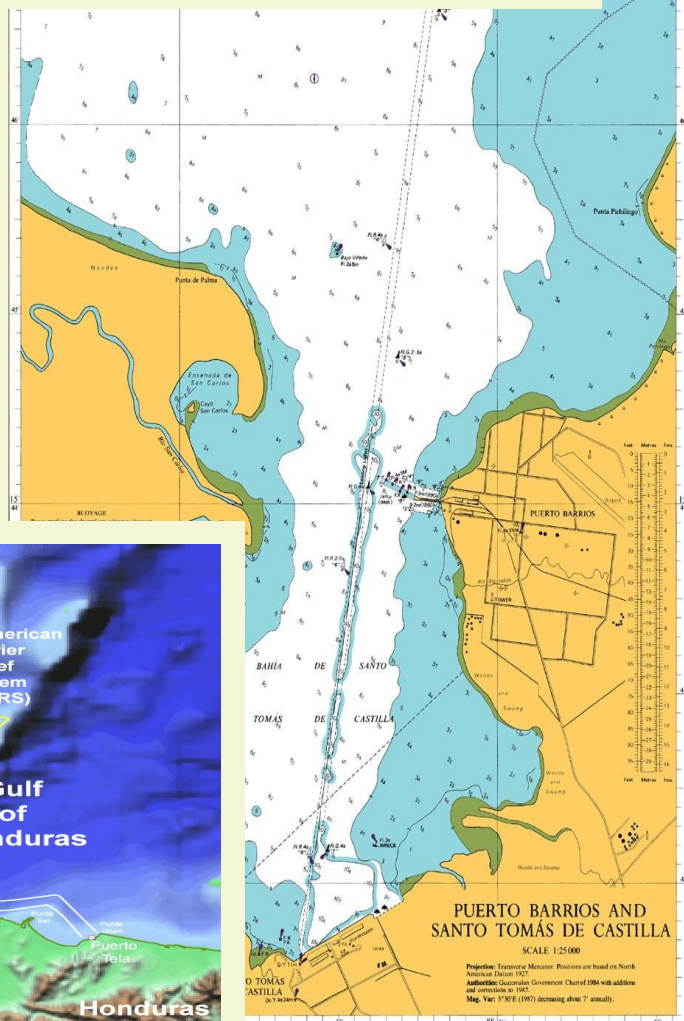


# PERFORMANCE ASSESSMENT REPORT

of the  
MACHC Hydrographic Surveying Capacity Building  
Partnership

with the  
Gulf of Honduras Project  
2008–2011



Submitted to the MACHC Capacity Building Committee, December 2011

**PERFORMANCE ASSESSMENT REPORT**  
**of the MACHC Hydrographic Surveying Capacity Building Partnership**  
**with the Gulf of Honduras Project**  
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**Executive Summary:**

As required by Procedure 5 of the IHO Capacity Building Committee, this report provides an assessment of the results, lessons learned and related recommendations of the three-year capacity building pilot project supported by the MACHC in partnership with the Gulf of Honduras Project from 2008-2011. In accordance with the IHO capacity building phases, this effort focused on providing Hydrography Type 2 (training on basic hydrographic survey practices –single beam surveys—and related data processing). Contributors to this report include the U.S. National Oceanic and Atmospheric Administration (NOAA) and Navy trainers, the hydrographic focal points of the participating countries of Belize, Honduras and Guatemala, the Director of Gulf of Honduras Project Office, the Chair of the MACHC Electronic Charting Committee and the Chair MACHC Capacity Building Committee.

The overarching objective was to improve hydrographic capacity in the three countries by training personnel and assisting with the execution of their planned surveys in the approaches to major ports in the region and to process the data for chart updates through bilateral arrangements with the UK Hydrographic Office. The training was conducted in three phases (2009-2011) which had the following major objectives:

- 1) Evaluate and set up hydrographic survey equipment purchased through the Gulf of Honduras Project
- 2) Establish and cultivate international partnerships between Gulf of Honduras hydrographic survey programs
- 3) Provide hydrographic survey training with the outcomes that participating Gulf of Honduras country organizations will be able to:
  - a. Configure and install hydrographic survey equipment on a suitable vessel
  - b. Establish and monitor a water level measurement station for IHO standard data acquisition
  - c. Conduct pre-survey and intra-survey planning
  - d. Acquire and process hydrographic survey data to IHO standards
  - e. Troubleshoot and conduct minor repair of hydrographic survey systems
  - f. Generate and transmit IHO standard survey products to the United Kingdom Hydrographic Office for nautical chart updates
- 4) Demonstrate the mutual benefits of establishing a non-traditional partnership between the MACHC and an international-donor funded regional project like the Gulf of Honduras Project to support hydrographic capacity building.

Using the performance indicators specified by the IHO CBSC (See Annex A), a summary rating of the project results are indicated in the table below. Country-specific ratings are included later in this document:

<i>Performance indicator</i>	<i>Mark</i>
Arrangements	4
Organisation of the project	3
Involvement (contribution):	
National partners	4
Regional partners	4
RHC	4
IHB	4

Efficiency of the project	3
Goals achieved	2
Planned timing	2
Future perspectives	3
Need of similar project (locally, regionally)	4
Impact on future development	4
Procedure of CBSC	4
Application form	
Support received	4
Follow up and reporting	3

This pilot project, initiated under the MACHC Electronic Chart Committee Working Group 1 successfully demonstrated the potential for accessing previously untapped international resources to support hydrographic capacity building, particularly in the acquisition of survey equipment that the countries would not have otherwise been able to attain via limited IHO Capacity Building resources. This non-traditional partnership between the Gulf of Honduras Project and the MACHC hydrographic training has established and/or expanded foundational hydrographic capabilities in the three countries that advanced mutual goals for navigation safety and environmental protection.

The pilot project, having achieved many of its anticipated outcomes has now come to an end. Consequently, the ECC WG1 will now disband since its original purpose has been achieved, and since the MACHC now has a Capacity Building Committee which did not exist at the time this project was initiated. However, the three participating countries of Belize, Guatemala and Honduras are strongly encouraged to continue actively participating in the MACHC to further enhance and expand their nascent hydrographic programs.

**Background:**

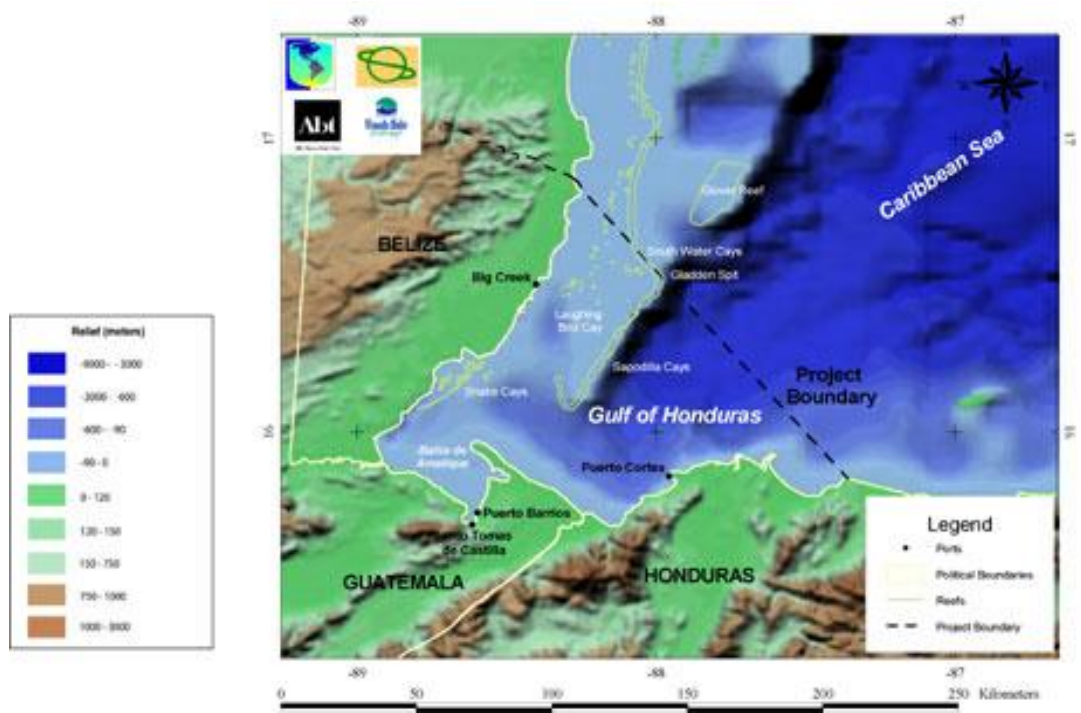
Before the MACHC Capacity Building Committee was established, its Electronic Chart Committee (ECC) initiated a pilot capacity building project in recognition of the disparities between national abilities to acquire hydrographic data and produce charts. Some nations could not begin to contemplate electronic chart (or even paper chart) production when they did not even have the basic capability to collect that data required for them. Upon learning about the initiation of the Global Environment Facility-funded and Inter-American Development Bank-administered Gulf of Honduras Project, the Committee (through its Working Group 1) pursued a partnership with the Project to leverage mutual resources to support hydrographic survey capacity building for mutually beneficial outcomes. Limited resources from both entities were leveraged successfully to acquire basic hydrographic equipment from the Project and provide the hydrographic expert training from the MACHC to increase the individual national capabilities and support the navigation and environmental objectives of all involved.

The Gulf of Honduras encompasses a tri-national body of coastal and marine waters, including portions of the exclusive economic zones of Belize, Guatemala and Honduras. The Project Area includes the Gulf of Honduras as well the watersheds in Belize, Guatemala and Honduras with rivers flowing into the Gulf. The development objective of the Gulf of Honduras Project is to reverse the degradation of coastal and marine ecosystems within the Gulf of Honduras through prevention of maritime transport-related pollution in the major ports and navigation lanes, *improved navigational safety*, and reduced land-based sources of pollution draining into the Gulf.

Environmental problems in the Gulf of Honduras are highly trans-boundary due to the oceanography of the water body. The predominant direction of currents varies with seasons, contributing to the interconnection of waters in Belize, Guatemala and Honduras. As a result of the prevailing oceanographic currents, the Gulf

region is highly susceptible to pollution originating in one location and spreading over long distances in all three countries.

As maritime traffic and port operations within and beyond the Gulf continue to rise, the potential for catastrophic accidents, as well as chronic marine pollution, increases. The western portion of the Gulf is bordered by the Mesoamerican Barrier Reef System (MBRS), the second longest barrier reef in the world. The MBRS extends for 250 km and covers 22,800 km<sup>2</sup> as an assemblage of lagoon patch reefs, fringing reefs, and offshore atolls. It is unique due to its size, the vast array of reef types, the richness of the corals and its relatively pristine condition. The southern part of this reef system borders the Gulf of Honduras.



### MACHC/CBSC Involvement

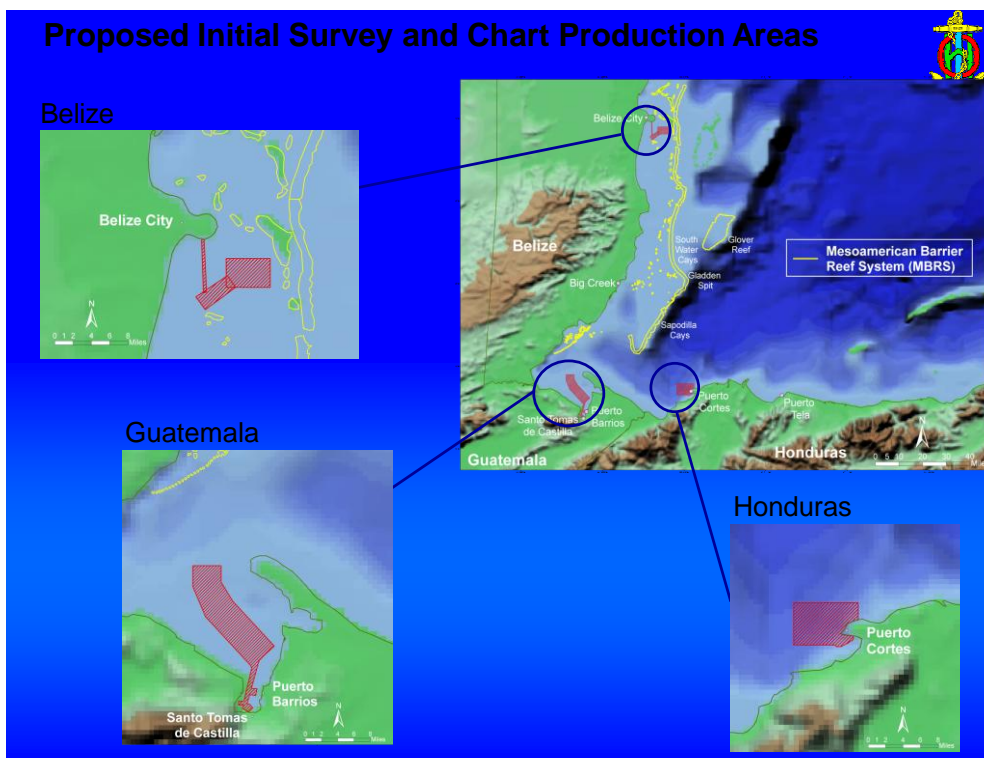
The MACHC, primarily through its Electronic Chart Committee/Working Group 1, has been working with the hydrographic focal points from the Governments of Belize, Guatemala and Honduras to achieve the objectives of the internationally-funded tri-national project: “Environmental Protection and Maritime Transport Pollution Control in the Gulf of Honduras”, through hydrographic capacity building. These National Institutional points of contact include the Belize Port Authority, Guatemalan Maritime Department and Santo Tomas de Castilla Port Authority, and the Honduran National Port Authority in Puerto Cortez.

An early analysis of the status of navigational charts and hydrographic data in the Gulf of Honduras by the MACHC confirmed that hydrographic survey data were discontinuous, often unreliable and outdated. Sedimentation and extreme weather events such as Hurricane Mitch also brought about significant changes in bathymetry that render navigational charts obsolete and increase navigational risks. The age, type and maintenance of the ships entering the Gulf of Honduras ports also play a part, as does the training of the ship crewmembers. Heavy storms and hurricanes threaten safety at sea and increase the probability of accidents. The need for improved navigational safety is widely recognized, including better communication systems and infrastructure, navigational aids, as well as the capability to update navigation charts and bathymetric maps.



In December 2006, the countries produced a Hydrographic Activity Implementation Plan as a major contribution to the 3<sup>rd</sup> Gulf of Honduras Project Component, “Enhancing Navigational Safety in Shipping Lanes.” The plan has now been largely implemented (the full plan can be found at: <http://www.iho-machc.org>) and includes the training that the IHO capacity building funds have supported.

In 2008, the GoH Project procured all the necessary equipment for the countries to perform hydrographic surveys, according to the IHO Order 1a Standards. (The list of equipment is detailed in the *Hydrographic Activities Implementation Plan, Annex A: Technical Specifications for Hydrographic Surveys by Country.*) Surveys were planned to IHO specifications (with the help of IHO/CBSC funding in 2005 for an expert Hydrographer to visit the countries and elaborate the plans) for the approaches to Belize City, Santo Tomas de Castilla and Puerto Cortes ports.



### **THREE TRAINING PHASES (2009-2011):**

The CBSC, in cooperation with the NOAA National Ocean Service (NOS) and the U.S. Naval Oceanographic Office (NAVOCEANO), provided three phases of hydrographic survey training to the three Gulf of Honduras countries from 2009-2011:

**Phase 1)** In 2009, the CBSC funded two Subject Matter Experts (SME) from NOS and NAVOCEANO to conduct operational training in Belize, Guatemala and Honduras. Due to delays in equipment delivery to the countries and other logistical problems outside of MACHC control, in-country training did not take place until February-March 2009 (vice originally scheduled dates in 2008). Although the original objectives were ambitious for a two-week training period, progress was slowed in each of the countries due to the fact that all of the equipment was not available or fully integrated when the SMEs arrived. Thus, the first phase of training focused on basic hydrography principles, system integration lessons/recommendations, and some limited operational training.

NOAA also provided two weeks of introductory hydrographic classroom theory and field training the first two weeks of February 2009 and February 2010 in Norfolk, Virginia, USA. One operational representative from each of the three countries participated in 2009 and affirmed that this training was a very useful prelude to the in-country training that occurred subsequently. One additional representative from Belize participated in 2010 NOAA Hydrographic Training Course.

**Phase 2)** The second CBSC-funded training sessions took place in the three Gulf of Honduras countries during winter-spring 2010. Labelled as “Advanced Training,” these training sessions built upon lessons learned during the first phase while also providing additional tides training and capability assessment via a NOAA tide contractor visit. The Phase 2 training yielded some preliminary data products and solidified numerous basic hydrographic principles.

**Phase 3)** The third and final phase of CBSC-funded in-country hydrographic survey training took place in two parts during 2011, the first focusing on providing additional operational training to Belize, and the second providing advanced Collaborative Hydrographic Training in Santo Tomas de Castilla for representatives of all three Gulf of Honduras countries.

***TRAINING PHASE OBJECTIVES and ANTICIPATED RESULTS (2009-2011):*** Training and the resultant accomplishments for all three phases generally revolved around the same core set of objectives:

- 1) Evaluate and set up hydrographic survey equipment purchased through the Gulf of Honduras Project
- 2) Establish and cultivate international partnerships between Gulf of Honduras hydrographic survey programs
- 3) Conduct a complete hydrographic survey via the following steps:
  - a. Configure and install hydrographic survey equipment on a suitable vessel
  - b. Establish and monitor a water level measurement station for IHO standard data acquisition
  - c. Conduct pre-survey and intra-survey planning
  - d. Acquire and process hydrographic survey data to IHO standards
  - e. Troubleshoot and conduct minor repair of hydrographic survey systems
  - f. Generate and transmit IHO standard survey products to the United Kingdom Hydrographic Office for nautical chart updates

Results from the above objectives were expected to yield the following results:

- (1) IHO-compliant hydrographic surveys complete with reports, smooth sheets, and XYZ data sets sent to the UK Hydrographic Office for chart updates, in accordance with associated bilateral arrangements
- (2) Establishment of intra-country and intra-regional water level and other oceanographic data measurement networks / expertise for hydrographic purposes (as well as for public use)
- (3) Support for safe and efficient marine transportation while protecting the Mesoamerican Barrier Reef System
- (4) Use of hydrographic information for environmental management purposes
- (5) Public appreciation and support from all levels of regional governments for sustained hydrographic capability/growth and attainment of resulting socio-economic and environmental objectives

The following matrices detail accomplishment of the mission objectives, actual results, associated challenges, and associated completion rating percentages.

<b>Original Objectives (Belize)</b>	<b>Completion / Accomplishments</b>	<b>Challenges</b>	<b>Completion Rating (%)</b>
1) Evaluate / set up hydrographic survey equipment purchased through GoH Project	Completed	Did not receive acceptable level of support from the GoH Project-contracted equipment vendor to provide initial equipment training, installation, or testing. Valuable training time in Phase 1 lost as the MACHC trainers provided this service.	<b>100</b>
2) Establish/cultivate international partnerships between GoH hydrographic survey programs	Completed; Established hydrography-related network with U.S., U.K., Honduras, Guatemala, and other MACHC partners/members	Delays/failures in correspondence between Belize, UKHO, US, and other GoH partners	<b>90</b>
3) Conduct a complete hydrographic survey:			
a. Configure / install hydrographic survey equipment on suitable vessel	Completed; Procured, modified, and commissioned a dedicated hydrographic survey vessel (R/V SEA KING) with project-provided survey equipment.	Completion of repairs/overhaul work and maintenance of R/V SEA KING. [Vessel fully functional as of October 2011]	<b>100</b>
b. Establish / monitor water-level measurement station for IHO standard data acquisition	Partially completed; Tide gauge installed, levelled, and used for data acquisition during training period.	Agreements between BPA and other in-country organizations (e.g. CCCCC, BNMS) to provide tide gauge network and related support, but agreement not maintained through personnel turnover; GoH-provided gauge damaged. Insufficient management understanding/support of tide gauge network.	<b>50</b>
c. Conduct pre-survey / intra-survey planning	Completed survey planning both prior to and during data acquisition; completed line plans for complete GoH project outlined critical areas.	Delay in delivery of and failure to acquire access (CD drive failed and limited support in other media) to UKHO raster charts	<b>100</b>
d. Acquire / process hydrographic survey data to IHO standards	Completed; Collected and processed hydrographic survey data (side scan sonar, single beam echosoundings, tide levels, sound velocity) to IHO Order 1 specifications in the vicinity of the Port of Belize Ltd pier.	Periodic lack of necessary personnel time/availability and/or survey vessel for survey acquisition and processing.	<b>100</b>
e. Troubleshoot / conduct minor repair of hydrographic survey systems	Completed; Successfully repaired, troubleshot, and/or re-configured most survey systems to ensure continuity of operations.	General lack of knowledge of basic personal computer operations and best practices	<b>100</b>
f. Generate / transmit IHO standard survey products to UKHO for nautical chart updates	Not completed; first Report of Survey planned to be transmitted to UKHO in 2011	Lack of IHO-grade data acquisition time; development of knowledge base in hydrographic survey personnel	<b>20</b>

<b>Anticipated Results (Belize)</b>	<b>Actual Results</b>	<b>Root Cause(s) / Challenges</b>	<b>Completion Rating (%)</b>
(1) IHO-compliant hydrographic surveys complete with reports, smooth sheets, XYZ data sets sent to UKHO for chart updates	See Objective 3)f.; Data acquired and processed that meets IHO Order 1 Specifications (waiting on Report of Survey to be completed), but only 10% of GoH-specified critical areas surveyed. Port of Big Creek is fully supportive of BPA survey operations.	Sub-optimal level of managerial and financial support to accomplish project survey objectives, including: <ul style="list-style-type: none"> <li>- Dedicated personnel time to train, practice/execute hydrographic survey, or maintain equipment</li> <li>- Fuel and transportation for survey vessel operations</li> <li>- Operations and maintenance of equipment and vessel</li> </ul>	<b>10</b>
(2) Establishment of intra-country and intra-regional water level and other oceanographic data measurement networks / expertise for hydrographic purposes & public use	Partially completed; basic and advanced tide / water level measurement training conducted with Belize personnel. Memorandum of Agreement established between several Belizean and regional agencies to collect tide data and maintain collection equipment. GoH Project provided gauge damaged; primary tide station not established.	Poor turnover of Tide MOA between old and new agency employees; maintenance and location/construction of existing tide infrastructure	<b>30</b>
(3) Support for safe and efficient marine transportation while protecting the Mesoamerican Barrier Reef System	Partially completed; hydrography being collected in Belizean territorial waters for nautical chart updates and marine enforcement / navigation safety purposes. Most progress in Big Creek.	See Root Causes/Challenges for (1) above.	<b>10</b>
(4) Use of hydrographic information for environmental management purposes	Completed; BPA sharing hydrographic data and preliminary products with commercial shipping and cruise line partners to enhance safety of navigation and mitigate potential environmental impacts, particularly on the Mesoamerican Barrier Reef System.		<b>100</b>
(5) Public appreciation and support for sustained hydrographic growth / capability and attainment of resulting socio-economic and environmental objectives	Partially demonstrated; Established communications with international hydrography partners while educating government administrators and in-country stakeholders of the importance of hydrography. Established annual budget, and potential increase in staffing for hydrographic unit(s) in the BPA	Broadcast of hydrography message to BPA management and public officials / elected representatives. Must continue to communicate accomplishments and needs to upper management and government.	<b>80</b>



Original Objectives (Guatemala)	Completion / Accomplishments	Challenges	Completion Rating (%)
1) Evaluate / set up hydrographic survey equipment purchased through GoH Project	Completed.	Did not receive acceptable level of support from the GoH Project-contracted equipment vendor to provide initial equipment training, installation, or testing. Valuable training time in Phase 1 lost as the MACHC trainers provided this service.	<b>100</b>
2) Establish/cultivate international partnerships between GoH hydrographic survey programs	Completed; Established hydrography-related network with U.S., U.K., Honduras, Belize, and other MACHC partners/members	Delays/failures in correspondence between Guatemala, UKHO, US, and other GoH partners	<b>90</b>
3) Conduct a complete hydrographic survey:			
a. Configure / install hydrographic survey equipment on suitable vessel	Completed. Modified, and commissioned a dedicated hydrographic survey vessel (LH Quirigua) with project-provided survey equipment.	Manufacturing of furniture and hardware for the installation survey equipment. All manufacturing made with tools and labor provided by the Port Authority. Received outstanding support from management, technicians and shop managers.	<b>100</b>
b. Establish / monitor water-level measurement station for IHO standard data acquisition	Completed. GoH Project-provided portable tide gauge was installed and levelled to a previously determined vertical benchmark, and placed in operation at the site of a previous Primary tide gauge. Hydrographers trained on all aspects of tide installation, level collection, and analysis.	The portable tide gauge is suitable for a secondary tide station (collection < 1 year) but not for a permanent Primary station. The Port Authority tide gauge site is suitable for a Primary station, but ENP personnel did not demonstrate expertise required to operate/manage one.	<b>50</b>
c. Conduct pre-survey / intra-survey planning	Partially completed. Received basic/ intermediate/ advanced training in survey planning. Line planning conducted by multiple crews.	High turnover of hydrographic personnel. The EMPORNAC-Santo Tomas de Castilla highly depended on personnel from Puerto Quetzal, but are slowly transitioning into a more autonomous unit.	<b>80</b>
d. Acquire / process hydrographic survey data to IHO standards	Completed. Acquired 100% of GoH Project survey areas and processed 99%.	Limited IT resources and proficiency, but improvements are ongoing.	<b>95</b>
e. Troubleshoot / conduct minor repair of hydrographic survey systems	Partially completed. Intermediate proficiency demonstrated.	High turnover of hydrographic personnel limits full proficiency.	<b>80</b>
f. Generate / transmit IHO standard survey products to UKHO for nautical chart updates	Partially completed. Data processing is 99% complete, but Guatemala has no formal agreement with internal or external charting partner, such as the UKHO.	Guatemala needs an external entity to assist in making final Quality Assurance check of the survey data.	<b>55</b>

**Anticipated Results  
(Guatemala)**

**Actual Results**

**Root Cause(s) / Challenges**

**Completion  
Rating (%)**

<p>(1) IHO-compliant hydrographic surveys complete with reports, smooth sheets, XYZ data sets sent to UKHO for chart updates</p>	<p>Partially completed. Data fully acquired and nearly fully processed.</p>	<p>Lack of formal agreement with UKHO or other partner limits chart update potential.</p>	<p><b>60</b></p>
<p>(2) Establishment of intra-country and intra-regional water level and other oceanographic data measurement networks / expertise for hydrographic purposes &amp; public use</p>	<p>Partially completed. Basic and advanced training completed on tide principles, station installation/operation, and data management/analysis. Temporary gauge installed at Santo Tomas de Castillo facility.</p>	<p>Currently no published / anticipated plans to work with other organizations in or out of country to share regional tide / oceanographic information.</p>	<p><b>25</b></p>
<p>(3) Support for safe and efficient marine transportation while protecting the Mesoamerican Barrier Reef System</p>	<p>Partially demonstrated. Data anticipated to be used by Guatemala charting authority, but no formal agreement made with UKHO.</p>	<p>Must develop further proficiency with hydrographic software and improve IT resources. Also, develop GIS proficiency.</p>	<p><b>85</b></p>
<p>(4) Use of hydrographic information for environmental management purposes</p>	<p>Not demonstrated.</p>	<p>High personnel turnover limits full proficiency. Must promote educational opportunities / career advancement potential to personnel with intellectual capabilities and proper academic background. Must improve IT resources; GIS proficiency is lacking.</p>	<p><b>15</b></p>
<p>(5) Public appreciation and support for sustained hydrographic growth / capability and attainment of resulting socio-economic and environmental objectives</p>	<p>Demonstrated. Obtained outstanding support from EMPORNAC upper and middle management, Servicio Maritimo Nacional (charting authority) and the Pilot Association. The program was covered by news media.</p>	<p>EMPORNAC provides financial support to the hydrographic unit via the Port Operations Department. While support provided by the Operations Department during 2008-2010 was outstanding, the Chief of the Hydrographic Division is not assigned nor controls a budget. Thus, there is uncertainty in the future growth and continuity of the hydrographic program.</p>	<p><b>95</b></p>

Original Objectives (Honduras)	Completion / Accomplishments	Challenges	Completion Rating (%)
1) Evaluate / set up hydrographic survey equipment purchased through GoH Project	Completed.	Did not receive an acceptable level of support from the GoH Project-contracted vendor to provide initial equipment training, installation, or testing. [Phase 1 training time lost]	<b>100</b>
2) Establish/cultivate international partnerships between GoH hydrographic survey programs	Partially Completed. Established low level links with MACHC states, Guatemala, and Belize (BPA) through MACHC-provided training.	Limited or no contact with UKHO to establish chart update communications	<b>50</b>
3) Conduct a complete hydrographic survey:			
a. Configure / install hydrographic survey equipment on suitable vessel	Not completed. A vessel was provided for Phase 1 training and part of Phase 2 training, but no vessel has been identified/dedicated for GoH Project hydrographic work, despite early promising indications that one was imminent.	ENP has not provided a vessel for GoH-related hydrographic survey work, although surveys are purportedly being completed on other ENP vessels.	<b>20</b>
b. Establish / monitor water-level measurement station for IHO standard data acquisition	Completed. GoH Project-provided portable tide gauge was installed and levelled to a previously determined vertical benchmark, and placed in operation at the site of a previous Primary tide gauge. ENP hydrographers trained on all aspects of tide installation, level collection, and analysis.	The portable tide gauge is suitable for a secondary tide station (collection < 1 year) but not for a permanent Primary station. The ENP tide gauge site is suitable for a Primary station, but ENP personnel did not demonstrate expertise required to operate/manage one.	<b>50</b>
c. Conduct pre-survey / intra-survey planning	Partially completed. ENP hydrographers trained in all aspects of survey planning, but did not have a vessel available to demonstrate knowledge.	Duties/responsibilities of ENP personnel are fragmented. Hydrographers assigned data collection are not involved in planning or processing.	<b>30</b>
d. Acquire / process hydrographic survey data to IHO standards	Not completed. Collected a few hours of hydrographic survey data near Puerto Cortes.	ENP hydrographers have been conducting survey operations for many years, but ENP did not make a vessel available for GoH Project-specific operations.	<b>20</b>
e. Troubleshoot / conduct minor repair of hydrographic survey systems	Completed. ENP has a proficient full-time Electronics Technician. Integration, troubleshooting, repair of hydrographic systems instructed and performed in 2009.	None.	<b>100</b>
f. Generate / transmit IHO standard survey products to UKHO for nautical chart updates	Not completed.	ENP Hydrographers reported having expertise in co-production of nautical charts, but no examples of survey products were provided/demonstrated.	<b>0</b>

<b>Anticipated Results (Honduras)</b>	<b>Actual Results</b>	<b>Root Cause(s) / Challenges</b>	<b>Completion Rating (%)</b>
(1) IHO-compliant hydrographic surveys complete with reports, smooth sheets, XYZ data sets sent to UKHO for chart updates	No survey data collected to IHO specifications for GoH Project survey areas.	ENP did not provide a survey vessel to acquire data. Hydrographers therefore had no opportunity to practice principles learned during training; personnel responsibilities are not evenly/efficiently shared or distributed to achieve program success.	<b>0</b>
(2) Establishment of intra-country and intra-regional water level and other oceanographic data measurement networks / expertise for hydrographic purposes & public use	Partially completed. Basic and advanced training completed on tide principles, station installation/operation, and data management/analysis. Temporary gauge installed at ENP facility.	Currently no anticipated plans to work with other organizations in or out of country to share regional tide / oceanographic information.	<b>25</b>
(3) Support for safe and efficient marine transportation while protecting the Mesoamerican Barrier Reef System	Not demonstrated.	ENP did not provide a vessel to support Honduras' commitment to the GoH Project.	<b>0</b>
(4) Use of hydrographic information for environmental management purposes	Not demonstrated. Chief Hydrographer advised on development and optimization of human and IT resources.	ENP Management does not promote cross-training or sharing of responsibilities. Even with a limited budget and IT resources, neither personnel nor existing resources are utilized optimally.	<b>0</b>
(5) Public appreciation and support for sustained hydrographic growth / capability and attainment of resulting socio-economic and environmental objectives	Partially demonstrated. Established communication with ENP upper management on benefits of well-run hydrographic program. ENP Management expressed commitment to providing necessary resources to meet GoH Project expectations. ENP Hydrographic Department has annual budget and inventory of survey equipment, some of which require upgrades/repair or have never been used (i.e. TSS-DMS-25)	Verbal commitment expressed, but no survey vessel was provided for GoH Project work, despite reports that vessels are regularly used for other hydrographic surveys. Observable discrepancies evident between commitments and actions taken.	<b>25</b>

## **FINDINGS/LESSONS LEARNED**

- This pilot project successfully demonstrated the potential for accessing previously untapped international resources to support hydrographic capacity building, particularly in the acquisition of survey equipment that the countries would not have otherwise been able to attain via limited IHO Capacity Building resources. This non-traditional partnership between the Gulf of Honduras Project and the MACHC hydrographic training has established and/or expanded foundational hydrographic capabilities in the three countries that advanced mutual goals for navigation safely and environmental protection.
- A dedicated project coordinator with appropriate support staff (in this case provided by the MACHC ECC) is essential for facilitating the extensive planning, communications, meetings and institutional connections required to navigate the complexities of GEF-funded projects like these for the national hydrographic focal points, the MACHC itself and other project partners.
- Although successfully overcome, the relatively high turnover of both technical and senior management focal points in the participating countries throughout the duration of this project, presented major challenges to the smooth execution of the project.
- Operational survey training could have been maximized had the Gulf of Honduras Project relied more completely on the hydrographic technical expertise of the MACHC to establish the requirements and guide the procurement and delivery of hydrographic equipment. Unfamiliarity with these technical aspects led to inadvertent impacts on the training by not having the equipment ready to operate when the training first started.
- Education of decision makers with budget and management authorities across the three countries about the value of hydrography for national economic and environmental priorities was from the start, and continues to be, an ongoing necessity in order for the nations involved to get the resources necessary to sustain hydrographic capabilities.

## **RECOMMENDATIONS**

- **Improvements for similar projects:**
  - Common to most international capacity building initiatives, lines of communication with clear roles and responsibilities should be clearly set up and understood by all vested parties prior to commencing action. This will enable the establishment of clear objectives and responsibilities while preventing confusion. It is equally critical that these approved objectives, responsibilities, and lines of communication be strictly followed unless deviations are approved at appropriate management levels. Thus, all participants should remain actively involved in the capacity building process, or when they leave, the transition to their successor should be seamless.
  - Incentive mechanisms should be defined during the multi-lateral agreement process. For example, the country will be acquiring a bigger share of the ownership of equipment and additional training if certain goals are met during defined periods of time.
- **Follow-up Projects:**
  - Under defined goals, continue support through periodic vendor and/or Hydrographer visits as needed to maintain and update countries' knowledge and equipment bases.



- Reinforce progress at the technical level with visits by high level IHB and/or MACHC leadership with their counterparts in the participating nations to further emphasize the value of hydrography to national economic and environmental priorities.
- Acquire a buy-in at the Ministerial Level to implement the basic administrative infrastructure to build functional hydrographic units, understanding that each country will have a unique set of realities and challenges.
- **Long term effect for Hydrography and its sustainable use** (by country, in no particular order):
  - **Belize (Belize Ports Authority)** – Assuming management continues to provide support and budgeted funding as has been demonstrated over the course of the last few months, Belize’s Hydrography program has long-term potential and sustainability. This will require continuous communication up and down the chain of command and generation of hydrographic products for UKHO chart updates and in-country stakeholder requests.
  - **Guatemala’s** Hydrography program is supported through several agencies. The Port Authorities are quasi-public agencies with certain budgetary operational autonomy and the financial capacity to procure, maintain and perform hydrographic survey operations; the Guatemalan Navy retains national authority in hydrographic matters but does not have the financial resources and dedicated career personnel to run a long term hydrographic office. Additionally, the National Hydrographic Commission (COHINAC) is trying to achieve the desired level of coordination across all of Guatemala’s hydrographic entities and if strengthened sufficiently, should be able to achieve desired results by leveraging national resources.

The Guatemalan Navy controls foreign higher education training opportunities and sends their most promising military officers to obtain high quality IHO Category “A” certifications abroad. However, these bright and highly trained Category “A” officers spend little time of their careers dedicated to establishing and sustaining a national hydrographic capability. Hydrography in Guatemala has long-term potential and sustainability if they can organize a Hydrographic Office or Unit with a dedicated workforce of educated and fairly compensated Civilian and Military career professionals. Guatemala does not have a national nautical charting authority and should seek partnerships via the MACHC to support chart production and updates and related training.

- **Honduras** – The Hydrographic Authority of Honduras is apparently assigned to the National Port Authority in Puerto Cortes (ENP). The ENP maintains its hydrographic capability with a set of designated civilian career employees in Puerto Cortes with solid skills and experience. Challenges preventing Honduras from development of an enhanced Hydrographic Program include that the current Hydrographic Unit does not have the administrative or political strength to demand a fair share of resources to run an affective Hydrographic Program, despite the obviously critical importance of surveying to this major regional port.

Assignment of responsibility for various hydrographic tasks is not efficiently delegated, nor are all members of the survey program involved with or have a basic knowledge of each step in the various hydrographic processes. Cross-training and broad knowledge sharing is recommended. A further impediment is the lack of a designated vessel to perform hydrographic surveys, despite early, quite promising indications from the ENP that one was imminent. Honduras does not have a national nautical charting authority and should seek partnerships via the MACHC to support chart production and updates and related training. Honduras’s hydrography program has long-term potential and sustainability if these issues can be successfully addressed.



**2009 NOAA Hydro Training Class (Norfolk, Virginia)**



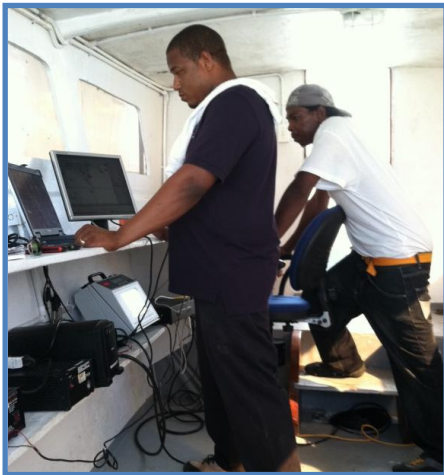
**2009 Honduras In-Country Phase 1 Training Class**



**2010 Belize In-Country Phase 2 Training Class**



**2010 Honduras In-Country Phase 2 Training**



**2011 Belize In-Country Phase 3 Training**



**2011 Gulf of Honduras Collaborative Training Class**

## ANNEX A

### MACHC CBSC Performance Indicator Ratings

#### Assessment (by the project leaders/organisers):

The project leader is requested to assess the project itself and future perspectives. Assessment should be carried out according to the table provided by rating each performance indicator on a scale from 0 to 5. Additional comments for more detailed explanation can be added in the table. The Project leader is invited to collect feedback from all other participants of the project if applicable.

Each of the performance indicators indicated in the table is rated according to the scales below:

a. Main evaluation

0 = 0-20%	No goals achieved, no result,
1 = 20-40%	Only some goals achieved or goals only achieved in minor parts
2 = 40-60%	About half of the goals achieved, result is only partially satisfying
3 = 60-80%	Nearly all major goals achieved, result is almost satisfying
4 = 80-90%	All major goals achieved, result is satisfying
5 = 90-100%	All goals completely achieved, result is absolutely satisfying, more than expected

b. Rating value to estimate the possible perspective for further projects

0 = 0-20%	Almost no basis for further projects, a general readjustment of co-operation is necessary before starting other projects
1 = 20-40%	Quite poor basis for further projects, readjustment of co-operation seems to be helpful before starting other projects
2 = 40-60%	Reasonable basis for further projects, but major adjustments are necessary
3 = 60-80%	Good basis for further projects, but some adjustments may be helpful
4 = 80-90%	Good basis for further projects
5 = 90-100%	Very good basis for further projects

## ANNEX B

### Project, Contact, and Financial Information

<b>Identification</b>	<b>Project Number :</b> (as assigned by CBSC)
Project Name:	Gulf of Honduras Hydrographic Activity Implementation Plan Capacity Building Support in accordance with the IHO capacity building phases:  Hydrography Type 2 (training on basic hydrographic survey practices –single beam surveys—and related data processing)
Submitting RHC/Country:	MACHC (as part of the approved MACHC/CB 2011 Plan)
Date:	5 November 2011
Institution(s) executing the project:	<ul style="list-style-type: none"> <li>• Belize Port Authority</li> <li>• Guatemalan Maritime Department and Santo Tomas de Castilla Port Authority</li> <li>• Honduras Port Authority</li> <li>• Gulf of Honduras Project Office</li> <li>• U.S. Navy and NOAA</li> </ul>
Name of responsible parties:	<p>1) Major John Flowers, Ports Commissioner Belize Port Authority 120 North Front Street Belize City, Belize, C.A.</p> <p>Tel: 501-665-66-61 Fax: 501 223-0710 E-mail: <a href="mailto:bzportauth@blt.net">bzportauth@blt.net</a></p> <p>2) Capitán de Navío Sergio Porres Jefe del Departamento Marítimo Ministerio de la Defensa Nacional Avenida La Reforma, 1-45 Zona 10 Antigua Escuela Politécnica Guatemala City, Guatemala</p> <p>E-mail: <a href="mailto:jefatura@deptomaritimo.gob.gt">jefatura@deptomaritimo.gob.gt</a> Teléfono: (502) 23344575</p> <p>2<sup>a</sup>) Dr. Estuardo Vargas Gerente , EMPORNAC Calle Real de la Villa, 17 calle 16-43, Edificio Plaza Santo Tomás de Castilla Guatemala, CA</p> <p>E-Mail: <a href="mailto:estuardovargas@yahoo.com">estuardovargas@yahoo.com</a></p> <p>3) Ing. Mynor Pinto, Gerente General Empresa Nacional Portuaria Puerto Cortes – Honduras CA</p> <p>Tel.: 504-665-66-61 Fax: 504-665-66-61</p>

	<p>E-mail: <a href="mailto:lfunes@enp.hn">lfunes@enp.hn</a>  E-mail: <a href="mailto:supciaco@enp.hn">supciaco@enp.hn</a></p>
<p>Supporting Organization  Points of Contact</p>	<p>Edas Muñoz Galeano, Director  Gulf of Honduras Regional Coordinating Unit (UCRP)  Edificio TRAINMAR, Planta Baja a un costado,  Empresa Nacional Portuaria (ENP)  Puerto Cortés, Honduras  Tel.: 00(504)2665-2343 Tel/Fax.: 00(504)2665-3072  E-Mail: <a href="mailto:edasmunozg@hotmail.com">edasmunozg@hotmail.com</a>; <a href="mailto:edasmunozg@gmail.com">edasmunozg@gmail.com</a></p> <p>Katie Ries, Chair MACHC Electronic Charting Committee  and Deputy Director, NOAA Office of Coast Survey  1315 East-West Highway, 6147  Silver Spring, MD 20910, USA  Telephone: 1(301) 713-2770, ext. 139  E-mail: <a href="mailto:Kathryn.Ries@noaa.gov">Kathryn.Ries@noaa.gov</a></p> <p>Eric Villalobos  Commander Naval Meteorology and Oceanography Command  Stennis, Mississippi, USA  E-Mail: <a href="mailto:eric.villalobos@navy.mil">eric.villalobos@navy.mil</a>  Phone: (228)688-4529</p> <p>Elliot Arroyo-Suarez, GoH Project Trainer  U.S. Naval Oceanographic Office  Stennis, Mississippi, USA  E-mail: <a href="mailto:elliott.arroyo-suarez@navy.mil">elliott.arroyo-suarez@navy.mil</a>  Phone: (228)688-5673</p> <p>LCDR Chris van Westendorp, GoH Project Trainer  NOAA Office of Coast Survey  Norfolk, Virginia, USA  E-mail: <a href="mailto:christiaan.vanwestendorp@noaa.gov">christiaan.vanwestendorp@noaa.gov</a>  Phone: (757)441-6746 x100</p>



## ANNEX C

### Project Financial Report

Financial report	Resources	Comments
In-kind contribution by countries involved	<p><u>2009-11 In-Country Training:</u></p> <p>Each country provided facilities, personnel time, vessel(s), fuel, logistics support for trainers</p> <p><u>2011 Collaborative Training (hosted by Guatemala)</u></p> <p>Each country provided travel and per diem for their multiple participants.</p> <p>Training Facility, Computers, Lodging Arrangements provided by Guatemala EMPORNAC</p>	
In-Kind contribution by other parties	<p>U.S. Navy and NOAA provided time and salaries of two hydrographer trainers for 2009-2011 annual two-week training courses as well as travel and per diem support for 2010 tide trainer.</p> <p>NOAA provided advance two-week training at its facilities in the U.S. at no cost to the participants in 2009-10.</p> <p>NOAA provided the multi-year coordination, planning and communications support for the project via the ECC Chair and staff. Travel support was provided to national representatives to MACHC meetings where major planning occurred.</p> <p>Gulf of Honduras Project procured a basic suite of hydrographic survey equipment for each country and lodging support for final 2011 regional training in Guatemala.</p>	
Contribution from CBSC Fund	Travel and per diem support for hydrographer trainers to conduct two-week in-country training sessions during 2009-11.	