



**INTERNATIONAL HYDROGRAPHIC
ORGANIZATION**

**MESO-AMERICAN AND CARIBBEAN
SEA HYDROGRAPHIC COMMISSION**

Capacity Building Programme

**REPORT OF TECHNICAL VISIT TO THE
REPUBLIC OF NICARAGUA**

**Managua, Nicaragua, 02 to 05
November 2014**

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EXECUTIVE SUMMARY

The Republic of Nicaragua is a maritime country par excellence. However, it is not a member of the International Hydrographic Organization (IHO), but it has been an associate member of the IHO's MesoAmerican and Caribbean Sea Hydrographic Commission (MACHC) since 2002. The Instituto Nicaragüense de Estudios Territoriales (INETER), which recently produced its first navigational chart, represents the point of contact between Nicaragua and the IHO.

According to the IHO – an intergovernmental, technical and consultative organisation that coordinates hydrographic efforts between maritime countries – Nicaragua has limited hydrographic capacities; hence it is aiming to encourage its authorities to consider assigning a higher priority to hydrographic development, whilst attempting to establish the technical framework that allows Nicaragua to fulfil its international commitments and to obtain better information to manage national strategic projects and any activities it is developing on, in or beneath the ocean.

Within this context, between 3 and 5 November 2014 and following coordination with the Government of Nicaragua, a Technical Team from the IHO undertook a Technical Visit to the Republic of Nicaragua, as a follow-up to the visit in 2005. The first item on the Technical Visit's programme was a presentation by the Team aimed at representatives from various national institutions with a connection to hydrography in one form or another. After a productive discussion, it was concluded that Nicaragua's current hydrographic capacities are not in line with the current and future requirements commanded by the maritime scene. It suggested considering adopting certain measures that allow contributions towards increasing those capacities, which was subsequently affirmed in the sectoral meetings, where the needs and incentives to fulfil those needs were analysed in detail.

Once the situation as a whole was analysed, the Technical Team proposed the following actions in its technical plan:

- Secure the capacities required to fulfil Phase 1 – Information on Maritime Safety – which involves: creating infrastructure and training personnel who will be assuming this responsibility, participating in the World-Wide Navigational Warning Service (WWNWS) and relevant NAVAREAs; resolving the issue of distributing navigational charts produced by INETER and undertaking to produce Sailing Directions for the coasts of Nicaragua, a publication with descriptions that would help to disseminate the characteristics of the coast, providing information regarding navigational safety.
- Secure the capacities required to further fulfil Phase 2 – Hydrographic Surveys – which involves increasing the existing qualified human resources and accessing multi-beam technology. The Team believes the following to be prerequisites: gauging national hydrographic demand; prioritising hydrographic survey activities and establishing a programme for that purpose, which will help to gauge the required human, technological and financial resources.
- Secure the capacities required to further fulfil Phase 3 – Cartographic Production – which involves: reinforcing current capacities to produce navigational charts with more duly trained personnel; continuing with the support provided by the UKHO in validating charts and initiating actions aimed at acquiring the skills and equipment to produce ENCs.
- In terms of equipment, INETER possesses basic hydrographic equipment that could be upgraded and complemented by new technology. The Technical Team recommended incorporating multi-beam echosounders to ensure port and port approach data is reliable where 100% coverage is required. The Team is of the opinion that in light of the other priority needs and the lack of trained personnel; it was premature to recommend any configuration for the production of ENCs.

In the coordination plan, the Team recommended the following actions:

- Actively participate in the MACHC and look into joining the IHO, insofar as it is feasible to obtain support from both organisations in the plans to increase capacities.
- Officially establish the Comisión Hidrográfica Nacional de Nicaragua (CHNN), a body that can be called upon to coordinate efforts amongst all the national institutions that supply and use hydrographic data, information, products and services.
- Instruct the CHNN (once formed) to identify national hydrographical and cartographical priorities, draft a nautical cartographical priority plan, and prepare a programme of hydrographical surveys to meet national demand.
- Instruct the CHNN (once formed) to propose methods, based on the foregoing, to assess the human, technical, structural and financial resources needed to carry out the plan and the aforementioned programme.
- Take advantage of and seek any opportunity for capacity building that is consistent with the plan to increase the capacities laid down by the CHNN.
- Instruct the CHNN (once formed) to develop a risk assessment tool with the support of MACHC, to help understanding the current position of Nicaragua and best solution in a systematic way.

**INTERNATIONAL HYDROGRAPHIC ORGANIZATION
MESO-AMERICAN AND CARIBBEAN SEA HYDROGRAPHIC COMMISSION**

CAPACITY BUILDING PROGRAMME

**REPORT OF TECHNICAL VISIT TO THE REPUBLIC OF NICARAGUA
Managua, Nicaragua, 02 to 05 November 2014**

I.- PREVIOUS BACKGROUND - GENERAL INFORMATION

Geographically speaking, the Republic of Nicaragua is a maritime country par excellence. On one side, its coasts are washed by the Pacific Ocean (approximately 450 kilometres) and on the other side by the waters of the Caribbean Sea (approximately 350 kilometres), which is why maritime activity as a whole constitutes the natural and daily setting for its population of 6.1 million (2012). However, according to the International Hydrographic Organization (IHO), an intergovernmental, technical and consultative organisation that coordinates hydrographic efforts between maritime countries, Nicaragua has limited hydrographic capacities; the Organization is therefore aiming to encourage its authorities to assign a higher level of priority to hydrographic development, whilst attempting to identify the assistance required to establish a technical framework that will allow Nicaragua to fulfil its international commitments and to obtain better information to manage projects or activities that are being carried out on, in or beneath the ocean.

This being the case and in this context, a Technical Visit was carried out to the Republic of Nicaragua from 03 to 05 November 2014. This Visit corresponds to an initiative of the International Hydrographic Organization (IHO) and constitutes a follow-up to the first visit carried out in 2005.

- Technical Visit of 2005:

The Programme entitled "IHO Capacity Building for the period 2003/2007" included, as a task, "To carry out technical visits to Central America and Mexico". It was during the 6th Meeting of the MACHC that the Nicaraguan representative made a request to the International Hydrographic Bureau – the Secretariat of the IHO – for such a visit to take place, in order to inform its authorities of the importance of hydrography and the related international provisions. This visit was carried out from 28 FEB. to 01 MAR. 2005 and the report of the visit is attached as **ANNEX A**.

The main aim was to:

- Provide information on the obligations of the signatories of the SOLAS Convention, in particular Regulation 9 "Hydrographic Services"
- Highlight the importance of hydrography as a contribution to the economic development of maritime countries
- Highlight the advantages of establishing a National Hydrographic Committee, or something similar, in order to coordinate relevant subjects at national level
- Provide information on possibilities of assistance for training and highlight the benefits of being a member of the IHO

The IHO Team was received by INETER, Ministry of Transport and Infrastructure (Directorate General of Water Transport), Armed Forces - Navy, Ministry of Public Works, Industry and Trade, including CIPA (Fishery and Aquiculture Research Centre); Empresa Nacional Portuaria [National Port Company] and the Ministry of the Environment.

Some of the conclusions of/recommendations from the visit were as follows:

- That coordination did exist between the national institutions related to hydrography and there was a body of experts trained in Spain, Mexico and Peru.
- The Ministry of Transport and Infrastructure was taking steps to incorporate Nicaragua into the IHO and all participants expressed an interest in establishing a national coordinating organisation (National Hydrographic Committee). Its main role would be to identify national priorities and to obtain suitable training and equipment.
- It was recommended that, given INETER's functions and capacities, after receiving specific training it would be in a position to produce navigational cartography.
- It was recommended that INETER carry out the initial coordination with the participants in order to make progress in establishing a national coordinating body and request, by diplomatic means, that it be incorporated into the IHO.
- It was concluded that Nicaragua was taking important steps towards achieving its hydrographic objectives, and the final message from the Team was that Hydrography had to be considered to be of national strategic importance and to have a transverse impact on the fulfilment of the objectives of many state agencies.

As almost 10 years have already passed, the IHO deemed it advisable to carry out a follow-up to this joint effort made in 2005 and put forward the proposal of a new technical visit to the Nicaraguan authorities.

- **Aim of the Technical Visit of 2014**

- To address, with the relevant institutions, the need to develop national plans for fulfilling the hydrographic obligations originating from the SOLAS [Safety of Life at Sea] Convention Regulations.
- To provide information on the opportunities offered by the IHO to improve or establish a national hydrography capacity through regional arrangements (MACHC), the Capacity Building Sub-Committee (CBSC) and contact with other Hydrographic Services.
- To produce a Technical Report providing an assessment of the hydrographic development status and recommending steps – prioritised action plan – aimed at contributing to its development, following the phases identified in the IHO capacity building strategy.

The start of the Technical Visit is given by means of an invitation sent by Mr Michel Amafo de Suriname, Chairman of the Meso-American and Caribbean Sea Hydrographic Commission (MACHC), of the IHO, to Mr Samuel Santos López, Minister for Foreign Affairs of the Republic of Nicaragua, dated 2 July 2014. **ANNEX B.**

The Technical Team consisted of Capitán de Navío [Captain] Hugo Gorziglia Antolini, Engineer and Hydrographer of the Chilean Navy Hydrographic and Oceanographic Service, Chile Hydrographer (1994-1997) and Director of the International Hydrographic Organization

(2002-2012), and Mr Tim Lewis, Engineer and Hydrographer of the United Kingdom Hydrographic Office, Administrator of Defence Collaboration and Arrangements of the Defence Maritime Geospatial Intelligence Centre.

II.- INTRODUCTION

1. Nicaragua's participation in the IHO Regional Hydrographic Commission.

Nicaragua is not a member of the International Hydrographic Organization (IHO), but it has been an associate member of the IHO's Meso-American and Caribbean Sea Hydrographic Commission (MACHC) since 06 November 2002, the date on which Mr Sergio Antonio CORDONERO González, of the *Instituto Nicaragüense de Estudios Territoriales* [Nicaraguan Institute of Territorial Studies] (INETER), the representative for Nicaragua at the 5th meeting of the MACHC, signed the Hydrographic Commission Statutes.

Nicaragua has participated in MACHC meetings sporadically, as there are records of its attendance at the 5th meeting of the MACHC in 2002, the 6th meeting of the MACHC in 2004 and the 13th meeting of the MACHC in 2012. At this last meeting, Nicaragua provided information on the status of Hydrography in Nicaragua, the text of which is attached as **ANNEX C**. On this same occasion, it presented the Puerto de Corintos chart, which is the first chart to be compiled and produced by Nicaragua in accordance with the cartographic standards established by the IHO. The members of the MACHC expressed their admiration for and acknowledgement of this achievement.

2. Preliminary contact.

With regard to a MACHC Capacity Building activity, coordination was carried out by Mr Jeff Bryant of the United Kingdom Hydrographic Office and MACHC Capacity Building coordinator. The link with Nicaragua had the invaluable support of the Ambassador of United Kingdom to Nicaragua, His Excellency Chris Campbell.

In Nicaragua, assistance was provided personally and prominently by Dr Paul Oquist Kelley, Minister, Private Secretary of Civic Power for National Policies and by the Ambassador of Nicaragua to the Netherlands, Mr Carlos Argüello-Gómez.

Dr Oquist and Ambassador Argüello-Gómez prepared an extensive programme, which is attached as **ANNEX D**. The aforementioned programme was carried out in full with some time changes according to the how the visit unfolded in practice.

The IHO Team had the pleasant company at all times of Mr Humberto E. González, Director of Research of the Private Secretariat of Civic Power for National Policies, who facilitated the completion of the programme, coordinated details and drove the visitors to all of the government departments at which the working meetings were held.

3. Points of contact in Nicaragua.

3.1 Briefing

The Programme for the Technical Visit first of all included an informative meeting led by Dr Paul Oquist, at which the Visit Team received information on the economic development achieved by Nicaragua in recent years thanks to prevailing political stability, which has allowed it to attract foreign investment and, within this context, start to carry out the Nicaragua "Gran Canal Interoceánico" project.

In turn, the Team had the opportunity to make a presentation to the representatives of various national institutions, allowing the Aims of the Technical Visit to be specified (**ANNEX E**); this presentation covered the following aspects:

- Greeting and Presentation

- Previous background information
- Aims of the Technical Visit
- Relevant changes to the global hydrographic scene that have occurred since 2005
- Hydrography areas of influence
- IHO mission and objectives
- Structure of the IHO including the MACHC
- IHO Capacity Building phases and strategy
- Capacity Building Fund
- MACHC Work Schedule
- Initiatives/Opportunities for Capacity Building in the MACHC
- Discussion

The following people attended this presentation: Dr Paul Oquist, Minister-Private Secretary for National Policies; Dr Carlos Argüello, Ambassador of Nicaragua to the Netherlands and Nicaraguan Agent to the International Court of Justice at The Hague and representatives of: the *Empresa Portuaria Nacional* [Nicaraguan National Port Company] (EPN); the *Instituto Nicaragüense de Pesca y Acuicultura* [Nicaraguan Institute of Fishing and Aquaculture] (INPESCA); the *Instituto Nicaragüense de Estudios Territoriales* [Nicaraguan Institute of Territorial Studies] (INETER); the *Ministerio del Medio Ambiente y los Recursos Naturales* [Ministry of the Environment and Natural Resources] (MARENA); the *Sistema Nacional para la Prevención, Mitigación y Atención de Desastres* [Nicaraguan National System for the Prevention, Mitigation and Warning of Disasters] (SINAPRED); the Ministry of Energy and Mines (MEM); the Ministry of Foreign Affairs (MINREX) and the *Secretaria Privada para Políticas Nacionales* [the Private Secretary for National Policies] (SPPN). For various reasons, the representatives of the following could not be present: the Gran Canal Interoceánico de Nicaragua Commission; the Nicaragua Armed Forces - Navy; the Hong Kong Nicaragua Canal Development Investment Company (HKND); and the Directorate General of Water Transport – Nicaraguan Maritime Authority.

A productive discussion took place at the end of the presentation. As a result of this, it was concluded that Nicaragua's current hydrographic capacities are not in line with the requirements commanded by the current and future maritime scene. It is suggested that the adoption of certain measures be considered to allow the increase of such capacities to be contributed to, such as:

- strengthening the capacity to coordinate hydrographic matters at national level,
- publicising and distributing the navigational cartography produced by INETER,
- participating on the international hydrographic stage (IHO and MACHC) and
- taking advantage of existing training opportunities.

These succinct conclusions will be elaborated on and strengthened later on in this report, after taking into consideration the detailed discussions held individually with the different organisations visited.

The participants were given a copy of Publication M-2 “The Need for National Hydrographic Services”; the aim of this publication is to publish information, using non-technical language, on why having a National Hydrographic Service is not an expense but an investment. It improves safety at sea, increases the protection of the marine environment and advances national development. More efficient and safer maritime transport means ensuring the safety of navigation, protection of the marine environment, national infrastructure development, coastal zone management, marine exploration, marine resource exploitation (minerals, fishing, etc.), maritime boundary delimitation, maritime defence and security, and coastal disaster management.

3.2 Sector-based Meetings

The Team had the opportunity to hold these sector-based working meetings with the authorities of the different national institutions, details of which are provided below according to the order in which such meetings took place. These meetings were very interesting and contributed to the Team being able to form a realistic outlook of the status of hydrographic development in Nicaragua and its significance as a maritime country.

a) *Sistema Nacional para la Prevención, Mitigación y Atención de Desastres* [Nicaraguan National System for the Prevention, Mitigation and Warning of Disasters] (SINAPRED)

The Team met with the leaders of SINAPRED and was informed of its mission and functions. In the same way, SINAPRED was provided with information on the aim of the visit, this proceeding to a valuable exchange of information and, in particular, to the scenario of two types of disaster that could occur on the coasts and in the waters of Nicaragua, in which hydrographic knowledge plays a significant role.

- Subject: Tsunamis and Storm Surges.

SINAPRED is aware of this type of natural disaster and has been carrying out an intense campaign of public education and awareness, including executing evacuation exercises, following the routes identified on diagrams produced for this purpose. Sirens have also been installed in order to alert the public, and recently – September 2014 – it was host to the 3rd Meeting of the Regional Working Group for Central America of the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS), dependent on the Intergovernmental Oceanographic Commission (IOC).

At this meeting, it was decided to support the proposal to develop a regional process for the preparation of flood and evacuation maps, amongst other initiatives. However, it is worth mentioning that SINAPRED does not currently have up-to-date and reliable hydro-cartographic information, nor does it have a channel/mechanism in place that will allow it to incorporate its needs into a national cartographic plan. Such a plan does not exist nor is there a national coordinating body for compiling the needs of different ministries.

It is considered that hydrographic knowledge and the availability of coastal cartography would contribute to improving plans in the case of a tsunamigenic event or storm surges, enabling flood areas to be determined with greater accuracy and, with that, evacuation routes and safe assembly places to be defined.

- Subject: Pollution of the Marine Environment.

The lack of navigational cartography and basic relevant oceanographic information (waves, tides, currents) and the fact that there is no programme for monitoring these environmental conditions makes it difficult for, or does not allow, measures for the prevention and mitigation of any oil spills or spills of other products in the marine environment to be adopted.

After evaluating the areas with the highest risk of this type of disaster occurring, SINAPRED would be able to identify the areas that would require navigational cartography and prioritise this need, informing INETER of it, which is the agency responsible for providing such information. Also, having environmental information available could, through modelling, allow SINAPRED to prepare for the most likely scenarios and adopt prevention and mitigation measures. It is understood that this type of disaster merits an immediate reaction in order to minimise damage to the environment and its associated ecosystem.

b) Nicaraguan National Oil Company (PETRONIC)

The Team was welcomed by the Chairman of the Board and by the Manager of PETRONIC, who explained the scope of the activities carried out by the company, which mainly focus on distribution. PETRONIC is certainly connected with exploration activities, but not with transportation activities.

After explaining the aim of the technical visit, the Team underlined the importance of having standardised, reliable and up-to-date navigational charts, given that any oil spill in Nicaraguan waters would potentially damage the marine environment and its associated ecosystems. To that effect, the Team urged PETRONIC to help increase the priority level given to hydrographic work and the production of navigational cartography, given that the vessels transporting fuel do so using cartography that dates back to 1960/1970.

The Team also stressed the importance of establishing mechanisms for exploration operations to ensure that the bathymetric data obtained is provided to INETER for its use in the compilation and production of navigational charts of Nicaraguan waters.

In summary, it is noted that PETRONIC has a direct connection with national hydrographic activity. On one hand, it acts as a driving force for the provision to INETER of bathymetric data and any information that will contribute to the safety of navigation and that has been obtained by exploration/prospecting companies and, on the other hand, it acts as a petitioner for the safe transportation of fuel, which is achieved by identifying cartographic requirements depending on navigation routes.

c) *Instituto Nicaragüense de Estudios Territoriales* [Nicaraguan Institute of Territorial Studies] (INETER)

The Team was welcomed to INETER by the Director of the Directorate General of Water Resources, on which the Department of Hydrography depends, who explained current hydrographic capacities, its achievements and the limiting factors to be able to pay an appropriate amount of attention to the increasing demand for data, information, products and services. There is a full description of the foregoing provided in **ANNEX F**.

INETER has been the point of contact established by Nicaragua for its relationship with the IHO. The IHO and the MACHC secretariat communicate with INETER regularly in order for it to share the capacity building opportunities that may be of interest to Nicaragua. In fact, there is a record of INETER's participation in a basic and practical hydrography course given in 2006 and another hydrography course, lasting for two weeks, which was carried out in September/October 2014 in Managua, Nicaragua.

INETER is holding regular meetings with the Navy, the *Empresa Portuaria Nacional* [National Port Company] and the Directorate General of Water Transport, which is the Maritime Authority in Nicaragua. These meetings will allow the minimum amount of coordination required to advance hydrographic works to be carried out, whilst waiting for the creation of the National Hydrographic Committee (NHC) to be formalised.

It is worth pointing out that human resources, instruments and technologies available and the operational budget for carrying out hydrographic surveys and the production of the corresponding navigational cartography are not measured to take charge of the present demand in accordance with the requirements of the SOLAS Convention. Certainly, neither is it capable of dealing, in due course, with the other information needs requested by other services and governmental institutions. This situation is, in itself, worrying in view of the scenario that an operation of the magnitude of the Gran Canal Interoceánico will impose; this will require reliable cartography that is kept permanently up to date, both for the approaches and for the ports themselves (Puerto Aguila and Puerto Brito), the channels and the lakes that make up the system.

INETER does not currently have the capacity to produce Electronic Navigational Charts (ENCs), but although this is worrying, the lack of procedures that allow the navigational chart, which it has succeeded in publishing with tremendous effort, to be made available to mariners on their bridge, is even more so. Indeed, the Puerto de Corinto chart has been finalised and validated by the United Kingdom Hydrographic Office (UKHO), however it is not available to users. The subject of the distribution of navigational charts, as they are being produced – there are another four in the final stages –, merits urgent action to be taken. The Team was informed that this subject is to be considered by the government authorities and, on this occasion, it is asked that this subject be made a priority in order to find a solution.

In summary, a very important step has been taken, namely carrying out the hydrographic survey of the Puerto de Corinto, and others, and producing the corresponding Puerto de Corinto navigational chart whilst complying with international standards. That is to say, the current platform allows objectives to be reached, however current capacities have to be strengthened, especially in qualified human resources, available technology and a budget suitable for the operation of these resources and, all of that, whilst complying with a structured cartographic plan – which does not exist – produced according to actual national needs and priorities. The trend in the capacity to carry out hydrographic surveys in situ, which increased from 101 days in 2010 to 130 days in 2011 and dropped to 50 days in 2012, reaching just 25 days in 2013, is a worrying statistic that is not consistent with the fact that there is a lack of data for producing the navigational charts that the country needs.

By way of example, it is possible to indicate that after the maritime delimitation between Nicaragua and Colombia was recently defined by the International Court of Justice, there are no official Nicaraguan navigational charts to advise mariners as to which country's waters they are navigating in. There certainly should be a navigational chart that, in addition to ensuring the safety of mariners, would provide them with information that is as valuable as that mentioned above.

During the discussion carried out with the INETER personnel, the conclusion was reached that there are certain gaps that are not being covered by any agencies, such as is the case of the distribution of Notices to Mariners through international systems and procedures that ensure the safety of life at sea. Nor are there any agencies that are engaged in the preparation of Sailing Directions for the Coasts of Nicaragua, a publication that is intended to complement the information contained on navigational charts by means of a detailed description of the distinctive features of the coast, access to ports and their features, with their capacities and limitations, and dangers to be avoided by mariners.

From the study on related legal bodies carried out by the Team, another aspect that it is now necessary to specify is that of responsibility in the production of navigational charts, given that this is assigned to two departments in INETER: the Cartography Department (*Section 5 Point 5 Produce, update, edit and publish official maps, basic maps, urban and rural land maps, thematic maps and hydrographic charts. Navigational and aeronautical charts of the country with different scales*) and also the Hydrography Department (*Section 18 The Hydrography Department is responsible for operating and maintaining the Red Nacional de Estaciones Mareo gráficas y Limnimétricas [National Network of graphic and limnimetric tide stations] (RDML), carrying out hydrographic and bathymetric surveys, producing navigational charts, and producing publications and bulletins for information on the behaviour of the tides and hydrographic resources in general*), which leads to confusion.

The foregoing would be recommended to review and complement the current duties of the Hydrography Department, in such a way that the “Hydrographic Services” provided for in Regulation 9 of the SOLAS Convention (**ANNEX G**) are widely covered in the responsibilities allocated to this Department; the benefit and practicality of dissociating Superficial Hydrology and the Hydrogeology of Hydrography, establishing a Directorate General of Hydrography responsible for all components of national Hydrography, could even be an area for study. Thus, it is deemed that hydrography would be given a greater level of visibility at government and national level.

Details of the IHO's Annual, publication P-5, have been updated with the data provided by INETER and are attached as **ANNEX H**.

d) *Ministerio del Ambiente y los Recursos Naturales* [Nicaraguan Ministry of the Environment and Natural Resources] (MARENA)

At the meeting held by the Team with the MARENA authorities, the latter gave an excellent presentation on Coastal Zone Management and Environmental Protection, denoting the high priority given to the subject. Several shortcomings were identified during the presentation and the discussion that followed, which are translated into the lack of oceanographic information and capacity for observing the environmental parameters required to monitor marine parks and specially protected areas. The limited tide stations that do exist do not allow this data to be incorporated into the working models and do not contribute to the monitoring of the mean sea level behaviour or to tidal current studies.

The Team required information on the hydrographic needs that were priorities for supporting Ministry management, concluding that the lack of navigational cartography, which will illustrate to mariners and the fishing fleet the exact location of the protected areas, constituted a weakness. It agreed that the lack of oceanography experts meant that national projects, aimed at getting to know the marine environment in detail in order to adopt prevention measures and draw up contingency plans in the event of any maritime accidents and environmental pollution, could not be tackled. Importance was also ascribed to the need to have a national hydrographic and oceanographic data centre to support research.

It became known that no university offers a degree in oceanography, however, this may be changed if there were clear signals for prioritising the development of any activity associated with the ocean to a greater extent. The recent incorporation of an extensive EEZ could constitute the trigger to make this happen.

The Team applauded the efforts made to protect the coastal zone and to spread the word of its importance, and invited the Ministry's experts to be on the alert for possible improvements to hydrographic capacity, the reality of which could be possible if the interests of all the government agencies related to the ocean are combined.

After the Team became aware of Law 690 on the Development of Coastal Zones, it took note that the aforementioned law requires INETER to help with scientific research and to make technological contributions, establishing the necessary cartography and a data bank for the collection, organisation, administration and disclosure of information on the coastal zones.

e) *Instituto Nicaragüense de la Pesca y Acuicultura* [Nicaraguan Institute of Fishing and Aquaculture] (INPESCA)

The INPESCA authorities gave a full and detailed presentation on the fishing situation in Nicaragua. The Team was impressed by the trend of most of the statistics, which was interpreted as being a very good sign for the sector.

After explaining the aim of the technical visit, the participants had an interesting conversation on the varied themes connecting fishing and aquaculture activities with hydrography.

Firstly, it was considered that having navigational cartography would allow the subject of concessions to be supported, so they could be georeferenced and represented on the chart, facilitating their administration and minimising conflicts of interest between the different parties involved. In addition, navigational charts would come to contribute to the navigational safety of the fishing fleet, which, having 9500 small-scale craft and 141 industrial craft, of which 7 make up the tuna fleet, does not have this information. This puts the lives of the fishermen and their expensive fishing equipment at risk.

A discussion was held on the importance of involving the fishing fleet in the collection of bathymetric data when it is in transit to the fishing grounds and during fishing operations.

Finally, the importance of having a maritime safety information mechanism, such that any new information affecting the safety of navigation can reach an operations centre, which will

distribute it to all mariners navigating in Nicaraguan waters. There is currently no infrastructure in place to comply with this standard.

It was agreed that the provision of hydrographic services to the fishing fleet is a necessity, the demand for which grows as the activity grows.

Finally, the fact of not having navigational charts to show international boundaries and the limits of the territorial sea and EEZ was deemed a weakness; this complicates the administration and control of fishing resources.

f) Nicaragua Armed Forces – Navy

The Team arrived at the Naval Base, where it was welcomed by the authorities. On this occasion, the Team's presentation mainly focused on the importance of hydrography as support for naval and safety operations. The role of the IHO was emphasised, as was its capacity to contribute to the hydrographic development of the countries requiring this.

The coordination carried out by the Navy with INETER, the *Empresa Portuaria Nacional* [National Port Company] and the Maritime Authority became known, as did the arrangement adopted in the sense of aiming at the creation of a National Hydrographic Committee (NHC). The Team highlighted the steps that the Commission for Delimiting the Maritime Boundaries of the Municipalities is taking, however it mentioned the importance of being able to depend upon a navigational chart that would allow such boundaries to be marked and appropriate publicity to be given to it.

It mentioned the importance of depending upon reliable and up-to-date charts for Search and Rescue operations and for the Navy's mission itself, with which those present were completely in agreement.

The Navy does not carry out hydrographic surveys but occasionally contributes with a platform for carrying out specific bathymetric works.

Another important point was that of considering that if current capacities are strengthened, this must be carried out in accordance with the sizing of actual needs and, for this, the creation of the NHC is a priority. Those present requested that this report include an example of the establishment of an NHC, which is attached as **ANNEX I**.

g) Empresa Portuaria Nacional [Nicaraguan National Port Company] (EPN)

The Team was provided with information on the hydrographic surveys carried out due to the need to ensure reliable navigation in the access to and in the manoeuvring and berthing area for vessels with different characteristics that are making landfall in the ports of Nicaragua.

The EPN carries out bathymetric surveys to verify the depths in the maritime and lake port areas, verify dredged areas and calculate dredging volumes, preparing the bathymetric plans in CAD format. It has two craft for carrying out bathymetric studies, one for shallow and calm waters, and the other for offshore bathymetric studies. Its capacity allows it to settle the port safety matter.

It also provides support, with its resources, to INETER's responsibilities for the execution of hydrographic surveys in order to produce navigational charts, as was the case with Puerto Corinto in 2010, which gave rise to the first port chart produced by Nicaragua. It also provides support with information on aids to navigation for updating navigational charts, however it is not responsible for distributing this information or preparing Sailing Directions or other navigational publications.

The EPN has given its support for the creation of the Comisión Hidrográfica Nacional de Nicaragua (CHNN) [Nicaragua National Hydrographic Committee (NHC), the text of which is

in progress. The Team became aware that the proposal considers that the CHNN is made up of the EPN; the Ministry of Transport and Infrastructure, through the Directorate General of Water Transport (MTI-DGTA); the Nicaraguan Armed Forces, through the Navy; and INETER, through the Directorate General of Water Resources. Also that the Commission will be of an advisory, scientific and technological nature, and will have the following aims:

- 1) To promote technical cooperation in terms of hydrographic surveys, navigational cartography and information for mariners.
- 2) To examine, in its area of competence, national affairs related to hydrography.
- 3) To seek advice and technical assistance from the IHO and other organisations in order to strengthen its national capacities;
- 4) To facilitate the exchange of information in relation to surveys, technical and scientific research and/or developments, to look after the planning and organisation of hydrographic activities, navigational cartography and safe navigation, in the broadest sense of the aim, but without interfering in institutional responsibilities.
- 5) To carry out studies as a working group of Nicaragua, when this is deemed necessary.
- 6) To facilitate the exchange of interinstitutional technical information under the drafting of bilateral arrangements.

This news was very well received by the Team, creating an exchange of opinions with regard to which tasks should be the first to be undertaken, once established. Within them there is a definition of hydrographic demand and necessary resources, a definition of a prioritised hydrographic plan and the training required to increase capacity and incorporate ENC production.

Other activities of the EPN that were known were the handling of the dredging matter and the determination of the place at which to deposit the sediment, the positioning of lighthouses in ports and the operation of the tidal station in the Puerto de Corinto.

The Team emphasised the need to work together and recommended giving priority to making the status of the Commission official. This authority will be well positioned to identify training requirements, ensure compliance with the technical specifications established by the IHO and, ultimately, consider hydrographic development and its advantages as a national strategic capacity and not as an individual institutional capacity, considering the diversity of governmental users that depend on hydrographic knowledge to carry out their duties. Finally, the Team highlighted the importance of finding a solution to the distribution of navigational charts, given that it does not make sense to produce charts and then not make them available to the mariners arriving in the ports of Nicaragua. To that effect, the arrangement offered by the UKHO deserves to be considered as an alternative that is available immediately.

h) Ministry of Transport and Infrastructure – Directorate General of Water Transport

The Maritime and Port Authority received the Team, whose members explained the aim of the visit and announced the aspects that are considered to be a priority as regards compliance with the SOLAS Convention, given that the Directorate General of Water Transport represents Nicaragua before the International Maritime Organization (IMO).

One of the matters discussed in detail was the IMO Voluntary Audit Scheme, which will soon, in 2016, become "compulsory". It relates to an inspection to discover the level of compliance with the regulations of the SOLAS Convention and, as far as we are concerned, it relates to how Nicaragua is collecting hydrographic information and producing navigational charts and

publications, what mechanisms are in place for distributing maritime safety information, and how charts and publications are kept up to date, etc.

It was agreed that, concerning this matter, there is still quite a lot to be done and it could be one of the matters to be dealt with by the CHNN. Although there is reduced capacity for carrying out hydrographic surveys and producing navigational charts, demand *a priori* is a lot higher than the response capacity. But, not only that, rather that it is important to urgently settle the matter of the distribution of navigational charts, take steps to prepare the Sailing Directions for the Coasts of Nicaragua, begin the distribution of notices to mariners through the NAVAREA system (NAVAREA IV for the Caribbean Sea and NAVAREA XII for the Pacific Ocean) and increase capacity to produce ENC's. The solution to these shortcomings requires a coordinated increase in the following four components: personnel; technology; infrastructure and operating budget. It also requires the adoption of facilitating administrative measures.

i) Ministry of Energy and Mines.

The Team was pleasantly impressed by the level of interest shown by this Ministry's authorities, which had obviously dedicated time to carrying out in-depth research on the aim of the technical visit prior to the meeting. Indeed, it was not necessary to justify the visit because the Minister immediately expressed his total support for the evident need to increase Nicaragua's hydrographic capacity.

As an important user of hydrographic information, products and services, this ministry highlighted oil prospecting activities, seismic studies, off-shore wind farms and energy originating from tides and currents, which are all activities whose success depends, in one way or another, on hydrographic knowledge.

One of the aspects dealt with in detail was the best use of the data obtained in prospecting operations. It is not about the data from seismic profiles or characterisation of the subsoil, but the bathymetric information, which, of very good quality, is obtained by research vessels and which, according to the Team, must become part of the country's hydrographic database, and the information obtained after it is processed, which is used to produce, complete or improve navigational charts.

Another matter dealt with was the lack of a procedure and protocols so that, when a danger to navigation is detected, prospecting vessels can communicate such information urgently in order to prevent another vessel approaching the area from suffering a maritime accident.

In short, this ministry is in favour of establishing the CHNN and treating the matters with which this Commission would be dealing as state matters.

j) Ministry of Foreign Affairs

The Minister for Foreign Affairs and his Deputy Minister were kind enough to welcome the Team, which had the opportunity to express its preliminary assessment that it had formed thus far, following the various sector-based meetings held.

The following were addressed: the importance of considering a mechanism for distributing the navigational charts that INETER was producing; the fact that it is advisable to create the CHNN in order to officially combine the efforts of the different government agencies, both suppliers and users of hydrographic data, information, products and services, and consider giving a greater connotation and priority level to the function entrusted to INETER, by law and regulations, in relation to hydrography and navigational cartography.

Another aspect that the Team emphasised to the Minister was the fact that it is advisable to include Nicaragua on the international hydrographic stage, with an active participation in the MACHC, of which it is an associate member, and that of considering Nicaragua joining the IHO. Both actions would make it easier to obtain the support of the IHO and its 82 Member States for capacity building opportunities.

Finally, and faced with the sustained development that Nicaragua is achieving, the mega Gran Canal Interoceánico de Nicaragua project and the increasing demand for hydrographic information to support other national initiatives, the Team reinforced the idea of considering the increase in hydrographic capacity as a strategic objective of Nicaragua.

k) “Gran Canal Interoceánico de Nicaragua” Commission and the HKND Investment Company

Representatives of the Commission gave an interesting presentation on the mega project “Gran Canal Interoceánico de Nicaragua”, detailing its components throughout its trajectory. Subsequently, the Team was required to explain the aim of the visit and its potential link with the project. The Team expressed its thanks for the presentation and described the mission of the IHO, its relationship with the IMO and the aim of the visit. It emphasised the natural demand for hydrographic data that a project of this magnitude involves.

It was advised that neither the representatives of the Commission or the members of the HKND Investment Company had knowledge of the existence of the IHO. The need to have up-to-date navigational cartography, most likely in ENC (Electronic Navigational Chart) format, standardised to international standards, which ensures the safety of navigation from the open sea to the respective ports located on the Pacific and the Caribbean, and from there through the channels and lakes, seems to be a matter that has not been dealt with.

Neither has the imminent need to increase INETER's capacity to carry out hydrographic surveys and produce navigational charts, or to check the work that may have been carried out by third parties in its absence. This was a motivation for intervention by the HKND, which promised to include an item on "hydrographic capacity building" in the project. This marvellous piece of engineering would certainly be no good if the vessels crossing it do not have the appropriate navigational charts that are based on reliable data and kept permanently up to date. That's why there is a vital need to strengthen the INETER.

The Team revealed that it is already necessary to coordinate it in order to be able to carry out operations to unload machinery and equipment; preliminary hydrographic works will certainly have to be carried out in order to secure such an operation. It is considered that INETER, as the national authority in the matter of hydrography and navigational cartography, must keep itself fully informed about these preliminary works. The Team is of the opinion that the bathymetric, tidal and current-related data obtained will be very useful for many subsequent studies by way of pre-project reference.

NOTE:

The Team was able to draw valuable conclusions from the discussions held and, based on these, it has been able to identify actions that are aimed at improving Nicaragua's hydrographic capacity, which will subsequently be reflected in the conclusions and recommended actions.

III.- DESCRIPTION OF MARITIME ACTIVITIES

4. National Maritime Affairs.

Even though it is in a privileged geographical position, with coasts on the Caribbean Sea and the Pacific Ocean, a maritime-oriented mentality was not perceived amongst the Nicaraguan people. Nicaragua's maritime development is modest, however there is a mega project in progress, the authorities for which are the Nicaraguan government and a Chinese company

and partners, for the construction of the “Gran Canal Interoceánico de Nicaragua”, a project that is intended to change Nicaragua's passive maritime destiny.

The Nicaraguan government and HKND Group confirmed the Working Schedule for the Gran Canal Interoceánico de Nicaragua, to begin on the planned date in December 2014, in accordance with an official note published in Managua. The Schedule confirmation was signed by President Daniel Ortega and Mr Wang Jing, Chairman and CEO of HKND Group, Contractor of the Gran Canal. The year in which operations will begin is 2019.

The project considers the following:

1. A channel connecting the Caribbean to the Pacific
2. A port at Punta Águila on the Caribbean coast
3. A port at Brito on the Pacific coast
4. Free-Trade, manufacture and finances area in the Pacific (Rivas)
5. International airport at Rivas
6. Highways, motorways, access roads and bridges
7. Tourist complexes

5. Maritime traffic and trade.

a) International Cargo by Handling Type - Metric Tonnes

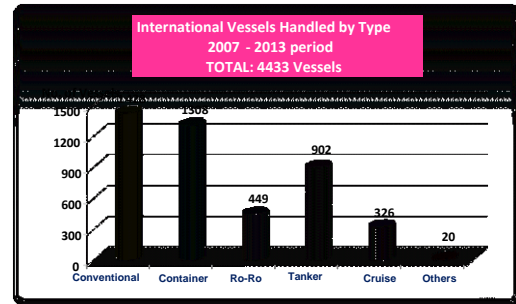
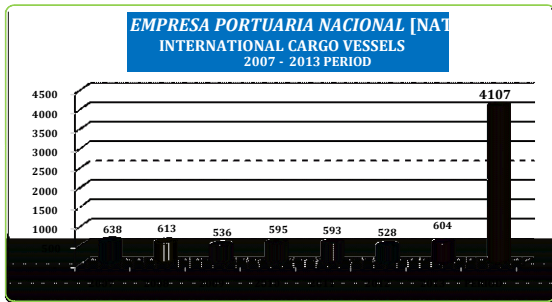
YEAR	General Cargo	Containerised Cargo	Ro-Ro	Solid Bulk	Liquid Bulk	TOTAL
2007	79,640	442,950	21,870	909,130	1,484,720	2,938,310
2008	102,920	495,730	13,910	739,690	1,447,010	2,799,260
2009	49,560	494,120	6980	563,750	1,719,198	2,833,608
2010	100,010	603,650	13,461	788,830	1,503,200	3,009,151
2011	54,170	749,100	17,591	963,530	1,653,360	3,437,751
2012	101,570	808,290	26,230	1,106,390	1,608,967	3,651,447
2013	221,610	774,450	22,060	1,031,390	1,572,759	3,622,269
TOTAL	709,480	4,368,290	122,102	6,102,710	10,989,214	22,291,796

Source: Empresa Portuaria Nacional - Statistics

Movimiento de Contenedores por puerto - Nicaragua, 2007-2013 (TEU'S)								
Puerto/Año	2007	2008	2009	2010	2011	2012	2013	PERIODO 2007 - 2013
Puerto Corinto	58,614	58,885	56,185	64,916	80,121	89,403	91,867	499,992
Importación	30,141	31,719	30,162	33,988	42,107	46,409	48,216	262,742
Exportación	28,473	27,166	26,023	30,928	38,014	42,995	43,651	237,250
Puerto Arlen Siú	2,393	3,706	3,293	3,223	4,036	4,765	5,430	26,846
Importación	1,160	1,882	1,595	1,639	1,938	2,393	2,864	13,471
Exportación	1,233	1,824	1,698	1,584	2,098	2,372	2,566	13,375
Puerto Bluff - Bluefields	404	445	436	185	310	140	858	2,778
Importación	199	160	121	86	151	76	454	1,247
Exportación	205	285	315	99	159	64	404	1,531
Puerto Cabezas	45	204	18	-	-	-	-	267
Importación	13	58	7	-	-	-	-	78
Exportación	32	146	11	-	-	-	-	189
TOTAL	61,456	63,240	59,932	68,324	84,467	94,308	98,155	529,882
IMPORTACION	31,513	33,819	31,885	35,713	44,196	48,878	51,534	277,538
EXPORTACION	29,943	29,421	28,047	32,611	40,271	45,431	46,621	252,345

Fuente: Empresa Portuaria Nacional - Estadística

Movement of Containers by port – Nicaragua, 2007-2013 (TEUs)

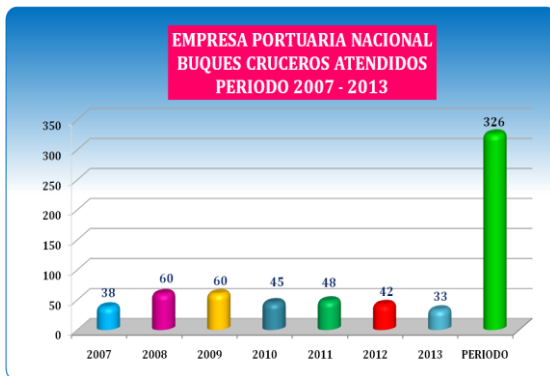


b) Tourism

Tourism is currently one of the country's most dynamic sectors. More than 50% of this industry is located on the coast, especially in the Pacific. Tourist activities are based on the use of natural coastal marine resources (beaches, diving, recreational fishing, cruise vessels and ecotourism in general).

The Caribbean coast of Nicaragua has very important appealing aspects, with Corn Island and the Cayo Perlas island standing out.

The tourism sector has experienced sustained development in recent years. Compared with the other Central American countries with fairly similar tourist attractions, Nicaragua has experienced a global increase in the arrival of tourists of 326.4%, followed by El Salvador, with 210.7%, Panama with 142.5%, Costa Rica with 137.9%, Guatemala with 62.3% and Honduras with 5%.



Cruise Vessels Handled

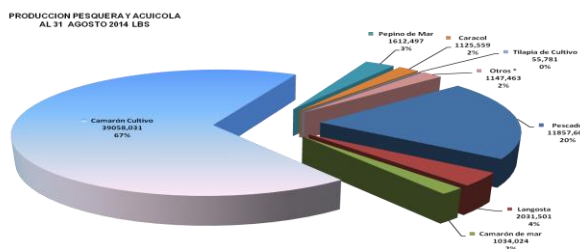


Number of Tourists Handled

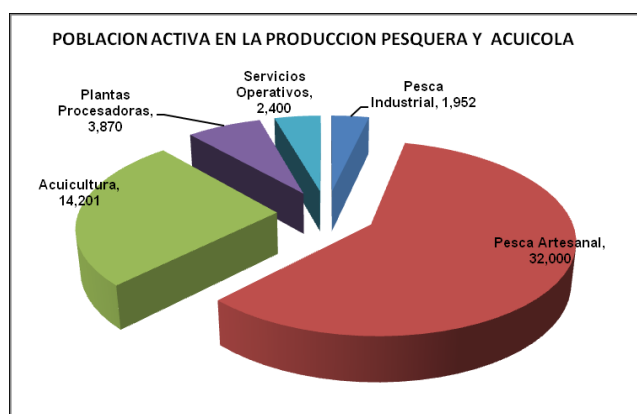
c) Fisheries

Craft	9641
Small-scale	9500
Industrial	141
Lobster	86
Fish traps	67
Diving	19
Shrimp	30
Coastal	27
Prawn	2
Depth	1
Scale (skin)	16

Tuna	7
Cucumber	2



Fish and Aquacultural Production at 31 August 2014 Lbs.



Active population in Fish and Aquacultural Production

Comparison between installed capacity and production

Region	CARIBBEAN PACIFIC	
Use (millions of pounds)		
Potential	181.1	287.6
Use	31.3	21
Fishing	13.6	19.5
Structure		
Companies		
with craft	40	6
processors	9	9
stocking centres	5	4
Laboratories		10

It has been estimated that Nicaragua has used less than 5% of the fishing potential available (CIPA, 2007). According to the VIII Population Census and the VI Housing Census, Census 2005/INIDE, Nicaragua had 5,142,098 inhabitants in 2005. 54.03% was concentrated in the Pacific area, 33.90% in the Central and northern area and 12.07% in the Caribbean autonomous regions.

The Pacific coast is a plain that occupies a quarter of the country, with 54.03% of the country's population concentrated in it with a density of 151.66 inhabitants per km².

6.11% and 5.96% of the country's population are concentrated in the RAAN [North Atlantic Autonomous Region] and the RAAS [South Atlantic Autonomous Region], respectively, and

these regions have a population density in the same order of 9.57 and 11.13 inhabitants per km².

The *Instituto Nicaragüense de la Pesca y Acuicultura* [Nicaraguan Institute of Fishing and Aquaculture] (INPESCA) mentioned that per capita consumption of fish products in Nicaragua increased from 2.3 kg/person/year in 2008 to 3.87 kg/person/year in 2009. This figure indicates an improvement in the diet of the Nicaraguan people, as well as an increase in production.

6. Responsibility for Safety of Navigation.

The law does not seem to be clear in this respect. INETER is responsible for carrying out hydrographic surveys and producing navigational cartography, however it is noted that the Maritime Authority must be responsible for the safety of navigation, given that it represents Nicaragua before the IMO, however there is no infrastructure in place to allow it to take care of the aids to navigation and the distribution of notices to mariners. The ENP only takes care of the existing lights in the ports under its jurisdiction.

7. Defence Force Responsibilities.

The Nicaragua Armed Forces – Navy – has been assigned Search and Rescue duties and is responsible for safety/security and operations for combating illegal activities. It does not have a hydrographic role and its participation is sporadic and on request, providing the platform, but it lacks the hydrographic capacity to carry out hydrographic surveys. It uses cartography in non-official digital format, provided by private suppliers, in its operations.

8. Coastal Zone Management and Environmental Protection.

There are 72 protected areas in Nicaragua, equivalent to 2,153,855 ha, or 18.2% of the national territory. It is estimated that 47% of the land included in protected rural areas protect, directly or indirectly, coastal resources in 15 protected rural areas, of which 11 are in the Caribbean. In the Pacific, the representation is only partial as the protected coastal rural areas only include part of the Estero Padre Ramos, Delta del Estero Real, Río Escalante-Chococente and Isla Juan Venado.

Of the 72 protected areas that make up the *Sistema Nacional de Áreas Protegidas* [National System of Protected Areas] (SINAP), 8 of them have marine-coastal areas; these represent 48.87% of the total extent of the system of protected areas on a national level. The Reserva de los Cayos Miskitos in the Nicaraguan Caribbean is the largest and represents 28.3%, followed by Río San Juan and La Flor with 2.1% and 2.0%, respectively; each of the remaining protected areas with marine components represents less than 1%.

IV.- OUTLINE OF C-55 ANALYSIS

9. Status of Surveys within the National Maritime Zone.

Surveys have been carried out for environmental zoning for support in the identification of the areas available for the exploration and exploitation of hydrocarbons, and there is a good register of the seismic surveys and wells drilled from 1960 to 2011, however there has been no national marine scientific activity, so such capacity does not exist.

Hydrographic surveys that comply with international standards have only been concentrated in five ports and, for the moment, only the Puerto Corinto chart is known, which has been completed and validated, however there is still no mechanism in place to allow it to be marketed and made available to the masters of vessels arriving at the coasts of Nicaragua.

10. Collection and Circulation of Nautical Information.

INETER obtains, in situ, hydrographic and navigational information required for the compilation of the navigational charts in progress. There is no one responsible for preparing Sailing Directions for the coasts of Nicaragua and such a publication does not exist. There are various organisations that have useful information for this purpose and, under the leadership of INETER and with the support of the members of the CHNN, it is hoped that this shortcoming will be overcome. It was recommended that, in the event of a lack of human resources for this, the possibility of assigning a paper/thesis to a university student be explored, in which the latter carries out the compilation work, following the instructions of the IHO and a Sailing Directions model from other countries.

It is considered to be feasible to obtain advice within the MACHC for establishing the terms of reference for preparing this publication.

11. Survey Capability.

As has already been mentioned in previous sections, the current status of INETER's hydrographic capacity is included in **ANNEX F**. INETER has demonstrated the fact that it has the capacity to carry out hydrographic surveys, process the data and produce the corresponding paper navigational chart. In fact, the Puerto de Corinto navigational chart is ready to be distributed and another four port charts are in the final stages of production.

However, INETER's capacity is far from being able to deal with the demand for hydrographic information required to ensure the safety of navigation and to support the plans of other state agencies. It is recommended that future plans for INETER's growth be specified once the Nicaragua National Hydrographic Committee has been formed. It is not a question of doubling or tripling current capacity, but of growing in accordance with a prioritised working plan produced according to actual national needs, to be defined by the aforementioned Commission.

12. Independent Chart Production Capability.

As has been reported, the Puerto de Corinto chart was validated by the UKHO and is fit to be distributed. It is hoped that the other four chart ports in the final stages of production will follow the same path. That is to say, specifically, INETER has the capacity to produce paper navigational charts in accordance with international standards set by the IHO for this purpose. However, there is no capacity for producing Electronic Navigational Charts (ENC), which are vital for using ECDIS (Electronic Chart Display Information System) equipment. This limitation will have to be corrected as state-of-the-art vessels have these systems built in, complying with IMO standards that endeavour to increase the safety of navigation. It is feasible to obtain this capacity with the support of the IHO Member States, the hydrographic industry and the capacity building opportunities offered by the IHO.

The non-existence of a cartographic plan and scheme that would consider the identification of the navigational cartography coverage that would be desirable for Nicaragua constitutes a great weakness as, at present and after the five port charts defined have been completed, it leaves the question of what is to be done next. Without establishing this plan, it is very risky to define the means that it has available. The job of creating a cartographic plan to guide hydrographic efforts must be one of the priorities of the CHNN.

V.- PROPOSALS FOR CO-ORDINATION AND CAPACITY BUILDING

13. National Hydrographic Committee.

The Nicaragua National Hydrographic Committee is in the process of being established. The wording of its text was agreed upon by INETER, the Navy, the EPN and the Maritime Authority (Directorate General of Water Transport). The importance of its existence was highlighted during all the meetings held, and the Team was left with the impression that such an initiative will be implemented before long.

The Team was persistent in specifying that it is up to Nicaragua to set its priorities and the Commission would have to have the task of agreeing on a prioritised cartographic plan that would satisfy all requests from the state, those connected to the safety of navigation and others required for national development projects. The foregoing having been completed and, based on current capacities, it will be possible to identify and measure the missing capacities. With this information INETER, representing Nicaragua, must obtain the assistance of the IHO, the MACHC and the Capacity Building Sub-Committee of the IHO to request the necessary support.

Considering the Gran Canal Interoceánico project, it would be highly advisable that the Comisión del Canal [channel commission] also be represented in the CHNN.

Finally, it is considered that the CHNN could also have an important role in helping the government to establish a National Maritime Policy.

14. MSI organisation and GMDSS.

There are no procedures or a structured system in place that could fulfil national obligations on maritime safety information (MSI) and a Global Maritime Distress and Safety System (GMDSS). In this respect, the Team recommends that the human resources that are available and in a position to receive training to establish this service be identified. The Maritime Authority, INETER and the EPN are aware of this weakness affecting the safety of navigation in Nicaraguan waters.

The EPN takes charge of the information within the ports under its control, but this in no case corresponds to the global service that the states signing the SOLAS Convention have committed to providing.

a) MSI (navigational warnings).

This service does not exist, it is not available and there are no specific plans to establish it. The Team explained in detail the importance of Nicaragua appointing and training a small number of people (at least two) to receive, evaluate and broadcast the information that may affect the safety of navigation. There is agreement on this and it is considered that the IHO, the World-Wide Navigational Warning System Sub-Committee and the Capacity Building Sub-Committee may offer training alternatives. Although the CHNN could have another opinion, this service could be included with the Maritime Authority or with INETER, that is beside the point. The important thing is that the service is established and functions in accordance with international standards.

b) Information on ports and harbours.

The Team was informed that the administration of the Ports for which the EPN is responsible does not pose a problem and the necessary extension and maintenance works at hydrographic level are carried out by the EPN hydrographic unit. Its capacity allows it to deal with its own needs and even to support INETER when circumstances merit this.

The Team was not aware of a programme to increase EPN's hydrographic capacity, however it is deemed to be necessary; the EPN is in a position to be able to fund the incorporation of new technologies and the incorporation of trained personnel, depending on the case.

c) GMDSS status.

Nicaragua does not have the structure or the personnel that are trained to operate the GMDSS. The Team requested that urgent attention be given to this subject, which is interfering with the maritime safety service requirements described in the SOLAS Convention.

15. Hydrographic Capacity.

As has been mentioned, INETER has a Hydrography Department, which has limited hydrographic capacities. In order to tackle the current challenges originating from the expected growth of maritime traffic and from the demand for hydrographic data on the part of government users, a substantial increase in human, technological and budgetary resources must be considered. Its definition, harmonised with national economic growth, has to be studied and proposed by the CHNN. It is not suitable for the Team to begin to measure and specify such growth without first having a will and a definition on the part of the government with regard to the periods defined for carrying out international commitments and meeting national needs.

The Team recommended urgently assigning to the CHNN the task of submitting a proposal to the government for a prioritised navigational cartographic plan, from which a hydrographic survey plan will arise. The scope of such surveys will make it possible to identify the extent of the human, technological and budgetary resources necessary for its implementation and execution, based on a working programme and objectives to be reached.

a) Provision of survey data.

The Team recommended exhausting all means so that any activity for which a concession has been granted and which is funded with state resources will ensure the provision to INETER of bathymetric data, which it will be free to use, for the benefit of projects of national interest and, within these, the preparation of navigational charts.

The establishment of a National Hydrographic and Oceanographic Data Centre, which would be responsible for looking after all of this duly validated data constituting extremely valuable national assets, was recommended.

It is necessary to establish coordination mechanisms, on a national level, that would facilitate the population of such a database and the use of which would be regulated for state purposes. Along these lines, the CHNN could be invited to suggest the necessary protocols.

b) Survey capability.

The Team is of the opinion that there is currently no survey capability in the hydro-cartographic area or in the navigational safety information field. As has been mentioned, existing capacity is very limited and does not allow the priority commitments to be carried out. If this capacity does not increase, it will not be possible to divert resources to allow surveys to be carried out. The shortage of personnel is concentrated on works in the field and processing activities. It is even very difficult to train existing personnel due to the fact that when they are taken off the production line, the system becomes even weaker.

The Team recommended that the CHNN focus on identifying priority needs and then on finding resources to meet these needs within a reasonable time frame.

Nicaragua's participation in the international arena is very important and special emphasis is placed on the value of Nicaragua's participation in the next MACHC meeting, which is to be held in Mexico in December.

The Team is of the opinion that the Maritime Safety Information (MSI) matter and the matter of Nicaragua's participation in the NAVAREA, NAVTEX and GMDSS systems could be discussed at the MACHC with the NAVAREA Coordinator (NAVAREA IV for

the Caribbean Sea and NAVAREA XII for the Pacific Ocean), as could the matter of finding a solution to this serious limitation. It is feasible to find support at regional level, which would enable those appointed to fulfil this role to be trained.

c) Chart production.

The Team is aware that INETER has the capacity to produce paper navigational charts, however this capacity is limited and would not allow a cartographic plan, once established, to be carried out. With regard to producing ENC's, the Team believes that such capacity does not exist; however, it could be achieved by training one of INETER's current cartographers but, for this to happen, access to the appropriate technology (software and hardware) is necessary.

The Team recommended that which has already been pointed out on several occasions. To determine the need and then determine the means for satisfying such a need. If we take the matter of ENC production, providing training in this would not make sense if such training were not associated with the availability of technology to make use of it.

The problem is not related to a lack of knowledge to carry out operations in the field, but rather to the fact that these operations can still not incorporate multibeam sonars, which, as with the incorporation of ENC production, require trained personnel and technology so that they, once trained, can deliver.

The Hydrography Department is currently only meeting minimum demand and not with the timeliness desired. We must not forget that navigational charts have to be kept up to date and this requires regular surveys to be carried out. The subject merits a review and a solution with regard to the size of hydro-cartographic capacity that the state is willing to have at its service.

Despite the commendable effort currently being made, there is no capacity for producing navigational publications with information in addition to the information contained in the navigational charts.

d) Potential for regional activity.

As there is no capacity to meet the country's own needs, it cannot be hoped that it will be able to assist other states in the region with hydro-cartographic works.

VI.- PROPOSALS FOR ASSISTANCE

16. Training.

After having explained the details of the three phases taken into account by hydrographic capacity building and included in **ANNEX J**, the Team proposed the following:

a) Secure the capacities required to carry out Phase 1 – Information on Maritime Safety.

In order to do this, it was recommended that the matter be discussed within the CHNN, on which occasion, it should be agreed to establish a national mechanism to take charge of Maritime Safety Information (MSI). Participation in the World-Wide Navigational Warning Service (WWNWS) could be a matter to be dealt with at the next MACHC meeting to be held in Mexico in December 2014, an occasion on which the representative of Nicaragua could require assistance to train at least two people for the job. This training could be provided by any of the MACHC member countries at their premises, through training courses held in Nicaragua or by means of the organisation of a new MSI course for the region, in which Nicaragua could participate.

Given the importance that Nicaragua places on this service being in place as soon as possible, the Team believes that assistance will be given for this training course, however it is vital to create the administrative and regulatory infrastructure with which the system would operate.

The Team considers this action to be taken as a high priority, but the training course must run parallel with the aforementioned administrative arrangements.

In this area, the Team also recommended that preparations begin on the Sailing Directions for the Coasts of Nicaragua, a publication with descriptions that would help to disseminate the characteristics of the coasts, providing information to ensure the safety of navigation.

b) Secure the capacities required to improve the execution of Phase 2 – Hydrographic Surveys.

The Team believes that the existing basic organisation is not sufficient to carry out, in the time frame required, the hydrographic surveys needed to execute a national navigational cartographic plan, let alone to be able to provide services to other state institutions.

In this respect, the Team believes that the capacity increase is related to having more duly trained human resources and access to more modern technology such as, for example, multibeam echo sounders.

The Team believes that the CHNN has an important mission and that is measuring hydrographic demand for all national activities and prioritising them, establishing a hydrographic survey programme to be carried out. The foregoing having been done, it will be possible to measure the human, technological and financial resources required for this to be carried out.

According to Nicaragua's economic growth, it is feasible to increase the budget and also to purchase more modern technology, however human resources must be available and in a position to receive training.

The Team recommended making the most of any available training opportunity and that which the IHO can provide through its Member States, the MACHC and the Capacity Building Committee, upon request by Nicaragua. For this, it is essential for Nicaragua to participate on the regional (MACHC) and global (IHO) international hydrographic stage.

The execution of this phase urgently requires an active CHNN and the support that the government gives to its arrangements. It is emphasised that, without sizing needs and priorities, it would be risky to indicate the number of personnel to be trained to carry out hydrographic surveys and to process their data. Training must run parallel with the incorporation of new technologies (equipment and software). The Team urges that any acquisition be made with training included.

c) Secure the capacities required to improve the execution of Phase 3 – Cartographic Production.

The Team was informed of the preparation of the first navigational chart produced by INETER and validated by the UKHO, which offered its comments to improve the presentation and content of the chart even more. That is to say, the limited personnel that INETER has at its disposal were capable of producing a paper navigational chart whilst complying with the standards set by the IHO.

The Team believes that other charts will also be able to follow the same course, despite agreeing on a cartographic plan and its corresponding hydrographic survey programme, the existing capacity will not be sufficient to undertake all of the activities and, by necessity, an increase in qualified personnel has to be considered.

The basics for the production of navigational charts can be obtained from courses provided for this purpose by certain hydrographic offices of IHO member countries, for example the UKHO.

The Team believes in strengthening current capacity for the production of navigational charts and also starting to take steps to obtain skills needed to produce ENCs. This navigational chart format, which is essential for use in ECDIS equipment already required by the IMO for

SOLAS vessels and that can be extended to other vessels in the near future, requires specialised equipment and software.

This step, as it is the most onerous and requires duly trained personnel and equipment, is not an immediate priority, however it is something to be developed and included in Nicaragua's hydrographic development plan. At the moment, ENC's can be produced with the assistance of an ENC Regional Centre, thus ensuring that they are kept up to date.

17. Equipment.

In terms of equipment, the Team was very cautious not to tire itself out providing too many technical details about the instruments, hardware and software available on the market for carrying out hydrographic surveys and producing navigational charts.

INETER has basic equipment that meets its needs, however it can be improved and complemented with new technologies.

Given the initial priorities anticipated – ports and approaches to ports – where 100% coverage is required, the Team recommended the incorporation of multibeam echo sounders to ensure that reliable information is obtained. However, it is necessary to train those who will have the job of operating the equipment and processing its data. Normally, basic training can be obtained from the company producing the equipment, however by participating on the international stage, it is possible to obtain valid information on past experience. Contact with experts from other countries, for example at the MACHC meetings or at the workshops organised by the MACHC, makes it possible to obtain important details when it comes to making decisions about purchases.

For the moment, the Team does not recommend any configurations for the production of ENC's. It believes that this is premature in the light of other priority needs that it is necessary to deal with.

18. Funding.

It is confirmed that the national authorities with which the Team was connected during the technical visit are fully up to date with the IHO publication M-2 "The Need for National Hydrographic Services" and with what it would mean for Nicaragua, in economic terms, to be a member of the IHO.

The Team informed the authorities that participating in the MACHC would not generate extra expenses, except for those associated with their representatives attending the meetings. It was also indicated to the authorities that certain capacity building initiatives are fully or partially funded by the IHO Capacity Building Fund.

The Team did not specify the costs of a training course in particular, given that it only makes sense to attempt to put a value on the activities that the CHNN will define at the right time.

VII.- FOLLOW-UP ACTIONS

19. Encouragement of formation of a National Hydrographic Committee (NHC), development of a National Hydrographic Strategy and RHC Membership.

The national authorities are establishing the Nicaragua National Hydrographic Committee and are considering defining their position with regard to a possible application to join the IHO. It has been confirmed to the authorities that Nicaragua is an associate member of the MACHC and that if it becomes a member of the IHO, its status will automatically change to that of a full member. The fact was also underlined that in order to obtain the benefits of both memberships, it is necessary to participate actively in the activities that these organisations arrange.

The Nicaragua National Hydrographic Committee, in light of this report, will have an important task in determining the level of hydrographic development that Nicaragua would like to achieve.

ACTION: IHB; Chairman of the MACHC.

20. Encouragement of effective and timely collection and promulgation of hydrographic information.

As there is no organisation to deal with Notices to Mariners and to handle Maritime Safety Information (MSI), the Team focused on justifying its importance and the high priority that should be given to this shortcoming.

Nicaragua was invited to consider, as a matter of priority, participating in the next MACHC meeting, an occasion on which the subject would be addressed with the aim of finding a temporary solution to this shortcoming that affects the safety of navigation until the CHNN submits a proposal to, and this is accepted by, the government for the creation of a unit to deal with the subject and to be Nicaragua's point of contact with the NAVAREA IV (Caribbean Sea) and XII (Pacific Ocean) Coordinator.

ACTION: NAVAREA IV and XII Coordinator

21. Encouragement of development of hydrographic capability.

The Team has established that the following actions take priority and invited the Nicaraguan government to consider them in a positive light:

- Establish the capacities to carry out phase 1, insofar as it has a direct and immediate impact on the subject of safety of navigation.
- Actively participate in the MACHC and look into joining the IHO, insofar as it is feasible to obtain support from both organisations in the plans to increase capacities.
- Officially establish the Nicaragua National Hydrographic Committee (CHNN), a body that can be called upon to coordinate the efforts of all national institutions that supply and use hydrographic data, information, products and services.
- Train the CHNN (once formed) to identify national hydro-cartographic priorities, draft a prioritised navigational cartographic plan, and prepare a hydrographic survey programme to meet national demand.
- Train the CHNN (once formed) to propose methods, based on that defined in the previous point, to measure the human, technical, structural and financial resources needed to carry out the plan and the aforementioned programme.
- Take advantage of and seek any opportunity for capacity building that is consistent with the plan to increase capacities laid down by the CHNN.

ACTION: IHB, MACHC and CBSC

22. Encouragement of development of a risk assessment tool.

The Team, acknowledging the success achieved after the development of risk management tool (e.g. Land Information New Zealand – LINZ) to help understanding the risks associated and to which a maritime country can be exposed by not developing the required hydrographic capabilities, is of the idea that the CHNN (when formed) should develop this assessment tool with the support of MACHC.

This action shall help Nicaragua to understand its current position and find the best solution in a systematic way.

ACTION: MACHC