



*Sea level rise not only changes our coastline and coastal features, but poses a real threat to the livelihood of many.*

## Small States Big Stakes

World Environment Day is celebrated annually on June 5 to raise global awareness of the need to take positive environmental action. The UN General Assembly declared 2014 the International Year of Small Island Developing States (SIDS) to celebrate the contributions that this group of countries and territories has made to the world. This year, the theme for World Environment Day “Raise your voice not the sea levels” focuses on SIDS.

*(continued page 2)*

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## Small States Big Stakes (con't.)

What are SIDS? SIDS are low-lying coastal countries that tend to share similar sustainable development challenges, including small but growing populations, limited resources, remoteness, susceptibility to natural disasters, vulnerability to external shocks, excessive dependence on international trade, and fragile environments. Currently, the United Nations Department of Economic and Social Affairs has designated 52 countries as small island developing states these include countries of the Caribbean such as Jamaica, Barbados, Cuba, Grenada, Guyana, and Trinidad and Tobago.

Of the challenges listed above, one of the most potent problems facing SIDS is rising sea levels. Sure enough, the notion of Trinidad sinking has been well publicized but we are not sinking- a more sinister faith awaits us, we are becoming a causality of the worldwide problem of climate change. Global warming, climate change and sea level rise seem to be inextricably linked. According to Greenpeace, around 23% of the world's population live in the near coastal zone and the densities in these areas are about three times higher than the global average. Agricultural land and infrastructure also tend to be concentrated in the coastal zone, so any rise in sea-level can affect economies and living conditions in the impacted areas.

As global warming continues, rising sea levels, high tides and storm surges riding on ever-higher seas become more dangerous to people and coastal infrastructure as natural protection against damaging storm surges are increasingly threatened. Natural protection such as mangroves and barrier beaches can eventually be washed over or drowned. As a result many SIDS that have the capital, invest in sea walls and other artificial defenses to protect roads.



*Heavy erosion at Salybia Beach Trinidad*

In Trinidad, the Manzanilla beach has been partially destroyed by waves pounding the artificial defenses and in Icacos, roads and coconut trees have been washed away by the sea. In these areas, sea-level rise has increased erosion of beaches, wetlands, and engineered structures. Another problem faced by SIDS, is that of saltwater intrusion.

Rise in sea-levels can lead to the intrusion of salt water into groundwater drinking supplies, contaminate irrigation supplies and/or overrun agricultural fields. Low-lying, gently sloping coastal areas are particularly vulnerable to contamination of freshwater supplies by saltwater.

Rising sea levels can also harm our coral reefs because though these dynamic ecosystems are resilient they also tend to be very fragile. Reef communities boast hundreds of thousands of species, many of which are undescribed by science. Corals are dependent on light to maintain their biological functions. A rise in sea level will cause reef ecosystems at the depth limit of coral growth to experience diminished light conditions that can no longer sustain growth and most likely result in death. SIDS are very vulnerable, because of their small size, the inherently scarcity of space leads to competing land uses. In most of the islands, the rugged topography also drastically reduces the amount of land available for development to narrow coastal strips which must accommodate industry, tourism, residential and other land uses. When sea level rises or any natural disasters occur, they place a strain on the environment's resources and the ability for sustainable development is reduced.

What is the solution? According to Agenda 21 (A non-binding, voluntarily implemented action plan of the United Nations with regard to sustainable development), it is vital that SIDS adopt and implement plans and programmes to support the sustainable development and utilization of the marine and coastal resources, including meeting essential human needs, maintaining biodiversity and improving the quality of life for island people. Mapping areas vulnerable to sea level rise and developing computer-based information systems are essential for the development of adequate response strategies, adaptation policies and determination of measures to minimize the impact of climate change and sea level rise.

To ensure our future we must do our part. The environment, societies and economies can be damaged, overloaded or prevented from meeting our needs. By our choices, we to a large extent determine our own quality of life, conditions of our lands and opportunities for future generations.

Submitted by  
**Glendon Glasgow**  
*Information Officer*

### *References*

Hoegh-Guldberg 1999  
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## Welcome to the IMA



**Mr. Mark Dhanoolal**  
*Laboratory Technician II,  
Environmental Quality Programme*



**Mr. Keagan Lai Fang**  
*Laboratory Technician II,  
Environmental Quality Programme*

## IMA EVENTS & ACTIVITIES

### IMA ventures into indoor Shrimp farming

The Institute of Marine Affairs (IMA) has embarked on research into the Pacific white shrimp (*Litopenaeus vannamei* or *Penaeus vannamei*) which will be cultured in tanks, via a production system that recycles seawater; a marine recirculating aquaculture system (RAS). The aim of this research is to raise awareness amongst local aquaculture fish farmers and potential investors, of the biological, ecological and economical issues that affect marine shrimp in these types of production systems.



*Juveniles acclimatize before being released into the Production Tank*



*Post larvae shrimp*

The Pacific white shrimp will be grown to a jumbo size, and is expected to be ready for consumption by October 2014.



*Pacific white shrimp (*Litopenaeus vannamei* or *Penaeus vannamei*)*

## Bountiful Biodiversity

World Biological Diversity Day or Biodiversity Day is celebrated annually on May 22, the theme for this year 'Island Biodiversity'. Many of us may recall learning in school that an island is a piece of land surrounded by water. The unique islands of Trinidad and Tobago are considered Small Island Developing States (SIDS) and as such are among the most vulnerable of the developing countries. Factors that make SIDS vulnerable include: small populations and economies, susceptibility to natural diseases and climate change, particularly sea level rise from climate change, limited diversification in production and exports, dependence on international markets and export concentration, as well as fragility of land and marine ecosystems. Biological Diversity or "biodiversity" describes the variety of life on Earth – all plants, animals, and their genetic material. Biodiversity provides basic human needs such as food, shelter and medicine. It includes ecosystems that maintain oxygen in the air, enrich the soil, purify the water, protect against storm damage and regulate climate. It contributes to culture, aesthetics, support livelihoods, economies and tourism. Biodiversity in Trinidad and Tobago plays a major role in the ecosystem services that support human well being.



For a better understanding of biodiversity, it may be divided into three main categories:

### (i) Genetic Diversity -

refers to the different genes contained in all living species, including individual plants, animals, fungi and micro-organisms. For example, within marine species of fish, genetic diversity can be seen in various fish such as Grouper, Flying fish and Red Snapper. These are all species of fish but they are not the same because their genes are different.

### (ii) Species Diversity –

refers to the number of species or the range of different types of species within an area. Rich in species diversity, Trinidad and Tobago is home to over 100 species of mammals, more than 460 species of birds, over 3300 plant species, more than 85 species of reptiles, approximately 30 species of amphibians, at least 950 species of marine fish and 50 freshwater fish, over 650 species of butterflies, nearly 200 species of marine algae, 41 coral species, 4 mangrove species and an estimated 4 species of sea grasses!!!

## BIODIVERSITY OF TOBAGO

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4	Blue Crab	<i>Callinectes sapidus</i>
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### (iii) Ecosystem Diversity -

An ecosystem is a community of living organisms (plants and animals) that interact with the non-living, physical elements (air, water, sun, soil, etc.) within an environment. Major types of ecosystems include Tropical Rain forests, Grasslands, Coral reefs and Mangroves. Small islands comprising high proportions of marine and coastal areas are important sources of income. Coastal ecosystems offer shoreline protection and provide feeding, breeding, and nursery grounds to many marine species and support marine fisheries. In 2006, the value of the reefs to recreation and tourism was estimated to be between US\$100 - \$130 million or approximately 45% of Tobago's Gross Domestic Product (GDP) for that year and shoreline protection was valued between US \$18 million and \$33 million.

### What causes Biodiversity loss?

Species are becoming extinct at an accelerated rate and most of these extinctions have been tied to human activity. Threats include over-exploitationsuch as over-hunting and over-fishing of a species, the introduction of exotic (non-native) specieswhich can affect native species by competing with them or infecting them such as the lionfish in our waters, pollution which may result in death of living organisms and global climate changewhich alters environments whereby species or populations may be lost if unable to adapt to new conditions.

The rich biodiversity of our islands is important as it provides us with food, shelter, medicine, protection against storm damage, contributes to our rich cultural heritage and supports livelihoods. It is one of our national treasures and must be appreciated and protected.

**Krystal Ganaselal**  
Information Officer

### References

Fourth National Report of Trinidad and Tobago to the Convention on Biological Diversity.  
<https://www.cbd.int/island/whymatters.shtml>

## IMA EVENTS & ACTIVITIES (con't)

### BIODIVERSITY POSTER DISTRIBUTION

On April 15 2014, Lori Lee Lum, Community Education Officer distributed Biodiversity posters of Trinidad and Tobago as well as books on The Construction of an Artisanal Fishing Vessel of Trinidad and Tobago, and Wetlands of Trinidad and Tobago, to the following visitor/ information centres: Valencia Visitor Centre, Grande Riviere Visitor Centre, Toco Foundation and Nature Seekers in Matura.



*Lori Lee Lum with a member of the Turtle Village Trust*

### IMA at 15th UNICPOLOS Meeting

Ms. Wendy Nelson, Research Officer, Marine Chemistry Department, attended the Fifteenth Meeting of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea (UNICPOLOS). The meeting was held at the United Nations Headquarters in New York between 27 and 30 May, 2014. These meetings provide Member States with an opportunity for open and transparent discussion of issues affecting oceans and seas such as illegal, unreported and unregulated fishing, maritime safety and security, and the impacts of ocean acidification on the marine environment.

The topic of focus of this meeting was, "The role of seafood in global food security". Discussions were centred around three main areas

in order to chart an international plan of action:

- (1) Understanding global food security and the current role of seafood therein
- (2) The role of seafood in global food security in the context of the three pillars of sustainable development: economic, social and environment
- (3) Opportunities for, and challenges to, the future role of seafood in global food security.



*Wendy Nelson, Research Officer*

### Community Science Week—GASPARILLO

The IMA, through its Information Centre participated in the NIHERST Community Science Week from 28 April to 2 May 2014 at Gasparillo Secondary School.

The aim of the Science Week was to promote science education in rural communities by providing children and adults with a fun science experience. Students gained an appreciation for our marine environment and importance of conservation. An estimated 586 students, teachers and adults visited the IMA's booth from Primary and Secondary schools in the surrounding area.



*Krystal Chandler engaged in a game of Environmental Jeopardy with students*

### Matura High School Visits

The IMA welcomed a group of students from the Matura High school as they visited the Marine Education Center and the Aquaculture facility on June 24 2014. The 22 students were accompanied by two teachers and taken on a tour of the Aquaculture facility. A presentation was also given by Krystal Chandler, Information Officer, which focused on Marine Pollution. At the end of the tour, the students thanked the staff of Aquaculture and the Information Center for a highly productive day and a wealth of knowledge of the effects of Marine Pollution.



*Tyrone Walters, F&ARP and students from Matura High school*

## IMA EVENTS & ACTIVITIES (con't)

### GPO and LBS workshop in Nicaragua

The Regional workshop on Global Partnership for Oceans took place in Managua, Nicaragua from 9th to 10th June. The intention of the workshop sponsored by the World Bank was to start reviewing the first draft of water quality management reports and agree how the work can be completed and the reports finalised. The countries which have already completed reports were: Columbia, Costa Rica, Jamaica and Mexico. The key water quality management issues identified included; marine litter, domestic waste water, nutrient pollution and pesticides. Countries proposed to participate in the next phase include: Trinidad and Tobago, Cuba, Dominican Republic and St. Lucia. A year and half ago the World Bank began collaboration with UNEP on land based pollution sources (LBS). The main aim of the collaboration was sustainability of the Caribbean Sea.



*Technical experts from Mexico, Costa Rica, Jamaica, Cuba, Dominican Republic, Saint Lucia, Trinidad and Tobago and Colombia attending opening ceremony of Regional Workshop on Global Partnership for Oceans.*

The 2nd LBS STAC Meeting also took place in Nicaragua from 10th to 13th June. The LBS STAC meeting convenes every two years. This meeting reviewed the achievements of the AMEP sub-programme during 2013-2014 and the proposed work plan for the 2015-2016 biennium. Dr. Darryl Banjoo, Principal Research officer and Dr. Beverly Foster-Hinds, CIO, IMA, attended both events.

The Secretariat of the Cartagena Convention is responsible for convening a Working Group of Government-designated experts to function as a Scientific, Technical and Advisory Committee (STAC) on activities for the management and control of marine pollution from land-based sources.

### Sustainable and Conservation of Marine Biological Diversity



Dr. Donna-May Sakura-Lemessy attended a CARICOM Workshop (under the UN Convention on Law of the Sea) on “Sustainable and Conservation of Marine Biological Diversity” on 20 and 21 May 2014 in Kingston Jamaica sponsored by PEWS Charitable Trusts and the High Seas Alliance/Government of Jamaica. Over the course of the two-day workshop, representatives from most of the Caribbean Community heard presentations from regional and international experts on marine genetic resources (including access and benefit sharing), area-based management tools including Marine Protected Areas, Environmental Impact Assessments, and the Capacity-building and technology transfer Secretariat for the Caribbean and Adjacent Regions Sub—Commission (IOCARIBE).

### World Oceans Day celebration at Macqueripe

In commemoration of World Oceans Day on June 8th, 2014 the Institute of Marine Affairs – Information Centre hosted a public awareness booth on Macqueripe Beach to sensitize the public to the significance of our oceans. There were lots of games and giveaways. The invasive Lionfish was also on display.

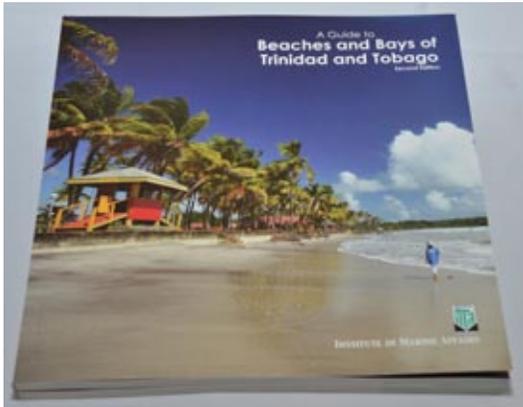
The theme for this year is “Together we can protect the Ocean.”



*Visitors engaged in a game of spin the wheel!*



## A Guide to Beaches and Bays of Trinidad and Tobago, 2nd Edition



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### THE BLUE CORNER

*We have the power to save the earth!*

#### Bugs that walk on water

**Gerridae** is a family of true bugs in the order *Hemiptera*, commonly known as water striders

Gerrids distinguish themselves by having the unique ability to walk on water.

Gerridae, or water striders, are anatomically built to transfer their weight to be able to run on top of the water's surface. As a result, one could likely find water striders present in any pond, river, or lake.



Water strider



Scientists have identified over 1,700 species of gerrids, 10% of them being marine.

References: [http://www.fcps.edu/islandcreekes/ecology/common\\_water\\_strider.htm](http://www.fcps.edu/islandcreekes/ecology/common_water_strider.htm)



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