INSTITUTE OF MARINE AFFAIRS

Annual Administrative Report

October 2017 - September 2018

Institute of Marine Affairs
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IMAgovTT

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VISION

To be the premier marine research organisation in the Caribbean

MISSION STATEMENT

To conduct and foster research and to provide advice for the sustainable management of the coastal and marine areas and resources of Trinidad and Tobago

ACKNOWLEDGEMENTS

The Achievements highlighted in the Annual Report were made possible by the hard work and commitment of Management and Staff. My sincerest gratitude to the Management Team and officers of the Research and Support Departments.

Dr. Ahmad Khan
Director
Institute of Marine Affairs

BOARD OF GOVERNORS

CHAIRMAN

- HAYDEN ALEXANDER

MEMBERS

- Governor Nadia Jardine
- Governor Ricardo Alfred, Deputy Chair,
- Governor Paul Gabbadon,
- Chairman Hayden Alexander,
- Governor Dave Elliot
- Governor Andrea Julien

'The Honourable Camille Robinson-Regis, Minister of Planning and Development (centre) is flanked by IMA Board Members in July 2017.

(L-R) Paul Gabbadon, Andrea Julien, Hayden Alexander (Chairman), Ricardo Alfredo, Nadine Jardine, Dave Elliott

CHAIRMAN'S REMARKS

Key managerial positions inclusive of Director, Deputy Director, Research and Chief Information Officer were filled as set out in the Act of Parliament, Chapter 37:01 of the Revised Laws of the Republic Trinidad and Tobago. All other senior man-agement posts were also filled early in the new fiscal period. The Board of Governors (BOG) anticipate that these appoint-ments will be critical to steering the organisation towards delivering the Government's strategic priorities for the develop-ment of the marine and coastal areas in Trinidad and Tobago.

Vision 2030's "Placing the Environment at the Centre of Social and Economic Development" was the guiding principle by which the newly installed management team was mandated to begin the visioning process leading to the crafting and finalisation of a strategic plan for the period 2018-2023. Vision 2030 provided the framework and lens for the review of the organisation's accom-plishments to date, the discovery of new opportunities for demonstrating the Institute's relevance and worth to the national community, and for the delineation of a future for the IMA.

The most recent trends in marine science research, and the application of information communication technologies, which are revolutionising the manner in which data are collected and analysed, are some of the considerations the Management Team placed before the BOG. The BOG also required the Management Team to review the organisation's people manage-ment practices and to craft a culture conducive to delivery of the strategic priorities of the organisation. Lean financial times (the Institute received reduced allocations for the period under review) also called for a rationalisation of spend and revenue generation functions within the organisation. In this regard, the new Management Team was tasked with deliver-ing increased stakeholder value even as expenditure was tightened. The BOGs also mandated the creation of expanded op-portunities for visibility and messaging on the benefits of and contributions made by the IMA to environmental sustain-abil-ity of the country.

As the organisation prepares to build the necessary capacity to make its future contributions, the BOG also tasked the Man-agement with the delivery of "quick wins" such as the finalisation of research reports to be made available to policy and de-cision makers and modernisation of its approaches where possible.
In fiscal 2017/2018 too, we had cause to pause for celebration. The Institute of Marine Affairs celebrated its fortieth anni-versary. The BOG was pleased to support the recognition of the contributions of the phenomenal men and women at the Institute. The outputs of their work contribute to the national understanding of our coastal and marine environments, and their policy advice promotes its care. The milestone was marked with a Long Service Award for staff, the re-design and re-launch of the organisation's website and the publication of two books: "Life Along the Seashore of Trinidad and Tobago" and "Coastal Reflections". The former is a field guide to the biodiversity one is likely to find along our coasts and the latter refers to a collection of photos celebrating the flora and fauna of our marine areas. Both were well received by the organisation's stakeholders and attracted corporate sponsorship.

The Institute has made a sterling contribution to the development of marine and coastal conservation in Trinidad and Toba-go. Over the years the work of the IMA has supported the Government's policies with regard to the establishment of pro-tected marine and wetland areas, development along the coasts and the sustainable utilisation of marine resources for the benefit of all. Heightened global concerns regarding the evolving impact of climate change ensures that the work of the IMA will continue to have relevance and value for many years to come. As a Small Island Developing State (SIDS) the IMA is among this country's first line of defence in understanding how human activity and climate change is impacting our marine environment. Indeed the IMA provides the Science to Support Vision!

Mr. Hayden Alexander
Chairman, Board of Governors
Institute of Marine Affairs

DIRECTOR'S REMARKS

Supporting Vision with Science:
Vision 2030 Strategic Goal Five:
Placing the Environment at the Centre of Social and Economic Development and Supporting Globally Competitive Business.

Fiscal 2017/2018 was a year of laying the foundations to support a re-branded and re-invigorated IMA. It was a year of introspection and analysis, as the management team and staff of the IMA sought to re-emerge a more cutting edge and dynamic organisation, ready and equipped to serve the nation even better.

Rooted in the United Nations' Sustainable Development Goals, the Government of the Republic of Trinidad and Tobago has determined that our development thrusts must be pursued in harmony with the protection and wise use of our environment. This is the fifth key focus area of The National Development Strategy for Trinidad and Tobago 2016-2030 commonly referred to as Vision 2030. As members of a global community, our nation also seeks make its contribution to addressing global priorities such as climate change, biodiversity loss and ensuring that life under the sea is protected, managed and put to the best use for all of mankind.

With this in mind and having arrived at our fortieth anniversary milestone, the Institute of Marine Affairs embarked on a journey to review, revisit, and repurpose our research agenda in order to provide more tailored solutions, policy advice and recommendations to address some of the strategic imperatives in Goal Five of the National Development Strategy, We saw our business as one of providing the science that our government and citizenry need to make informed development deci-sions, hence our theme…Supporting Vision with Science.

Not only did we re-align our research programmmes with the government's stated strategies, we embarked on a process of developing an organisational strategic plan that will see the re-energising and modernisation of the Institute. We began a series of conversations with ourselves and our stakeholders and these conversations identified some "low hanging fruits" or initiatives that would immediately assist us in our bid to become more relevant to the national community. One of the out-comes was a newly designed and user-friendly website. Those discussions will no doubt continue into the next fiscal year as we finalise our organisational strategic plan.

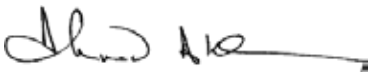
We recognised too that strategic partnerships and alliances are key to our success. A "Proof of Concept" collaboration be-tween the IMA, Microsoft Caribbean, Fujitsu/Globe Ranger and Digicel Limited led to the launch of a Water Quality Buoy in Claxton Bay on 25 October 2017. The buoy was equipped with various sensors to collect real time data on certain parame-ters, and we anticipate that the buoy will contribute to the modernising of how we collect and analyse data in the future, if the technology proves workable.

Within this fiscal year, we also began the process of rebuilding relationships with the two academic institutions on the is-land that support marine science research and education, namely The University of the West Indies and the University of Trinidad and Tobago. We also sought to cultivate partnerships with foreign missions, resident here, in Trinidad and Toba-go.

I began this statement with the hint that were have had forty years in the business of marine science research. Forty years is an important milestone in the life of any organisation and for us at the Institute of Marine Affairs it is no different. We were established by an Act of Parliament, Chapter 37:01 in the Revised Laws of the Republic of Trinidad and Tobago. Since the creation of the IMA in November of 1977, the environment in which the IMA operates has undergone many changes, but the primary mission of the IMA, that is, to promote and foster a deeper understanding and appreciation of all aspects of the ma-rine environment, and, to increase the capabilities of the Government in the formulation of consistent and informed policies in our local marine affairs, continues to be at the forefront of the Institute's activities. The production of two fortieth anniver-sary coffee table books was considered an excellent way to celebrate the staff and their achievements in fulfilling that mis-sion over the past four decades.

We have only just begun in our quest to deliver in a direct and an unambiguous manner and to support the national devel-opment agenda of the government. Let us build on the good foundations which have been laid during the past four decades and continue to produce the high-quality research output for which the IMA has come to be known by our key stakeholders.

The IMA remains committed to supporting the national development agenda of the Government of the Republic of Trinidad and Tobago and conducting the research required for the sustainable management of our natural resources.



Dr. Ahmad Khan
Director
Institute of Marine Affairs

ABBREVIATIONS AND ACRONYMS

BWM	Ballast Water Management
APIC	**Association for the Promotion of International Cooperation**
β-gal	**Beta-galactosidase**
BBNJ	**Biodiversity in Areas Beyond National Jurisdiction**
BWM	**Ballast Water Management**
CCMP	**Caribbean Coastal Marine Productivity**
CEHI	**Caribbean Environmental Health Institute**
CMA	**Caribbean Marine Atlas**
CREWS	**Coral Reef Early Warning System**
EAP	**Employee Assistance Programme**
GEF	**Global Environment Facility**
GEF SGP	**Global Environment Facility- Small Grants Programme**
GIS	**Geographic Information Systems**
F&ARP	**Fisheries and Aquaculture Research Programme**
FOI	**Freedom of Information**
IAS	**Invasive Alien Species**
ICC	**International Coastal Cleanup**
ICRI	**International Coral Reef Initiative**
ICZM	**Integrated Coastal Zone Management**
IFREMER	**Institut français de recherche pour l'exploitation de la mer (French Research Institute for Exploitation of the Sea)**
IMA	**Institute of Marine Affairs**
LB-IMTA	**Land-Based Integrated Multi-trophic Aquaculture**
LBS	**Land-Based Sources**
MSP	**Marine Spatial Plan**
MPA	**Marine Protected Area**
NSDI	**National Spatial Data Infrastructure**
NOSCP	**National Oil Spill Contingency Plan**
OCP	**Oceanography and Coastal Processes Programme**
ONPG	**ortho-Nitrophenyl-β-galactoside**
PAH	**Polycyclic Aromatic Hydrocarbons**
PBBS	**Port Biological Baseline Survey**
PSIP	**Public Sector Investment Programme**
SEA	**Secondary Entrance Assessment**
SDGs	**Sustainable Development Goals**
RAS	**Recirculating Aquaculture System**
UNEP	**United Nations Environment Programme**
UWI	**The University of the West Indies**
YBD	**Yellow Band Disease**

INTRODUCTION

The Institute of Marine Affairs (IMA) is a multi-disciplinary marine research organisation established by Act of Parliament No. 15 of 1976, Chap. 37:01 The IMA has pioneered and participated in numerous programmes locally and regionally. Its mission is "to conduct fundamental and applied research in the marine and coastal environment so as to provide advice for the sustainable management of these natural resources in Trinidad and Tobago." The 2017/2018 fiscal year focussed on strengthening the research programmes and building collaboration with national and international partners.

Regrettably, severe shortfalls in cash flow stymied progress and consequently many of the research objectives of the IMA could not be realised as planned during this fiscal year.

During the 2017-2018 fiscal year, research was conducted under five programmes: Biodiversity and Ecology; Fisheries and Aquaculture; Oceanography and Coastal Processes; Environmental Quality and Geomatics. The research fields included but were not limited to:

i. Coastal Geology;
ii. Land-based and marine pollution;
iii. Microbiology;
iv. Marine Ecology-benthic, wetlands (including coral reef);
v. Fish Biology;
vi. Aquaculture; and
vii. Geographic Information System (GIS).

During the 2017-2018 fiscal period, the research work plan was aligned to the Government's development strategy articu-lated in the National Vision 2030 Sustainable Development Policy: Vision 2030. This document outlines the Government's long-term development agenda which incorporates much of the United Nations' (UN) Sustainable Development Goals. The unique mandate of the IMA makes the organisation a key stakeholder in realising delivery of the UN Sustainable Develop-ment Goals related to the marine environment on behalf of the Government.

RESEARCH PROGRAMMES & PROJECTS

BIODIVERSITY & ECOLOGY RESEARCH PROGRAMME
FISHERIES & AQUACULTURE RESEARCH PROGRAMME
OCEANOGRAPHY & COASTAL PROCESSES RESEARCH PROGRAMME
GEOMATICS UNIT RESEARCH PROGRAMME
ENVIRONMENTAL QUALITY RESEARCH PROGRAMME

NATIONAL COASTAL CONSERVATION PROGRAMME

Associating ecosystem health with human wellbeing is a key step towards the realisation of the Vision 2030's motivational theme of placing the environment at the centre of social and economic development, as well as the United Nation's SDGs. Coastal ecosystems, inclusive of coral reefs, seagrass beds, mangrove forests, beaches and bays provide numerous ecosystem services, including food provision, water purification, coastal protection, flood control, artistic inspiration, and supports the livelihood of coastal communities. Globally, these ecosystems are threatened. At current conversion rates, 30-40% of tidal marshes and seagrasses and nearly 100% of mangroves could be lost in the next 100 years. The National Coastal Conservation Programme (NCCP) seeks to develop a quantifiable, interpretive framework of measureable indicators and criteria that associates IMA's ongoing ecosystem health monitoring with indicators of economic dependence, human wellbeing and governance,and with the aim of the National Development Strategy implementation and policy innovation.

The project provides up-to-date information on the state of marine ecosystems in Trinidad of Tobago inclusive of mangrove forests, seagrass beds, coral reefs and beaches and bays. The scientific data is spatially displayed using a Geographic Information System (GIS) interface and made available to policy makers so as to inform management interventions for the conservation of these vital resources which provide numerous ecosystem services such as: coastal protection; carbon sequestration; and the provision of fish nursery sites. The data adds to the international body of knowledge and supports the IMA's biennial reporting in its State of the Marine Environment (SOME) Report. It will support the Environmental Management Authority's (EMA's) annual State of the Environment reporting requirement and the implementation of an Integrated Coastal Zone Policy Framework for Trinidad and Tobago.

This integrating framework on ecosystem health under the NCCP is informed by biophysical indicators and criteria selected from ongoing and historic work on:

.

i. Mangrove monitoring;
ii. Seagrass monitoring;
iii. Coral reef monitoring;
iv. Monitoring and assessment of coastal processes along shorelines with an emphasis on beach dynamics; and the
v. Spatial mapping of the living and non-living coastal resources of Trinidad and Tobago.

Integrated with these biophysical indicators are socio-economic and cultural indicators derived from demography, fisheries livelihood data, poverty and perceptions and governance indicators (e.g. area under Marine Protected Area, conservation protection regulation).

The other research programme activities undertaken by the IMA include:

i. Long-term Monitoring and Assessment in Trinidad;
ii. Update and Maintenance of IMA's Fingerprinting Database on Petroleum Hydrocarbons;
iii. Bacteriological Water Quality at Popular Recreational Water-Use Sites in Trinidad and Tobago; and,
iv. Utilisation of Marine Recirculating System to Culture Marine Species of commercial and ecological value.

Mangrove Monitoring

Global climate change is expected to exacerbate loss and degradation of mangrove forests. The loss or decline of their species harm human populations dependent on their services (Millennium Ecosystem Assessment, 2005). Establishing mangrove baselines and monitoring gradual changes will enable the separation of site-based influence from global climate change and will provide a better understanding of mangrove responses to sea level rise and global climate change. During this fiscal year, mangrove maps were updated using 2014 aerial photography. Measurement of carbon sequestration and storage commenced as mangrove forest is considered a 'blue carbon' ecosystem because of its ability to isolate and absorb carbon.

Principal Researcher: Rahanna Juman, PhD

Supporting Researcher: Hamish Asmath

Seagrass Monitoring

An inventory of the seagrass communities around Trinidad and Tobago was completed in 2001 and a monitoring programme was developed and implemented in 2002. Seagrass density, biomass and areal productivity were monitored at four sites along the northwest peninsula of Trinidad and five sites in southwest Tobago, twice per year. Water quality parameters including nitrates, nitrites, ammonia, phosphates, and chlorophyll concentrations were collected twice per year at all nine seagrass sites. During this fiscal year, the macro-benthic community was surveyed in Bon Accord Lagoon and compared with a baseline survey from 2008 to determine community shifts.

Principal Researcher: Rahanna Juman PhD

Supporting researcher: Attish Kanhai

Coral Reef Monitoring

Baseline studies on coral reefs in Tobago were conducted in the 1980's and repeated in 2008. Based on the recommendations from the 2008 report, a monitoring programme was developed. This programme includes a high-resolution examination of the stability of the coral community structure and demography (recruitment, growth, survivorship, etc.) of major coral reef organisms on an impacted reef (Buccoo Reef), a less impacted reef (Culloden Reef), and an intermediate reef (Speyside Reef). Additional coral sites at Charlotteville, Castara and Plymouth were established in 2015. Fish, macro-algal and macro-invertebrate (principally including corals, gorgonians and sea urchins) populations are studied at the same permanent transects on an annual basis, and annual monitoring reports are produced that give insights into the dynamics of coral reef communities. For this work to progress further, the Institute must recruit a Coral Reef Ecologist.

Principal Researcher: Coral Reef Ecologist (To be hired)

Monitoring and assessment of coastal processes along the shoreline with emphasis on beach dynamics

Beaches are dynamic coastal features which respond to storms, wind, waves, currents and tides differently depending on geology. Notwithstanding the protection by reefs, beaches are generally the primary defences for any coastal development. Sand/sediment is critical in the protection of the coastline by facilitating the dissipation of energy from wave attack; thereby acting as a buffer to erosion. Beaches however are damaged by sand removal, improper building of coastal protection structures and any activity that prevents new sediment sources from replenishing them. Beach erosion is expected to be exacerbated by impacts due to climate change. This monitoring project which commenced in 1988, documents the erosion and accretion rates of selected beaches and bays in Trinidad and Tobago and identifies likely causes and impacts. This is important in determining coastal vulnerability and informing coastal development plans. In this fiscal, thirty (30) bays in Trinidad (76 stations) and 30 bays in Tobago (61 stations) were monitored. Littoral and beach profile data were collected on a quarterly basis for trend analysis.

Principal Research: Christopher Alexis

Spatial mapping of coastal resources

Spatial information and its role have evolved to become integrated into the scientific process. It is utilised throughout all levels of scientific practice and research. New and updated spatial technologies with improved accessibility, utility and ease of application has meant that spatial information has become an invaluable addition and enhancement to the work of scientists. As with other data rich bodies of information, the IMA required a knowledge management solution that would facilitate the maintenance, update and additions to the ever-increasing volumes of data held in the spatial information database. To improve the scope, effectiveness, efficiency, and support the development of research ideas through Spatial Data and Products, the creation of an intranet web-based system commenced to increase the availability, presentation and

usefulness of such data and products as housed in the IMA. This system will contribute to and ensure that the IMA complies with the National Spatial Data Infrastructure (NSDI) initiative and the Caribbean Marine Atlas (CMA) 2.

Principal Researcher: Hamish Asmath

Long-term environmental monitoring and assessment

The overall goal of this project is to provide timely and continuous information on the environmental status of the coastal and marine environment of Trinidad and Tobago. The data collected would aid in understanding the physical and chemical processes in the coastal and marine environments, and in assessing the various impacts on the coastal and marine environments from anthropogenic and natural influences. This project will identify changes or adverse impacts on the marine and coastal areas, and information derived can guide and inform policy making in a timely and efficient manner for improvement in the quality of life of citizens, and preservation of our natural environments. The project will contribute to the realisation of the Sustainable Development Goal No 14 - Life Under Water. The outputs and analysis from this project will provide the information needed to promote the sustainable use and conservation of marine resources thereby reducing marine pollution caused by land-based activities, marine debris and nutrient pollution.

Baseline assessment in Trinidad has revealed hotspot areas where there were excessive pollution levels. In fiscal 2017/2018, monitoring of marine areas continued in the Gulf of Paria at locations including Claxton Bay, Pt Lisas, Caroni, Port of Spain, and at estuarine areas at Maraval and Diego Martin culminating in the preparation and submission of and a draft research report. Results were presented at IMA's 4th Community Symposium on 28 March 2018 at the Chaguanas Borough Corporation. The Presentation entitled "A Focus on the Environmental Quality in the West Coast of Trinidad" informed stakeholders on the magnitude of pollution and the needs for greater enforcement to lower pollution levels.

Principal Researcher: Darryl Banjoo PhD

Testing of HYDROCARBONS levels IN OYSTERS SOLD BY VENDORS

During 2016 there were a series of oil spills and fish kills in the Gulf of Paria, and the general public expressed concern on over the possible contamination of fish and shellfish with hydrocarbons. In response, the IMA in 2017 sampled oysters from twelve (12) major vendors at locations in Curepe, St Augustine, Tacarigua, Freeport, Presal, Marabella, Gasparillo, Palmiste and Debe. The samples were analysed for Polycyclic Aromatic Hydrocarbons (PAHs) which are known carcinogens. Samples of oysters were extracted and preliminary analysis on hydrocarbon levels were performed to optimiszed instrumental conditions for analysis. Analysis of oyster samples were completed in 2018.

Principal Researcher: Darryl Banjoo PhD

Bacteriological Water Quality At Popular Recreational Water-Use Areas In Trinidad And Tobago

Water-based recreation is an important component of leisure activities and tourism in Trinidad and Tobago. Since 1981, bacteriological water quality surveys conducted by the IMA indicated the presence of sewage contamination at some beaches in Trinidad and Tobago. International studies found an increased risk of contracting gastrointestinal illness, acute febrile respiratory illness and infections of the eye, ear, nose and throat from swimming in sewage contaminated water. The existence of poor water quality at beaches and rivers would therefore impact negatively on public health and tourism. There are popular bathing beaches in Trinidad and Tobago for which bathing water quality data is non-existent. This programme addresses the existing data gaps by conducting baseline bacteriological water quality surveys at such beaches, and by identifying potential sources of sewage contamination. The programme will culminate with the implementation of continuous bacteriological water quality monitoring at popular bathing beaches in Trinidad and Tobago. During this fiscal year, bacteriological water quality surveys continued in Trinidad at Columbus Bay and at Balandra Bay. A research report was prepared on the findings of bacteriological water quality surveys at Guapo Beach and Clifton Hill Beach.

An output of this programme is the availability of information about bathing water quality at popular beaches. This will result in enhanced public health protection by enabling beachgoers to make informed choices, thus avoiding potential health risks. Information concerning bathing water quality and sources of sewage contamination for popular beaches will guide managers of beach facilities, relevant government agencies and other stakeholders when implementing mitigatory measures towards improving water quality at adversely impacted

sites. In addition, the identification of predictors of bathing water quality will enable beachgoers to assess the potential for possible health risks in the absence of available real-time beach water quality information. Furthermore, a Bathing Beach Water Quality Trinidad & Tobago (BBWQTT) App for mobile phones and digital signage erected at beaches in conjunction with relevant authorities will provide beachgoers with ready access to bathing water quality information for our popular beaches. The availability of bathing water quality data for popular beaches will enhance our tourism product by making Trinidad and Tobago a more inviting destination for ecologically and environmentally sensitive tourists.

Principal Researcher: Christine Bullock

Utilisation of Marine Recirculating System to Culture Marine Species of commercial and ecological value

This project was geared towards improving the operations of an inland marine recirculating aquaculture system (RAS). It is a continuation of the 2015-2016 Work Plan in which a land-based integrated multi-trophic aquaculture (LB-IMTA) system, capable of treating nutrient rich water exuded from the inland marine RAS, was constructed onsite at the IMA. During 2016-2017 fiscal, the LB-IMTA was integrated with the inland marine RAS using shrimp as the polluter, and oyster and marine algae as the cleaning organisms. The purpose of testing the integration of the LB-IMTA with the marine RAS would not only be to improve the economic and environmental viability for use of the marine RAS inland, but also attempt to create a stand-alone marine production model capable of being situated irrespective of location to the coast, and that has high commercial potential and relevance to sustainable livelihoods.

Principal Researcher: Daniel Robinson

R**ESEARCH PROJECTS**

An Investigation of the Benthic Community Structure along the South East Coast and Galeota Port, Trinidad

Trinidad and Tobago's petrochemical industry has resulted in a growing maritime sector with 8 major ports. More ports increase the risk of introduced invasive species via ballast water. The country acceded to the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention) in January 2012. The BWM Convention came into force in 2017 and requires new and existing ships carrying ballast water to control and manage their ballast in compliance with Convention standards. Article 6 of the BWM Convention (Scientific and Technical Research and Monitoring) states parties shall endeavour, individually or jointly to monitor the effects of ballast water management in waters under their jurisdiction where such research and monitoring can include observation, measurement, sampling, evaluation and analysis of technology and organisms and pathogens identified in the transfer of ships' ballast water. A Port Biological Baseline Survey (PBBS) can provide inventories of marine life in and around commercial ports frequented by ships carrying ballast water. The Port of Galeota was selected as the study location for a macro-benthic survey as it is a relatively new Port and assumed to be less impacted than the other major ports in Trinidad. The purpose of this benthic survey was to gather information on marine biodiversity within the port, with an emphasis on establishing the presence of non-indigenous species. This project is directly aligned to Theme V of Vision 2030 protecting our biodiversity; conserving our marine resources.

Principal Researcher: Attish Kanhai

Marine Reference Collection

The Marine Reference Collection is of national, regional and global significance in terms of its unique contents and relationship to world-wide taxonomic holdings. The collection provides a physical snapshot of a species or community at a point in time and space. It is this physical record that makes the collection so valuable because deoxyribonucleic acid (DNA) cannot be extracted from a photograph and a physical specimen can provide a wealth of unexpected information. During the 2017-2018 fiscal year, the Marine Reference Collection was relocated from the Research Building to a prefababricated container adjacent to the Research Building. This move was necessary for a number of reasons including healthy and safety concerns for staff and the temperature of the space was not adequate for the proper storage of the specimens. A cool temperature with low humidity is a very important requirement for preservation of natural history collections. Since the collection has been moved, maintenance and re-cataloguing of specimens have been ongoing and an in-house database for researchers to access is being developed. Once all the specimens are catalogued, they will also be made public on an international website called Global Biodiversity Information Facility (GBIF) (https://www.gbif.org/) which will be easy for to the public to access. There has been collaboration with The University of the West Indies' Zoology Museum which has a small collection of marine specimens and The University of Trinidad and Tobago's Marine department which has just started their own collection of marine specimens. IMA is also collaborating with Dr Ray McCarthy from the University of Florida, who is providing technical advice and training.

Principal Researcher: Alana Jute

Pilot Project: Development of an Integrated Coastal Zone Management Plan for the North West Peninsula of Trinidad - Phase 1

An Integrated Coastal Zone Management (ICZM) Policy Framework was developed in 2014 by a Multi-sectoral Steering Committee appointed by Cabinet in 2012. To implement this policy, area plans would have to be developed collaboratively with key stakeholders. The Northwest Peninsula of Trinidad, extending from Scotland Bay to the mouth of the Diego Martin River was selected as the pilot area since this coastal area has a myriad of coastal uses and users, both onshore and offshore, as well as many coastal issues that need to be addressed. Phase 1 conducted in fiscal 2017-2018 involved undertaking all the groundwork for developing a marine spatial plan for the study area. This included mapping the land uses within the coastal zone (as defined by the ICZ Policy Framework) using 2014 aerial photography, identifying the socio-economic activities and user conflicts along the coast, reviewing all the development plans for the study area from regional (local government), national (central government) or management (Chaguaramas Development Authority) bodies and identify synergies and/or conflicts and conducting stakeholder consultations and surveys with regulatory agencies, local/national management authorities, business associations (yachting, shipping, hoteliers, fisherfolk, residents) to determine concerns, and current and future plans. This project would facilitate an ecosystem-based integrated approach to marine resource management aimed at maintaining and where necessary, enhancing ecosystem services, while facilitating economic development through evidence-based

decision-making and planning. This project contributes towards Government's initiative to implement an Integrated Coastal Zone Management Policy Framework in Trinidad and Tobago and is aligned to the United Nations' Sustainable Development Goal # No. 14- Livfe under water.

Principal Researcher: Rahanna Juman

Supporting Researchers: Kahlil Hassanali, Hamish Asmath, Christopher Alexis, Lester Doodnath

An Investigation into the Increase in Prevalence of Yellow Band Disease in Orbicella Faveolata Under Increasing Nutrient Enrichment

Orbicella faveolata is currently the main hermatypic (reef building) coral on Tobago's reef and it has been declining in health due to anthropogenic impacts and coral diseases. Orbicella. faveolata is currently known to be susceptible to seven diseases although yellow-band disease (YBD) is the most prevalent in the Caribbean. In Tobago, YBD is frequently present in some colonies, but not others and although YBD is capable of infecting 11 coral species, it predominantly infects O. faveolata colonies. This raises the possibility that there is a genetic susceptibility of this coral or its associated zooxanthellae strains. Identification of these genes would allow the identification of individuals and areas at high risk of developing YBD as well as increase our understanding of the molecular mechanisms that underlie this disease. Degraded water quality is frequently cited as a dominant cause of coral diseases and is positively linked to increased susceptibility to bleaching, disease outbreaks including the severity of the disease on the colony; though the specific effects of individual water parameters are still unclear. This project establishes the first baseline YBD dataset in Tobago and will determine the water quality parameters that make a significant contribution to poor coral health, as well as identify areas at greatest risk to YBD outbreaks. This study aims to provide a clear link between water quality and the increased susceptibility to YBD which can then be used to create effective management strategies. It will also provide vital information on disease rates, and reefs vulnerability to disease and climate change, which can also be used to inform reef management decisions.

Principal Researcher: Rachael Amoroso, Research Fellow.

Assessment of heavy metal accumulation in the Gulf of Paria using dated sediment cores

The Gulf of Paria is subject to heavy metal contamination from industrial and agricultural activities, sewage, domestic waste and urban run-off. These metals can bio-accumulate in aquatic organisms and pose a risk to human health. Historical information on heavy metal contamination can be used to establish baseline conditions and to evaluate how contaminant concentrations have responded to changes in population, land use and human activities, including pollution reduction strategies. While monitoring programs can provide valuable historical information, these programmes cannot evaluate conditions that existed before they were initiated, and advances in sampling and analytical techniques can make comparison with past data difficult. These limitations can be overcome through the analysis of dated sediment cores, which allows for the reconstruction of extended records of pollutant concentrations. This study will assess current sediment quality and evaluate how heavy metal concentrations have responded to industrialisation, urbanisation and the various pollution control strategies implemented in Trinidad and Tobago over the years, which will assist in improving management strategies. This is in alignment with the Vision 2030 National Development Strategy goal to create comprehensive waste and pollution management systems under Theme 5, "Placing the Environment at the Centre of Social and Economic Development." Surficial sediments from the Gulf of Paria were sampled during the 2017 wet season and analysed for heavy metals.

Principal Researcher: Wendy Nelson

The assessment and evaluation of rapid microbiological techniques for the determination of bacterial contamination in Tropical marine waters, Trinidad and Tobago

There is a need for rapid assessment techniques to determine environmental contamination. Traditionally, faecal pollution in Trinidad and Tobago has been assessed on the basis of concentrations of bacterial indicator organisms such as Enterococcus spp. and E.coli. Faecal-indicator bacterial concentrations have been measured using culture-based methods such as membrane filtration which are slow and require long hours of preparation and analysis. The need for rapid, reliable tests for recreational water quality is of great importance to protect public health in a timely manner. In 2016, Colilert 18 which uses Defined Substrate Technology® (DST®) nutrient indicator o-nitrophenyl-β-D galactopyranoside (ONPG) and 4-methyl-umbelliferyl-D-glucuronide (MUG)s to detect coliforms and E. coli were used to monitor water quality at sites in Trinidad and Tobago. Coliforms use their β-galactosidase enzyme to metabolise ONPG and change it from

colourless to yellow giving results in 24 hours. In 2017/2018, sampling continued in southwest Tobago, and reports were prepared for Maracas, Chaguaramas and southwest Tobago.
Principal Researcher: Sheldon Ramoutar

Metagenomic Analysis of Microbial Communities from Three Coastal Environments (Coral reef, Mangrove swamp, and Seagrass bed) in Bon Accord, Tobago

Microorganisms which are unique to each ecosystem underpin most of the geochemical cycles that were once previously thought to be driven by inorganic processes. The micro-organisms function by forming symbiotic relationships with eukaryotes, communicating with other microorganisms, acquiring nutrients and producing energy. By identifying the microbial community and their function within an ecosystem, the beneficial microorganisms needed for the healthy growth of specific ecosystems can be isolated and reproduced. In this study, three coastal environments in Bon Accord, Tobago will be targeted. The species under study will be corals, mangroves and seagrasses. This study has never been conducted in Trinidad and Tobago, and will be useful in the rehabilitation of the ecosystems which are currently under threat. For the period under review, final wet and dry season samples were collected and DNA extraction performed at The University of the West Indies. For the period under review, final wet and dry season samples were collected, DNA extraction was performed at UWI and samples were prepared for identification.
Principal Researcher: Sheldon Ramoutar

Age and Growth Studies of the Carite, Scomberomorus brasiliensis

This project undertakes a historical examination of the age composition and growth rates of the commercial stock of the Spanish mackerel (called carite domestically) from otolith samples provided by the Fisheries Division collected ad-hoc from the period 1991 to 1997. This assessment used sectioned otoliths to enumerate annuli or growth rings for both the adult phase (annular growth rings) and the juvenile phase (daily growth rings) to produce growth models as well as age compositions and mortality rates of the respective years in question. A draft paper for publication has been produced: Age and growth of the Serra Spanish mackerel (Scomberomorus brasiliensis) from sectioned otoliths reveal heavy exploitation of young of the year (Y-O-Y) in the waters around Trinidad. Still to be completed is the refining of the growth model for carite incorporating both the adult and juvenile phases of growth. Additionally, age adjustments taking into consideration reproductive data, and data of capture of the fish is being evaluated for possible incorporation of the growth modelling.
Principal Researcher: Rosemarie Kishore
Supporting Researcher: Farahnaz Solomon PhD

Age and Growth Studies of the Marine Invasive Pterois Volitans (Lionfish) from Early Invasion in Tobago Waters

The second known and recently introduced marine invasive alien species (IAS) in Trinidad and Tobago, is the Lionfish, Pterois volitans. Introduced into the Atlantic Ocean from the Indo-Pacific region, the Lionfish, was first captured in Castara, Tobago in July 2012, and at Saut D'eau, on the north coast of Trinidad in July 2013 completing the spread of the Lionfish throughout the Caribbean. Its biology as an invasive species has the potential to impact negatively on the coral reef systems and the coral reef fisheries as observed in the other Caribbean islands within its invasive geographic spread. As such, since its introduction in the Atlantic region, research aimed at managing these impacts requires improved information on trophic biology and life history parameters used in models predicting removal rates that will reduce lionfish densities and impacts successfully. Since the invasion is fairly recent, only two other age and growth studies have been conducted mainly from the northern Atlantic region. This study will represent the first age and growth study from the most southern limit of its distribution. Otolith samples of 570 fish collected ad-hoc from January 2014 to August 2017 have been aged and associated biological data are being verified in preparation for modelling to develop growth parameters. Preliminary analysis indicates that unlike commercial species aged thus far by the Laboratory, the size of the females per age group are smaller than males possible as more energy is expended into egg production, a possible strategy as an invasive species for rapid expansion of the population.

The knowledge of age and growth is fundamental to fishery science. Ages of fish is a prerequisite to estimate growth rate, age at recruitment, natural and fishing mortality rates, maturity schedules, and age-specific fecundity; all of which can contribute to a rational exploitation of fish stocks. Such studies are helpful in

describing the present and history of fish populations, and the future course of any fishery, and therefore provides the evidence essential to develop scientifically sound fisheries management policies. It is envisioned that the research conducted by the Fish Age and Growth Laboratory will be used by national fisheries regulatory agencies for assessment of the fish stocks to improve the fisheries management strategies.

Principal Researcher: Rosemarie Kishore

Supporting Researcher: Farahnaz Solomon

A Socio-Economic Assessment of the Domestic Leisure Marine Sector of Trinidad and Tobago: Charter Party Boat Segment

The domestic leisure marine sector experienced unprecedented growth in the last decade beginning from 2010. This growth is exemplified in the expansion of the Charter Party Boat Segment demonstrating the tremendous recreational and economic value of the coastal waters of Trinidad and Tobago. This socio-economic assessment of the Charter Party Boat Industry and associated facilities which commenced in the 2017-2018 fiscal year will provide baseline information, estimate the economic contribution of the industry to the national economy and identify areas of social, environmental and institutional conflict. This is in alignment with the Vision 2030 National Development Strategy call towards economic diversification and supports Ttheme V, "Placing the Environment at the Centre of Social and Economic Development."

Principal Researcher: Ben Maharaj

Greenwater Hapa-based Tilapia Fingerling Production System

The 2015-2016 Jumpstart Programme was designed to support on-going activities to boost tilapia production in Trinidad through the delivery of technical advice to fish farmers and the provision of fingerlings. A Hapa-based greenwater nursery system was implemented in 2016 for tilapia fingerling production. The environmental, biological and economic aspects of such a fingerling production system was documented during the 2017-2018 period via trials. A research report was prepared from which a manual will be created and made available to tilapia farmers. This project provides information on the production of fingerlings, as there is little local information regarding this component of the aquaculture value chain. The adoption of the Happa-based greenwater nursery system can provide stability in the supplying of fingerlings to medium and large-scale tilapia farms.

Principal Researcher: Daniel Robinson

IDENTIFICATION OF SITES MOST SUITABLE FOR SEACAGE CULTURE IN TRINIDAD AND TOBAGO

The development of the mari-culture sector presents an opportunity for economic diversification. However, this development must be data-driven, scientific, holistic and evidence-driven, giving due attention to environmental concerns and livelihood impacts. This project submitted under the Public Sector Investment Programme (PSIP) will support the development of a mari-culture industry in Trinidad and Tobago. It will attempt to undertake the groundwork needed to inform potential investors on processes which can provide supplemental and continuous supply of farmed marine finfish. The first phase of this study saw the use of parallel data collection strategies; one strategy utilising multi-criteria analysis to investigate and identify nearshore coastal sites in Trinidad and Tobago capable of siting sea cages. The site selection aspect is an attempt to not only provide research and development opportunities for on-growing production of marine finfish cultured at the nursery level in the marine RAS, but also to develop an economic model for seacage culture which can be used by investors and fishers for sustainable livelihood. By undertaking due diligence in the siting of these seacages, not only will the environmental friendliness of the operations be encouraged, but information which can be fed into the ICZM Framework can potentially be generated. Various key traits of site selection will be included in the site selection, inclusive of, but not limited to topographical, physical and chemical criteria, as well as near shore influences from the land.

Principal Researcher: Daniel Robinson

MULTI-DISCIPLINARY PROJECTS

Hydrological study of the Caroni river basin to determine transport and fate of land-based sources of pollutants
The Caroni River Basin, the hydrometric area that encompasses the Caroni Swamp, covers a total of about 883.4 km2, equivalent to 22% of the land surface area of the island and is the most populated and developed area of Trinidad. The hydrological regime in this river basin has been altered to facilitate human habitation and activities, including water harvesting for human consumption, flood mitigation and irrigation for agriculture. The Caroni River and associated Rivers discharge into the Caroni Swamp, the largest mangrove forest in Trinidad. The Swamp is important economically for oyster and crab harvesting, for hunting and for ecotourism. This study is modelling the hydrological regime within the Caroni Watershed and the hydrodynamic mixing in the swamp to determine the transport and fate of land-based pollutants particularly heavy metals and bacteria. This project will examine the land-sea interface and identify impact of sea level rise (saltwater intrusion) on the coastal ecosystems and provide data indicating areas where freshwater habitat could potentially be restored.

Sub-Component: Impacts of land-based pollutants on human health
The possible impacts of land-based pollutants on human health will be determined by assessing biota harvested for human consumption. A bacteriological assessment of the mangrove oyster (Crassostrea rhizophorae) and an assessment of heavy metals in the blue land crab (Cardisoma guanhumi) commenced during the 2017-2018 fiscal year. The mangrove oyster harvested from the Caroni Swamp is eaten as a raw oyster cocktail. Oysters are capable of harbouring microorganisms after filtering polluted waters and can hence cause potential health risks when eaten raw. The genus Vibrio is responsible for most health risks associated with oysters and whilst typical infections result in diarrhea and vomiting, some infections can cause more severe illnesses, including bloodstream infections and severe blistering skin lesions.

The Caroni Swamp is the largest and most commonly used crab harvesting site in Trinidad and Tobago. Heavy metals present in the environment can bioaccumulate in crabs and pose a risk to human health. This study provides data on heavy metals in edible tissue from crabs collected from the Caroni Swamp, and supplements existing datasets on shellfish species, which are limited for Trinidad and Tobago.

Samples were processed and edible tissue sent to The University of the West Indies, St. Augustine Campus for analysis of trace metals. Samples were also sent to the Woods Hole Oceanographic Institution (USA) for analysis of stable isotopes.
Principal Researcher: Hamish Asmath
Supporting Researchers: Rahanna Juman, Sheldon Ramoutar, Wendy Nelson, Farahnaz Solomon

INTERNATIONAL FELLOWSHIPS

Hubert Humphrey Fellowship - August 2017 to June 2018 (K. Hassanali)
The Hubert H. Humphrey Program enables young and mid-career professionals from designated countries to pursue graduate-level study in the United States (US) and to build and enhance leadership skills. This ten-month non-degree graduate-level study additionally allows candidates to foster a professional collaboration with U.S. counterparts. Administered by the State Department, Humphrey Fellows are selected based on their potential for leadership and their commitment to public service in either the public or the private sector. The Humphrey Program fosters a mutual exchange of knowledge and understanding about issues of common concern in the United States and the Fellows' home countries.

The Fellowship was primarily based at the University of California Davis (UC Davis) in the field of Natural Resources, Environmental Policy and Climate Change. A six-week Professional Affiliation at the Trinidad and Tobago Mission to the United Nations in New York was also undertaken where an ongoing collaborative relationship on oceans and Law of the Sea matters were strengthened. Mr. Kahlil Hassanali was awarded the Hubert H. Humphrey Fellowship and pursued a non-degree graduate study in the field on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction for the period under review.

University of Florida (R. Kishore)
The principal investigator of the Fish Age and Growth Laboratory, Ms. Rosemarie Kishore was successful in obtaining a professional award funded by the Florida Sea Grant in conjunction and partnership with the Gulf and Caribbean Fisheries Institute, The Billfish Foundation, and the Caribbean Regional Fisheries Mechanism (CRFM) under the Gulf and Caribbean Fisheries Exchange Program. This Award is competitive, based on a proposal of identified training needs, curriculum vitae of the applicant and a professional endorsement of the applicant.

The 4 months training, which ran from 15 August – 16 December 2017, was conducted at the University of Florida under the guidance of Professor Debra Murie. The training received helped the Officer to improve the methodologies in sample preparation and age reading and analyses employed in the Fish Age and Growth Laboratory.

WORKSHOPS

Joint Catalysing Implementation of the Strategic Action Programme (SAP) for the Sustainable Management of Shared Living Marine Resources in the Caribbean and North Brazil Shelf Large Marine Ecosystems (CLME+) Sub-Project Launching Workshop, 20- 24 November 2017, Port of Spain, Trinidad (W. Nelson, F. Solomon and R. Juman).

Gender training for Protected Areas, Environmental Management Authority, 14th. December 2017 (A. Kanhai).

Regional Workshop to develop the Caribbean Large Marine Ecosystem+ Civil Society Action Programme (CLME+ C-SAP), Day 4, 19 January 2018, Port of Spain, Trinidad (W. Nelson).

Regional Workshop on the International Convention on the Control of Harmful Anti-fouling Systems on Ships and the Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic, 20-22 June 2018, Port of Spain, Trinidad (W. Nelson).
GBIF Demonstration Workshop by UWI Zoology Museum, St Augustine – 23 July 2018 (A. Jute).

Inception workshop – Capacity Development for improved management of MEAs for Global Environmental Benefits – 17 July 2018 (K. Hassanali).

Short Course on the theory and Practice of Tropical W Atlantic sponge (Porifera) identification (Latin America and Caribbean Congress for Conservation Biology, UWI, St Augustine – 28-31 July 2018 (A. Jute)

My Deep Sea, My Backyard Workshop UWI, St Augustine – 13 August 2018 (A. Jute, F. Solomon, K. Hassanali,

A. Kanhai).

Town and Country Planning Division Automation of the Construction Permitting System Workshop – 14 August 2018 (K. Hassanali).

EXTERNAL MEETINGS

Project Steering Committee Meeting-Preparation of T&T 3rd National Communication and 1st Biennial Report of UNFCC. 3 October 2017 (R. Juman).

CANARI Caroni Protected Areas Meeting: A roadmap for participatory development of protected area management plan in T&T. 5 October 2017 (R. Juman).

Caribbean Community Climate Change Centre Conference (CCCCC)- International Climate Change Conference- Hilton Hotel, POS. 9-11 October 2017 (H. Asmath, R. Juman).

Ministry of Energy and Energy Industries (MEEI), Tower C, 1 Wrightson Road, POS, with stakeholders from agencies EMA, IMA, MSD and MEEI to discuss oil spill, 7 October 2017 (D. Banjoo).

RAC/REMPEITC – Caribe Tele-conference call with representative of Aruba, Curacao, Trinidad and Venezuela Teleconference call #18 regarding recent oiling events in the Lower Caribbean Region with RAC/REMPEITC – Caribe, 14 November 2017 (D. Banjoo).

GPS and GIS workshop with forest fire suppression personnel from Forestry Division - November 2017 (H. Asmath).

Ballast Water Exchange, stakeholder Committee Meeting, Maritime Services Division 6th December 2018 (A. Kanhai).

Coastal Dynamics Limited's Workshop on Forecasting Waves, Currents and Oil Spill Trajectories in Trinidad and Tobago at 2018 Energy Conference - 24 January 2018. Represented IMA as part of the panel discussion on the role of agencies during an oil spill (D. Banjoo).

IDB Mission on preparation of loan proposal for T&T Climate Resilient Coastal Infrastructure and Management Programme, 30 January 2018 (R. Juman).

Association of American States (ACS) – Caribbean Sea Commission 1st Extra-ordinary meeting of the Caribbean Sea Commission 5 February 2018 (R. Juman).

5th Meeting of the National Working Group/Trawl Multi-Sectoral Committee for By-catch Management and Promotion of Alternative Livelihood Strategies in the Shrimp Trawl Fishery in Trinidad and Tobago (REBYC II-LAC). 15 March 2018, Ministry of Agriculture Aquaculture Conference, Bamboo, Trinidad (F. Solomon).

High Level Forum, Policy and Programmatic Approaches to Sustainable Integrated Waste and Chemicals Management in Trinidad and Tobago, Hilton Trinidad Conference, POS, 20 March 2018. Hosted by the Basel Convention Regional Centre for Training and Technology for the Caribbean, (D. Banjoo).

Teleconference to discuss Development of Caribbean Nutrient Reduction Strategy with CAR/RCU UNEP on 24 April 2018. (D. Banjoo, R. Juman).

National Consultative Workshop on Agroecology in Trinidad and Tobago, Hosted by CAB International in collaboration with the Food and Agriculture Organisation (FAO) and the University of Trinidad and Tobago (UTT) 28 May 2018 (B. Maharaj).

Trinidad and Tobago National Culinary Team, Seafood (Lionfish) Night Special. 28 May 2018, One Woodbrook Place, Trinidad (F. Solomon).

Meeting with Fisheries Division. Presentation and discussion with consultant, Dr. Kim Baldwin for the REBYCII-

LAC project "Sustainable Management of Bycatch in Latin America and Caribbean Trawl Fisheries regarding participatory GIS - 25 July 2018 (R. Kishore).

Inter-American Institute for Cooperation (IICA) Climate Smart Agriculture Forum (D. Robinson).

Promoting Innovation for Diversification: Moving Forward (D. Robinson)

Society for Conservation Biology, Latin America and the Caribbean Congress for Conservation Biology Conference, UWI, St Augustine- July 2018 (H. Asmath).

Dr. Carla Phillips, Lecturer- Marine Mammal Medicine/Aquatic Animal Health, School of Veterinary Medicine, UWI to discuss the ongoing 'fish kill at La Brea - 14 August 2018 (R. Kishore).

World Food Day Brief for the Permanent Mission of Trinidad and Tobago to the Office of the United Nations at Geneva. 14 September 2018. Ocelot Conference Room, Ministry of Agriculture, Land and Fisheries, Chaguanas, Trinidad (F. Solomon, B. Maharaj).

INTERNATIONAL CONFERENCES/ SYMPOSIA / WORKSHOPS

Major Aspects of Coastal Environmental Management Workshop I, 17- 20 October 2017, Kingston, Jamaica (W. Nelson).

Coastal and Environmental Summit 2017- Sustainable Development Management and Designing of Coasts & Marine Environments for Effective Protection of Commercial, CSR, Disaster Risk Reduction and Socio-Political Interests, Singapore, 7-10 November 2017 (R. Juman).

Implementing and Monitoring the Sustainable Development Goals in the Caribbean: The Role of the Ocean. 17-19 January 2018, St. Vincent and the Grenadines (A. Kanhai).

Caribbean Marine Atlas Steering Committee Meeting, Santa Marta, Colombia, 21 to 13 February 2018 (H. Asmath)

Major Aspects of Coastal Environmental Management Workshop II, 5- 9 March 2018, Coquimbo, Chile (W. Nelson)

Marine Genetic Resources Regional Management Workshop Jamaica 12-14 March 2018 (A. Jute).

Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)-6 Plenary, Medellin, Columbia- 17-24 March 2018. (R. Juman).

Caribbean Marine Atlas Steering Committee Steering Committee meeting in Belgium. Flanders UNESCO Science Trust (FUST) meeting in Belgium - May 2018 (H. Asmath).

Sustainable Marine Resources: Enhancing Biodiversity in Coastal Waterways, 9–13 July 2018, York Hotel, Singapore (F. Solomon).

International Conference on Coastal Engineering (ICCE) August 3rd. 2018 – Baltimore, USA (C. Alexis)

2nd CARICOM BBNJ Workshop - to prepare for the Inter-Governmental Conference on an international legally binding instrument under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Biodiversity in Areas Beyond National Jurisdiction (BBNJ Agreement) – 30 July–1 August 2018 (K. Hassanali).

Inter-Governmental Conference on an international legally binding instrument under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Biodiversity in Areas Beyond National Jurisdiction (BBNJ Agreement) – 1st Session – United Nations Headquarters, New York, USA 4-17

September 2018 (K. Hassanali).

Coastal Processes and Methodological Criteria for Beach Recovery – 6– 17 August 2018, Panama City, Panama (C. Alexis).

Event Strengthening Institutional Capacity for the Management of Coastal erosion Processes Associated with Climate Change Course 2: Seminar on Sedimentology 15– 21 August 2018, Panama City, Panama. (A. Mohammad).

Collection and Perseveration of Water and Sediment Samples Course. 10-14 September 2018 Sao Paulo, Brazil (Kyle Williams).

Experts Workshop on Marine Pollution Indicators SDG Goal Target 14.1.1 - IOC-UNESCO, Paris, 10-14 September 2018 (D. Banjoo).

PUBLIC CONSULTATIONS

Consultation on the Proposed Ocean Bottom Node Seismic Survey in Offshore Blocks 2(c) and 3(a) – (CEC 5226/2017) hosted by BHP Billiton. 19 October 2017, Matura Secondary School, Trinidad (F. Solomon).

National Technical Consultation on Climate Risk Assessment Projected executed with European Union Technical Assistance under the Environmental Programme for Trinidad and Tobago 4-5 December 2017, Port of Spain (R. Juman, H. Asmath and A. Kanhai).

Presentation of Mercury Concentration Results - Fish Sampling Tests under Project: Development of Minamata Initial Assessments in the Caribbean Region on 8 December 2017 at the MOPD, Conference Room, Level 14, Eric Williams Finance Building, Independence Square, Port of Spain. Presented by Ms. Jewel Batchasingh of the Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean (D. Banjoo).

Stakeholder Consultation on the Update of the National Implementation Plan and Inventory for the Stockholm Convention under the GEF Project 5558, executed by the Basel Convention Regional Centre for the Caribbean, 23 January 2018, Port of Spain, Trinidad (W. Nelson).

2nd Stakeholder Consultation Session on the Development of a Yacht Marketing and Promotional Plan, Ministry of Trade and Industry, 30 January 2018, Port of Spain, Trinidad (W. Nelson).

Stakeholder Town Meeting for the National implementation Plan (NIP) Action Plan Endorsement, on 10 May 2018, Environmental Management Authority (EMA's) Conference Room, Port-of-Spain, (D. Banjoo).

National Consultation for the Draft Fisheries Management Bill. 12 June 2018. Kampo Restaurant, Chaguanas, Trinidad (F. Solomon, R. Kishore).

Public Consultation Meeting MATELOT - GRANDE RIVIERRE SHORELINE STABILISZATION WORKS - PHASE 1 hosted by Eco Engineering Ltd on behalf of the Coastal Protection Unit, Ministry of Works & Transport of the Government of the Republic of Trinidad and Tobago. 28 August 2018 (C. Alexis, B. Maharaj).

PUBLICATIONS

TECHNICAL REPORTS

Rapid Assessment of Bamboo Village - Erosion of Coastal Cliff (C. Alexis).

Report on the oil fingerprinting analysis of eight oil samples for the Atlantic LNG Company of Trinidad and Tobago (ALNG), June 2018, 64p .(D. Banjoo).

Marine Water Quality at Carrera Island, Chaguaramas, Trinidad. Prepared for the Trinidad and Tobago Prison Service, July 2018, 16p. (D. Banjoo).

Mangrove Monitoring Report for Point Lisas Nitrogen Limited, July 2018 (R. Juman).

RESEARCH REPORTS

Amoroso, R. (2018). Coral Reef Monitoring Report for 2017. Final Report Institute of Marine Affairs.

Ramoutar, S. (2018). Bathing Beach Quality for Maracas Bay. Final Report Institute of Marine Affairs.

Ramoutar, S. (2018). The Bathing Beach Water Quality along the Chaguaramas Peninsula, Trinidad, W.I. Final Report Institute of Marine Affairs.

Kishore, R. (2018). Ecological Assessment of the Marine Invasive Alien Species (IAS) Perna viridis in Trinidad and Tobago. Final Report Institute of Marine Affairs.

Nelson, W. and Kishore, R. (2017). Heavy Metals in Selected Commercially Important Fish Species from Trinidad and Tobago. Final Report Institute of Marine Affairs.

JOURNAL PUBLICATIONS

Kanhai, A. and Juman, R. (2018). The effect of seasonal and human pressure on macro-benthic fauna in the Caroni Swamp Ramsar Site, Trinidad and Tobago. Rev. Biol. Trop. (Int. J. Trop. Biol. ISSN-0034-7744) Vol. 66(3): pp. 1101-1117.

Hassanali, K. (2018). Approaching the implementing agreement to UNCLOS on biodiversity in ABNJ: Exploring favourable outcomes for CARICOM. Marine Policy 98; pp. 92-96.

BOOK

Linardich, G. Ralph, K. Carpenter, N. Cox, D.R. Robertson, H. Harwell, A. Acero P., W. Anderson Jr., F. Barthelat, J.-L. Bouchereau, J. J. Brown, J. Buchanan, D. Buddo, B. Collette,M. Comeros-Raynal, M. Craig, M. Curtis, T. Defex, J. Dooley, W. Driggers III, C. Elfes Livsey, T.Fraser, R. Gilmore Jr., L. Grijalba Bendeck, A. Hines, R. Kishore, K. Lindeman, J.-P. Maréchal, J. McEachran, R. McManus, J. Moore, T. Munroe, H. Oxenford, F. Pezold, F. Pina Amargós, A. Polanco Fernandez, B. Polidoro, C. Pollock, R. Robins, B. Russell, C. Sayer, S. Singh-Renton, W. Smith-Vaniz, L. Tornabene, J. Van Tassell, J.-C. Vié, and J. T. Williams, 2017. The Conservation Status of Marine Bony Shorefishes of the Greater Caribbean. Gland, Switzerland: IUCN. viii + 75 p.

ENVIRONMENTAL INCIDENT REPORTS

Report on the Fingerprinting Analyses Conducted on Oil Spilled in Chaguaramas, Trinidad, October 2017, 78p. (D. Banjoo).

Report on the Fingerprinting Analyses Conducted on Oil Spilled in Chaguaramas, Trinidad, April 2018, 52p. (D. Banjoo).

Report on the Investigation of the Oil Spill off Orange Valley, Trinidad, July 2018, 65p. (D. Banjoo).

Sewage Spill – Maracas 11 September 2018. Environmental Incident at Maracas Beach, Trinidad, W.I. (S. Ramoutar).

Report of a Fish Kill at Lizard River, Guayaguayare, Trinidad. April 2018. (F. Solomon).

- Fish Kill Responses (F. Solomon):
- Fish Kill Investigation, La Brea, 26 February 2018
- Fish Kkill Investigation Lizard River, Guayaguayare Bay, 26 April 2018.
- Fish Kkill Investigation, La Brea, 11 June 2018
- Fish Kill Investigation La Brea, 22 June 2018
- Fish Kill Investigation La Brea, 23 June 2018
- Fish Kill Investigation, La Brea, 19 September 2018

OTHER ACHIEVEMENTS

- Launch of Water Quality Buoy in Claxton Bay on 25 October 2017 a "Proof of Concept" between the IMA, Microsoft Caribbean, Fujitsu/ GlobeRanger and Digicel Limited. A buoy with various sensors was placed in the Gulf of Paria to collect real time data on certain parameters.
- Institute of Marine Affairs 4th Community Research Symposium, Chaguanas Borough Corporation Auditorium, 28 March 2018.
- Signing of the Agreement between UNEP and Government of Trinidad and Tobago designated the IMA the Regional Activity Centre (RAC) for the Land-based Sources of Pollution Protocol under the Cartagena Convention- 4 April 2018.
- Mangrove Replanting Exercise in Caroni Swamp. A collaboration between the IMA, MoPD and the University School to commemorate Work Biodiversity Day on 22 May 2018.
- Launch of the International Year of the Coral Reef Initiative on 8 June 2018.
- Mangrove Replanting Exercise in Brickfield. A collaboration between the IMA and MoPD to commemorate World Desertification Day on 22-23 June 2018.
- Prepared and submitted proposal on Caroni Swamp for Caribbean Large Marine Ecosystem (CLME+) – Ecosystem Based Management, August 2018.

EXTERNAL COMMITTEES

- Ad Hoc Technical Working Group for the Development of Ambient Water Quality Standards (AWQS) for Trinidad and Tobago and Revision of the Water Pollution Rules, 2018 (W. Nelson).
- Member Ad Hoc Sub Committee to finalise World Food Day Brief for the Permanent Mission of Trinidad and Tobago to the office of the United Nations at Geneva (B. Maharaj).
- National Working Group/Trawl Multi-Sectoral Committee for By-catch Management and Promotion of Alternative Livelihood Strategies in the Shrimp Trawl Fishery in Trinidad and Tobago (F. Solomon).
- Biodiversity Committee, chaired by the Environmental Policy Unity, Ministry of Planning and Development (A. Jute and K. Ganaselal).
- National Steering Committee to guide the preparation of the country's 6th National Report (6th NR) on the Implementation of the Convention on Biological Diversity (CBD) (A. Kanhai).
- Steering Committee for the project entitled "Preparation of Trinidad and Tobago's Third National Communication and First Biennial Update Report to the United Nations Framework Convention on Climate Change (UNFCCC) (K. Hassanali).

- Advisory Committee for the Capacity Development for Improved Management of Multilateral Environmental Agreements for Global Environmental Benefits Project (K. Hassanali).
- Inter-agency Committee for the Expansion of Trans-shipment and Cold-Stacking Activities of the Gulf of Paria (K. Hassanali).
- National Steering Committee (NSC) for Global Environment Facility- Small Grants Programme (GEF SGP) 2016-2018 (W. Nelson, Alternate: K. Hassanali).
- National Steering Committee of the Global Environmental Facility-Small Grants Program (GEF-SGP) – Technical Committee member (K. Hassanali).
- Improving Forest and Protected Area Management in Trinidad and Tobago – North East Tobago Marine Protected Area Sub-Committee (K. Hassanali).
- Improving Forest and Protected Area Management in Trinidad and Tobago – Caroni Sub-Committee – (R. Juman, Alternate- K. Hassanali).
- Improving Forest and Protected Area Management in Trinidad and Tobago, Nariva Subcommittee (H. Asmath).
- Land Reclamation Committee (C. Alexis).
- Project Steering Committee – Turtle Conservation in Trinidad and Tobago chaired by Turtle Village Trust (R. Juman, C. Alexis).
- Upstream Effluent Management (UEM) Committee Meeting (D. Banjoo).
- UNEP LBS SOCAR (State of the Area Report) Data Sub-Group (D. Banjoo).
- Sub Committee in Marine Scientific Research of the Inter-Ministerial Committee on the Law of the Sea, (R. Kishore).
- Inter-ministerial Committee to develop the National Maritime Policy and Strategy for Trinidad and Tobago (Dr Ahmad Khan, alternate R. Kishore).
- San Fernando Re-Development Committee (L. Doodnath).
- Integrated Coastal Zone Management Inter-Ministerial Committee (R. Juman, Deputy Chair)

The Information Centre is responsible for the promotion of the research work of the Institute of Marine Affairs, public education and awareness of all aspects of marine conservation and dissemination of information to

INFORMATION CENTRE

PUBLIC EDUCATION
STAKEHOLDER RELATIONS MANAGEMENT
LIBRARY SERVICE
INTRODUCTION

the general public. The Centre actively engages primary and secondary school pupils, tertiary level students, stakeholders, community-based organisations, non-governmental organisations, government agencies and the private sector through the staging of public exhibitions, delivery of school presentations and other outreach activities.

The Information Centre is also tasked with disseminating research information to inform policy and to keep stakeholders informed of ongoing and completed research projects. It also includes a Library that serves as the only documentation centre that provides, inter alia, local marine environmental information unique to Trinidad and Tobago.

PUBLIC AWARENESS AND EDUCATION

The Information Centre's public awareness and outreach programme engaged 3,070 students and teachers, which included primary school pupils, secondary school students, tertiary level students, citizens and various private and public organisations and agencies. Marine conservation awareness was carried out in various forms, including educational talks, games, exhibits and tours conducted by the Fisheries and Aquaculture Research and Programme (FARP) at the Institute of Marine Affairs as well as externally by the officers of the Information Centre. More than 80 tertiary level students from The University of the West Indies, University of Trinidad and Tobago and College of Science, Technology and Applied Arts of Trinidad and Tobago (COSTAATT), along with 560 primary school pupils and more than 100 secondary school students, were accommodated at the IMA for a tour of the Aquaculture Facility.

The Information Centre participated in environmental exhibitions where the Information Officers engaged more than 600 persons on the significance of coastal and marine conservation. During outreach activities, Officers delivered presentations on various topics including Coral Reefs and Wetlands, Climate Change, and Marine Litter/Pollution to more than 1,400 students at several primary and secondary level schools in Trinidad and Tobago. The Officers also facilitated a number of career days for several secondary schools, disseminating information and guidance on the subjects required for a career in marine sciences.

An outreach programme was delivered to the Institute's host community within the Carenage and Point Cumuna areas. In its fifteenth year, the Sea & Me Project was presented to post-Secondary Entrance Assessment (SEA) pupils of four primary schools in the Carenage and Point Cumana areas. The topics covered included water education, marine mammals, coral reefs and water safety. This community activity provides an opportunity for pupils to be exposed to the basic tenets of biodiversity and our marine and coastal resources.

This was also the second year that the Sea & Me Project was presented to the Sangre Grande Seventh Day Adventist Primary School, expanding this specialised outreach activity beyond the Carenage and Point Cumana areas. These outreach activities are beneficial to the sustainable development of Trinidad and Tobago as it supports Theme 1 (Nurturing our Greatest Asset) of Vision 2030 National Development Strategy – Goal 7: Modern Relevant Education and Training System. Please see the Appendix for more details on the outreach activities conducted for the period under review.

Production of Public Awareness and Education Videos

The IMA Partnered with Sustain TT, a non-governmental organisation to produce short duration environmental awareness films to sensitise the public on the adverse effects of marine pollution. The two videos entitled, "The Bottle: and "Future Work" were launched at the Green Screen Film Festival in August 2018.

PUBLIC AND STAKEHOLDER RELATIONS

The Department is responsible for disseminating information and managing relationships with the Institute's stakeholders. Several events were hosted to demonstrate the Institute of Marine Affairs' support to Theme 5 (Placing the Environment at the Centre of Social and Economic Development), Vision 2030 National Development Strategy – Goal 5: Natural Resource Management will be improved. These events are outlined below:

The IMA hosted a press conference on 25 October 2017 at the Claxton Bay Fishing Facility to launch a new project – Water Quality Monitoring Buoy. This project represents a critical partnership between the Government and private sector stakeholder (Microsoft Caribbean, Fujitu/Globe Rangers and Digicel) to develop a Proof of Concept (POC) for collecting continuous realtime scientific data. A buoy equipped with water quality underwater sensors positioned was deployed to collect real time data on environmental parameters such as temperature, dissolved oxygen concentration, salinity, pH and turbidity.
The Minister of Planning and Development, the Honourable Camille Robinson-Regis, delivered the feature address, which was followed by the deployment of the water quality monitoring buoy in the Gulf of Paria. The Honourable Minister, Stakeholders, members of the Media and staff were invited to witness the deployment upon the IMA's two vessels.

Through the collaboration with UNEP for the hosting of a workshop, national development goals have been aligned to the sustainable development goals. The IMA and the United Nations Environment Programme (UNEP) hosted a Workshop at Kapok Hotel from 20–23 November 2017 entitled "Joint Catalysing Implementation of the Strategic Action Programme (SAP) for the Sustainable Management of shared Living Resources in the Caribbean and North Brazil Shelf Large Marine Ecosystem (CLME+) sub-project Launching Workshop".

The IMA was formally established as a Regional Activity Centre (RAC) of the Caribbean Environment Programme (CEP) through a framework agreement between the Government of the Republic of Trinidad and Tobago and the United Nations Development Programme (UNEP). The Minister of Planning and Development, the Honourable Camille Robinson-Regis signed the document on 4 April 2018 at the Ministry of Planning and Development, Port of Spain. As a RAC, the IMA will continue to support procedures developed to protect the marine environment and human health from land-based sources of marine pollution (LBS PROTOCOL).

IMA's 40th Anniversary Activities and Events

Under the theme, 'Science and Innovation for Marine Conservation' the IMA commemorated 40 years of operation with an Anniversary Long Service Employee Awards and Website Launch, which was held on 18 April 2018 in the Auditorium of the newly established, Government Plaza, Port of Spain. Awardees were recognised for their significant contribution and years of valued service and twenty-two members of staff were honoured for their years of service under the following categories; 37 years and over, 25-29 years, 20-24 years and 15-19 years. Additionally, the Institute's newly designed and upgraded website was launched at the Anniversary Launch and Long Service Awards. At this anniversary function, two new publications entitled "Coastal Reflections: Celebrating 40 Years of Excellence" and "Life along the Seashore of Trinidad and Tobago" were launched.

In recognition of the advancements and achievements attained by the IMA during its 40 years in existence, a Public Lecture Series was organised to commemorate the Institute's years of public education service to Trinidad and Tobago. . A total of three lectures were arranged; The 1st lecture was held on 15 May 2018 at the Old Fire Station Building, corner Hart and Abercromby Streets, Port of Spain. Mr. Derek Hudson, Vice President, Shell Trinidad and Tobago, presented on "Science-based Management of our Oceans and Coasts, its Economic Value (Blue Economy), Emerging Issues and Challenges and Innovative Management Solutions'. IMA's 2nd Public Lecture was entitled "Oceans and Climate Change – What does it mean for Small Island Developing States?" and was delivered by Mr. Kishan Kumarsingh, Head of Multilateral Agreements, Ministry of Planning and Development on 8 June 2018, again at the Old Fire Station Building, Port of Spain. The 3rd Public Lecture, entitled "The EMA's Role, Function and Activities towards the Science-based Management of T&T's Oceans and Coasts" was delivered by Mr. Hayden Romano, Managing Director, Environmental Management Authority. The lecture was held on 24 July 2018 at Cipriani College of Labour and Co-operative Studies. In an effort to recognise staff contributions and to strengthen employee camaraderie, a Staff Appreciation Day was held on 1 June 2018 in commemoration of the corporate anniversary.

A Staff Appreciation Day was held on 1st June 2018 in commemoration of IMA's 40th Anniversary.

Promotional Products

Through the publication of the tri-annual external newsletter entitled, IMA News, which was produced and disseminated in December 2017, April and August 2018, stakeholders were informed of the progress in research projects, new monitoring processes such as the water quality monitoring buoy and alerted to pressing marine environmental matters through articles written by research staff.

The IMA Tidal Calendar 2018 was produced to not only inform of tidal projections but to showcase the splendid beauty of the scenic sea and landscapes through photographs that adorned the twelve months. These tidal projections support the maritime sector and yachting industry.

For the period under review, twenty-eight newspaper articles were submitted by researchers from the various research programmes and were published in the Trinidad Express, Tobago Newsday and Tobago Today. The use of traditional media such as the newspaper is still a viable medium to raise awareness on marine conservation and environmental issues.

Corporate Social Responsibility

The Institute commemorated the International Day for the Conservation of Mangrove Ecosystem by collaborating with the Ministry of Planning and Development to replant over 1100 seedlings at Brickfield Fishing Facility. The exercise was coordinated by Institute's Deputy Director, Dr. Rahanna Juman and the purpose of the activity was to alleviate coastal erosion in the area. With more than 100 volunteers, this two-day exercise took place on 23 June 2018 with the seedlings being harvested at Caroni Swamp, and on 24 June 2018, the seedlings were replanted at Brickfield. The Minister of Planning and Development, the Honourable Camille Robinson-Regis, participated in the replanting exercise along with staff members and volunteers from non-governmental organisations as well from other ministries, showing tremendous support on these days.

The Information Centre assisted the Research Programmes in convening IMA's 4th Community Research Symposium, entitled "Caroni to Pointe-a-Pierre - Conserving Our Coastal Environment" on 28 March 2018 at the Chaguanas Borough Corporation. Members of the public along with persons from EMA, Regional Corporation, the Meteorological Office and other organisations attended the sSymposium. The objective of this symposium was to share relevant scientific information to all stakeholders and discuss challenges, possible solutions and mitigation measures within the area. Presentations were delivered by IMA Research staff on the hydrology of the Caroni River basin, heavy metal content and water quality along the coast as well as human health concerns related to oyster consumption. External presentations were also conducted by various entities including NAMDEVCO, Ministry of Agriculture, Lands and Fisheries, PLIPDECO and FAO/UN. These presentations covered topics such as good agricultural practices, methods to reduce bycatch and options for expanding the protected area of the Caroni Swamp. The symposium not only disseminates the research work of the Institute but also fosters and builds bridges between scientists, society and the business community.

To support our commitment to the environment and conservation of our natural resources, the IMA participated in the International Coastal Cleanup 2018. On Saturday 15th September, IMA joined in the Ocean Conservancy's annual International Coastal Cleanup at the Foreshore, Port of Spain. This year, the IMA partnered with the Ministry of Planning and Development, with assistance from Unit Trust Corporation. With 136 volunteers at the site, staff members assisted in collecting over 4, 289 pounds of garbage, filling 122 bags of trash.

Diplomatic Relations/Visits

Visit by Australian High Commissioner

On 31 July 2018, the Australian High Commissioner to Trinidad and Tobago, His Excellency John Philbeam visited the IMA and toured various areas within the research building including Geographic Information Systems, Environmental Quality Programme and Fisheries and Aquaculture Research Programme. The main purpose of his visit was to encourage the Institute to apply for the International Coral Reef Initiative (ICRI) membership through the Ministry of Planning and Development. ICRI is currently co-chaired by Australia, Indonesia and Monaco. The ICRI is an informal partnership between nations and organisations which strives to preserve coral reefs and related ecosystems around the world in a framework of sustainable use.

Visit by Canadian High Commissioner

The Canadian High Commissioner Her Excellency, Carla Hogan Rufelds, High Commissioner and Senior Advisor also visited the IMA on 12 September 2018 to illicit support for Trinidad and Tobago's participation in the first global Sustainable Blue Economy Conference in Nairobi, Kenya, 2018. The delegation shared the benefits of attendance, the areas of mutual interests and on how a delegation for the country may receive assistance to facilitate their attendance. Trinidad and Tobago's delegation to the meeting was led by Her Excellency Penelope Beckles, Trinidad and Tobago's Ambassador to the United Nations.

Visit by the Japanese Embassy

Representatives from the Japanese Embassy visited on 28 September 2018 and held discussions on possible partnership with the Sophia University in Tokyo, Japan. The delegation comprised Professor Anne McDonald, Lecturer, Graduate School of Global Environmental Studies, Sophia University and Mr. Megumi Araki, Director & Secretary General of the Association for International Cooperation (APIC).

OTHER VISITORS AT IMA

St. Francois Students - World of Work Programme July 2018
Pacific Lutheran University – 2 students

SOCIAL MEDIA

Trend reports for digital platforms such as Facebook indicated that more persons were accessing the IMA's Facebook page using mobile devices as compared to a desktop over the period. As a result, the following content strategy was employed:

- Consciously reducing wordy bits of copy to short-form statements and relying more on clean, crisp graphic design;.
- Avoiding ad-hoc uploads of research/social content `and sticking to a set schedule for particular types of output to encourage user habits based on predictability.
    - Every Monday – Administrative/strategic updates
    - Every afternoon – any trending news related to IMA, marine environment policy or awareness, weather etc.
    - Every 3rd Friday – 1 short-video
    - Every last Friday – a social/fun greeting
- Integrating other supporting social media platforms such as Instagram and LinkedIn; and,
- Adjusting the IMA website in order to make it more mobile-friendly.

In April 2018, the Institute's social media efforts were expanded across other networks in a bid to present content suited to the demographic that utilising the platform. The digital platforms of the organisation was also expanded to included a new Twitter account. Platforms were also streamlined where possible through the use of one handle, IMAgovTT by the end of May 2018. Pre-existing accounts directed to the new or deactivated where possible. The following outlines succinctly what was achieved:

- www.twitter.com/imagovtt first Tweet June 20th 2018
- IMACHAG followers directed to IMAgovTT
- IMACHAG deactivated by December 2018

Current IMA employees on LinkedIn were encouraged via email, to affiliate themselves with the new page https://www.linkedin.com/company/imagovtt instead of https://www.linkedin.com/company/institute-of-marine-affairs-tt
Cross-platform promotion of content posted on LinkedIn via Facebook and Twitter to drive visitor count. Existing LinkedIn pages were however not deactivated to allow current and former employees to retain their affiliations.

The IMA also established an Instagram platform. Local and globally recognised environmental events, national public holidays formed the basis of most of the content created for the platform. By the close of the fiscal period, the page attracted 500 followers without the use of paid advertisements or boosts.

Three videos were produced and uploaded onto the YouTube account for the period under review. These videos include the following: The Bottle co-produced with Sustain T&T and two recordings from our 40th Anniversary Public Lecture Series – Science-based Management of our Oceans – Derek Hudson and Oceans and Climate Change - Kishan Kumarsingh. This along with a zero-cost, cross-platform promotional drive in May, utilising Facebook, Instagram and WhatsApp, our total number of followers saw a net increase of 83 subscribers, bringing the subscription count to 112 followers.

Challenges
The various, above-mentioned networks provided different user/subscription metrics and presented the information at different reporting intervals, subjecting analytics data/records to inconsistent sampling periods. Specific durations are not readily available in some cases.

Some networks provided engagement calculations based on organic reach (how many times content was viewed by users) while others are based on organic impressions (how many times content was delivered to a user's feed but not guaranteeing viewership).

Over the fiscal period, with the progressive introduction of the use of analytics/insights for the various networks by the IMA, not discounting the disclaimers posted by the social media platform owners that data for specific periods would not be accurate, it was observed that miscalculations were likely and the simplification of the information an unwieldy process.

Targets and recommendations for 2018-2019 Fiscal period:
- An audit of LinkedIn users claiming to have worked with IMA, and reporting fraudulent affiliations to LinkedIn's Help Desk
- Deactivation of the LinkedIn page https://www.linkedin.com/company/institute-of-marine-affairs-tt
- Deactivation of www.twitter.com/imachag
- Exploring the use of social media for ways to convert engagement to income generation or cost reduction for the IMA
- Regular posting of in-house video productions for varied social media platforms

Internal relations
Monthly Internal Newsletters were sent to all users, electronically, highlighting staff achievements and involvement in external projects, and included attendance at seminars, training sessions and workshops. In keeping with the IMA's 'Going Green' initiative, efforts were made to reduce the use of paper by limiting the number of internal newsletters that were mounted on the notice boards on the compound.

IMA recognised First Peoples Holiday and Divali in the Auditorium on 11th October 2017. Brief presentations were delivered by the Librarian, Lorraine Barrow on the Santa Rosa First Peoples. Internal Auditor, Mrs. Reena Ramdass, explained the significance of the festival of Divali and light refreshments were shared to celebrate the occasion.

Retirement functions were held on 30 October 2017 on the IMA compound to recognise 38 years of yeoman service of Mrs. Lori Lee Lum, former Community Education Officer, and 27 years of dedicated service of Mrs. Maria Wyke, Personnel and Industrial Relations Officer, which was held on 25 October 2018.

The Mobile Unit of the National Blood Transfusion Service (Blood Bank) of Trinidad and Tobago visited the IMA on 11 December 2017 where some staff members donated blood in the Auditorium.

IMA's Christmas potluck brunch was celebrated on 14 December 2017 in the Auditorium with staff members sharing good will and cheer during the festive season.

A presentation on "Wetlands" was delivered by Dr. Rahanna Juman, Deputy Director of Research (Ag.) in the Auditorium on 2nd February in commemoration of World Environment Day.

In the spirit of improving employee morale and to recognise work-life balance, office celebrations were held to recognise and honour mothers and fathers at work. A surprise Mother's Day Celebration, organised by male staff of the Institute, was held on 11 May 2018 where refreshments were shared with all and tokens presented to female staff. Similarly, a surprise Father's Day lunch, organised by the ladies, was celebrated on 20 June 2018. Tokens were procured and presented to all male staff of the Institute.

IMA staff participated in the Ministry of Planning and Development's Sports and Cultural Club's 3rd Inter-departmental 5-A-Side Small Goal Football Competition on Saturday 4th August 2018. The IMA Stingrays, led by Captain Sean Carrington, played 5 games, winning 2 and drawing 3. Their victory against the Ministry of Planning and Development's Accounts/Human Resources Department was secured after a penalty shootout. They earned 1st place in the competition.

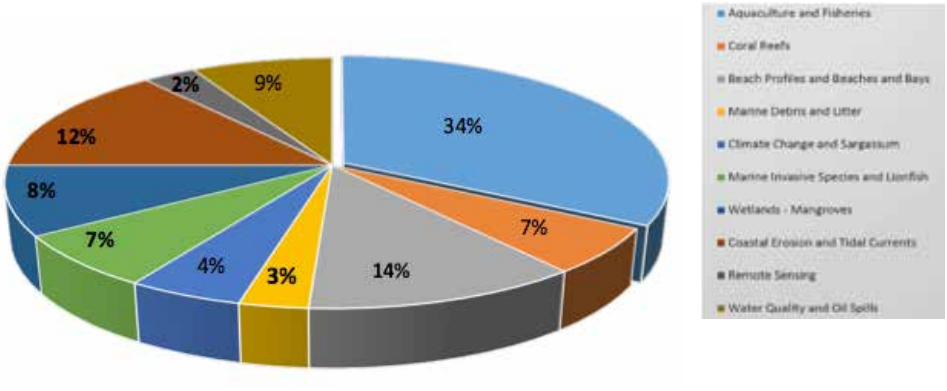
INFORMATION CENTRE - LIBRARY SERVICE UNIT

The Institute of Marine Affairs (IMA) Library continues to support the research programmes and support departments through the provision of a current and comprehensive information service and access to external information resources within a welcoming environment.
For the period under review, the Institute's website was upgraded to provide an online presence and interface with the public. This aspect of the website interface enabled a remote or virtual information service, which prompted and enhanced an active and committed response from the Library. All website queries were addressed within a twenty-four window. This subtle change in the enquiry and delivery of information via the online platform gradually transformed the Library to that of a partially virtual resource centre over the fiscal period. This section of the report documents the contributions made by the Library to advance the objectives of the Research Programmes and to the various goals of the Government's National Development Strategy – Vision 2030.

Library Services

Information Services - Over the last fiscal year 2017-2018, the IMA Library received a total of two hundred and forty (240) information requests, an almost 40% increase from the previous fiscal 2016-2017. The information requests comprised internal and external enquiries that were categorised as in person/footfall queries, e-mail requests, and website queries. All two hundred and forty information queries were satisfactorily filled by the Library of which two requests were filled by documents borrowed on interlibrary loan service. Out of the total of two hundred and forty (240) requests, seventy-six (76) persons visited the Library requesting information while seventy-one (71) e-mail requests were satisfactorily addressed via electronic mail. The average turnaround time for addressing each information request was four hours.
Interlibrary Loan Service - The Interlibrary loan service and the resource sharing arrangement have assisted the Library to acquire permanent access to useful and relevant journal articles that would enhance research output and ensure continued availability.

Figure 1. SUBJECT-RELATED ENQUIRIES Oct. 2017 – Sep. 2018



Subject-related enquiries comprised the following topics: aquaculture and fisheries; beach profiles and beaches and bays; coral reefs; marine debris and litter; climate change and sargassum and marine invasive species (Lionfish); wetlands; coastal erosion and tidal currents and remote sensing. As shown indicated in the following pie chart, the broad topic of Aquaculture and Fisheries was requested the most by library patrons.

Mounting of Exhibits and Displays - The IMA Library mounted exhibitions, which informed staff, in entertaining ways, on the significance of United Nations Commemorative Days of World Wetlands Day, World Biodiversity Day, World Environment Day and World Oceans Day. An exhibit was mounted to commemorate the national icons and unsung heroes for our 54th National Independence of the Republic of Trinidad and Tobago. Additionally, thirty-eight (38) newspaper articles, which were written by Staff and published in the Daily Express, Trinidad Guardian, Tobago Today and Tobago Newsday were mounted on Display Board in the Library. The topics ranged from marine litter, coral reefs, benthic communities, beaches and bays and coastal erosion.

Stakeholder Engagement via Information Dissemination - As articulated in Act No. 13 of 1990 of the Revised Laws of the Republic of Trinidad and Tobago, which is to disseminate an understanding of the importance of the marine and related environment, the Library disseminated a total of eighty-six IMA research reports, in a combination of print and electronic formats, to The University of the West Indies (UWI) Alma Jordan Library, and the libraries of the Ministry of Planning and Development, the University of Trinidad and Tobago (UTT) and the Environmental Management Authority (EMA). Of that amount, twenty (20) IMA Research Reports were shared with NALIS Library Headquarters in Port of Spain. The dissemination of these reports enables the Library to promote the transfer and availability of the Institute's research publications to the scientific community, government ministries, and state agencies and to non-governmental organisations. Other non-research publications, such as the two commemorative publications entitled, 'Coastal Reflections of Trinidad and Tobago: Celebrating 40 Years of Excellence 1978-2018' and 'Life along the Seashore of Trinidad and Tobago' were disseminated to stakeholders

Library Operations

Collection Development - In keeping with its goal to acquire, organise and preserve relevant print and electronic information resources to support and meet research needs and support department goals, one hundred and thirteen (113) publications were added to the Library's General and Special IMA Research Reports Collections, of which nineteen (19) items were downloaded and added to the collections. Twenty-eight (28) publications were digitiszed and thirty-one (31) items were downloaded from open-access peer-reviewed websites to meet and fulfil specific information requests from staff and the public. To further meet internal requests, five important scholarly e-resources were received via a resource sharing arrangement from The UWI – Alma Jordan Library, which were subsequently added to the collection. These five journal articles or e-resources helped to bridge the gaps in research materials in the Fisheries and Aquaculture Research Programme and based on their feedback, these e-resources were relevant and useful in their area of research. Two reports, which were borrowed via the Interlibrary Loan Service, were photocopied, scanned and added to the General Collection. Thirty-two (32) volume titles of the Red Law Books of Trinidad and Tobago, the Revised Laws of the Republic of Trinidad and Tobago were purchased and added to the Reference Collection. Newspaper Clippings – Because newspapers provide current local content that strengthens an information service, newspapers are marked for marine environment and related content. For the period under review, a total of 400 newspaper articles were captured and saved to relevant folders.

Despite the chronic budgetary constraints, the Library was able to add a few quality scientific publications to the existing collection. The provision of a comprehensive and current cache of information helps to enhance the collection, further the research objectives and stimulate the ongoing strategic planning of the IMA. The collection also supports Theme one of the Government of the Republic of Trinidad and Tobago's National Development Strategy – Vision 20130, which is entitled, 'Putting People First: Nurturing our Greatest Asset'. The collection provides guides and assists several school students studying Geography with their school-based assignments. It also benefits all five goals of Theme V of the Government of the Republic of Trinidad and Tobago's National Development Strategy, entitled, 'Placing the Environment at the Centre of Social and Economic Development through the provision of current and quality information in the subject areas of climate change, marine biodiversity, marine pollution and natural resources management.

Collection Management - Collection management refers to the cataloguing, classification and processing of publications. Forty-three (43) publications were catalogued, which added further value to each item resulting in ease of retrieval, reference and use and thereby achieving 70% of the target figure.

Collection Management: Preservation – As the Institute's 40th Anniversary falls within the dates of the period under review, a decision was taken to preserve and conserve all intellectual property of the IMA. A total of forty-four (44) publications comprising regional and national reports on the marine environment were digitised in archival quality. Fourteen (14) IMA Tidal Calendars from its inception in 2001 to 2014 were digitised and thirteen (13) IMA News, external newsletter, were also digitized for preservation significance of corporate and intellectual memory.

Table 1 on the following page provides key activities within Library operations for the period.

In keeping with the Government's National Development Strategy -Theme V- Placing the environment at the Centre of Social and Economic Development – current and relevant information was provided in a timely manner, which would indirectly help stakeholders, government ministries and state agencies to inform policy and decision making.

Table 1 Key Performance Indicators 2017-2018

Library Key Performance Indicators – 2017-2018			
Library Services – Activity	**Total**		
Circulation of IMA Publications	**63**		
Staff Users of the Library	**48**		
Queries Internal Queries - 64 External (in person) and Reference Queries - 76 E-mail Queries - 71 Website Queries - 29	**240**		
Data Requests	**12**		
Freedom of Information Requests	**1**		
Exhibitions Physical Displays - 5 Electronic Displays - 5	**10**		
Commemorative Publications sold			
Reprographics Services	**TTD $ 81.55**		
Library Space used for Meetings	**31**		
Library Operations – Activity			
New Publication (Gratis) Additions	**26**		
Downloaded publications	**87**		
Cataloguing and Classification of publications	**42**		
Digitization of IMA Research Reports and other publications	39		
Newspaper Clipping Articles	400		
User Feedback			
Assess the helpfulness and friendliness of Library Staff	**75%** very satisfied	**25%** satisfied	
Assess overall library service	**59.4 %** very satisfied	**37.5%** satisfied	**3.1%** partially satisfied
Assess the relevance and currency of content	**91%** satisfied	**9%** partially satisfied	

INFORMATION & TECHNOLOGY

SERVICE DELIVERY ENHANCEMENT
IT GOVERNANCE AND SERVICE EXCELLENCE
ASSET SECURITY AND PRIVACY
FUTURE PROJECTIONS
IT STRATEGIC ACTIVITIES AND INITIATIVES

The Information Technology Department (ITD) endeavoured and made progress in the appropriate deployment of technology to increase productivity, manage workflow and enable communications over the period under review. Consistent maintenance and modest improvements to the IT infrastructure were effected in order to grow an agile and resilient network. Despite financial challenges, the Department persevered to support organisational needs.

Projects were designed around specific areas namely;: Service Delivery Enhancement;and IT Governance Improvement; and Bolstering of Asset Security and Privacy. Service Delivery Enhancement is necessary to address any deficiencies in service quality through the development of a repository of knowledge assets to equip staff to function at optimum levels. The useful life of the IT infrastructure must be extended despite financial constraints. To this end a preventative maintenance programme was initiated, which was preceded by a procurement insights project that was developed to improve the transparency and management of the ordering process. These projects have contributed to an improvement in service delivery. wWith the addition of a knowledge repository, the management of order fulfilment and equipment health monitoring, and in-house servicing of computer systems, the IT Department is better poised to support the organisation.

IT Governance improvement programme focused on employing guiding principles and the ISO Model from ISO/IEC: 38500:2015 Standard to ensure that the IT resources are utilised appropriately and are capable of supporting organisational strategies and objectives. There was moderate success in the development and revision of the Standard Operating Procedures for IT through the implementation of server and client system maintenance. The preliminary work has been undertaken to facilitate IT Inventory Management and an interim system was deployed to obtain feedback prior to a bespoke system implementation. Data management initiatives were established to collate and safeguard current data as well as increase in the database tally and the population of nutrient and geology databases.
Asset Security and Privacy progamme focused on IT Disaster Recovery Planning, which has been subsumed under organisational Business Continuity Planning. A consultant was hired to address deficiencies with the network infrastructure and inherent risks have been mitigated. Proposals have been drafted and approved for the acquisition of a Storage Area Network (SAN) as well as repair of the building UPS which also supports the server room.

Initiatives
The IT Department was involved directly with support for research initiatives such as the Water Quality Buoy Monitoring Solution through procurement of a Cloud Platform Azure Cloud Subscription. IT Policies for Remote Access and Cellular Usage have been revised and have obtained approval. IT has jointly submitted Request for Proposals and assisted in the process of guiding the development of a new Website for the IMA.

Table 2 Good Governance and Service Excellence

Item	Initiatives	Support for Government Mandate	Foster IMA Research
1	Enhanced Service Delivery	All under Theme V	Increased Productivity Better Managed Workflows Good Communication infrastructure
2	IT Governance Improvement	Improved Environmental Institutional Arrangements • Strengthened institutional, policy and regulatory framework	Increased Productivity Better Managed Workflows Good Communication infrastructure
3	Asset Security and Privacy	All under Theme V	Increased Productivity Better Managed Workflows Good Communication infrastructure

Future Projections

The table below lists six anticipated strategic initiatives for the upcoming fiscal year

i. Digital Transformation through the implementation and upgrade of new and existing IT applications;
ii. The establishment of a productivity and project management information system;
iii. The creation of a general research database archiving platform;
iv. The expansion of the Institute's data storage capacity; and
v. A disaster recovery plan.

Table 3. Future ICT Initiatives

1	Digital Transformation through the Implementation and upgrade of new and existing IT Applications	Theme II: Sub Goal 2 The Public Service will have modern, effective, and efficient management systems	-Efficient and practical workflows to facilitate service delivery -Modernized Business Communication Infrastructure -Increased productivity -Improved collaboration across Departments -Promotion of Shared Services
2	Establishment of a Productivity & Project Management Information System	Theme II: Sub Goal 2 The Public Service will have modern, effective, and efficient management systems	-Improved organisational efficiency -Facilitate better project collaboration and coordination among Units -Provides Programme & Project Oversight to Executive on a macro and micro level
3	Creation of a General Research Database Archiving Platform	Theme II: Sub Goal 2 The Public Service will have modern, effective, and efficient management systems	-A common repository for IMA data -A searchable compendium of historical projects. -Improved access to information and historical resources. -Continuity and retention of organisation research data. -Improved IT data infrastructure.
4	The Expansion of the Institute's Data Storage Capacity	Theme II: Sub Goal 2 The Public Service will have modern, effective, and efficient management systems	-Provision of an environment to accommodate the increasing rate of data collection. -Secure and redundant data stores.
5	Disaster Recovery Plan	Theme II: Sub Goal 2 The Public Service will have modern, effective, and efficient management systems	-Improved BCP preparedness. -Protection of critical business processes & data. -Reduction of Risk impact to the organisation -Improved communication. A roadmap detailing roles and responsibilities of persons.
6	ICT Policy & IT Governance	Theme II: Sub Goal 2 The Public Service will have modern, effective, and efficient management systems	-Ensure the efficient and effective use of IT systems, processes and communication. -Better IT Security -Improved Communication to stakeholders -Positive changes in behaviour towards IT and thereby improving organisation culture -Improved accountability.

HUMAN RESOURCE MANAGEMENT

ORGANISATION CAPACITY AND STRUCTURE
TRAINING AND DEVELOPMENT
THE HUMAN RESOURCE DEPARTMENT

The human resource needs of this multi-disciplinary research institute are wide-ranging, requiring expertise in many different areas of specialty.

The core activity of the Institute, the Research, is divided into six thematic areas namely – Oceanography, Biodiversity, Legal and Policy, Environmental, Fisheries and Aquaculture and Marine Chemistry, with each programme requiring research scientists in different areas of expertise. There are five departments which support the research activity including Human Resources, Information Technology, Information Centre, Finance and Administration, Technical & Support Services, each department requiring different kinds of expertise at varying levels of competence.

In years past, the Institute has endeavoured to recruit the required skills and competencies to conduct its various activities. Vacancies have been advertised both locally and regionally via the Internet and sometimes recruitment agencies have been engaged to assist in recruiting management level staff. In the main, the Institute has had little or no difficulty recruiting suitable candidates for the non-research positions although some difficulty has been experienced in acquiring the required expertise in the area of Finance and Administration.

The nature of the work requires that the IMA recruit persons with a research degree that is Master of Philosophy (M.Phil.) or Doctor of Philosophy (Ph.D.). However, because of the scarcity of suitable graduates, candidates with M.Sc. degrees have been hired. Candidates with M.Sc. degrees are generally less experienced in research methodologies.

Organisation Capacity and Structure

The Institute of Marine Affairs has a staff complement of eighty-seven (87) employees.

Figure 2 STAFF COMPLEMENT BY DEPARTMENTS AS AT OCTOBER 23, 2018

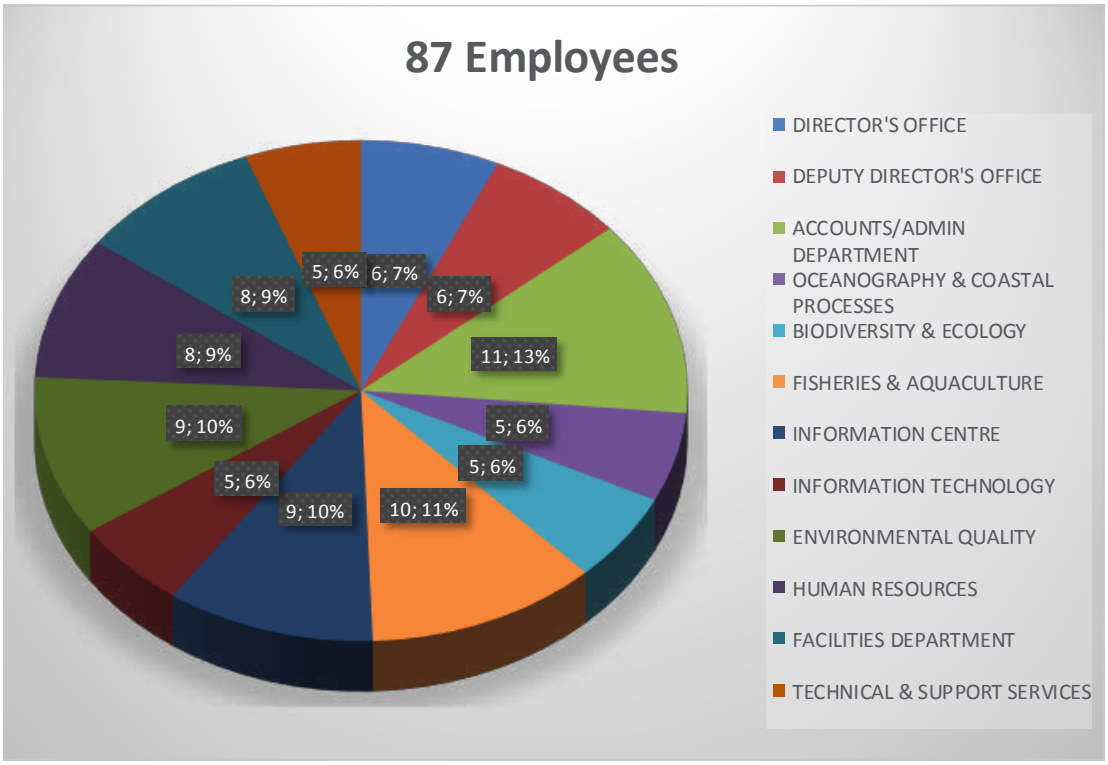
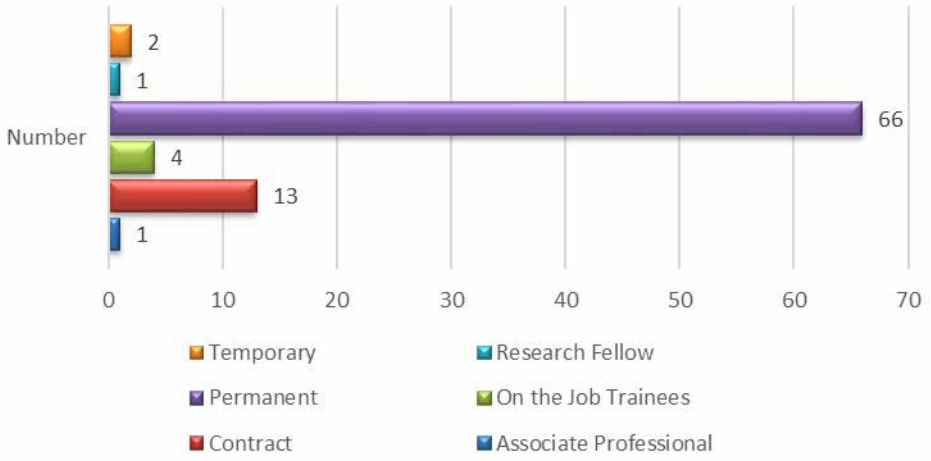


FIGURE 3: CATEGORY OF STAFF

Further, the Institute of Marine Affairs will be providing placements for returning national scholars under the



Associate Professionals Placement Programme of the Ministry of Education in the following areas:

1. Marine Biology - Coral Reef Ecology
2. Marine Biology - Wetlands Ecology
3. Fisheries Biology – Aquaculture/Mari culture
4. Physical Oceanography
5. Socio-Economics
6. Chemistry – Environmental/Analytical Chemistry

The IMA will assign members of the senior research team to mentor and train suitably qualified returning national scholars in order provide them with both the theoretical and practical work experiences necessary for them to develop into researchers and applied scientists, in their own right. The IMA is currently seeking to retain one of the returning national scholars, who is the holder of a Ph.D. in Marine Biology with specialisation in coral reef ecology who will be an asset to the IMA's current work programme in coral reef research in Tobago.

Training and Development

In a bid to meet the needs for the various specialised skills, the Institute has established a Research Training Programme. The objective of the Research Training Programme is to provide opportunities for young professionals to receive training in methods of scientific research under the expert guidance of the Institute's marine scientists in the various fields of marine science and technology.

It is the expectation of the Institute that these young men and women would acquire the necessary research skills and training in the marine environment and so provide a pool of possible candidates from which the Institute could select skilled scientists for employment.

These research-training opportunities are offered through the Internship Programme and Research Fellowship Programme to university students whose interests are to pursue a higher degree in topics relevant to marine science or topics that are aligned with the works or mandate of the Institute.

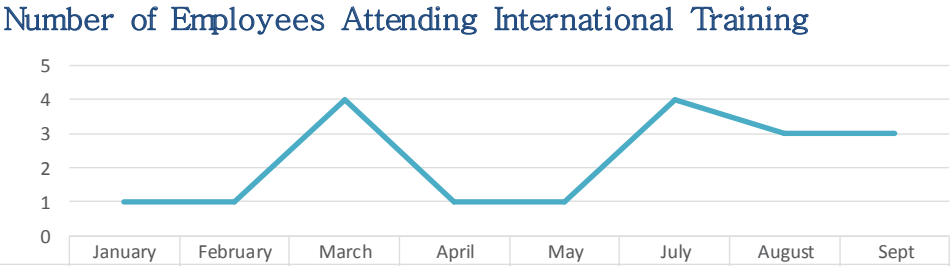
Internship Programme: University students pursuing first degree or postgraduate degree in a relevant field of study are given a short-term attachment at the IMA, normally for three months. During this time the intern will receive training in various research methodologies within a specified research programme based on their area of study.

Research Fellowship: The Institute offers registered university students a two-year Fellowship Award to pursue a higher research degree (M.Phil. or Ph.D.) in a field relevant to the research work of the IMA. The student is jointly supervised by the IMA and the university and is given the opportunity to participate in

other research areas at the Institute. The Institute provides a stipend and the funding necessary for field and laboratory work. In return the Institute would receive all research data, reports and papers submitted by the Fellow on the research conducted. Patents received on arising from the work conducted at the Institute must be duly acknowledged as are any publications in scientific journals and other scientific industry news or papers.

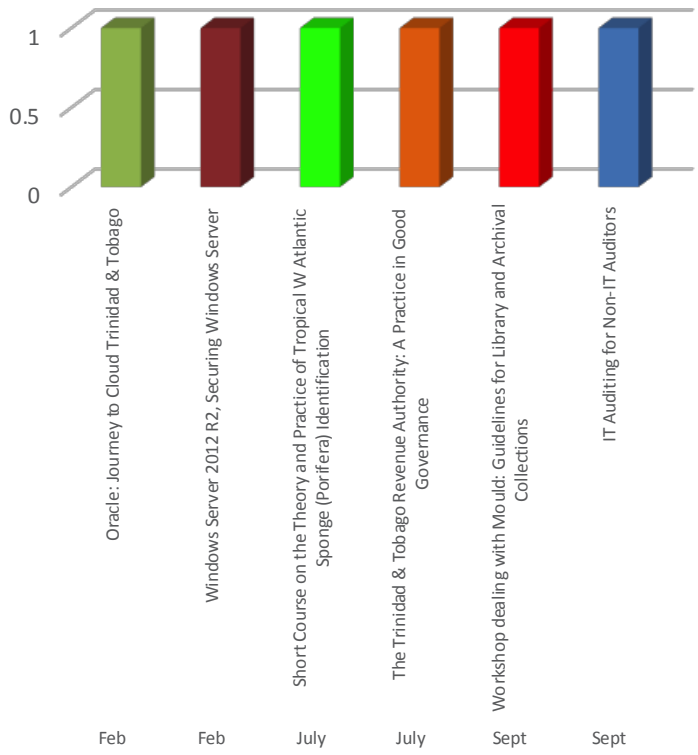
For these programmes to be successful, we must have highly skilled and experienced scientists available to provide guidance and encouragement. The training programmes have been relatively successful in providing research candidates in various fields of marine research and in the non-research support areas.

Training and development also present an opportunity to expand the knowledge base of all employees as it provides both the individual and the organisation benefits that make the cost and time worthwhile. The return on investment from training and development of employees is maximised once the organisation develops pathways to put the new information to use. The Institute of Marine Affairs (IMA) strives to be the premier marine research organisation in the Caribbean, and training and development is among the strategic pathways identified to achieve that goal. The organisation must be relevant and abreast with today's technological advancements especially in the fields of Information Technology and marine scientific research. We strive to ensure that our staff are afforded the opportunity to attend training workshops or conferences in order to educate, inspire critical and constructive thinking and possible adaptation of new ideas where relevant.

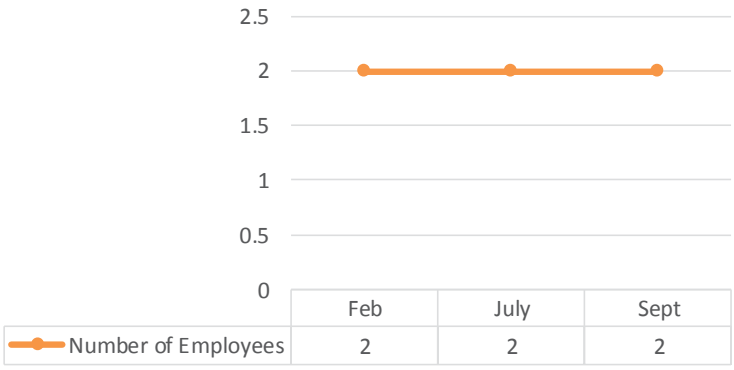


	January	February	March	April	May	July	August	Sept
Number of Employees	1	1	4	1	1	4	3	3

Local Training Attended



Number of Employees Attending Local Training



The Human Resource Department endeavours to ensure that the IMA has experienced personnel on board, who are interested in ensuring that the Institute is in alignment with the IMA's Act and the Government's Vision 2030 Policy Document to execute our research mandate in accordance.

RESOURCE MANAGEMENT: Operations

INTRODUCTION

The work of the Operations Department is undertaken by two Sections: Facilities and Technical and Support Services.

The Facilities Department provides and maintains the equipment and machinery to support the research being conducted by the Institute. The Department also maintains the Institute's grounds and offices. For the period under review a complement of six staff performed the functions and services in the Facilities section and another four in the Technical Support Service section in support of the research at the IMA:

- 2 Groundsmen - (Mr. Maurice Andrews and Mr. Garvin Seegobin);
- 1 General Craftsman - (Mr. Dennis Carter)
- The Institute is functioning with one craftsman less than required;
- 1 Electrician - (Mr. Derick Gomez);
- 1 Clerk/Typist - (Ms. Kamini Ramkhelawan) Ms. Ramkhelawan pursued the Diploma in Management for Administrative Professionals at ROYTEC for one (1) year which ended in August 2018.
- 1 Operations Manager - (Lt Sonny Jitta)

The Operations Manager assumed duties on 1 October 2018
For the period under review, the Facilities Department had oversight for the finalisation of a few projects namely:

1. Flood Alleviation works by completed by the following firms; Triple E Building,; WSP; and individual contractor, Lester James;
2. Regularisation of IMA Water Supply;
    i. The regularisation of the sewage connection with the Water And Sewage Authority (WASA).
    ii. A licensed plumber is to be retained to register the IMA's sewage connection and the IMA will consult with the Chaguaramas Development Authority (CDA) official drawings for the area which display WASA stamps.
    iii. The well pump was replaced
1. Building Maintenance and Upgrades
    ii. The Auditorium upgrade was completed;
    iii. v. Drainage works were completed;
    iv. Operations Department assisted in the preparation of State of the Marine Environment (SOME) report.
    v. Quotations from Peake Technologies received for split systems for the Research Building.
    vi. viii, Glass doors for entrance to the B5 building were repaired
    vii. Quotations for the fumigation on the B5 received
    viii. Deputy Director's office was returned to a state of functionality.
    ix. Shed for research project on oysters was completed.
    x. Repairs to security/perimeter lighting on the eastern side of the compound were completed.
    xi. Ceiling works in the HR offices were completed

Chiller and Freezer maintenance in the Research Building is covered by a service agreement for one year with Mecalfab, this will end in August 2018.

Aquaculture well is usually serviced every other year. This service was carried out in January 2018 by Water and Oil Well Services.

The Operations Department is responsible for supplying the Institute with potable water as well as ensuring that all coolers are sanitised.
A total of 132 requests were recorded and completed using the Operations Department Helpdesk The unit

also maintains the following contracts for important repairs and service:

- Air-conditioning maintenance (Research Building)-service provider was Peake Technologies.
- All other areas air-conditioning were maintained by service provider, Temperature Solution Ltd.
- Grounds maintenance were provided by the Alan Alexander General Maintenance Services.
- Passenger Elevator Maintenance was provided by Caribbean Lifts Limited

The following firms also provide service to the Institute.

- Grounds & R.V. Kanawa Generators-SAVCO Power Limited
- General Pest Control-Pest Off Ltd-
- General cleaning/Janitorial services Interior Cleaning Services Ltd.
- Security Services-PPL Security

Finally, the Chiller system for the Research Building continued to be a challenge as this system is outdated and subjected to the problem of voltage fluctuation in the Chaguaramas area. There have been numerous breakdowns and downtime reported for this recurring problem. Solutions were considered, specifically the option of putting the system on the generator;

There were several electrical problems in the Accounts and Information Centre buildings, which were resolved using in-house labour and procurement of electrical materials. Additionally, a consultant is assisting the Department in conducting an electrical audit;

Technical and Support Services

The Technical and Support Services Department staff consists of:

2 Launch Captains, Mr. Ronald Robinson and Mr. Andre Warren who is currently on a one-year contract after replacing the late Mr. Ruskin Cummings. The contract expired in November 2018.

1 Launch Engineer, Mr. Mark Pierre.

The Institute is currently operating without a consistent Seaman II (Deckhand) as Mr. Derry Juman's temporary tenure came to an end in November 2017. He however, remained on call when exercises were scheduled.

1 Auto Mechanic, Mr. Christopher Superville. The IMA has mechanic who has upgraded his skillet with a Diploma in Supervisory Management.

The maintenance of the IMA fleet of vehicles fall under the purview of the mechanic

TABLE FLEET MAINTAINED BY IMA OPERATIONS DEPARTMENT

1			Mazda	B2500 Pick Up	TBZ 4737
2			Mazda	BT-50 Pick Up	TCF 1840
3			Mazda	BT-50 Pick Up	TDH 7658
4			Mazda	BT-50 Pick Up	TDH 7659
5			Nissan	X-Trail	PBZ 4582
6			Nissan	Wingroad	PBX 8909
7			Nissan	Panel Van	TCF 516
8			Nissan	Civilian Passenger Bus	TBJ 1599
9			Toyota	Hilux	TCX 5579
10			Toyota	Hilux	TCX 5580
11			Nissan	Frontier	TDM 1928

The following vehicles will be up for auction in 2018:

TBR 4966-Mazda B2500 Pick Up

TBR 4967-Mazda B2500 Pick Up

TBZ 5770-Mazda B2500 Pick Up
The Massey Ferguson Tractor -TAP 7261

Annual inspection of all vehicles takes place in the months of March and April and the Institute prepared the following vessels for 2018 inspection. At present, the fleet of seaworthy vessels include:

1. R.V. PELAGICA
2. M.L. KANAWA
3. MAKO 25
4. YAMAHA SX-210. This vessel was gained as an exchange for our Boston Whaler by the Forestry Division.
5. MUDSKIPPER and Trailer.
6. Annual licenses were also due in April of each year for vessels and trailers.

FINANCE & ADMINISTRATION

BALANCE SHEET
INCOME STATEMENT
CASHFLOW STATEMENT
INCORPORATION ACTIVITIES AND ACCOUNTING POLICIES
NOTES TO FINANCIAL STATEMENTS

UNAUDITED FINANCIAL STATEMENTS FOR THE YEAR ENDED SEPTEMBER 30, 2018

INSTITUTE OF MARINE AFFAIRS

UNAUDITED BALANCE SHEET

As at 30 September 2018

	2018	2017
	TT$	TT$
ASSETS		
Non-Current Assets		
Fixed Assets	42,510,556	44,350,409
Total Non-Current Assets	42,510,556	44,350,409
CURRENT ASSETS		
Cash and bank	14,326,888	14,995,439
Investments	28,394,053	28,165,247
Accounts Receivable	295,089	89,352
Goods in Transit	1,181,077	347,669
VAT	166,358	166,932
Prepayments & Other Assets	3,674,072	3,807,067
Total Current Assets	48,037,537	47,571,706
TOTAL ASSETS	**90,548,093**	**91,922,115**
EQUITY AND LIABILITIES		
Revaluation Reserve	531,918	-
Retained Earnings	31,469,144	31,752,404
	32,001,062	31,752,404
Non-Current Liabilities		
Pension Plan Liability	341,873	341,873
Deferred Income	55,991,412	57,191,412
Retentions	1,163,688	1,163,688
Total Non-Current Liabilities	57,496,973	58,696,973
Current Liabilities		
Accounts Payable	320,498	664,791
Accruals & other Liabilities	729,560	807,947
Total Current Liabilities	1,050,058	1,472,738
TOTAL EQUITY & LIABILITIES	**90,548,093**	**91,922,115**

INSTITUTE OF MARINE AFFAIRS

UNAUDITED STATEMENT OF INCOME AND EXPENDITURE

For the year ended September 30, 2018

	2018	2017
	TT$	TT$
INCOME		
Government Funds	25,761,658	23,935,757
Interest	346,819	328,989
Gain/Loss on Foreign Exchange	4,706	16,411
Gain/Loss on Asset Disposal	33,256	-
Non-Government Income	216,738	153,273
Total Income	**26,363,177**	**24,434,430**
EXPENDITURE		
Salaries & Related Cost	16,081,021	15,648,460
Administrative Expenses	4,031,948	4,181,029
Maintenance & Repairs	1,490,979	1,843,486
Research Expenses	1,211,435	1,515,559
Audit fees	100,913	100,913
Board remuneration	369,432	101,572
Depreciation Expense	3,227,245	3,819,848
Total Expenses	**26,512,973**	**27,210,867**
Surplus (Deficit) for the period	**(149,796)**	**(2,776,437)**
OTHER COMPREHENSIVE INCOME		
Unrealized Gain/Loss on Investment	(133,466)	(9,478)
Pension Plan Adjustment	-	(830,318)
Total Comprehensive Income	**(283,262)**	**(3,616,233)**

INSTITUTE OF MARINE AFFAIRS

UNAUDITED STATEMENT OF CHANGES IN EQUITY

September 30, 2018

	2018	2017
	TT$	TT$
Retained earnings brought forward	31,752,404	35,368,630
Loss for the period	(283,262)	(3,616,226)
Retained earnings carried forward	31,469,135	31,752,404

INSTITUTE OF MARINE AFFAIRS

CASH FLOW STATEMENT

For the year ended September 30, 2018

	2018	2017
OPERATING ACTIVITIES	**TT$**	**TT$**
Deficit for the period	(283,262)	(3,616,233)
Adjustments:		
Depreciation	3,227,245	3,819,855
Unrealized (Gain)/Loss on Investments	133,466	9,478
(Gain)/Loss on Asset Disposals	(33,256)	-
Transfers to Deferred Income	(4,200,000)	(1,710,757)
(Increase) Decrease in Pension Plan Asset	-	830,318
Unrealized Foreign Currency (Gain) /Loss	(4,706)	(16,411)
Dec. /(Inc) in Trade and Other Receivables	(905,576)	100,343
Increase/(Decrease) in Creditors/Accruals	(422,680)	579,306
Net Cash used in Operating Activities	(2,488,769)	(4,101)
INVESTING ACTIVITIES		
Capital grants received	3,000,000	510,757
Purchase of Fixed Assets	(862,257)	(684,271)
Proceeds from disposal of Assets	40,041	-
Net cash flow provided by Investing Activities	2,177,784	(173,514)
FINANCING ACTIVITIES		
Unrealized Foreign Currency Gain/Loss	4,706	16,411
Unrealized (Gain)/loss on Investments	(133,466)	(9,478)
Net cash flow used in Financing Activities	(128,760)	6,933
Net Increase/(Decrease) in cash equivalents	(439,745)	(170,682)
Cash Balance at Beg. of period	43,160,686	43,331,368
Cash Balance at End of Period	**42,720,941**	**43,160,686**
Represented by:		
Cash at bank	14,326,888	14,995,439
Investments	28,394,053	28,165,247
	42,720,941	**43,160,686**

INSTITUTE OF MARINE AFFAIRS
Notes to the Financial Statements for the year ended September 30, 2018

1. INCORPORATION ACTIVITIES

The Institute was established by an Act of Parliament of Trinidad and Tobago on 10th May 1976, Chapter 37:01 of the Laws of the Republic of Trinidad and Tobago refers. This Act was amended by Act #13 of 1990.

The principal activities are:

a. to develop and implement programmes and projects that translate the marine and related policies of the Government into activities that contribute to national development;
b. to develop and execute programmes and projects that foster and encourage regional and international collaboration in the exploitation of the marine and other related areas of the environment;
c. to promote a public understanding of and appreciation for all aspects of the marine and related environment;
d. to stimulate and advance the conduct of marine scientific research in Trinidad and Tobago;
e. to promote the utilisation and conservation of the marine resources for the economic and social benefit of Trinidad and Tobago and to enhance the national capabilities;
f. to do all such things as are incidental or conducive to the attainment of the above objects.

2. REPORTING CURRENCY

The financial statements are expressed in Trinidad and Tobago dollars.

3. SIGNIFICANT ACCOUNTING POLICIES

a. Accounting Convention
The financial statements are prepared under the historical cost convention and in accordance with approved accounting standards. No account is taken of the effects of inflation.

b. Accounts Receivable
Accounts receivable are stated net of provision for bad and doubtful debts. The Institute has made a provision for doubtful debts of approximately 3% of debtors in the year ended 2018.

c. Fixed Assets
Fixed assets are depreciated at rates estimated to write off the depreciable amounts to the fixed assets over their useful lives.

The annual depreciation rates used are: -

Category	**Method**	**Rate**
Buildings and improvement works	Straight line	2%
Plant and machinery	Reducing balance	10-25%
Computer Equipment	Reducing balance	33%
Furniture and fittings	Reducing balance	10%
Marine vessels	Reducing balance	25%
Motor vehicles	Reducing balance	25%
Reference and resource materials	Reducing balance	10%

d. Income
The Government of Trinidad and Tobago funds most of the operations of the Institute by means of monthly subventions. These are recognized on a cash basis and credited to income.

e. Deferred Income
Grants from Government, related to the purchase of fixed assets, are deferred and credited to revenue over the useful life of the assets concerned.

f. Taxation
The Institute may be exempted from the payment of, or the Government shall bear the cost of any taxes, customs duties, fees or levies which may be imposed on the Institute in respect of any equipment, materials and supplies imported into Trinidad and Tobago by the Institute which are essential for its operations.

g. Foreign currency
Transactions involving foreign currencies are converted at the rates prevailing on the dates of such transactions. Monetary assets and liabilities are translated at the rate prevailing at the Balance Sheet date. Exchange gains and losses are taken directly to the Income and Expenditure Account.

INSTITUTE OF MARINE AFFAIRS

Notes to the Financial Statements for the year ended September 30, 2018

4. FIXED ASSETS

Property, plant and equipment	LAND & BUILDINGS	CAPITAL WORK IN PROGRESS	MOTOR VEHICLE	PLANT & MACHINERY	REFERENCE & RESOURCE	FURNITURE & FIXTURES	TOTAL
Year ended 30 September 2017							
Opening book value 2017	31,696,285	1,019,360	476,719	8,266,356	212,173	2,679,514	44,350,409
Additions				857,431		4,826	862,258
Disposals			(584,372)	(1,254,888)			(1,839,260)
Revaluations			110,000	588,000			698,000
Depreciation on Disposal			575,406	1,090,987			1,666,393
Depreciation charge	(785,292)		(118,580)	(2,033,305)	(21,525)	(268,543)	(3,227,245)
Closing net book value	**30,910,993**	**1,019,360**	**459,175**	**7,514,581**	**190,648**	**2,415,797**	**42,510,556**
At 30 September 2018							
Accumulated Cost	39,584,831	1,019,360	1,915,575	44,800,302	1,259,545	5,998,661	94,578,276
Revaluation							
Depreciation							
Accumulated depreciation	(8,673,839)		(1,456,400)	(37,285,720)	(1,068,897)	(3,582,864)	(52,067,720)
Net book value 2018	**30,910,993**	**1,019,360**	**459,175**	**7,514,581**	**190,648**	**2,415,797**	**42,510,556**
Year ended 30 September 2017							
Opening book value 2016	32,485,173	1,019,360	635,626	10,471,362	237,172	2,637,292	47,485,985
Additions				354,957		329,315	684,273
Disposals				(3,590,650)		(4,668)	(3,595,318)
Revaluations							
Depreciation on Disposal				3,590,651		4,668	3,595,319
Depreciation charge	(788,888)		(158,906)	(2,559,964)	(24,999)	(287,092)	(3,819,848)
Closing net book value	**31,696,285**	**1,019,360**	**476,719**	**8,266,356**	**212,173**	**2,679,514**	**44,350,409**
At 30 September 2017							
Accumulated Cost	39,584,831	1,019,360	2,389,946	44,609,758	1,259,545	5,993,835	94,857,276
Revaluation							
Accumulated depreciation	(7,888,547)	-	(1,913,226)	(36,343,402)	(1,047,372)	(3,314,321)	(50,506,868)
Net book value 2017	**31,696,285**	**1,019,360**	**476,719**	**8,266,356**	**212,173**	**2,679,514**	**44,350,409**

APPENDIX 1

INFORMATION CENTRE
DETAILS OF PUBLIC EDUCATION AND OUTREACH ACTIVITIES

INSTITUTE OF MARINE AFFAIRS
Notes to the Financial Statements for the year ended September 30, 2018

5. PENSION PLAN LIABILITY

The Institute's pension plan is a defined benefit plan. The plan is operated by virtue of a Trust Deed made on 8th June 1990 between the Institute of Marine Affairs and the Trustees of the Plan. The assets supporting the Plan are invested through a Deposit Administration Policy with an insurance company.

Effective 1st October 1999, the Institute adopted the provisions of International Accounting Standard 19 Employee Benefits (IAS 19) (Revised). It treated with the transitional asset as an adjustment to the opening retained earnings of that period because it was impracticable to restate the comparative information of prior periods.

6. ADMINISTRATION

Included in Administration expenditure is the cost attributable to a thirty (30) year lease agreement between Chaguaramas Development Authority (CDA) and the IMA. This lease is an operating lease and provides for an annual rent of $14,850 over the total period of the lease.

Information Centre
Details of Public Education and Outreach Activities
October 2017 – September 2018

School visits to the Library and Tours of the Aquaculture Facility and Laboratories:

La Horquetta Government Primary.
2 October 2017.
80 student Aquaculture Facility..

Bishop Anstey High School
11 October 2017.
35 students were assisted by the Geology Department on their field trip at Las Cuevas and information on coastal conservation and climate change was discussed.

College of Science, Technology and Applied Arts of Trinidad and Tobago (COSTAATT)
23 October 2017.
6 students received a presentation on 'Eutrophicication' along with a tour of the Aquaculture Facility and Marine Chemistry Laboratories.

The University of the West Indies (UWI). Life Sciences, Science and Technology (BIOL 3970)
10 November 2017.
33 students toured the IMA's Aquaculture Facility.

Santa Rosa Government Primary
30 November 2017.
73 students toured the IMA's Aquaculture Facility.

College of Science, Technology and Applied Arts of Trinidad and Tobago (COSTAATT)
5 December 2017.
12 students toured the IMA'S of the Marine Chemistry Laboratories.

School of Veterinary Medicine, The University of the West Indies (UWI) Aquatic Animal Health Externship
11 January 2018.
10 veterinary students toured the IMA's Aquaculture Facility.

Guaico Presbyterian Primary School
17 January 2018.
60 students received a presentation on "Mangroves".

Bishop Anstey Junior School
6 February 2018
58 students and teachers received a presentation on "Food Webs & Chains/Mangroves" and participated in a tour of the IMA's Aquaculture Facility.

University of the West Indies - Diploma in Agriculture (Aquaculture course)
15 February 2018.
6 students toured the IMA's Aquaculture Facility.

Aranguez TIA Primary School
15 February 2018.
51 students and adults received a presentation on 'Mangroves' and an Aquaculture Facility tour.

University of Trinidad and Tobago (UTT)
20 February 2018.
12 students received a tour of the Aquaculture Facility The students learnt about the current projects and operations of the Aquaculture Facility and assisted with field work to gain practical experience.

Maria Regina Primary School
22 February 2018.
72 students received a presentation on 'Coral Reefs' and an aquaculture tour.

Maracas SDA Primary
15 March 2018.
42 students and teachers students received a presentation on "Coral Reefs" and received a tour of the Aquaculture Facility

The University Primary
23 March 2018.
57 students received a presentation on "Ocean Services" and a tour of the Aquaculture Facility.

University of Trinidad and Tobago (UTT)
8 March 2018.
5 M.Sc. students received a tour of the Aquaculture Facility.

Abbytopia of Hope vacation camp
10 April 2018.
30 children and adults visited the IMA for a presentation on "Coral Reefs" and received a tour of the Aquaculture Facility.

UWI Veterinary School.
7 June 2018.
12 students with focus on 'Aquatic Animal Health' visited the IMA's Aquaculture Facility.

Shift Caribbean and CNIRD/Marine Environment Education Programme TT (MEEPTT).
17 July 2018.
Approximately 18 students and 11 adults visited the IMA compound and received a presentation on "Marine Pollution" followed by a tour of IMA's aquaculture facility. As part of the marine debris awareness campaign with MEEPTT, a clean-up activity was carried out at Hart's Cut where 319 pounds of garbage were collected, filling 31 garbage bags during the one hour clean up activity.

Sacoda Serve/STEM vacation camp
25 July 2018.
34 students and adults visited the IMA for a presentation on 'Marine Pollution' and received a tour of the Aquaculture facility. Various types of equipment used in IMA's research were showcased and explained to the students. Equipment included the Ekman Grab, Refractometer, Plankton tow net, Secchi disk, Kemmerer bottle, YSI metre, Dan kit and Buoyancy Control Device (BCD).

Sacoda Serve/STEM vacation camp
6 August 2018
Presentation on "Marine Pollution/Beating Plastics" was delivered, along with a tour
Aquaculture Ffacility with 39 visiting students and adults. Various types of equipment used in IMA's research was showcased and explained to the students.

Church Deliverance of God vacation camp
17 August 2018
The group of 47 students and adults received a presentation on 'Coral Reefs' and a tour of the n Aaquaculture Facility

SCHOOL OUTREACH

ASJA Boys San Fernando's Career Fair
17 October 2017.
IMA participated at a Career Fair with 170 students visiting the booth and learning about possible careers in the field of marine sciences.

Fyzabad Secondary School's Career Day
23 November 2016.
85 students and teachers received information on 'Careers in Marine Sciences' through presentations delivered.

ASJA Girls Secondary School, Barrackpore's Science Fair
18 January 2018.
IMA participated at a Science Fair with 70 students visiting the booth and learning about possible careers in the field of marine sciences.

Belmont Boys' Secondary School's Career Day
1 sMarch 2018.
Approximately 60 students received presentations on Careers in Marines Sciences.

Five Rivers Secondary School's Career Day
14th. March 2018.
IMA participated by engaging approximately 122 students and informing them about Careers in Marines Sciences.

Holy Faith Penal Secondary School's Career Day
20 April 2018.
IMA participated by engaging approximately 110 students and informing them about Careers in Marines Sciences.

Lower Cumuto Primary school
May/June 2018
Presentations on Marine Mammals and Coral Reefs. Approximately 25 students were engaged and received presentations from IMA staff.

Arima West Primary School.
11 May 2018.
Outreach session was carried out at UTT, Chaguaramas Campus. Over 106 students and adults were engaged by IMA staff.

Cowen Hamilton Secondary School
12 May 2018.
Under the STEM Programme. 30 students were engaged by an IMA researcher, receiving a presentation on Careers in Marine Sciences.

Iere High School's (SBA) Geography field trip.
18 May 2018.
IMA provided assistance through the Geology Department, assisting approximately 45 students.

Bishop's Anstey High School's Career Day.
24 May 2018.
Outreach session engaged approximately 15 students, sharing information about possible Careers in Marine Sciences.

Parvati Girls Hindu College – Debe World Environment Day Celebration.
5 June 2018.
245 students received presentations on "Marine Pollution, Plastics and Microplastics".

Community Outreach/Information Dissemination

Sea & Me Project 2018

The fifteenth year of the Sea and Me Project (Carenage and Pt. Cumana) Schools began on 8th May 2018 and ended on 6th June 2018. The project involved 67 Standard Five Post SEA students of the four primary schools in Carenage and Point Cumana. Topics covered were Water Education, Marine Mammals, Coral Reefs and Water Safety. The second year of the Sea & Me 2018 (Sangre Grande) was held with the Sangre Grande Seventh Day Adventist Primary School. Outreach sessions were carried out from 9 - 28 May 2018. A total of 60 students participated in the Sea & Me (Sangre Grande) Programme.

Marine Environment Education Programme Trinidad and Tobago (MEEPTT)

IMA entered into a collaboration with the Caribbean Network for Integrated Rural Development (CNIRD) and GEF UNDP for a new project entitled Marine Environment Education Programme Trinidad and Tobago (MEEPTT). The awareness campaign was developed to educate school children about marine debris and the ways that we can prevent it. The first educational awareness session was held on 26th January 2018, with 37 secondary students from Diego Martin Secondary School and South East Port of Spain Secondary, followed by a beach cleanup and data collection exercise at Hart's Cut. A total of 2731 pieces of garbage were collected, weighing over 115 pounds.

A second session was held on 21 January 2018 at the IMA, with 41 secondary school students from St. Anthony's College and Bon Air High School followed by a beach clean -up and data collection exercise up at Hart's Cut. A total of 1312 pieces of garbage were collected, amounting to 26 filled garbage bags, weighing over 87 pounds.

The third session was held on 1st May 2018 at the IMA, with 40 secondary school students and 4 teachers being engaged from Corpus Christi Secondary and Mucurapo West Secondary. IMA's collaboration with the Caribbean Network for Integrated Rural Development (CNIRD)/ GEF UNDP's project "Marine Environment Education Program Trinidad and Tobago (MEEPTT)" continued the marine debris awareness campaign. The presentation was followed by a beach clean-up and data collection exercise up at Hart's Cut. A total of 1967 pieces of garbage were collected, amounting to 33 filled garbage bags, weighing over 321 pounds.

APPENDIX 2

NEWSPAPER ARTICLES/MEDIA RELEASES

Henry, Tyann. "Royalty of the Sea – The Queen Conch". Tobago Newsday, 2017, 5 October.

Juman, Rahanna. "Water Quality Buoy for Gulf of Paria" Trinidad Express, 2017, 19 October.

Juman, Rahanna. "IMA Deploys Water Quality Buoy in the Gulf". Trinidad Express, 2017, 2 November.

Juman, Rahanna. "Deployment of the Water Quality Buoy in Claxton Bay Gulf of Paria". Trinidad Guardian. 2017, 5 November.

Barrow, Lorraine. "Promoting Marine and Coastal Awareness". Tobago Newsday, 2017, 7 November.

Banjoo, Darryl. "What we need to know about Oil Fingerprinting". Trinidad Express. 2017, 9 November.

Barrow, Lorraine. "Promoting Marine and Coastal Awareness". Tobago Today, 2017, 10 November.

Kanhai, Attish. "Was Sabastian the Crab an Invasive Organism?" Trinidad Express. 2017, 16 November.

Seemungal, Ryan. "Building digital relationships" Trinidad Express. 2017, 30 November.

Kanhai, Attish. "Christmas Trees and Coral Reefs : What's the Link" ? Trinidad Express, 2017, 21 December.

Barrow, Lorraine. "10 Green Corporate Resolutions for 2018" Trinidad Express. 2018, 18 January.

Juman, Rahanna. "Conserving our wetlands". Trinidad Express, 2018, 1 February.

Solomon, Farahnaz . "By-catch – a Global Problem". Trinidad Express, 2017, 15 February.

Kanhai, Attish. "The Power is Yours in Combating Climate Change". Trinidad Express, 2018, 1 March.

Barrow, Lorraine. "From Caroni to Pointe – a – Pierre : Conserving our Marine Environment ". Trinidad Express, 2018, 22 March.

Amoroso, Rachael. "International Year of the Reef…Resilience to impacts of climate change" Trinidad Express, 2018, 26 April.

Barrow, Lorraine. "IMA Marks 40th Anniversary with Series of Lectures." Trinidad Express, 2018, 15 May.

Barrie, Alicia. "Marine Pollution: the Benefits of Recycling." Trinidad Express, 2018, 31 May.

Mohan, Jeunisse. "The Plastic Problem". Trinidad Express, 2018, 7 June.

Mohan, Jeunisse . "Every Bit of Plastic ever made Still Exists". Tobago Newsday, 2018, 7 June.

Ramoutar, Sheldon. "Using Microbes to Clean up Oil Spills." Trinidad Express, 2018, 14 June.

Solomon, Farahnaz. "Fish Kill vs Fish Dump." Trinidad Express, 2018, 28 June.

Ramoutar, Sheldon. "Be Safe at the Beach." Trinidad Express, 2018, 12 July.

Kanhai, Attish. "The Untold Story of the Saharan Dust." Trinidad Express, 2018, 26 July.

Henderson, Laura-Ashley. "Benthic Organisms - Fascinating Facts." Tobago Newsday, 2018, 6 September.

Hassanali, Kahlil. "Striving for the Sustainable Use of World Oceans." Trinidad Express, 2018, 13 September.
Henderson, Laura-Ashley. "Benthic organisms: Fascinating Facts." Tobago Today, 2018, 21 September.

Henderson, Laura-Ashley. "Six Fascinating Facts of Benthic Organisms". Trinidad Express. 2018, 27 September.

APPENDIX 3

WORKSHOPS/CONFERENCES/MEETINGS

LOCAL

Training: **"UNESCO Sandwatch Training Programme"**
Venue: Radisson Hotel, POS
Date: 2– 5 October 2017
Attendee(s): Matthew Rahamut and Krystal Ganaselal

Training: **"Supervisory Management"**
Venue: SBCS, Champs Fleurs
Date: 9– 10 October 2017
Attendee(s): Paul Nelson

Seminar: **"Chromatography and Chemistries and Supplies"**
Venue: Trinidad and Tobago Bureau of Standards
Date: 12 October 2017
Attendee(s): Keagan Lai Fang and Aleisha Dennie

Training: **"Supervisory Management"**
Venue: UTT, Chaguanas Campus
Date: 23– 27 October 2017
Attendee(s): Kyle Williams

Training: **"Microsoft Innovation Summit"**
Venue: Port of Spain
Date: 12 December 2017
Attendee(s): Paul Nelson

Training: **"Oracle: Journey to Cloud Trinidad and Tobago"**
Venue: Marriott Courtyard, Port of Spain
Date: 6 February 2018
Attendee(s): Paul Nelson

Training: **"Windows Server 2012 R2, Securing Windows Server"**
Venue: Port of Spain
Date: 26 February 2018
Attendee(s): Oscar Ramoutar

Workshop: **"Wider Caribbean Sea Turtle Conservation Network (WIDECAST)**"
Venue: Playa Del Este Beach Resort, Salybia
Date: 19– 21 March 2018
Attendee(s): Glendon Glasgow
Meeting: "The Trinidad and Tobago Revenue Authority: A Practice in Good Governance"
Venue: Port of Spain
Date: 25 July 2018
Attendee(s): Rishmala Reena Ramdass

Training: **"Short Course on the Theory and Practice of Tropical W Atlantic Sponge (Porifera) Identification"**
Venue: UWI, St. Augustine
Date: 28–31 July 2018
Attendee(s): Alana Jute

Workshop: **"Workshop dealing with Mould: Guidelines for Library and Archival Collections"**
Venue: NALIS, Port of Spain
Date: 5 September 2018
Attendee(s): Lorraine Barrow

EXHIBITIONS

Nature Seekers' Annual Beach Cleanup and Turtle Building Competition
4 March 2018. Orosco Bay (Matura Beach)
IMA participated by hosting a booth to share information on marine conservation and an estimated 150 persons visited the IMA's booth. An IMA representative also participated this activity as one of the judges for the turtle-building competition.

Atlantic LNG's Biodiversity Display/World Environment Day.
4 June 2018 at Point Fortin
Outreach session engaged approximately 283 students and adults from the following schools; Egypt Village Government Primary, Salazar Trace Government, Vance River RC Primary, San Fernando Central Government Secondary, Beach Camp Community School and Siparia West Secondary.

EMA's World Environment Day Public Display.
Friday 22 June 2018. Trincity Mall.
Outreach Session carried out through the hosting of an IMA booth, engaging approximately 100 persons.

Ministry of Planning and Environment (Environmental Policy and Planning Division)'s World Environment Day (WED) Talks.
26 June 2018. NALIS's A/V room.
A small booth was set up, engaging approximately 20 persons.
Pan American Development Foundation - Resistance and Prevention Programme.
29 July 2018. Valencia Recreational Facility.
IMA hosted a booth and engaged approximately 70 persons.

VACATION CAMPS/OUTREACH

"Abbytopia of Hope" Vacation Camp.
4 April 2018. Chaguanas Public Library.
Approximately 20 children, aged 5—11 years received presentations on Marine Mammals and Marine Debris.

Couva NALIS vacation camp
5 April 2018. Couva Public Library.
25 young adults received a presentation on "Oceans, Marine Life and Turtles" on

Chaguanas NALIS Vacation Camp
25 May 2018. Chaguanas Public Library.
Outreach session with 44 Primary School students and adults in celebration of World Biodiversity Day.
Atlantic LNG Point Fortin's Finest Programme 2018/The Barcam
10 July and 25th July 2018. Pt. Fortin.
Outreach session engaged approximately 60 students.

Sangre Grande Seventh Day Adventist vacation bible group
23 July 2018
Approximately 53 students and adults visited the IMA for a presentation on 'Coral Reefs' and an Aquaculture tour.

Couva Public Library Vacation camp
26 July 2018. Couva Public Library.
Approximately 55 students were engaged in a presentation on "Marine Pollution".

Training: **"Training and Skills Development – Strategic Communications"**
Venue: IMA Auditorium
Date: 10, 11 and 11 September 2018
Attendee(s): Krystal Ganaselal, Glendon Glasgow, Karl Doyle, Jeunisse Mohon and Lorraine Barrow.
Hosted by Alicia Carter-Fisher

Training: **"IT Auditing for Non-IT Auditors"**
Venue: Arthur Lok Jack, Champs Fleurs
Date: 18 September 2018
Attendee(s): Marcia Powell

INTERNATIONAL

Workshop: **"Major Aspects of Coastal Environmental Management"**
Venue: Kingston, Jamainca
Date: 17–20 October 2017
Attendee/s: Wendy Nelson

Workshop: **"Coastal and Environment Summit 2017". Presentation delivered on 'Trinidad and Tobago's Integrated Coastal Zone Management (ICZM) Experience: The problems, approaches, challenges faced and lessons learnt'. Moderated panel discussion 'Evaluating and improving effectiveness of ICZM'.**
Venue: Singapore
Date: 7-10 November 2017
Attendee(s): Rahanna Juman

Workshop: **"Implementing and Monitoring the Sustainable Development Goals in the Caribbean: The Role of the Ocean"**
Venue: St. Vincent and the Grenadines
Date: 17– 19 January 2018
Attendee/s: Attish Kanhai

Workshop: **"Indicators and Thematic Data for the Caribbean Marine Atlas Phase 2 Project"**
Venue: Colombia
Date: 15-16 February 2017
Attendee(s): Hamish Asmath

Meeting: **"Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)".**
Venue: Madellin, Columbia
Date: 17-24 March 2018
Attendee(s): Rahanna Juman

Meeting: **"Intergovernmental Oceanographic Commission (IOC) Group of Experts Capacity Development Meeting".**
Venue: Paris, France
Date: 20–24 March 2018
Attendee/s: Lorraine Barrow

Workshop: **"Marine Genetic Resources Regional Management Workshop".**
Venue: Kingston, Jamaica
Date: 12–14 March 2018
Attendee/s: Alana Jute

Workshop: **"Major Aspects of Coastal Environmental Management II"**
Venue: Coquimbo, Chile
Date: 5–9 March 2018
Attendee/s: Wendy Nelson

Meeting: **"Flanders UNESCO Science Trust (FUST) Ocean Event and Steering Meeting of Caribbean Marine Atlas Phase 2"**
Venue: Brussels
Date: 14-17 May 2018
Attendee(s): Hamish Asmath

Training: **"Course on Sustainable Marine Resources: Enhancing Biodiversity in Coastal Waterways"**
Venue: Singapore
Date: 9–13 July 2018
Attendee/s: Farahnaz Solomon

Meeting: **"Fourth Meeting of the Scientific, Technical and Advisory Committee (STAC) to the Protocol concerning Pollution from land-based Sources and Activities (LBS) in the wider Caribbean Region"**
Venue: Panama City, Panama
Date: 18–20 July 2018
Attendee/s: Ahmad Khan

Conference: **"36th International Conference on Coastal Engineering (ICCE) 2018"**
Venue: Baltimore, Maryland, USA
Date: 30 July–3 August 2018
Attendee/s: Christopher Alexis

Workshop: **"Second Regional Workshop Marine Biological Diversity of Areas Beyond National Jurisdiction for Member States of CARICOM"**
Venue: Belize City, Belize
Date: 30 July–1 August 2018
Attendee/s: Kahlil Hassanali

Training: **"Strengthening Institutional Capacity for the Management of Coastal Erosion Processes Associated with Climate Change: Coastal Processes and Methodological Criteria for Beach Recovery Training Course"**
Venue: Panama City, Panama
Date: 6–17 August 2018
Attendee/s: Christopher Alexis

Training: **"Strengthening Institutional Capacity for the Management of Coastal Erosion Processes Associated with Climate Change: Seminar on Sedimentology"**
Venue: Panama City, Panama
Date: 15–21August 2018
Attendee/s: Aaron Mohammed

Meeting: **"Strengthening Institutional Capacity for the Management of Coastal Erosion Processes Associated with Climate Change: 3rd Focal Point Meeting""**
Venue: Panama City, Panama
Date: 17 August 2018
Attendee/s: Ahmad Khan

Conference:	**"1st Session of the Intergovernmental Conference on an International Legally Binding Instrument under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction"**
Venue:	New York, USA
Date:	4–17 September 2018
Attendee/s:	Kahlil Hassanali

Training:	**"Course: Sampling and Preservation of Water and Sediment Samples"**
Venue:	Sao Paulo, Brazil
Date:	10–14 September 2018
Attendee/s:	Kyle Williams

Meeting:	"**Experts Meeting on Marine Pollution Indicators under Sustainable Development Goal Target"**
Venue:	Paris, France
Date:	12–13 September 2018
Attendee/s:	Darryl Banjoo