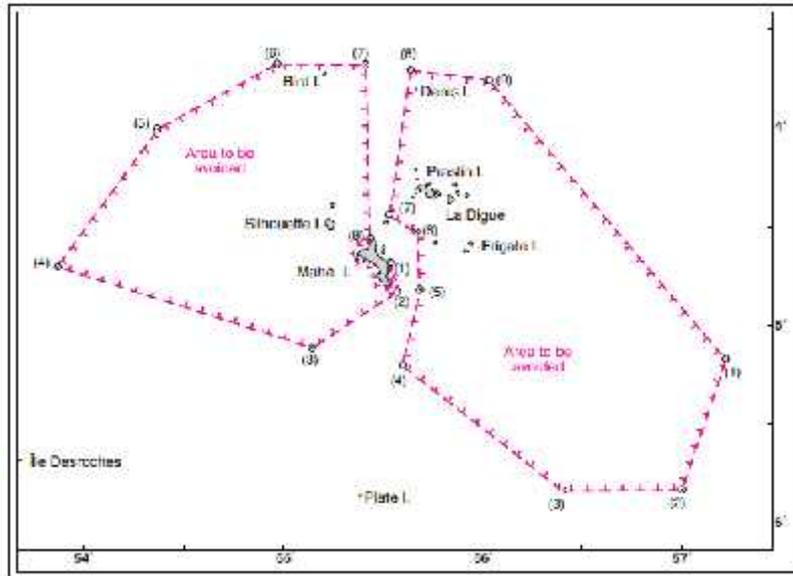
6. Shipping Routes including Navigable Channels

No main shipping routes pass through Seychelles' waters except that described in paragraph 7 below.

⁵ NP39 p.9

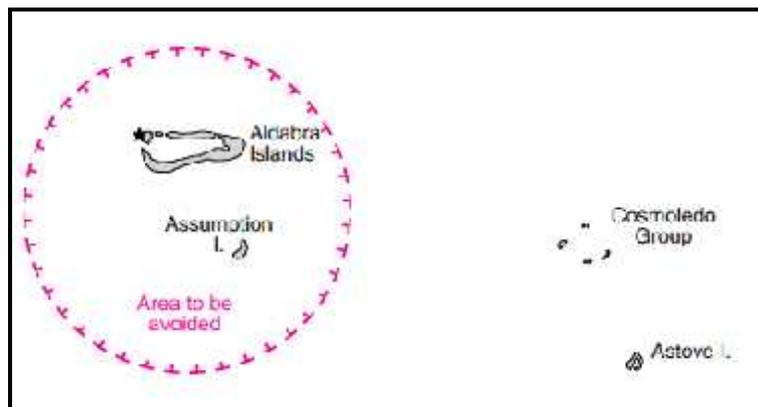
7. IMO Adopted Areas to Be Avoided

An IMO-adopted “Area to Avoided” has been established to prevent risk of pollution and damage to the environment, including unique wildlife, on Seychelles Bank and around Aldabra Island. The first area, covering most of the Seychelles Bank, is in two parts separated by access channels to Victoria on Mahé. All ships of more than 200 grt, whether or not bound for ports in the Seychelles, should avoid these areas.



Seychelles Bank IMO Adopted Areas to be Avoided⁶

A further area has been designated around the Aldabra Islands in order to avoid risk of pollution and damage to the environment in this area of unique wildlife, all ships of more than 500 grt carrying cargoes of oil or hazardous materials should avoid the area contained within a circle of radius 30 nautical miles centred upon geographical position 09°36' S, 046°21' E.



Aldabra Islands IMO Adopted Area to be Avoided⁷

⁶ IMO Ship Routing Guide

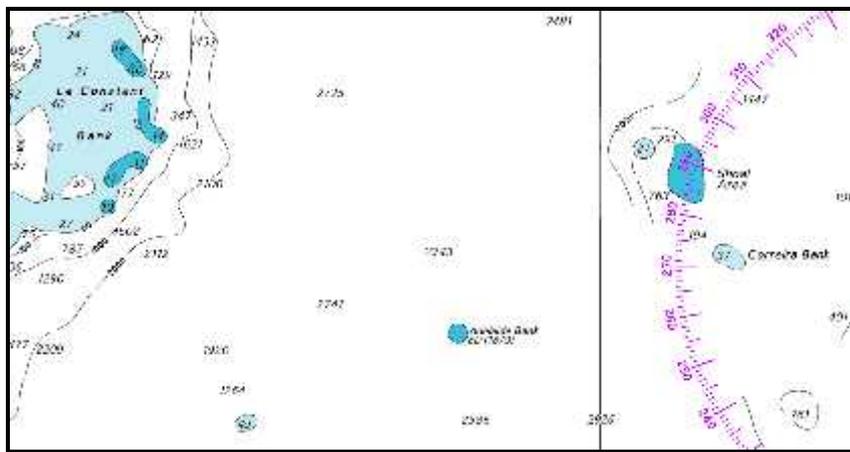
⁷ IMO Ship Routing Guide

8. Marine Parks and Reserves

The Seychelles National Parks Authority (SNPA) administers the various marine parks and reserves within Seychelles waters to protect the delicate national marine environment. It is apparent that whilst notes are on BA charts indicate the presence of these areas and at some scales the limits, there is insufficient charted detail such as yacht mooring areas and newly established marine reserves which have not been notified to the PCA (UKHO). In addition the necessary supplementary information is not yet published in Sailing Directions. It is recommended that SNPA forward all the necessary information for the charting and promulgation of the areas and the dangers and restrictions within them to SMSA for transmission to the PCA at the earliest opportunity.

9. Vigias

The charts published by the PCA (UKHO) warn that the areas covered have in many cases not been systematically surveyed and that uncharted shoals or reefs may exist. The chart extract below is of an area approximately 135 miles southeast of Mahé. Within this area is marked the Adelaide Bank reported in 1879 but whose existence is considered doubtful. To the southwest of Adelaide Bank is an isolated 49m shoal and to the northeast of it a group of shoals that indicate a much larger shoal area. These features are common on charts of the Seychelles and illustrate the care with which the mariner must take in navigating Seychelles waters.



Extract from BA721 Southern Approaches to the Seychelles Group

10. Offshore Oil and Gas

Vessels conducting seismic surveys may be encountered on Seychelles bank which is considered to have hydrocarbon potential.⁸

11. Maritime Claims

Seychelles claims a 12 mile territorial sea, a contiguous zone of 24 miles and an exclusive economic zone (EEZ) of 200 miles.⁹ The total EEZ area totals approximately 1,332,000 square kilometres¹⁰ an area over 600 times larger than its land area. The Seychelles has a Continental Shelf area of approximately 48,800 square kilometres¹¹.

The Seychelles government has made good progress in its EEZ claims bordering the High Seas and with its neighbours whilst also pursuing claims under UNCLOS Article 76. The following is a résumé of the current situation:

⁸ NP39 p.2

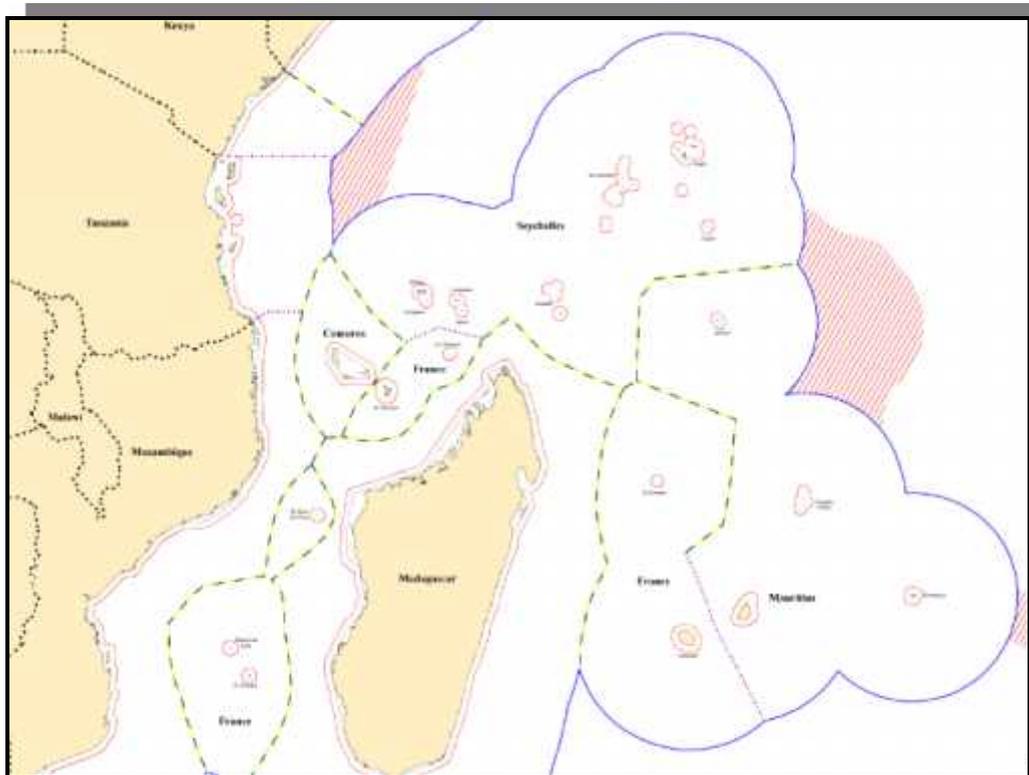
⁹ NP39 p.9

¹⁰ <http://www.searoundus.org/eez/690.aspx> [accessed 7 September 2012]

¹¹ <http://www.searoundus.org/eez/690.aspx> [accessed 7 September 2012]

Claim Type	Area & Parties Involved	Status
UNCLOS 76	Mascarene Plateau - the Seychelles	Submitted
	Northern Plateau – High Seas	Under discussion
	Aldabara Region	Under discussion
EEZ Limit	Tanzania	Completed
	Comoros	Under discussion
	Tanzania/Comoros	Under discussion
	France	Under discussion
	the Seychelles	Under discussion
	Madagascar	Under discussion
	Comoros / France / Myotte	Under discussion

Current State of Maritime Claims



Seychelles' Potential Maritime Boundaries¹²

¹² UKHO Law of the Sea Department

12. Defence including Coastguard

The Seychelles Coast Guard (SCG) is a branch of the Military of Seychelles created in 1992. It is a maritime, military, multi-mission service. SCG has responsibility for search and rescue for vessel incidents as well as environmental protection from the Port and Marine Services Division. It has four vessels including the *Topaze* shown below.



An element of the SCG is the Hydrographic Brigade which is, at present, non-operational.

13. Environment

It was not possible to assess any specific environmental requirement for hydrography during the visit.

There are two established tide gauges in the Seychelles; one is situated at the main airport on Mahé and the other on Île Denis. Readings from these gauges are automatically transmitted to the University of Hawaii, as part of the GLOSS programme, for adjustment and dissemination. It is understood that the gauge at Mahé is linked to land datum. Tidal data from these gauges can be obtained from the university on request. The National Meteorological Centre, which monitors and is responsible for them locally, considers that a more extensive network of gauges should be established throughout the Seychelles, for sea level rise and tsunami warning. It was stated by the Director National Meteorological Centre that sea level rise in the Seychelles is currently 6mm per annum.

There are no oceanographic data buoys within Seychelles' waters.

14. Fishing

The main export from the Seychelles is tuna commercially fished under licence. In addition a pearl fishery farm hazardous to navigation is located in the channel forming the NW entrance to Baie Curieuse (approx posn 4° 17.7 S 55° 43.2 E), details of the fishery including detailed coordinates and descriptions of the mooring arrangements should be provided to the PCA through SMSA as a matter of urgency..

15. Tourism and Coastal Recreational Amenities

It was not possible to assess any tourism requirement for hydrography during the visit.

16. Education and Science

It was not possible to assess any education or science requirement for hydrography during the visit.

17. Planned Maritime Developments in Seychelles Waters

It was indicated that consideration is being given to increase the facilities in Port Victoria, tourism facilities and aquaculture.

Annex D – Existing Hydrographic Data for Seychelles

1. General

Admiralty charts of waters in the vicinity of the islands of Seychelles Group and of the outlying islands to the S and SW depend mainly on modern Admiralty surveys; the port of Victoria and some small areas in the approaches are charted from modern Seychelles government surveys. Some small areas in the vicinity of the islands of the main group and in Les Amirantes are charted from late nineteenth century Admiralty surveys.

Whilst there has been no national data gathering plan for at least a decade, data gathering has been progressing under other foreign programmes during this period. Unfortunately, due to a lack of hydrographic coordination and direct responsibility this data has not been provided to the PCA. The following sections discuss the data available to the government of Seychelles and it is strongly recommended to either obtain the data and/or make arrangements for the transfer of the data to the PCA for the chart improvement programme.

2. National Data

An archive of national hydrographic data does not exist and it has to be assumed that all data gathered under previous survey campaigns has been incorporated into modern charting although this could not be verified. The demise of the SCGHB also saw the virtual destruction of its hydrographic data archive. A few documents remain but are in poor condition and not catalogued. It is recommended that in due course, with the reestablishment of the SCGHB that archive records are obtained from the various foreign sources holding Seychelles data. It is further recommended that the current analogue data holdings of SCGHB be provided to GDM/HLU to determine its usability and for cataloguing and storage.

3. India

The Seychelles Coastguard (SCG) has strong links with the Indian Navy including permanent representation with a serving officer (Commander) as the Maritime Security Advisor to the Commander SCG. Indian Navy survey vessels routinely operate within Seychelles territorial waters (TTW) and EEZ. Data arising from these surveys may have been sent to the Seychelles government although due to the demise of the Hydrographic Brigade this could not be determined. Data arising from these surveys has to date not been forwarded to the PCA for chart action, for example, a provisional survey drawing of a survey dated 2003 in the approaches to Mahé was observed in the SCGHB but is not included on the latest BA chart. It is recommended that the Seychelles government formally request from the Indian government a complete list of surveys conducted by the Indian Navy in the Seychelles' EEZ and TTW; the list of surveys to include dates, survey methods, scales and geographic area covered for inclusion in the national database.

4. United Kingdom Hydrographic Office

The UKHO has an extensive hydrographic archive for the Seychelles. All survey data held by UKHO has been incorporated into the current published charts. It is recommended that the Seychelles government formally request from the United Kingdom government a complete list of surveys conducted by the United Kingdom in Seychelles' EEZ and TTW list of surveys to include dates, survey methods, scales and geographic area covered for inclusion in the national database.

5. Summary of Current State of Surveys

The current state of surveys as summarized in IHO Publication C-55 'Status of Hydrographic Surveying and Nautical Charting Worldwide' Third Edition (2004) updated 27 September 2011 is shown in the table below. The Seychelles' EEZ is approximately 1,332,000 square kilometres of which the area >200m depth is approximately 27 times that of the area <200m which totals approximately 48,780 square kilometres. Given the imprecise delineation of the 200m contour and the incomplete knowledge of surveys undertaken in Seychelles' waters the figures in and for C-55 are at best approximate. It was not possible to revise the figures during the visit.

Area Code	Definition	C55 (%)
A1	Area adequately surveyed (<200m)	25
A2	Area adequately surveyed (>200m)	0
B1	Area requiring resurvey at larger scale or to modern standards (<200m)	40
B2	Area requiring resurvey at larger scale or to modern standards(>200m)	0
C1	Area which has never been systematically surveyed (<200m)	35
C2	Area which has never been systematically surveyed (>200m)	100

IHO C-55 Seychelles - Status of Hydrographic Surveys [Updated 16 May 2007]¹³

¹³ IHO C55 Region L p.11 http://88.208.211.37/iho_pubs/CB/C-55/C-55_Eng.htm [Accessed 9 Sep 2012]

Annex E – Charting Analysis of Seychelles’ Waters

1. Seychelles Chart Coverage

The Republic of Seychelles does not have a chart production capability and relies historically on the UKHO to fulfil this function. The résumé of chart coverage for Seychelles shown in IHO Publication C55 - *Status of Nautical Charting* (updated 16 May 2007) is shown in the table below. The figures in brackets show revised values as supplied by UKHO for this report.

Chart Type	% Covered by INT Charts	% Covered by RNCs	% Covered by ENCs
Small Scale:			
Offshore Passage	100 (100)	100 (100)	0 (100)
Medium Scale:			
Landfall, Coastal Passage	100 (100)	100 (100)	0 (100)
Large Scale:			
Approaches and Ports	100 (100)	100 (100)	50 (40)

IHO C55 Status of Chart Coverage

While C-55 shows that Seychelles is well covered by charts, it must be noted that the quality of the data from which those charts are derived are often out of date and of variable quality.

2. Indian Naval Hydrographic Department Charts

The following charts of the Seychelles are produced by INHD although the IHO team have not sighted these charts.

- 2085 Coëtivy Island - Scale: 37,500 - Published: 31 May 07
- 2087 Port Victoria - Scale: 7,500 - Published: 30 Apr 07
- 2502 Western Approaches to Mahe Island - Scale: 37,500 - Published: 28 Feb 09
- 2509 Assumption Island - Scale: 25,000 and 7,500 - Published: 31 Mar 12

3. British Admiralty Charts

For historical reasons the United Kingdom, through the United Kingdom Hydrographic Office (UKHO) remains the Primary Charting Authority (PCA) for the Seychelles. All UKHO charts covering the Seychelles are referred to WGS 84, however, the data from which the charts are compiled is noted as being in many cases old, imperfect and on undefined reference systems such that some charts carry the note:

CHART ACCURACY

Owing to the age and quality of the source information, some detail on this chart may not be positioned accurately. Particular caution is advised when navigating in the vicinity of dangers, even when using an electronic positioning system such as GPS.

The published charts and current state of maintenance is shown in the table below a fuller discussion of the charts and the data upon which they are based can be found in Annex F – *Nautical Charting Review*

BA Chart	Title	Scale	Published Lasted Updated	Annual Sales 2010 (2011)
718	Islands north of Madagascar		NE 08 Oct 1998	
	Aldabra Island	100,000	NM-3263/12	
	Assumption	75,000		
	Aldabra Island – Ile Picard	30,000		
	Cosmoledo Group	75,000		
	Farquhar Group	100,000		
	Iles Glorieuses	150,000		
	Astove	50,000		
	Farquhar Group – Entrance to Inner Harbour	20,000		
721	Southern Approaches to the Seychelles Group	750,000	NE 10 Aug 1990 NM-4540/12	805(715)
722	Mahé – Port Victoria and Approaches	12,500	Ed 4 15 Jan 2009 NM- Nil	251(308)
724	Anchorage in the Seychelles Group and Outlying Islands		Ed 4 31 Jul 2008 NM-5236/10	294(268)
	Les Amirantes - Desroches	300,000		
	Île Aux Vaches	35,000		
	Coëtivy	200,000		
	Providence and St Pierre Islands	300,000		
	Les Amirantes – Banc Africains	75,000		
	Île Denis	50,000		
	Baie Curieuse	25,000		
	Baie St Anne to La Digue	25,000		
	Grand Anse	25,000		
	Les Amirantes – D'arros and St Joseph Is	75,000		
740	The Seychelles Group	300,000	Ed 3 8 May 2003 NM-4540/12	418(400)
742	Seychelles Group – Mahé, Praslin and Adjacent Islands	125,000	Ed 3 9 Jun 2011 NM-4540/12	437(998)

Summary of UKHO Charting

4. UKHO and INHD Charting Comparison

The table below shows the comparison between UKHO charts and the INHD equivalent.

INHD Chart	UKHO Chart	Title	INHD Scale	INHD Data	INHD ENC	UKHO Scale	UKHO Data	UKHO ENC
2509	718	Assumption Island	25,000	2010	No	75,000	1962-1972	Yes
			7,500					
			7,500					
2087	722	Port Victoria	7,500	2006	No	12,500	2006-1943	Yes
2085	724	Coëtivy Island	37,500	2006-07	No	200,000	1875-1975	Yes
2502	742	Western Approaches to Mahé Island	37,500	2008	No	125,000	1971-1976	Yes

Annex F – Nautical Charting Review

Island	Remarks
<p>Aldabra Islands Group (9°25'.00S 46°20'.00E) BA 718</p>	<p>This consists of four lesser islands which lie on the rim of an atoll, around a lagoon, and which are separated by narrow channels. The atoll is composed of raised coral with an elevation of about 5 m and has a rugged surface, much eroded by rain water, generally covered with dense scrub. There are small groups of poor coconut palms in places and groups of casuarinas, 20 m high, occur along the coast. The seaward face of the atoll consists, for the most part, of abrupt cliffs of coral rock, often undercut by wave erosion. There are many coves, the largest of these having small beaches at their heads.</p> <p>BA 718 Islands North of Madagascar. The surveys supporting the charting of the Aldabra Islands Group come mainly from British government surveys dating from between 1962 and 1972.</p>
<p>Alphonse & adjacent islands. (7°00'.65S 52°43'.60E) BA 721</p>	<p>Alphonse lies on a separate, steep-to coral reef and is also mainly covered with coconut palms. On the SE side of the island there is a small settlement with a small hospital and jetty, the latter previously found to be disused. Saint François (7°09'.60S 52°44'.00E) is in the form of a ridge, covered with coconut palms, lying on the S side of a steep-to atoll which consists mainly of sand and coral banks around a lagoon and is itself surrounded by a reef which dries in places. Bijoutier, 5 miles N, stands on a detached reef and is similarly covered with palms.</p> <p>BA 721 Southern Approaches to the Seychelles Group. The area covered by Alphonse, its reef and the reef areas to the S and the adjacent seas are effectively unsurveyed other than delineation of the extreme reef edges.</p>
<p>Assomption Island. (9°44'.00S 46°30'.00E) BA 718</p>	<p>Assomption Island consists mainly of raised coral, with a maximum elevation of about 6 m, covered with low, thick bushes. At the SE end of the island there is a chain of sand dunes and hills. Most of the coast is formed by abrupt overhanging cliffs, except for a bay on the W side, the shore of which is a sloping sandy beach. At the S end of this bay there is an abandoned settlement among casuarina trees while a second abandoned settlement lies among similar trees at the N end of the island.</p> <p>BA 718 Islands North of Madagascar. The surveys supporting the charting of Assomption Island come from British government surveys dating from between 1962 and 1972; however, the surveys appear incomplete.</p>
<p>Astove Island. (10°05'.30S 47°44'.00E) BA 718</p>	<p>Astove Island virtually encircles a very shallow lagoon, being broken by a channel on the S side which gives access to the lagoon from seaward. The W half of the island is covered with trees and is lower than the E part, the coast of which is composed almost entirely of generally bare sand dunes. Near the N end of the W coast there is a small settlement.</p> <p>BA 718 Islands North of Madagascar. The surveys supporting the charting of Astove Island come from British government surveys dating from between 1962 and 1972. The island is steep to with apparently no isolated shoals. The survey is still considered sufficient for modern charting.</p>
<p>Coëtivy (7°08'.00S 56°17'.00E) BA724</p>	<p>Coëtivy (7°08'.00S 56°17'.00E) is covered with trees, mainly coconut palms, except at the S end where it is more open. There are several sandhills but none higher than the trees and they cannot be seen from seaward. On the W coast of the island there is a small settlement.</p> <p>The island lies on the E edge of a rectangular-shaped bank, occupying the N half of that side. It is partially surrounded by a coastal reef which partly dries and borders the entire E coast and which extends 2¾ miles farther SW, beyond the island, to occupy another quarter of the E side of the bank. A shoal area extends SSW of the island, bordering the reef mentioned above which partially dries at LW and on which the sea breaks heavily during the South-east trade wind. The main bank extends W from the island a distance of about 9 miles, having depths between 6.7 m and 20 m. Beyond the edges of the bank and E of the island the depth increases rapidly beyond 300 m.</p> <p>BA724 Anchorages in the Seychelles Group. Plan of Coëtivy. The NW approach to Coëtivy is based on medium scale British navy surveys 1971 and 1975 with two anchorages from surveys in 1964. The remainder of the plan is based on data acquired between 1875 and 1897.</p>

Island	Remarks
<p>Cosmoledo Group. (9°43'.00S 47°35'.00E)</p> <p>BA 718</p>	<p>Cosmoledo Group consists of a number of islands and islets of raised coral with generally sandy surfaces lying on an atoll. The seaward edge of a reef fringing the group dries 0.6 to 0.9 m. Several gaps in the reef lead into the lagoon.</p> <p>Menai (9°42'.80S 47°30'.70E) lies on the W end of the atoll. The seaward coast of the island is sandy and generally wooded with two points projecting, one each side of a small settlement situated in the middle of the coast. The settlement is occupied from Mahé, in Seychelles Group, the inhabitants staying for about a year at a time. North of the settlement there are sandhills with an elevation of 12 m, well wooded, while elsewhere the island is fairly open with patches of dense scrub.</p> <p>Île Sud-Ouest, (9°46'.20S 47°34'.70E) at the S point of the atoll, rises to sandhills covered with bush. Near the W end of the island there is a fisherman's shelter.</p> <p>Grande Île, (9°45'.00S 47°39'.00) the SE island of the group, is largely composed of sand and gravel. The seaward coast consists of low cliffs rising steeply to sand dunes with sparse trees. At the N end of the island there are some fishermen's shelters.</p> <p>Grand Polyte, (9°43'.30S 47°39'.45E) on the E point of the atoll, is mostly covered with sand and gravel. Petit Polyte, lying off the S end of Grand Polyte, is low.</p> <p>BA 718 Islands North of Madagascar. The surveys supporting the charting of the Cosmoledo Group come from British government surveys dating from between 1962 and 1972; the inner lagoon is from surveys between 1878 and 1905. The atoll on which the islands are located is steep to with apparently no isolated shoals.</p>
<p>Farquhar Group. (10°10'.90S 51°06'.00E)</p> <p>BA 718</p>	<p>Farquhar Group, formed by a number of islands and small islets, lies on the reef of an atoll surrounding a lagoon.</p> <p>South Island (10°10'.80S 51°10'.00E) is distinguished by a ridge of sand dunes about 21 m high along its E (seaward) side. Manaha Islands (10°09'.36S 51°10'.55E), three smaller islets between South and North Islands, are low and flat. North Island (10°06'.70S 51°10'.35E) is flat with a maximum elevation of 3 m, except for the N part on which there are some sand dunes, one of which, Turtle Hill, attains 12 m. In this part there is also a settlement.</p> <p>Goëlettes (10°13'.40S 51°07'.75E), is a small, flat islet with a single palm tree. Beyond this, the reef extends a farther 5 miles W, drying in patches at LW. On the N side of the atoll, 5 miles NW of South Island, the edge of the reef is marked by Trois Îles, a line of several small islets in an east-west orientation, including Déposé (10°09'.00S 51°04'.17E), notable for a stand of five prominent trees, and Île du Milieu and Île Lapin, both of which have a covering of bushes.</p> <p>BA 718 Islands North of Madagascar. The surveys supporting the charting of the Farquhar Group come from British government surveys dating from between 1878 and 1905. There appears to be extensive shoal water surrounding the atoll.</p>
<p>Les Amirantes Group (5°35S 53°15E)</p> <p>BA 721</p> <p>BA724</p>	<p>Les Amirantes group consists of a chain of small islands lying mainly on the E side of an extensive bank of growing coral and sand, parts of which dry, centred about position 5°35'.00S 53°15'.00E, comprising Desnoeufs (6°14'.50S 53°02'.00E), Marie Louis (6°10'.80S 53°08'.30E), Boudouse (6°05'.20S 52°50'.30E), Étoile (5°53'.14S 53°01'.07E), Poivre (5°45'.40S 53°18'.40E), Île du Sud (5°46'.54S 53°18'.60E), Sand Cay (5°40'.00S 53°14'.00E), Saint Joseph (5°26'.25S 53°21'.80E), D'Arros (5°25'.00S 53°18'.00E), Rémoire (5°06'.91S 53°18'.54E), some smaller islets lying on Bancs Africains (4°54'.00S 53°23'.00E) and Desroches (5°41'.50S 53°40'.00E) a detached island lying on the drying S edge of the almost circular coral reef of an atoll.</p> <p>All the islands are flat and sandy and fringed with coral reefs. None reach an elevation more than 6 m but are populated with coconut palms and casuarina trees with heights up to 27 m and these may be seen from a distance.</p> <p>BA 721 Southern Approaches to the Seychelles Group. The area of Les Amirantes on this chart is based on British navy survey data between and 1971 and 1976 at scales between 1:12,500 and 1:250,000.</p> <p>BA724 Anchorages in the Seychelles Group. Plan of Desroches based on small scale British navy surveys 1875 and 1897 with a small scale survey of the anchorage close north of Desroches from 1964. Plan of Banc Africains based on medium scale surveys between 1971 and 1975 and miscellaneous lines of sounding of indeterminate age. Plan of D'Arros and St Joseph Islands based on medium scale surveys between 1971 and 1975 with supplementary data from late nineteenth century surveys.</p>

Island	Remarks
Île Plate. (5°52'.16S 55°23'.20E)	Île Plate is low and wooded and lies on the NE quadrant of an extensive bank, surrounded by barrier reefs upon which the sea breaks heavily. There is a small settlement in the centre of the island, the inhabitants of which are employed in the production of copra.
BA 721	BA 721 Southern Approaches to the Seychelles Group. The area of Île Plate on this chart is based on British navy survey data between and 1958 and 1972 at scales between 1:100,000 and 1:150,000. The waters surrounding shoal ground on which Île Plate is located may be considered to be almost unsurveyed.
Providence Group. (9°25'.00S 51°00'.00E)	Providence Group, lying some 380 miles SW of Mahé in Seychelles Group, comprises: Bancs Providence (9°32'.00S 50°59'.00E), one of a number of sand cays which lie, with some banks that dry about 1 m, on the reef. There are coconut palms on the island and on the surrounding cays with which it may merge from time to time to form a single, larger, island. On the N end there are some huts.
BA 716	
BA 724	Providence Island (9°13' 00S 51°01'.80E), well wooded, mainly with coconut palms.
	Saint Pierre Island (9°19' 80S 50°43'.70E), formed of raised coral with elevations up to 9 m, and bare except for a dump of casuarina trees which rise to about 12 m on its N part. The surface of the island has become phosphatised by large numbers of sea birds. The coast consists of abrupt coral cliffs about 3 m high, undercut and worn into blow holes by constant swell.
	BA724 Anchorages in the Seychelles Group. Plan of Providence and Saint Pierre Islands based primarily on late nineteenth century data with surrounding sea area from miscellaneous lines of sounding supplemented by medium scale British navy surveys between 1971 and 1975.
	BA716 Seychelles Group to Madagascar and Agalega Islands. Area covered by the same data as for BA724 but depicted at a smaller scale.
Seychelles Group – North (3°46'S 55°08'E)	There are two main islands on the northern extremity of the Seychelles bank. Île aux Vaches (3°43'.35S 55°12'.40E) and Île Denis (3°48'.30S 55°4'.00E).
BA 724	Île aux Vaches lies on the E side of an extensive flat consisting of sand and coral with depths less than 10 m. This is positioned on the extreme N edge of Seychelles Bank and, beyond the flat, the bank is steep-to, the depth increasing rapidly beyond 1000 m within 4 miles of the shore. The sea breaks heavily on the N side. The island is also flat and of similar composition, covered with casuarina trees and coconut palms. The coasts are bordered by thick scrub, except at the N end of the island where there is a sandy spit. The E and SE sides of the island are fringed with coral reefs that dry. The island is inhabited.
BA 740	Île Denis lies on the S part of a bank with depths less than 10 m. The island is low and flat, covered with coconut palms and casuarina trees. A coral reef, which dries in patches, fringes the island except for the NW part and surf breaks heavily on the E and S shores during SE winds.
	BA724 Anchorages in the Seychelles Group. Plan of Île aux Vaches based primarily on late nineteenth century data supplemented by medium scale British navy surveys between 1971 and 1975. Plan of Île Denis based primarily on medium scale British navy surveys between 1971 and 1975 with some smaller scale data from the same source and period.
	BA740 The Seychelles Group. The two islands are covered by large scale plans on BA724. Surveys of the waters surrounding these islands on which the chart is based are British navy small scale surveys dating from between 1971 and 1972.
Seychelles Group – Mahé (4°40'S 55°30'E)	Mahé is the main island in the Seychelles Group on the east side of which is the sole port of entry, Port Victoria.
BA 722	BA722 Port Victoria and Approaches. This chart is almost totally based on modern data from Seychelles government, British and United States Navy surveys post 2001 at scales from 1:1,000 to 1:12,500
BA 742	BA742 Mahé, Praslin and Adjacent Islands. The waters to the east of Mahé, that not covered by the Area to be Avoided, is compiled from British navy surveys undertaken between 1970 and 1975 at a scale of 1:50,000. The waters to the west of the island are based on an INDH chart published in 2009 using INDH data from 2008 at 1:37,500.

Annex G – IHO Yearbook

SEYCHELLES (REPUBLIC OF THE)

MINISTRY OF TRANSPORT Seychelles Maritime Safety Administration PO Box 47 Mahé Director General: Captain Joachim VALMONT Responsible for national hydrographic policy and provision for SOLAS V obligations	
The Hydrographic functions have, since independence, been split between the Seychelles government for MSI and hydrographic surveying whilst the provision of nautical charting and publications is undertaken by the United Kingdom Hydrographic Office under a bilateral arrangement.	
Telephone : Fax : Website: Email:	+ 248 422 4866 + 248 422 4829 www.spa.sc Dg@smsa.sc
SEYCHELLES COAST GUARD PO Box 257 Mahé Commanding Officer: Lt Col Georges ADELINÉ Delegated responsibility for the collection and promulgation of hydrographic information. Note: this function is temporarily in abeyance whilst new staff are being trained and the Seychelles Coast Guard Hydrographic Brigade is being re-equipped.	
Telephone : Fax : Website: Email:	+ 248 461 0293 + 248 271 8090