# IMA NEWS

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INSTITUTE OF MARINE AFFAIRS

# The Disappearance of our Seagrass Communities

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Seagrasses are flowering plants that grow on the seafloor in shallow coastal habitats. They are very productive, faunally rich and ecologically important marine resources. Seagrass beds provide nursery habitats for a number of commercially important species such as conch and lobster, and they help sequester carbon dioxide in the ocean. They are semi-permeable filters that stabilize bottom sediments, slow/reduce current flow, prevent erosion and filter suspended solids and nutrients from coastal waters. These filters are becoming overloaded as land-use changes in the coastal catchment and in the nearshore environment are adversely affecting them. Increasing population density in coastal areas has enhanced sediment, while nutrient loading and nutrient over-enrichment of coastal waters have been cited as the main reasons for seagrass bed decline worldwide.

Since 2002, the Institute of Marine Affairs has been monitoring the health and productivity of selected *Thalassia* (turtle grass) dominated seagrass beds around the islands. The healthiest and most productive seagrass sites in the country were once found in Southwest Tobago at Buccoo Bay and Kilgwyn Bay. However since 2015, it was noted that the seagrass beds in Kilgwyn Bay had disappeared, and this coincided with a Sargassum invasion. Bon Accord Lagoon recorded the lowest biomass and density in Tobago, but while the monitored sites within the Lagoon are overgrown by macroalgae, seagrasses have spread into areas adjacent to Buccoo Reef. Seagrass coverage in the Buccoo Reef/Bon Accord Lagoon Marine Protected Area has doubled within the past 14 years. The grasses have colonized the Nylon Pool, a very popular shallow, sandy area in the back reef zone where visitors are allowed to swim at the end of a glass boat tour.

In Trinidad, the most productive *Thalassia* site was once found at William's Bay. This area was home to a diversity of species including fishes such as seahorse, juvenile grunts, groupers and snappers, green turtles

*above:*
Mixed *Thalassia* and *Halodule* seagrass bed, St. Peter's Bay, Carenage, Trinidad

*next page:*
Sampling seagrass in Buccoo Bay, Tobago

and invertebrates such as starfish, conch and urchins. Since 2012, a decline in *Thalassia* biomass and productivity was observed, and today, it is completely gone; its demise coincided with development activities taking place on the peninsula. The *Thalassia* community, which was once found on the eastern side of St Peter's Bay, was destroyed in 2010, while the community on the western side of the bay was destroyed in 2012. St Peter's Bay has been impacted by land reclamation activities over the past decade, and receives sediment laden waters from the coastal catchment which has been deforested for housing.

Poor water quality caused by land-based pollution and coastal development are the main factors negatively impacting the health of seagrasses in Trinidad and Tobago. The beds in Trinidad, which are found along

the most intensely developed coastline, continue to be subjected to development pressures from the coastal catchment. Loss of seagrass beds would result in loss of their ecosystem services such as coastal protection, habitat and nursery for fish and other marine species. There is an urgent need to conserve, and in some areas rehabilitate our seagrass communities to ensure that they can provide a safe haven for our rich biodiversity, protect our coastline and sequester carbon dioxide.

# Aquaculture Workshop 2017

The IMA hosted a 10 day workshop entitled 'The use of freshwater fish in Vector Control' from 6th—17th February 2017. Vector control is based on the introduction of organisms that prey upon, parasitize, compete with or otherwise reduce populations of the target species. Against the Aedes mosquito a selection of larvivorous fish species and predatory copepods (small freshwater crustaceans) are effective against the immature larval stages of vector mosquitoes.

The biological control organisms are bred and distributed into water-storage containers or wells. Small-scale projects have shown that the success of biological control is mainly reliant on the organization of the project. Eight (8) persons through the Pan American Health Organisation (PAHO) participated in the workshop. Countries represented were St. Vincent and the Grenadines, St. Lucia, Grenada and Barbados. The representatives who attended the workshop were from the Vector Control Unit within their respective countries.

# Faded brilliance- the loss of corals to disease

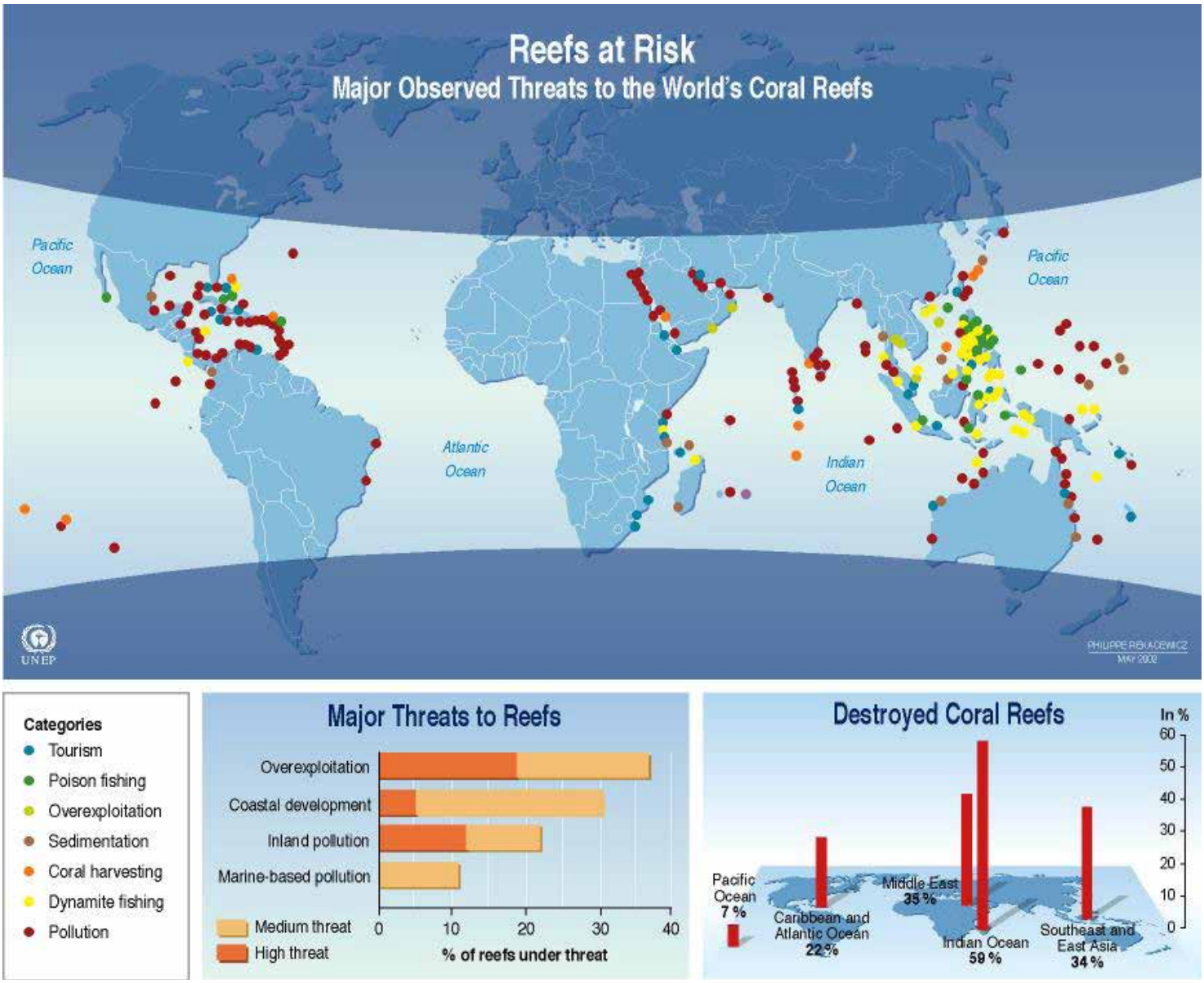
Rachael Amoroso,
Institute of Marine Affairs

On my first dive in Tobago a few years ago, I was stunned by the beauty of the coral reef; the colours of the stony corals and sponges, the gorgonians swishing with the waves and the multitude of playful fish careening about. After the dive, I was happily chatted away by the older divers who matter-of-factly told me that the reef I had seen that day was nothing compared to what it was like a few years before. Back then I was told, the reefs were covered in twice as much coral. So what happened to our coral reefs? Well a few things happened, some local while others were global.

Forty years ago, Tobago's reefs looked much different from how they do today. The coral cover of stony "reef building" corals was far more extensive, so much so that stony corals dominated the reef floor over all other reef organisms like soft corals, sponges and algae. In many reef areas along the leeward coast, the most abundant of these stony corals was a highly branched species called Acropora, whose complex structures were exceptional at providing numerous habitats for fish and other reef creatures. There was also a greater variety of stony coral species. But in recent years, stony coral cover has fallen dramatically to the point that on certain reefs on the northern end of the island, stony corals are no longer the primary organism on the reef and have been replaced by sponges or soft corals, which are less capable of supporting the abundance of marine life compared to that of stony corals. The previously abundant Acropora have been reduced to a few scattered colonies around Tobago, and replaced by simple mound forming stony corals. In addition, more and more coral colonies are being observed with diseases.

The changes in the reef scape have been brought about by both chronic and acute stressor events working in tandem over the years. Climate change has been for some time the greatest threat to reefs since corals are particularly vulnerable to its effects. Sea surface temperatures rise [driven by climate change] during the year to temperatures high enough to cause corals to undergo thermal bleaching. Corals exist in a symbiotic relationship with microscopic algae called zooxanthellae and gain most of their nutrients from the zooxanthellae living within their tissues. When corals become sufficiently stressed they expel their zooxanthellae, losing their colour and resulting in a pale "bleached" look. If corals remain without their zooxanthellae for extended periods of time they die.

These periods of high sea temperatures and the resultant bleaching episodes have begun to increase in frequency and now take place every few years. One such episode occurred in 2010 which resulted in the death of up to 50% of stony corals on reefs along the leeward coast of Tobago. Stony corals grow very slowly and many of the affected reefs have not yet regrown the corals lost in 2010.




Source: Bryant at al., *Reefs at Risk: A Map-Based Indicator of Threats to the World's Coral Reefs*, World Resources Institute (WRI) Washington DC, 1998

An additional effect of thermal bleaching is the onset of coral diseases whose infection rates typically explode a few months to a year following a thermal bleaching event.

Coral diseases are becoming increasingly important, especially in the Caribbean, in shaping the reefscape as they are capable of killing whole coral colonies and have been known to wipe-out thriving coral populations. Acropora, which once reached 46% cover in Buccoo's shallow reefs are now estimated at 0%. This unprecedented loss is primarily attributed to a deadly coral disease called White-band disease. White-band disease is not the only deadly disease plaguing Caribbean corals. The Caribbean region is known to have the greatest variety of coral diseases with almost twice as many coral diseases described in the Caribbean than any other region.

Often the infectious agent is unknown but we do know that there are human pathogens capable of causing coral diseases. Many of the coral species around Tobago are vulnerable to multiple disease, and they are being observed with increased frequency throughout the year. At present a growing concern is the effect of yellow-band disease on the coral species Orbicella faveolata which is currently the most abundant species in Tobago. Some colonies of O.faveolata appear not to be vulnerable to yellow-band disease. Since colonies of O.faveolata may house different species of zooxanthellae, the IMA is starting research to investigate whether there exists a genetic susceptibility of either O.faveolata or a specific zooxanthellae strain to yellow-band disease.

Coral bleaching events are expected to become more frequent due to elevated sea surface temperature associated with climate change

Sedimentation and nutrient pollution have also been changing the reefscape. Sedimentation can stress and kill coral while it reduces diversity in affected areas to species that are resistant. Chronic nutrient pollution retards colony growth, deforms coral recruits [baby corals] and is known to worsen coral disease outbreaks. Many of the reefs ,which support our fishing and tourism industries, and protect nearly 90km of Tobago's coastline and beaches from erosion, are struggling with climate change, coral diseases and pollution. The reefscape is changing. It is becoming smaller and less bright but there is still a window of opportunity to reduce local stresses and give our reefs a fighting chance against the effects of climate change and coral diseases.

# IMA Events & Activities

## IMA's Community Symposium

Towards a
HEALTHIER
Southwest Peninsula
San Fernando to Icacos

The Institute of Marine Affairs (IMA) held its second Community Research Symposium at the Chatham Community Centre, Southwest Trinidad on March 29th 2017. The theme of the Symposium was 'Towards a Healthier Southwest Peninsula, Trinidad' and in attendance were councillors, students from Presentation College and Holy Name-Point Fortin, fisherfolk, community members and activists, non-governmental organisations, government agencies and private sector entities. Mrs. Toylan Arneaud, Director (Ag.), delivered welcoming remarks and stated the goal, which was to provide pertinent non-technical information on the state of the coastal environment in the southwest peninsula based on sound scientific research. She also indicated that it was necessary for the IMA to share lessons and impart practical solutions for tackling complex coastal issues. The Mayor of Point Fortin, His Worship, Councillor Abdon Mason and Mr. Shankar Teelucksingh, Councillor for Cedros, also delivered remarks indicating their support for research along the southwest peninsula to address environmental problems.

The feature address was provided by Dr. Marissa Gowrie, representative of the Ministry of Planning and Development, who emphasized the Ministry's commitment to partner with coastal communities, private sector and state agencies such as the IMA, to mitigate against environmental impacts that affect coastal livelihoods and the country's economic prosperity.

Presentations were delivered by IMA Researchers on the current state of wetlands and beaches along the peninsula, water, sediment and biota quality, bathing

*Dr. Darryl Banjoo, Senior Research Officer, IMA, delivers a presentation entitled, "Trinidad after the December 2013 Oil Spills"*

*A student of Presentation College, San Fernando expresses his views*

beach quality, fish kills and the use of bacteria to breakdown oil. External presenters included the Environmental Management Authority, whose representative presented on Environmental Incidents, and a representative from Microsoft West Indies, who presented on a joint Proof of Concept (POC), a collaborative effort between the IMA, Fijitsu and Digicel. This POC aims to develop a water quality monitoring instrument to be deployed in the Gulf of Paria, which would provide real time data on water parameters such as temperature, salinity, sediment, dissolved oxygen and ammonium concentrations. The attentive audience raised concerns about coastal erosion and pollution from oil spills and asked whether fish was safe to eat. The IMA had the opportunity to clarify any misinformation. The symposium provided a platform for multi-stakeholder dialogue, and highlighted the need for cooperation on the way forward. The IMA will continue its initiative to provide pertinent information to coastal communities. The next Community Symposium is being planned for September 2017 in Southeast Trinidad.

# Clean-up at Chacachacare

The IMA in conjunction with the Ministry of Agriculture and Fisheries, Chaguaramas Development Authority (CDA), and the Environmental Management Authority (EMA), participated in the Cleanup of Chacachacare island on 12th March, 2017. IMA joined 200 volunteers to clean up the shorelines, beaches and deciduous forest, characteristic of the island. The areas were cluttered with garbage washing helplessly to and fro in the tides, and in most cases piled along the shorelines waiting to be biodegraded - plastics, boxes, old coolers, glass bottlers, garbage of all sorts, cigarette and food wrappers, and the indestructible styrofoam. All these were collected and placed into colour-coded bags. Volunteers, who were directed to report to Staubles Bay by 7:00 a.m., were transported to the island courtesy the Trinidad and Tobago Defence Force; once there, garbage and crocus bags, insect repellent and a few shovels were distributed to the volunteers who grouped into teams of 5 to 6 persons

*IMA's team that participated in the beach cleanup*

# Water Education Workshop

A Water Education Workshop debuted on 16th February with 24 enthusiastic Standard 3 pupils of St. Peters' R.C. Primary School, Point Cumana. Through games and song the students participated in activities that helped them understand the connection of all water on Earth.

Activities included the singing of a song entitled "We need water to survive" to help understand our need for water. Other activities carried out were the simulation of the sound of a thunderstorm as well as 'The Incredible Journey' as students learnt how water moves through the water cycle. The purpose of the workshop was to encourage appreciation and foster positive attitudes on conservation of water resources. We all need to care for this precious asset, especially during the dry season in Trinidad and Tobago.

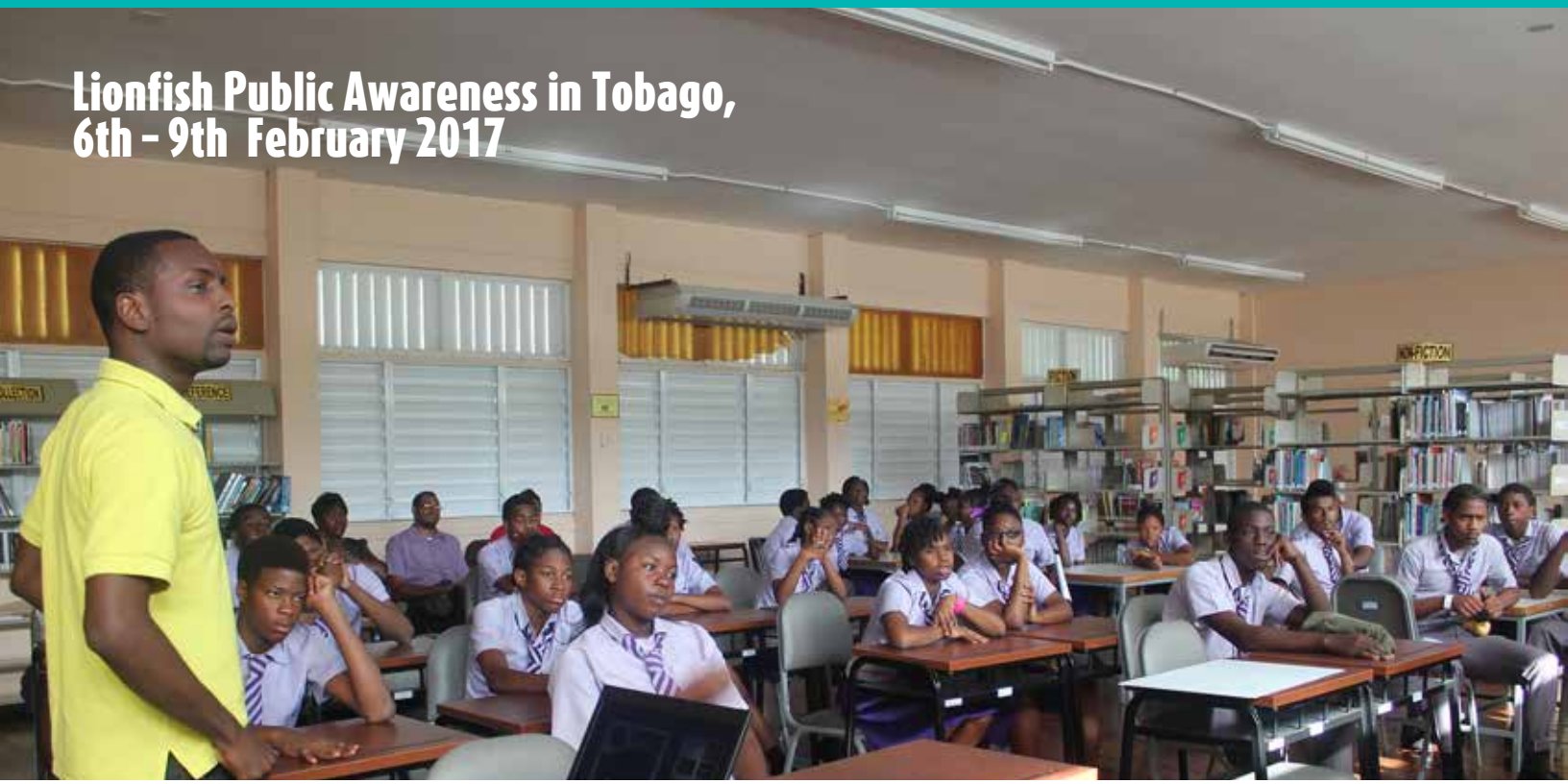
*Pupils of St. Peters' R.C. Primary School, Point Cumana first water education workshop*

# Career Day at St. Benedict's College

The IMA participated in a Career Day at St. Benedict's College on 10th February 2017. Students of Forms 3 and 5 learned about marine conservation and possible career paths in the field of marine sciences. An estimated 140 students visited the IMA's booth. Presentations on 'Careers in Marine Sciences' were delivered by G. Glasgow and K. Ganaselal. Other organisations present included the Police Service, T&TEC, UTT, COSTTATT and USC.

*Students of Forms 3 receiving advice on careers in marine science*

# Lionfish Public Awareness in Tobago, 6th - 9th February 2017



Glendon Glasgow, Information Officer, speaks to Roxborough Secondary students about the invasive Lionfish

The Lionfish is now well established in the marine environment of Trinidad and Tobago since its initial capture in 2012 in Castara. This invasive species presents a significant threat to the integrity of marine ecosystems due to its high reproductive rate, voracious appetite, and scarcity of natural predators in the Caribbean Sea and Atlantic Ocean.

They have the potential to reduce the abundance of ecologically important species such as parrotfish and other herbivorous fishes that keep seaweeds and algae from overgrowing corals. Scientists advise that the Lionfish may have the potential to act with other existing stressors, such as climate change, over-fishing, and pollution, making them of particular concern for the health of Atlantic coral reefs.

The IMA, together with the Department of Marine Resources and Fisheries, THA, have been involved in initiatives to inform stakeholders in fishing communities, the dive sector and the general public about this potential threat to livelihoods since 2010. Under the Green Fund Lionfish Public Awareness Project, three Lionfish Derbies were held at Charlotteville, Castara and Parlatuvier removing over 1000 of these invasive fish from the waters around Tobago. A culling exercise was also carried out in November 2016 in the Buccoo Reef Marine Park.

The IMA has raised Lionfish Awareness to schools in Tobago since 2015. Over this period, ten primary schools have received presentations on **'Coral Reefs and the Threat of the Lionfish'**, while nine secondary schools learnt about **'Invasive Species: Threat of the Lionfish'**, engaging approximately 680 pupils. The information was reinforced with Lionfish posters donated to the schools and activity books, water bottles, insulated lunch bags, and note books for the students. This term eight schools from Charlotteville to Roxborough were visited. While both teachers and pupils were already aware of the Lionfish, they were enthusiastic to learn how this new fish (invasive species) was a threat to Tobago.

Lori Lee Lum and Glendon Glasgow, IMA Information Officers, shared facts about this top predator, for example, how it could impact Tobago's fishing and dive tourism industries and the difference between venomous and poisonous fish. The Lionfish is not poisonous. It has venomous spines that can cause a sting, but once the fish is properly handled, it can be eaten and is quite delicious, like Snapper. The information generated discussion and many questions from eager students.

An attentive class at Speyside Anglican learns about the Threat of the Lionfish to Coral Reefs from Lori Lee Lum

Charlotteville Methodist students show off their Lionfish Activity books and lunch bag tokens

Std. 3 students—Ascension Anglican

# Community outreach initiative with the St. James Public Library

A joint project with the St. James Public Library commenced on 14th February. The initiative is to encourage students to come in and use the Library. Twenty Standard three students and two teachers of Ascension Anglican Primary School attended the IMA presentation 'Coral Reefs and the Threat of the Lionfish'. The seminar generated many questions from both students and teachers, and Lionfish Activity books and other tokens were distributed. Library assistants encouraged students to join the Library to be able to borrow books and videos on this and other topics. The next presentation will be on Tuesday 14th March 2017.

# Lionfish Wrap

INSTITUTE OF MARINE AFFAIRS

THE GREEN FUND

## Have you tried LIONFISH yet?

The Institute of Marine Affairs has embarked on a public awareness campaign to inform citizens about this recent challenge facing our marine environment. Eating Lionfish is beneficial to reefs and marine ecosystems. It is a white, flaky meat with a mild taste similar to Snapper, and can be prepared in a variety of ways.

Request it at your next dining experience to encourage chefs to put Lionfish dishes on the menu!

# THE BLUE CORNER

## Chip chip

Bivalves or clams are commonly found along Mayaro / Mmanzanilla Bays, buried in the sand and are known locally as “chip chip”. They are usually bluish white and when opened pink inside. They are also a food delicacy that can be prepared in various ways. These living animals can often be seen where the waves wash the sand around in the shallowest part of the beach as the tide changes. These clams can use the action of waves to move themselves up and down the beach, quickly burrowing into a new location before they can be swept away. This action is called the “dance of the coquina”.

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