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Caribbean Region

Cayenne, French Guiana, 15-17 March 2017

**REPORT FROM GCFI ON MARINE LITTER PROJECTS IMPLEMENTED AS PART  
OF THE MARINE LITTER NODE**

**Title:** Piloting marine litter reduction strategies for major Caribbean cultural/musical/sporting events- Carnival in Trinidad and Tobago

**Project coordinator:** Ms. Nakita Poon Kong, IAMovement

## **Part – A – Implementation Plan**

### **Background**

The Gulf and Caribbean Fisheries Institute (GCFI) and UNEP's Regional Coordinating Unit for the Caribbean (CAR/RCU), which also serves as Secretariat of the Cartagena Convention, are co-hosting a Regional Node for the for the Global Partnership on Marine Litter (GPML) in the Wider Caribbean Region (WCR). The purpose of the GPML node is in part to identify opportunities to support marine litter reduction and deterrence activities in the region, including small projects.

This concept note outlines a small project related to the reduction of marine litter associated with a major Caribbean cultural event – Carnival in Trinidad and Tobago. When the population comes together to enjoy the Carnival season, a tremendous amount of waste is generated, even though 70% is recyclable. These recyclables are mainly plastic and glass bottles from food and beverage consumption. During the Carnival season more than 100 fetes, including boat cruises, are organised, attracting hundreds and most times, thousands of persons. The Machel Monday concert alone typically attracts a crowd of between 25,000 and 30,000 people. 'Greening Carnival' is something that has been mentioned for years, but no concrete actions have ever come of it. Through local group Plastikeep, there is confirmed interest from a local event organizer in greening Carnival by focusing on a reduction in the generation of solid waste, and introducing measures to accelerate the cleanup and disposal process to avoid a significant amount of that waste washing down into drains, waterways and eventually reaching the marine environment. One soca celebrity has even indicated an interest in acting as a champion for marine litter reduction during Carnival. This proposal includes working with relevant government actors and contemplates reducing key sources of marine litter including reducing the use of disposable plastics (e.g. hard plastic that are re-usable and may carry sponsor logos) and possibly alternative packaging.

Although this project is not one of the projects to be implemented under the Small Scale Funding Agreement between UNEP and GCFI (which establishes the Caribbean node of the GPML), we have developed the concept note with a view to possible future funding opportunities.

### **Objective**

To help bring about a reduction in the generation of marine litter associated with activities during Carnival in Port of Spain, Trinidad utilising on-land reduction strategies. We hope that this will serve as a pilot project to share with other landmark Caribbean cultural/musical/sporting events that already show interest in achieving greater sustainability, environmental or social responsibility, such as Rebel Salute reggae concert Jamaica, Blue Mountain Music Festival, Saint Lucia Jazz Festival, Bequia Blues, New Fire Festival (sustainability festival highlighting local alternative music which we flag as an excellent opportunity for collaboration with Jack Johnson), Crop Over in Barbados, sailing regattas like Mount Gay Barbados or Antigua Classics, powerboat races like Great Race between Trinidad and Tobago, dive festivals like Dive Fest Dominica, Annual Bonaire Dive Festival, Tobago Underwater Carnival, test or T20 cricket matches, or landmark fisheries/tourism sites like fish market in Oistins- Barbados, Gros Islet- St. Lucia, and various fish fry events held regularly around the region.

### **Activities**

Note that below we indicate target delivery dates that would need to be associated with the activities in order to achieve implementation during Carnival 2017. This assumes start date for the project May 1, 2016 and we judge as realistic in seriously tackling this issue for the first time. Otherwise this proposal would likely need to focus on preparations for Carnival 2018.

#### **Activity 1 – Gather existing information, identify key stakeholders and undertake preliminary consultation**

1.1 Well in advance of Carnival season, gather general local data on marine litter in Trinidad & Tobago. This will make use of data collected from the International Coastal Cleanup events in Trinidad and Tobago, among other information.

1.2 Gather background information to understand the current approach to solid waste management during Carnival season and to determine scope for application of best practices in marine litter reduction, for example, reducing the use of disposables and alternatives.

1.3 Identify key stakeholders that have an impact on reducing marine litter during Trinidad Carnival. List key contact persons and their contact information involved with Carnival events, for example fete organisers, relevant government authorities, Carnival promoters and business owners with businesses centered around Carnival events.

1.4 Through a consultation process liaise with key stakeholders to discuss current waste management practices and regional best practices, and to identify possible marine litter reduction strategies associated with Carnival.

<b>Deliverables</b>	<b>Timeframe</b>	<b>Delivery date</b>
List of key actors consulted with about the establishment of waste management during Carnival; copies of presentations made at consultation meetings and any materials shared	2 months	End June 2016

**Activity 2 – Identify and recruit a celebrity marine litter champion**

2.1 Contact Mr. Montano and meet with him to discuss marine litter reduction during Carnival

Mr. Montano is one of Trinidad & Tobago’s most successful soca artists and could be an excellent candidate for celebrity champion for reducing marine litter during Carnival time. There have been some discussion already by local group Plastikeep with Mr. Montano on waste reduction strategies associated with Carnival, and these have served to confirm that there is potential for a larger collaborative effort. Plastikeep is a project created by the Greenlight Network (GLN), a non-profit Community Based Organization (CBO) registered with the Ministry of Community Development that seeks to address Trinidad’s mounting problem of plastic waste as well as the lack of consciousness in the general population around proper plastic disposal. Plastikeep’s pilot project in 2010 was the first time Trinidad had been given the opportunity to dispose of its plastic waste in a manner consistent with marine litter reduction.

In 2014, Plastikeep approached Mr. Montano to collaborate on a study to introduce recycling to both patrons and vendors at the Machel Monday Carnival concert, held at the Hasley Crawford Stadium in 2015. In previous discussions with Plastikeep, Mr Montano’s management team suggested that Plastikeep hold a conference on entertainment and sustainability in order to discuss the greening of Carnival. Our proposed activities build on this interest.

Our proposed discussions with Mr. Montano would build on this earlier interest and focus on reducing marine litter associated with his fetes as well as on Carnival Monday and Tuesday in general.

2.2. Contact Digicel TT and meet with the relevant company representative to discuss marine litter reduction during Carnival

Carnival artists such as Mr. Montano have important local corporate sponsors, in this case the telecommunications company Digicel TT who brand the majority of Mr. Montano’s events. Digicel TT usually sponsors memorabilia for events such as bandanas, reusable cups, t-shirts, etc. There is an opportunity to discuss with Mr. Montano and with Digicel TT to explore solutions to reduce the amount of waste generated during Carnival, for example by implementing reusable cups as an alternative to single use plastic bottles, and the use of water ATMS which can be provided by local company Hydrastation.

<b>Deliverables</b>	<b>Timeframe</b>	<b>Delivery date</b>
Meeting minutes and action steps for collaborating with Mr. Montano and/or Digicel TT	2 months	End August 2016
Secure participation/involvement of key stakeholders in the marine litter reduction strategy	2 months	End September 2016

**Activity 3** - Develop and launch communications strategy to build awareness of marine litter amongst organisers of Carnival and relevant agencies

Based on the findings of the consultation processes under Activities 1 and 2 we will discuss the adoption of best practices to reduce marine litter with the broader community of Carnival organisers and agencies through a targeted outreach program.

3.1 Identify key target audiences, including individual fete organisers, bar companies hired by the Carnival fetes to manage and/or sell their beverages for the duration of the event, owners of Carnival bands, governmental agencies, waste collection and disposal entities and Port of Spain agencies etc.

3.2 Develop a communications strategy that will help to create a shift in thinking about how Trinidadians generate and disposes of solid waste during the Carnival season. This will include messaging, content and avenues for outreach to the target audiences, such as via radio and television advertisements and interviews, a social media campaign, a national launch event, involvement of the marine litter champion and possible collaboration with the International Coastal Cleanup- Trinidad & Tobago (ICCTT) and eXXpedition on awareness-raising events.

Many of the key stakeholders working in the Carnival industry will be interested in financially viable options to using fewer disposable items, so there is potential to link this project with the proposed project in the GCFI concept note about marine litter innovation and cost analysis, and then to highlight the financial benefits of producing less waste during Carnival. Should meaningful data be available from the cost analysis work then we will seek to include this as content for communications materials targeted at those stakeholders.

We will utilise existing statistics from ICCTT annual nationwide beach clean ups like 75% of materials collected were single use items such as plastic utensils and containers to assist with the development of the communications strategy. We will seek opportunities to collaborate with newsworthy associated activities on marine litter reduction, such as utilizing data collected about microplastics in T&T's waters by eXXpedition, a group of women sailing around the world collecting environmental samples to assess plastic and pollutants. eXXpedition sailed to Trinidad in February 2016 and will be returning in 2017 closer to the Carnival season and also seeks to have an impact locally on reducing marine litter.

3.3 A particularly important stakeholder for consultation and ongoing communications is Mr. Dean Ackin, CEO of Ultimate Group which is the main organiser for many carnival events leading up to Carnival Monday and Tuesday, as well as the Carnival parade itself. We will meet with Mr. Ackin and using the communications materials explain how they can reduce the amount of disposable materials used, how they can work with the bar companies they hire to ensure appropriate disposal of beverage containers at the end of the event and how they can help to promote the importance of reducing marine litter. We will work with him to create the most effective strategy to reduce use of disposable materials during his fetes as well as on Carnival Monday and Tuesday.

3.4 Implement communications strategy throughout lead-up to Carnival, during, and post-Carnival events.

3.5 Monitor and evaluate the impact of the communications strategy.

We would like to have baseline figures and analyses from past Carnivals that track visitor numbers, plastics use, recycling, landfill, images to document events and waste created, and figures for costs of dealing with waste, so as to compare the contribution of this project, but there has been no such data collected so far. This project would be the first of its kind and includes monitoring activities to establish some baseline data, using teams of field staff to sort, weigh and collate data on waste, and contacts with organisers to establish estimates of visitor numbers and plastics use.

We will also utilise determined communications strategy objectives and outcomes from the implementation process as a monitoring and evaluation method. This would be a short-term evaluation using key stakeholders' feedback on whether there is a shift in the level of awareness on marine litter and its implications.

<b>Deliverables</b>	<b>Timeframe</b>	<b>Delivery date</b>
Communications strategy in support of marine litter reduction during Carnival	2 months	End August 2016

Report on meetings and awareness-raising events held, press achieved and reach of campaigns	3 months	November 2016
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**Activity 4 – Strengthen solid waste mechanisms in Port of Spain to capture and recycle litter before it enters the ocean**

4.1 Consult with all organisations to create most effective strategy to reduce marine litter in POS throughout the lead up to and during Carnival. This will involve approaching various waste organisations (both public and private sector), outlining the issues related to marine litter and sharing best practice solutions to dispose of waste properly. These organisations would include but not limited to:

- The Government of Trinidad & Tobago (GOVTT)
- I Care Trinidad & Tobago (ICARETT)
- The Trinidad and Tobago Solid Waste Management Company (SWMCOL)
- Carib Glass Ltd.
- Plastikeep

4.2 Focus on increasing the proportion of waste from Carnival that is recycled. The GOVTT is responsible for waste disposal to our dump sites. These dump sites have reached their carrying capacity, however are still in use, which means that waste is not being effectively disposed of. During the two-day Carnival event, usually the Monday and Tuesday before the religious holiday Ash Wednesday, the GOVTT collects all waste disposed of from the streets of Port of Spain and transports it to one of Trinidad’s dump sites. It would be beneficial to separate and where possible recycle this material instead of leaving it unsorted in landfill on the outskirts of the Capital.

In order to increase the proportion of waste from Carnival that is recycled, they would need to have a Material Recovery Facility (MRF), which would be costly. Another option would be to engage with ICARETT, SWMCOL or Plastikeep (projects and companies with recycling components) who would be asked to collect, sort and export recyclable waste to other countries. It is important to note that as of April 2016, the GOVTT has stated their plans for a recycling facility. The status of said facility will determine the fate of Trinidad’s marine litter reduction strategies.

4.3 With relevant agencies and private sector partners, hold a national/regional meeting on ‘Entertainment and Sustainability in the Caribbean’ prior to Carnival. This would address marine litter reduction and solid waste management – recycling, dealing with organic waste, materials disposal and repurposing. There is also scope, together with other partners, to address energy and greenhouse gases during Carnival – lighting, making an event carbon neutral - and community sustainability in general.

Deliverables	Timeframe	Delivery date
Marine litter reduction strategy	3 months	November 2016
Meeting report ‘Entertainment and Sustainability in the Caribbean’	2 months	January 2016

**Activity 5 – Implement marine litter reduction strategy during Carnival 2017**

5.1 Implement marine litter strategy, including through a series of ‘Green Carnival’ events

5.2 Follow up with the participating organisations to determine the issues and/or successes of the model. Determine whether this model is feasible for replication at the next year’s Carnival. Prepare case study on lessons learned to share with other organisers of major cultural and sporting events in the Caribbean.

5.3 Create a baseline of information with regard to number of visitors, how much waste was generated and how much is/ can be sorted and recycled. In 2015, Plastikeep collected co-mingled plastics, sorted and bailed three full containers that were shipped from Port of Spain to Georgia, USA. They spent approximately \$30000 from planning to completion on this process. This cost also included hiring staff to collect and sort plastics over the two-month period. If the GOVTT does not set up a recycling facility by Carnival 2017, it would be beneficial to create a temporary material sorting facility where we can gather baseline data on waste collected during Carnival.

5.4 Based on findings, prepare action plan for introduction of this approach for future Carnivals (phased approach with proposed reduction goals)

Deliverables	Timeframe	Delivery date
Marine litter reduction strategy implemented during Carnival	1 month	February 2017
Gather baseline data on waste generated	2 months	April 2017
Report on Green Carnival events and lessons learned	2 months	May 2017

**Notes-**

- We would like to acknowledge reviewers comments as they have been taken into consideration
- It is important to note that this pilot study is geared towards communicating and collaborating with key stakeholders, which will be determined by Activity 1 as we gather background information. Utilising this knowledge, we would like to create an effective communication strategy that may incorporate suggestions such as widening the key stakeholder scope with beverage companies, caterers and food producers, etc. These stakeholders do not necessarily have an economic incentive to use alternative packaging, and this concept note focuses on technical support and outreach rather than purchasing alternative packaging to reduce single use material waste
- It was suggested that six to eight months may be sufficient amount of time for this pilot study, however it's important to note the majority of Carnival organisers start planning for the following year's celebrations immediately after the current year. By March/ April of every year, organisers are in discussions for upcoming events. The first set of Carnival fetes start in July/ August with "Band launches"
- It was suggested that we look at music genres outside of soca. These were not considered for the pilot study because we looked at where the most waste would be generated, which centered around the largest fetes, namely soca fetes
- As it is a pilot study, we plan to focus on one soca artist that has shown interest in waste reduction, one sponsor and one fete organiser who hosts numerous events during the Carnival season. The overall study will also be focused on one major event, namely Carnival in Port of Spain. As we implement this pilot study, we will be better equipped to determine the most effective means reducing marine litter through individual stakeholders. This may result in partnering with one or a combination of all of these aforementioned stakeholders
- At the end of this pilot study, we will be better equipped to look at the wider range aforementioned suggestions such as expanding on partnerships formed during the 2016- 2017 Carnival season for the 2017- 2018 season, hosting Jack Johnson at the New Fire Festival, Trinidad and Tobago's Great Race as it relates more to the marine environment, partnering with local radio stations affiliated with Machel Montano's company so that the communications strategy has a broader reach, duplicating this pilot on another Caribbean island with an annual Carnival celebration, as well as reaching out to a wider target audience such as accommodation providers and transport providers such as airlines, etc.
- We wish to suggest a potential match for Jack Johnson with the New Fire Festival which is Trinidad's sustainability festival centered around having zero waste, but not focusing on Carnival music. They highlight local musicians that create alternative music to soca and calypso. For more information- <http://www.newfireworld.com/>
- Ideally, this pilot study will be part of a series of events during the lead up to Carnival as well as on Carnival Monday and Tuesday, however this is dependent on initial discussions with key stakeholders as well as the activities developed in line with the communications strategy
- The suggestion was made to broaden Activity 3 to include accommodation providers and transport providers such as airlines, and it may be that communications with these stakeholder groups will come about as part of the communications strategy. However in this first pilot we propose keeping a focus on the target audiences as originally proposed in order to ensure feasibility and greatest impact
- There have been initial discussions with key stakeholders such as the GOVTT, Port of Spain City Corporation, SWMCOL and Plastikeep. At this time, there is political uncertainty for implementing an effective waste management system. SWMCOL has a mandate from the GOVTT to receive all waste that is generated in

Trinidad, with no additional resources to dispose of it properly. There are also many players involved in waste management in Trinidad & Tobago, for example SWMCOL receives waste while City Corporations collect and transport. These systems are fragmented, and with outdated legislation makes for an inefficient system. It is important to gather the most current information as it relates to implementing this pilot study

### **Part B – Activity Based Budget**

<b>Budget</b>				
<b>Activity</b>	<b>Quantity</b>	<b>Unit</b>	<b>Unit Cost (USD)</b>	<b>Total Cost (USD)</b>
<b>Activity 1 – Gather existing information, identify key stakeholders and undertake preliminary consultation</b>				
List of key actors consulted with about the establishment of waste management during Carnival; copies of presentations made at consultation meetings and any materials shared	2 months	\$/month	\$3000	\$6000
Consultation meetings with key actors	2 days	\$/day	\$500	\$1000
<b>Sub-total</b>				<b>\$7000</b>
<b>Activity 2 – Identify and recruit a celebrity marine litter champion</b>				
Meeting with key stakeholders, discussing options to reduce marine litter at events, alternatives to single use materials, and communications strategy. Secure participation/involvement of key stakeholders in the marine litter reduction strategy. Produce minutes and action steps for collaborating with Mr. Montano and/or Digicel TT	2 months	\$/month	\$3000	\$6000
<b>Sub-total</b>				<b>\$6000</b>
<b>Activity 3 – Develop and launch communications strategy to build awareness of marine litter amongst organisers of Carnival and relevant agencies</b>				
Communications strategy in support of marine litter reduction during Carnival	2 months	\$/month	\$3000	\$6000
Report on meetings and awareness-raising events held, press achieved and reach of campaigns	3 months	\$/month	\$660	\$2000
<b>Sub-total</b>				<b>\$8000</b>
<b>Activity 4 – Strengthen solid waste mechanisms in Port of Spain to capture and recycle litter before it enters the ocean</b>				
Marine litter reduction strategy	3 months	\$/month	\$3000	\$9000
Meeting with key actors on ‘Entertainment and Sustainability in the Caribbean’	1 week	\$/week	\$1000	\$18000
Meeting report ‘Entertainment and Sustainability in the Caribbean’	2 months	\$/month	\$1000	\$2000
<b>Sub-total</b>				<b>\$29000</b>
<b>Activity 5 – Implement marine litter reduction strategy during Carnival 2017</b>				
Marine litter reduction strategy implemented during Carnival	1 month	\$/month	\$3000	\$9000
Gather baseline data on waste generated by collecting, sorting and shipping materials to USA to be recycled (this cost will only be incurred if the GOVTT does not have a recycling system in place by Carnival 2017)	2 months	\$/month	\$15000	\$30000
Report on Green Carnival events and lessons learned	2 months	\$/month	\$1000	\$2000
<b>Sub-total</b>				<b>\$41000</b>
<b>GRAND TOTAL</b>				<b>\$91000</b>

**Title:** The occurrence of micro-plastic in the intestinal tract of commercially exploited fish from Grenada

**Project coordinator:** Dr. Clare Morrall, WINDREF Research Fellow, St. George' University, Grenada, West Indies

## **Part – A – Implementation Plan**

### **Background**

The Gulf and Caribbean Fisheries Institute (GCFI) and UNEP's Regional Coordinating Unit for the Caribbean (CAR/RCU), which also serves as Secretariat of the Cartagena Convention, are co-hosting a Regional Node for the for the Global Partnership on Marine Litter (GPML) in the Wider Caribbean Region (WCR). The purpose of the GPML node is in part to identify opportunities to support marine litter activities in the region, including small projects.

This concept note outlines a small project related to microplastic ingestion by commercially important species of fish in the Caribbean region. This is one of two high priority small projects to be implemented under the Small Scale Funding Agreement between UNEP and GCFI which establishes the Caribbean node of the GPML.

The occurrence of micro-plastic in the intestinal tract of marine fish is a concern to human health due to the potential increased contamination of this food source by contaminants associated with plastics waste in the marine environment. Survey methods developed by Maria Cedras and Jude Bijoux, Seychelles Fishing Authority, of micro-plastic in the intestines of commercially harvested fish from the Seychelles provide guidelines for surveys of microplastic role in potential contamination of human food sources (Appendix 1). A preliminary survey of a variety of commercially harvested fish from Grenada will provide much-needed information for the Caribbean region.

### **Objective**

The aim of the project is to document the occurrence of micro-plastic particles in the intestinal tract of a number of commercially targeted fish from Grenada. The specific objectives are: i) to document the occurrence of microplastics in intestinal tract of up to 6 different fish species; and ii) compare the type, colour, size and amount of microplastics found among species.

### **Activities**

#### **Activity 1 –**

##### **1.1 Determine species of fish for inclusion in sampling**

Six fish species with pelagic, semi-pelagic and demersal life histories will be identified. To the extent possible, species as close to those utilized by the Seychelles project will be sampled. The types of fish would include two true pelagics (tuna), two semi-pelagics (jacks), and two demersal species (snapper).

##### **1.2 Acquire research permit**

The relevant research permits will be requested from Mr. Justin Rennie, Chief Fisheries Officer of the Fisheries Division, Ministry of Agriculture, Lands, Forestry, Fisheries & the Environment.

##### **1.3 Acquire specialist laboratory equipment and supplies**

This study requires several pieces of specialist equipment that are not currently available in Grenada. In particular, we will acquire a sufficiently sensitive balance.

##### **1.4 Acquire fish samples**

Fish will be purchased from fishermen or, if possible, discarded stomachs and intestines will be collected as fish are processed. Up to 60 fish will be sampled. Based on availability, 10 fish of each species will be collected. The type and number of fish sampled may vary depending upon availability at local fish markets. The fork length (LF) of each individual sampled will be recorded along with its weight (nearest g) and species identification.

<b>Deliverables</b>	<b>Delivery date</b>
<i>List of species for inclusion in the study</i>	<i>Two days after start</i>
<i>Research permit</i>	<i>One to four weeks</i>
<i>List of fish sampled in preliminary study by species and length</i>	<i>Two weeks after granting of permit</i>



## Activity 2 –

### 2.1 Processing of samples

Each fish gut will be carefully removed, tied at its two ends to ensure that there is no spillage of gut content, labelled and stored in a deep freezer for subsequent analysis in the WINDREF laboratory.

### 2.2 Intestinal tract analysis

We will sort the intestinal tract contents of each fish sampled and remove and record all pieces of microplastic  $\geq 250\mu\text{m}$ . The type, colour, size and amount micro-plastic will be recorded as per the methodology applied in the Seychelles' project.

Deliverables	Delivery date
<i>Preliminary data on first 12 fish sampled</i>	<i>Three weeks after granting of permit</i>

## Activity 3 –

Comparisons of microplastic ingestion between species will be made. A report documenting the presence of microplastics in the fish sampled during this study will be prepared.

Deliverables	Delivery date
<i>Project report</i>	<i>Six weeks after granting of research permit</i>

## Part B – Activity Based Budget

Budget				
Activity	Quantity	Unit	Unit Cost (USD)	Total Cost (USD)
<b>Activity 1 –</b>				
Lab disposables and storage containers	1	Total	450	450
Transport to buy fish	1	Per item	100	100
Scale	1	Per item	500	500
Shipping and handling of importation	2	Per item	50	50
Purchase of fish	60	Per fish	15	900
Salary Research Assistant	60	\$/hour	10	600
Project Coordinator	3	\$/day	400	1,200
<b>Sub-total</b>				<b>3,750</b>
<b>Activity 2 –</b>				
Salary Research Assistant	120	\$/hour	10	1,200
Project Coordinator	3	\$/day	400	1,200
<b>Sub-total</b>				<b>2,400</b>
<b>Activity 3 –</b>				
Salary Research Assistant	40	\$/hour	10	400
Project coordinator	2	\$/day	400	800
<b>Sub-total</b>				<b>1,200</b>
<b>Total</b>				<b>7,350</b>
<b>WINDREF Overhead</b>	<b>10%</b>		<b>7300</b>	<b>735</b>
<b>Grand total</b>				<b>8,080</b>

## GCFI Report – Microplastics in Commercially Exploited Fish from Grenada

### **Introduction**

This was a short pilot study of the Caribbean regional node of the Global Partnership on Marine Litter (GPML Caribbean) which is co-hosted by GCFI and UNEP Regional Coordinating Unit for the Caribbean. The purpose of the project was to establish the presence of microplastics in commercially exploited fish in Grenada.

### **Methods**

- 34 samples were analysed in total, from 7 different species - 6 samples of Red Hind, Red Snapper, Mutton Snapper and Barracuda, 5 samples of Blue Runner, 4 samples of Mahi Mahi and 1 sample of Yellowfin Tuna.
- The fish were either bought from the local fish market, or acquired from local fishermen.
- Measurements of the fish were taken, including the fork length, overall weight and once the guts had been removed, the gut weight was taken too.
- Liver samples were taken, and stored for future analysis (collaborations with a number of other institutes are currently in talks).
- The samples were then placed in a 10% potassium hydroxide (KOH) solution and placed in a water bath at 60°C for a number of days.
- The samples were passed through a 180µm sieve and rinsed with water to remove any residual KOH.
- Analysis took place under the dissecting microscope, and anything that looked potentially plastic was removed and further examined under the compound microscope.
- All the microplastics were visually confirmed by two people.

### **Results**

- 97.1% of samples contained microplastic (33 of 34 samples)
- 272 pieces of microplastic fibre were found in total
- 14 pieces of microplastic film were found in total
- 94.1% of the samples contained microplastic fibres and 26.5% contained microplastic film pieces.
- Clear fibres were the most common colour found, followed closely by blue, but yellow, red, orange, green and pink fibres were also found.
- The most fibres found in one sample was 25.

Species	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Total
Red Snapper	0	7	2	25	25	7	66
Red Hind	1	15	1	10	2	1	30
Mutton Snapper	6	2	10	2	10	24	54
Barracuda	9	9	7	0	25	1	51
Blue Runner	4	1	12	20	8	-	45
Mahi Mahi	1	9	6	6	-	-	22
Yellowfin Tuna	4	-	-	-	-	-	4

Number of microplastic fibres in each sample ( – indicates sample not obtained)

The findings of the project were presented at the 69<sup>th</sup> Gulf and Caribbean Fisheries Institute conference in Grand Cayman in November 2016 by Ms. Taylor, and a manuscript is being prepared to be submitted to the Gulf and Caribbean Research journal later this month.

## ATTACHMENT A

**Title:** Links between marine litter and the prevalence of mosquito-borne public health concerns

**Project coordinator:** Seann D. Regan, All Points Geospatial Consulting

### Budget and Implementation Plan

#### Part – A – Implementation Plan

##### Background

The Gulf and Caribbean Fisheries Institute (GCFI) and UNEP's Regional Coordinating Unit for the Caribbean (CAR/RCU), which also serves as Secretariat of the Cartagena Convention, are co-hosting a Regional Node for the for the Global Partnership on Marine Litter (GPML) in the Wider Caribbean Region (WCR). The purpose of the GPML node is in part to identify opportunities to support marine litter activities in the region, including small projects.

This concept note outlines a small project related to marine litter and the incidence of mosquito-borne public health concerns such as Chikungunya virus/Chik V in the Caribbean region. This is one of two high priority small projects to be implemented under the Small Scale Funding Agreement between UNEP and GCFI which establishes the Caribbean node of the GPML.

##### Objective

To map the incidence of mosquito-borne public health concerns in the Caribbean, to compare this with plastics consumption, and to put the findings into the context of Zika V.

##### Activities

We will bring together in a number of secondary datasets related to marine litter and mosquito-borne disease and integrate these data into a GIS format. By overlaying GIS data we will investigate potential correlates between the datasets and shed light on the potential risk that marine litter can represent as an amplifier of mosquito-borne disease in Caribbean. We will analyze various environmental data that is known to provide habitat for mosquito breeding, health data as it is available from public health departments in the study region, and demographic data to evaluate issues of poverty, and gender as they may relate incidence of disease and risk. The proposed approach involves a suitability analysis between marine litter and mosquito-borne disease rather than a rigorous analysis of data, working with the available datasets without undertaking cleaning of data. By developing associated graphics we will tell a story about potential risks associated with marine litter and mosquito-borne public health concerns and highlight a role for marine litter reduction in the Caribbean.

##### Activity 1 – Review

1.1 Literature review including:

- Chik V background information (eg. disease information to guide selection of datasets);
- Mosquito habitat and range, links with urban environment of Caribbean SIDS;
- Plastics consumption and distribution of marine litter;
- Past studies of marine litter and human health.

<b>Deliverables</b>	<b>Delivery date</b>
<i>Annotated bibliography</i>	<i>One week</i>
<i>Recommendations on secondary datasets for possible source data</i>	<i>With the annotated bibliography</i>

## Activity 2 – Data analysis

### 2.1 Review of secondary spatial datasets that can provide source data (meta-data):

- Public health data (eg. country health departments, regional health organizations);
- Marine litter (eg. Ocean Conservancy ICC);
- Population data including indicators of poverty, urban settlements, gender issues (eg. worldpop.org.uk; World Bank, UNDP, UNESCO);
- Financial impact (eg. past studies; World Bank, UNDP);
- Marine habitat (eg. CLME, TNC, FAO);
- Mosquito presence (eg. Vectormap.org, map.ox.ac.uk);
- Precipitation levels (5C's);
- Land Use Land Cover (eg. NLCD);
- Elevation (with a view to buffering data for coastal areas, TNC, NOAA Digital Elevation Models, FAO).

### 2.2 Determine geographic scope and scale of project (rank criteria for data layers)

### 2.3 Organize data inputs from public health sphere and marine litter

### 2.4 Transform data into comparable datasets

### 2.5 Decide on hosting platform for maps/outputs

Deliverables	Delivery date
<i>Review secondary datasets, determine scope</i>	<i>One week</i>
<i>Collect/organize data and integrate into geodatabase</i>	<i>Three days</i>
<i>Analysis of data and development of web map/story map</i>	<i>10 days</i>

## Activity 3 – Reporting

### 3.1 Develop web map/story map

### 3.2 Prepare supporting materials for reporting, including graphics and images, possibly also animations (dependent on data)

Deliverables	Delivery date
<i>Summary report and graphics (ppt and printed version)</i>	<i>One day</i>
<i>Make interactive graphics available on website</i>	<i>TBD in discussion with GCFI</i>

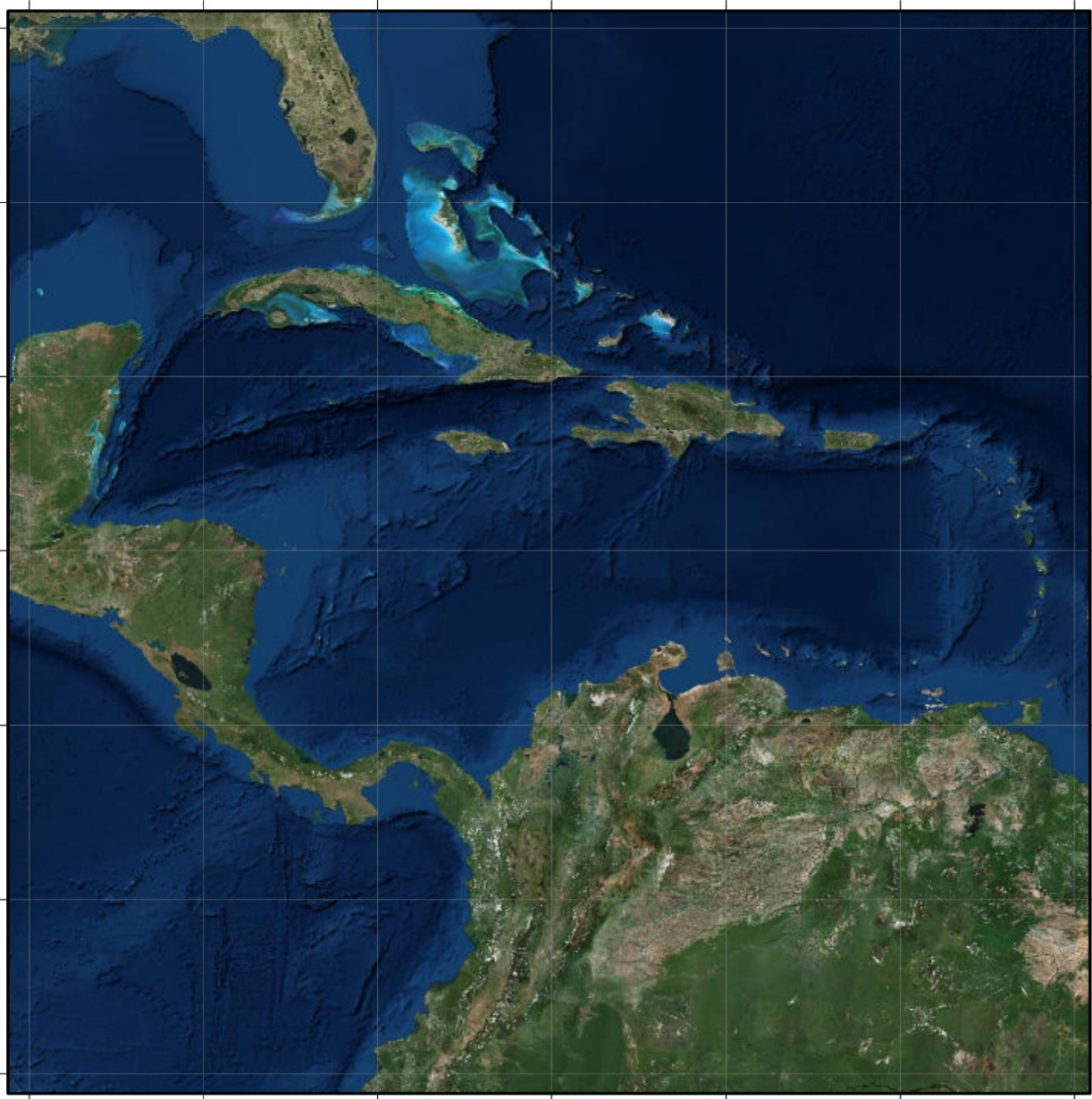
## Part B – Activity Based Budget

Budget				
Activity	Quantity	Unit	Unit Cost (USD)	Total Cost (USD)
<b>Activity 1 –</b>				
Literature review and recommendations	2 days	\$/day	350	700
<b>Sub-total</b>				700
<b>Activity 2 –</b>				
Review source data	5 days	\$/day	350	1750
Collect/organize data and integrate into geodatabase	3 days	\$/day	350	1050
Analysis	10 days	\$/day	350	3500
<b>Sub-total</b>				6300
<b>Activity 3 –</b>				
Reporting	1 day	\$/day	350	350
<b>Sub-total</b>				350
<b>Total</b>				<b>7350</b>
Overhead (10%)				735
<b>Grand Total</b>				<b>8085</b>



# Marine Litter as habitat for Mosquitos in the context of Zika Virus Disease (ZVD)

Working Draft Slides 5/20/2016

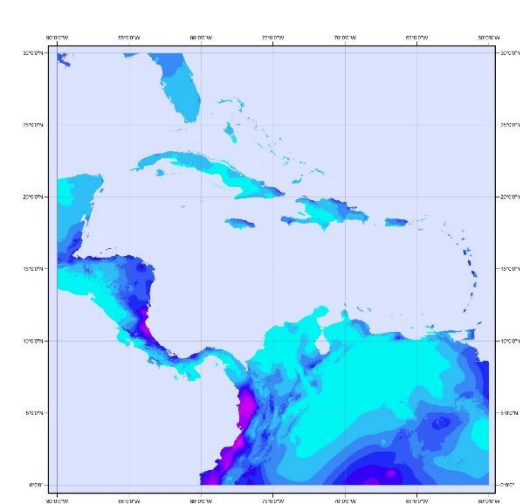


# Regional Study Area:

30 x 30 degree grid between 90 and 60 degrees West and 0 and 30 degrees North

Consistent with the UNEP and FAO Global Administrative Unit Layers (GAUL) initiative

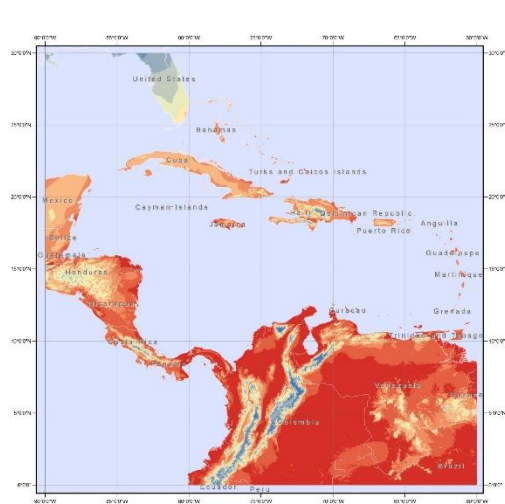
The globe is divided into 72 tiles with a regular frame of 30 degree and pixel resolution of 30 arc-second ( $\sim 1 \times 1$  km). The southern strip, falling in the Antarctica below latitude  $-60^\circ$  was not considered.



## Precipitation

Maximum and minimum annual mean precipitation

Data:  
<http://www.worldclim.org/>



## Temperature

Mean low temperature per grid cell

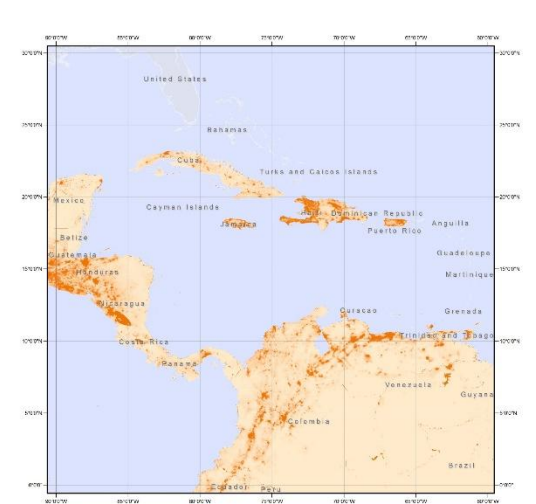
suitable ( $>13^{\circ}\text{C}$ ) and not suitable ( $<13^{\circ}\text{C}$ )

Data:  
<http://www.worldclim.org/>



## Elevation

The *Aedes Aegypti* species mosquitoes, which carry Zika, are not typically found at elevation higher than 6,500 feet/2,000 meters.



## Population Density

Population Density is an important risk factor for Zika

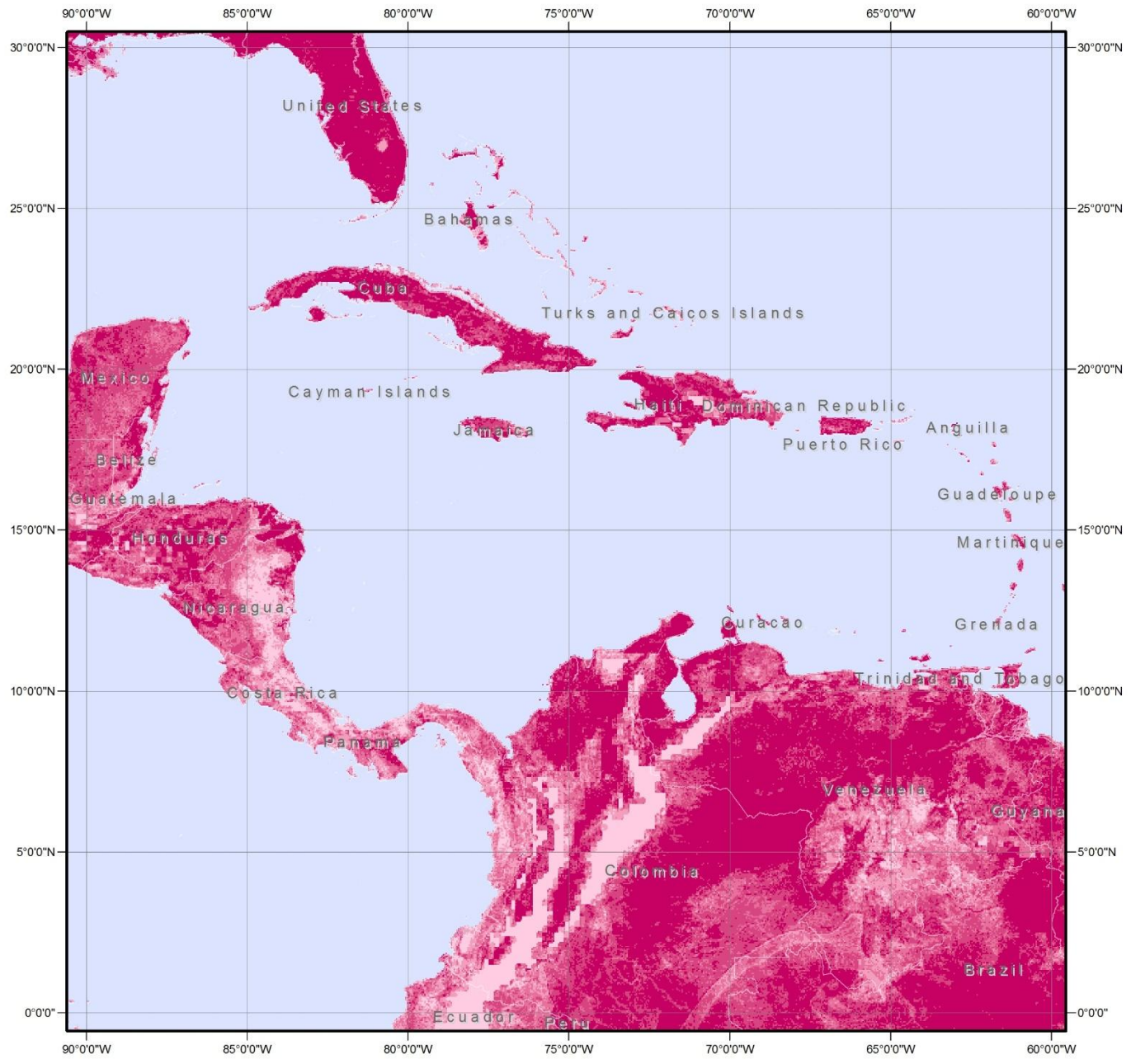
<http://www.nature.com/article/sdata201545>

<https://ij-healthgeographics.biomedcentral.com/articles/10.1186/1476-072X-13-2>



# Aedes Aegypti

## Aedes Aegypti Habitat Suitability Model



(Hay, et al. 2015)  
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4493616/>

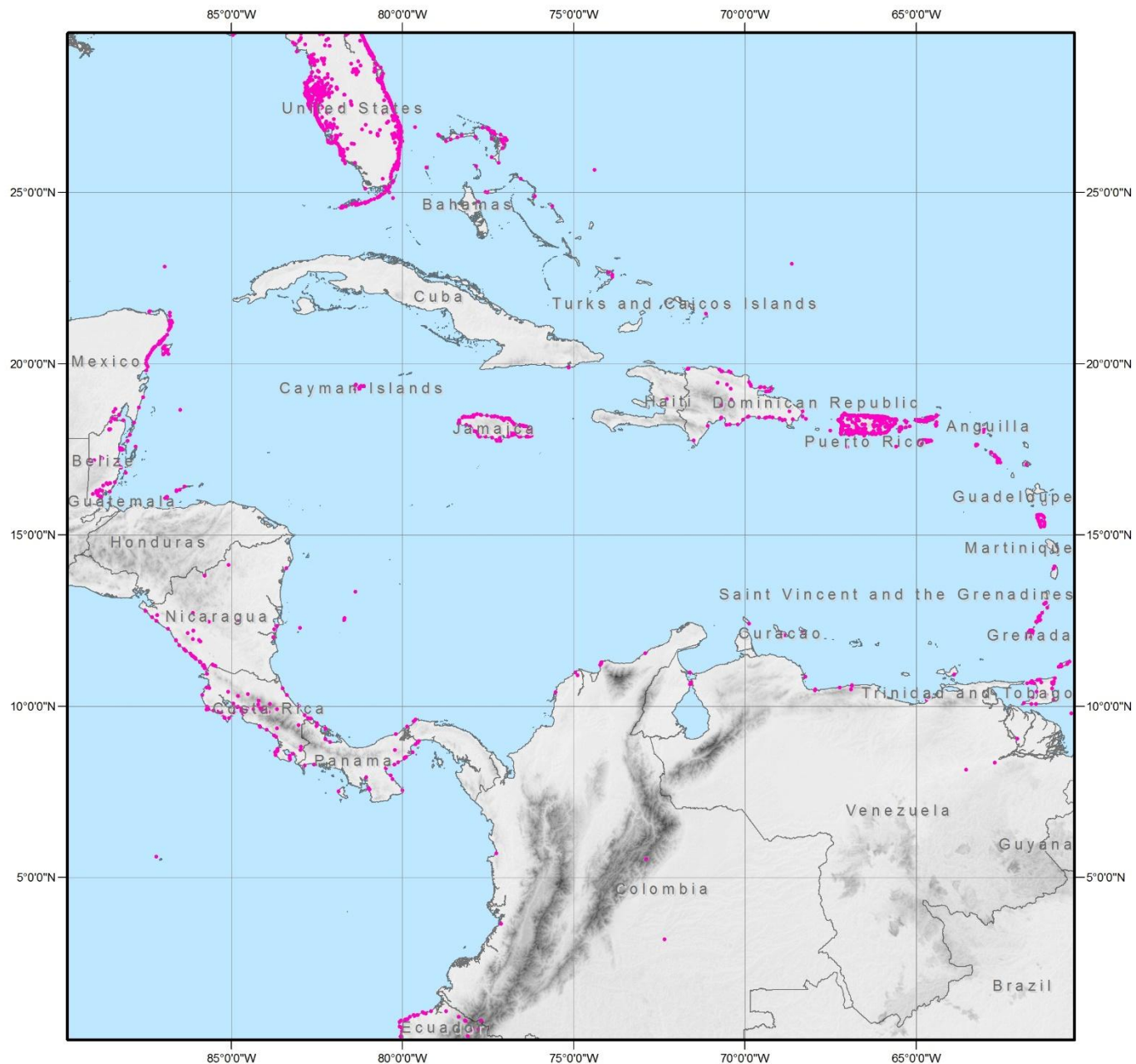
# Marine Litter Data

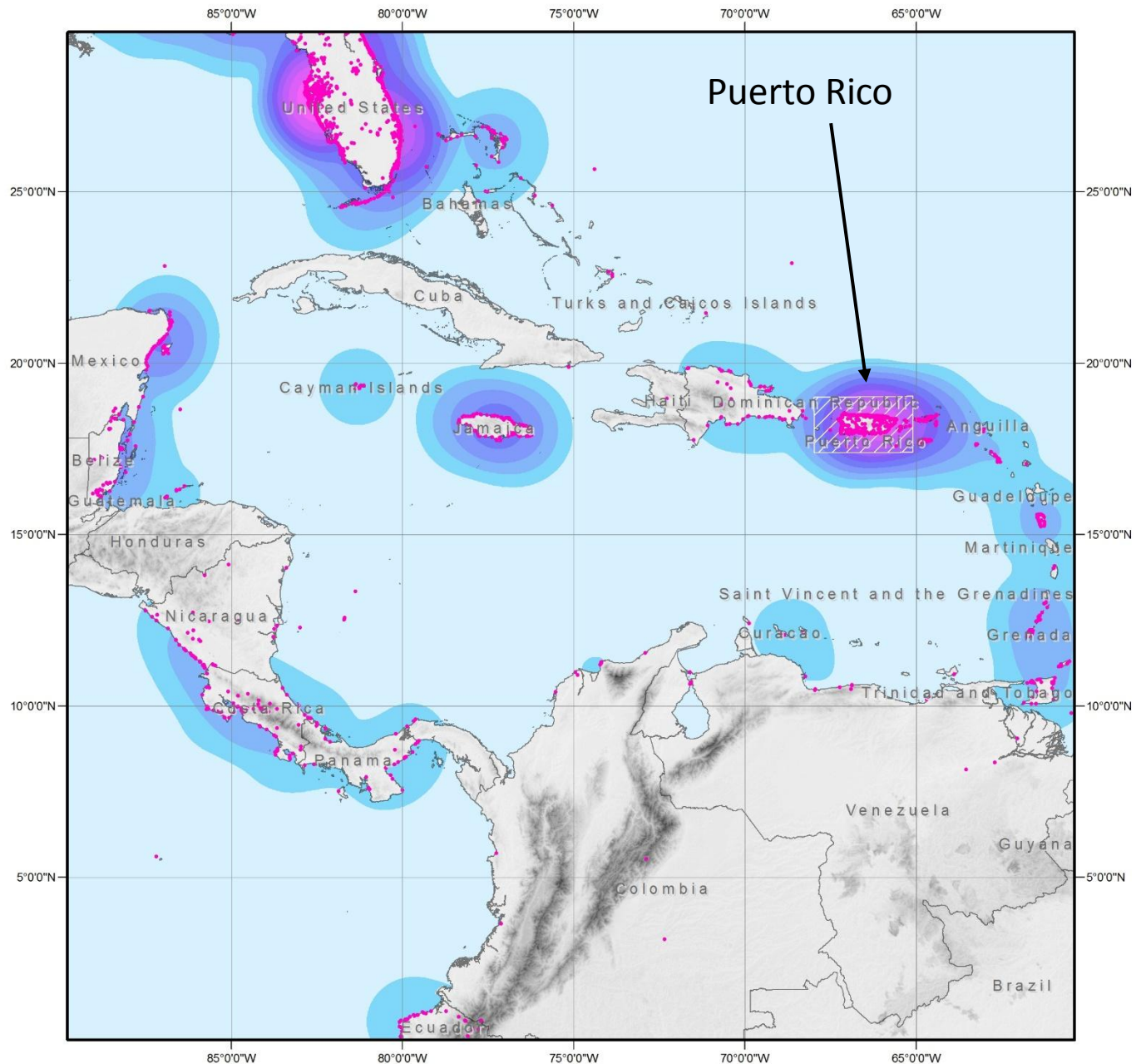
Point database (lat/lon) from coastal cleanup campaigns

Data is organized according to where cleanups occurred, date, people involved, length of beach descriptions of litter attributes.

\*Data is spatially biased (reported on beach cleanup occurred)

Source:  
<http://www.coastalcleanupdata.org/datacollection/index.php?event=locationDashboard&>



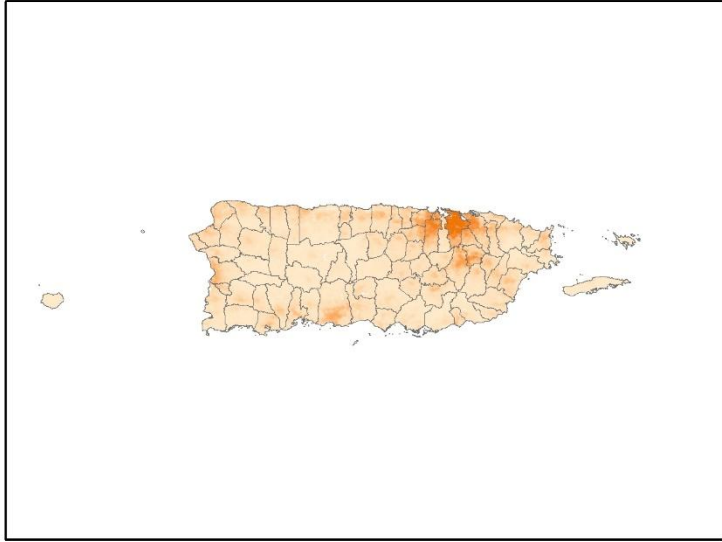


# Marine Debris Data

Marine Litter data were drawn from large database, only those that could potentially hold water were included in analysis. These included, Plastic Containers, Tires, etc. but data such as cigarettes, line nets, and so on were removed from further analysis.

Puerto Rico was chosen as a case study due to the high quality and spatial variability of marine debris data as well as incidence data recently released on Zika V.

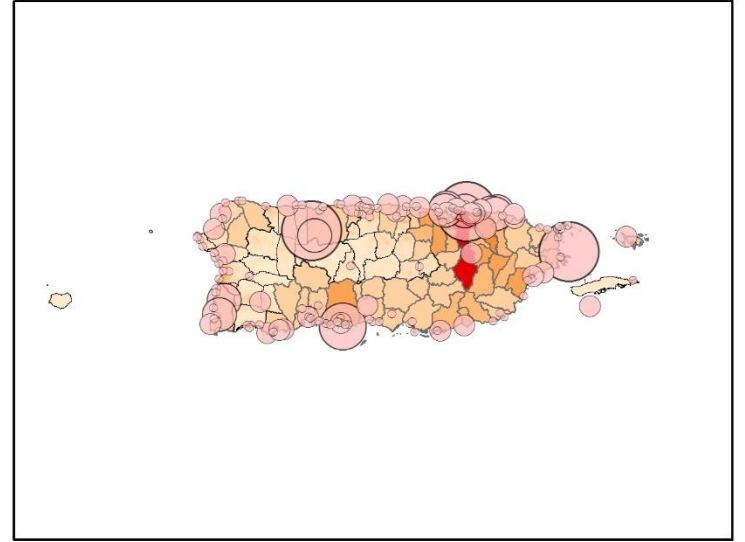
<http://www.cdc.gov/mmwr/volumes/65/wr/mm6517e2.htm>



**Population Density**  
 High  
 Low

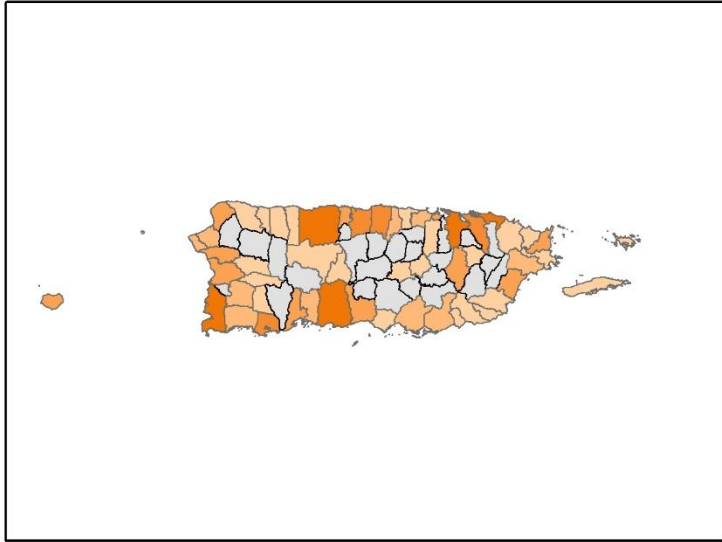


□ Puerto Rico Municipalities

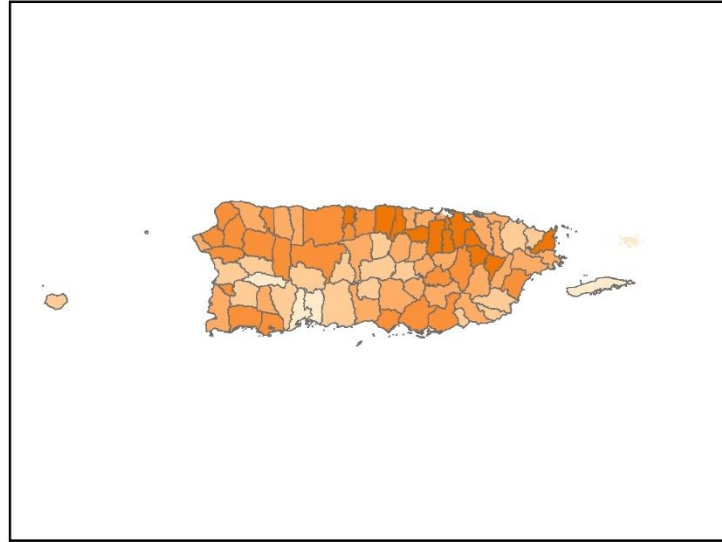
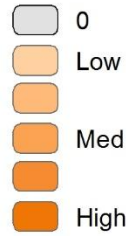


**Marine Litter (items per mile)**

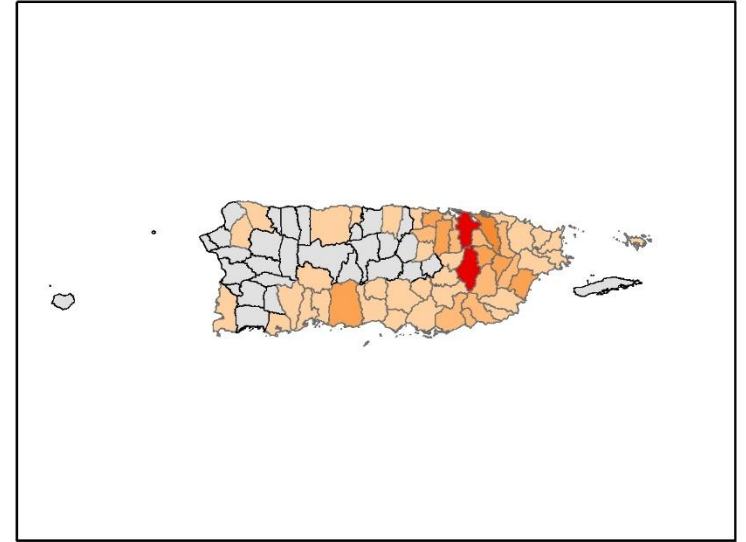
- 70 - 1243
- 1244 - 2415
- 2416 - 3588
- 3589 - 4760
- 4761 - 5933



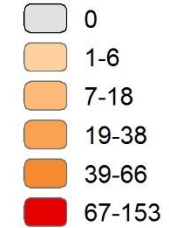
**Marine Debris (Aggregated to Municipalities )**



**Mosquito Habitat Model (Aggregated to Municipalities)**



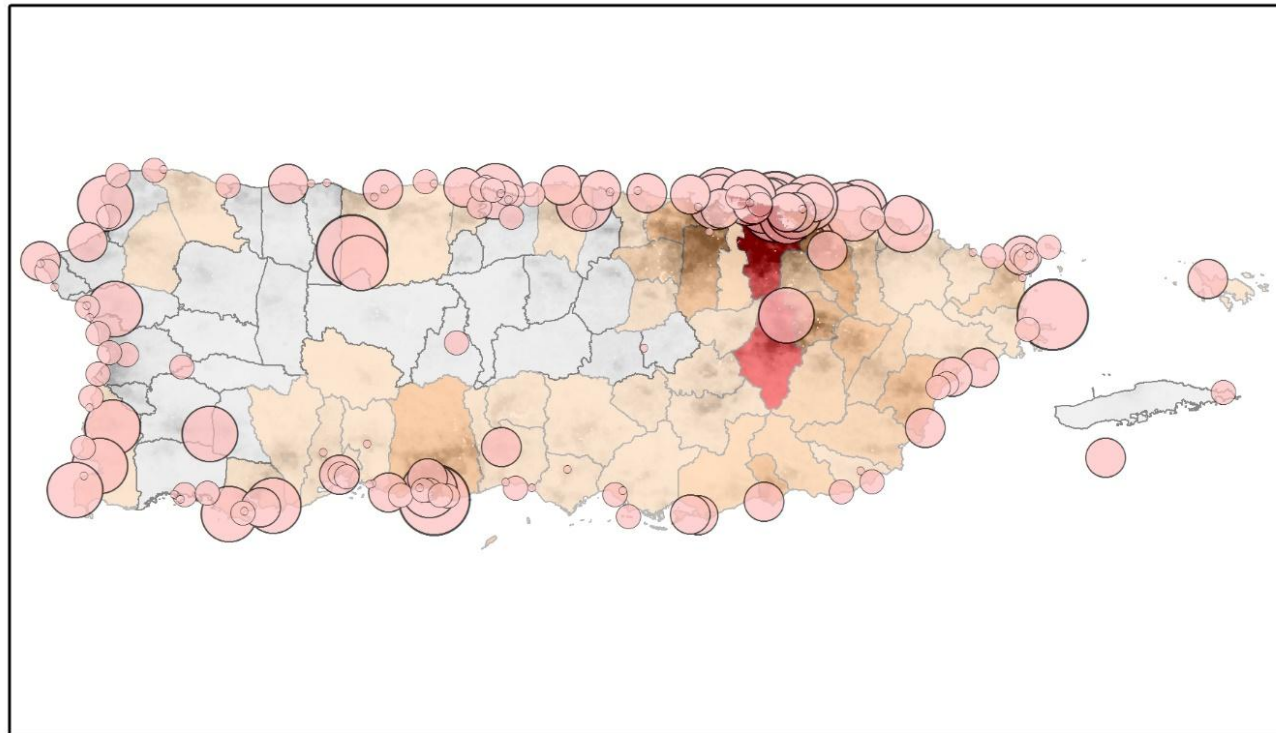
**Zika virus disease (n = 679) November 1, 2015–April 14, 2016**



# Spatial Analysis

Point data (lat/lon) from coastal cleanup campaigns was divided by beach cleanup length to get density by beach mile.

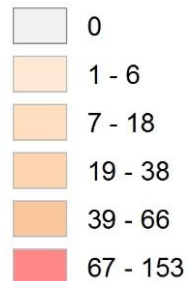
Only marine debris data that could potentially hold water was included in analysis.



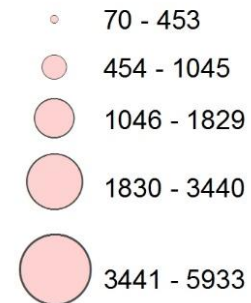
## Population Density



## Confirmed ZVD Cases



## Marine Debris

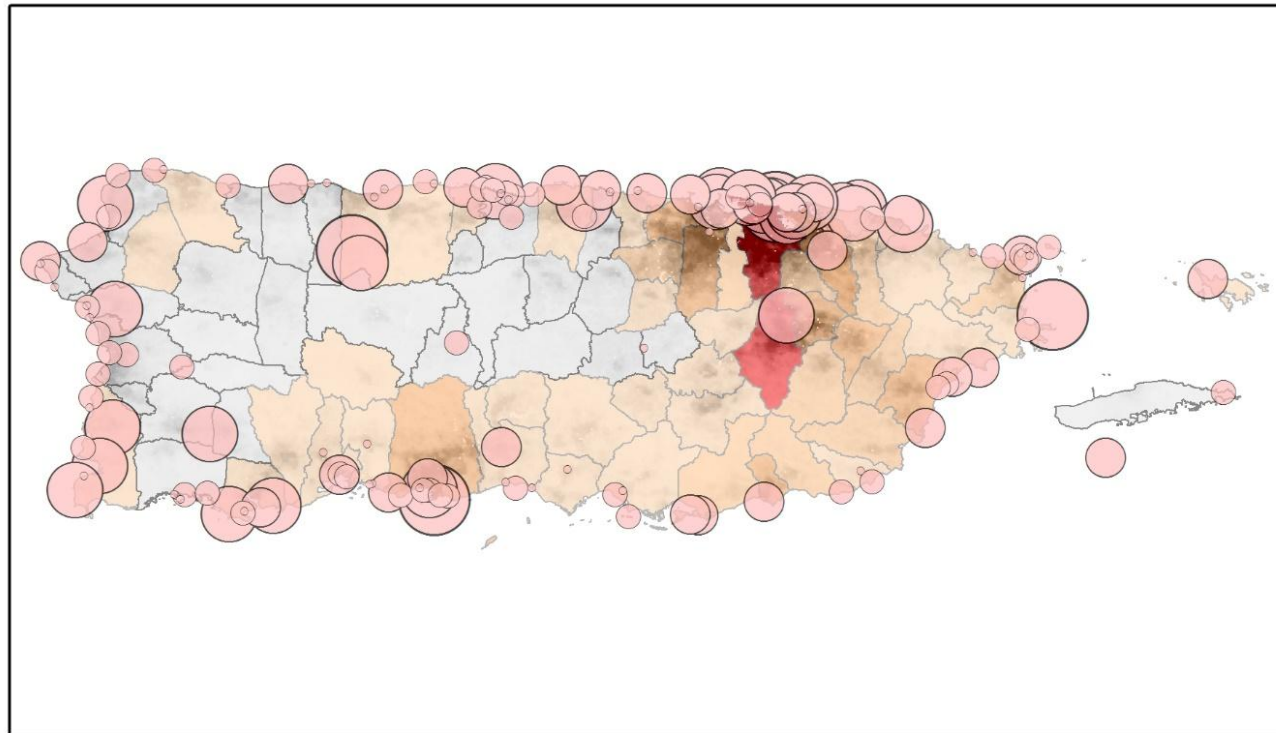


# Spatial Analysis

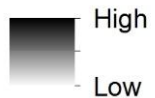
Confirmed ZikaVD Cases were reported at the Municipality level.

Population density is symbolize from light to dark.

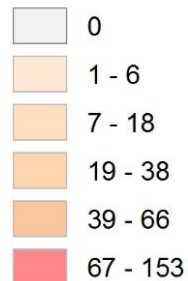
All data were Rasterized and aggregated to Municipalities for comparative analysis.



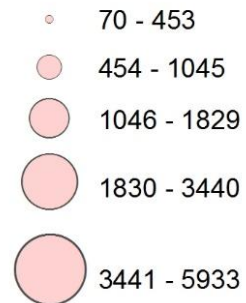
## Population Density



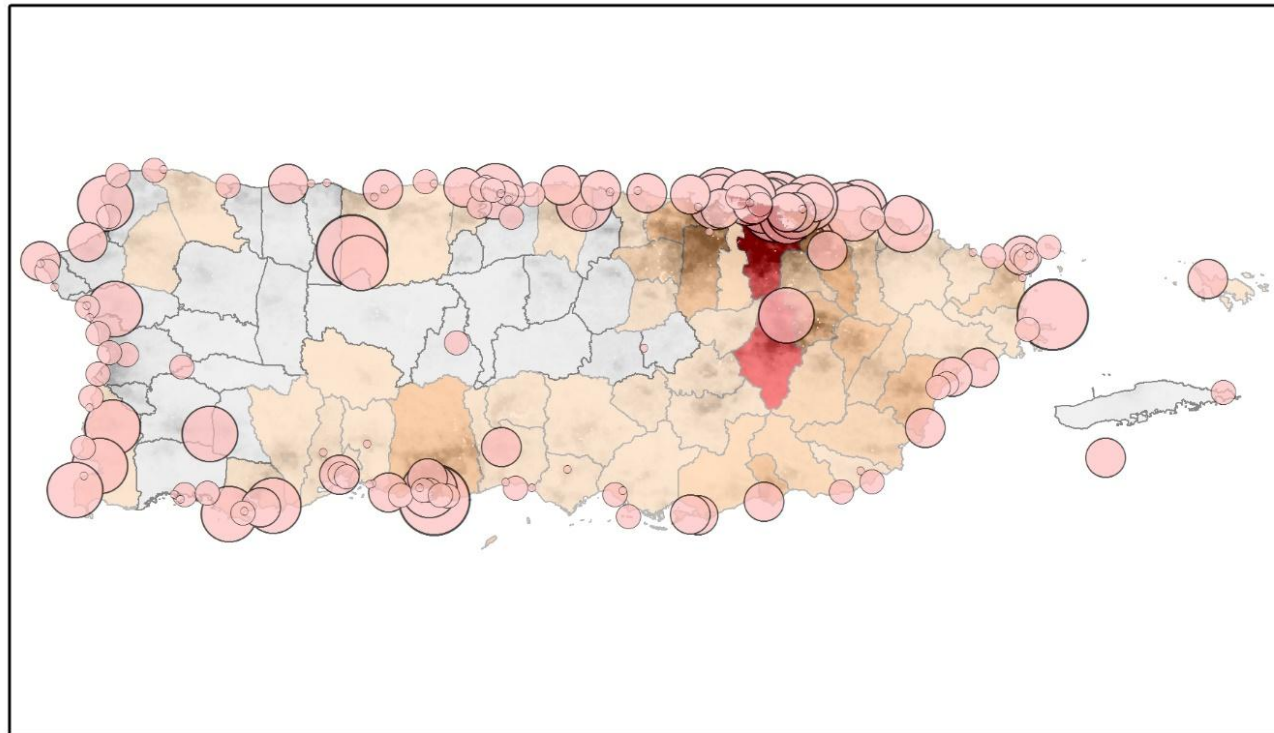
## Confirmed ZVD Cases



## Marine Debris



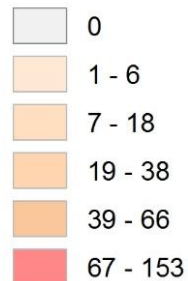
# Spatial Analysis



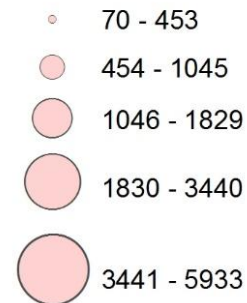
## Population Density



## Confirmed ZVD Cases



## Marine Debris



Marine litter as well as Zika cases are clustered in populated places which is to be expected, however these exploratory analysis show that marine debris may potentially serve to amplify areas already hard hit.

Future analysis should work to test these relationships for statistical significance, controlling for population density, and evaluating other potential correlates of interest, such as data on access to air conditioned homes, poverty status, and percentage of pregnant women.





## **ATTACHMENT A**

**Title:** Innovations and cost analysis of options for marine litter action

**Project coordinator:** Gulf and Caribbean Fisheries Institute, Inc.

### **Budget and Implementation Plan**

#### **Part – A – Implementation Plan**

##### **Background**

The Gulf and Caribbean Fisheries Institute (GCFI) and UNEP's Regional Coordinating Unit for the Caribbean (CAR/RCU), which also serves as Secretariat of the Cartagena Convention, are co-hosting a Regional Node for the Global Partnership on Marine Litter (GPML) in the Wider Caribbean Region (WCR). The purpose of the GPML node is in part to identify opportunities to support marine litter reduction activities in the region, including small projects.

This concept note is based upon the UNEP/RCU Regional Action Plan on Marine Litter Management (RAPMaLi) for the Wider Caribbean Region (2014). The proposed project will address needs identified in the RAPMaLi, in particular the recommendation that *"More research needs to be conducted to determine the various impacts of marine litter on the coastal ecosystems and other indicators. The economic impacts need to be assessed in order to help develop and prioritise response centers for businesses, industries and the public. Social impacts such as health issues should also be assessed in order to inform policymakers and the public of the need for effective management. Furthermore, there is a lack of corrective measures in dealing with the impacts of marine debris."* More specifically, it addresses Monitoring Programmes & Research Action 5 (Conduct an assessment of the economic impacts of marine litter, including costs for clean-up efforts, maintenance of recreational beach areas, costs for lost or abandoned fishing gear and the costs associated with loss of recreational uses of impacted coastal areas).

The proposed project is not part of the current GCFI-UNEP Small Scale Funding Agreement that establishes the GPML node, however, this Concept Note serves to identify the economic implications of marine litter on a number of important coastal resources and activities, and to compare these with the costs to invest in best solid waste management practices to reduce marine litter in the region. This project furthers the goals of the RAPMaLi as well as other international efforts including Protocol Concerning Pollution from Land-Based Sources and Activities (LBS Protocol) of the Cartagena Convention, the London Convention, MARPOL Annex V in which the WCR was designated a Special Area under Annex V dealing with waste from ships, the Honolulu Strategy, Global Prevention of Marine Litter (GPML), the Global Programme of Action for Protection of the Marine Environment (GPA) and "The Future We Want," an outcome document of the Rio+20 Earth Summit held in Rio de Janeiro, Brazil in 2012.

##### **Objective**

The objective of this project is to conduct an analysis at two Caribbean SIDS related to the costs for coastal clean-up efforts, maintenance of recreational beach areas, costs for lost or abandoned fishing gear (which are included in the RAPMaLi), and the costs associated with loss of recreational uses of impacted coastal areas. Pending outcomes of the small project related to marine litter and mosquito-borne public health concerns, we will evaluate feasibility to include public health costs associated with marine litter, based on costings of impacts of e.g. Chik-V and making a business case for preventing and managing plastic waste and therefore also promoting marine litter reduction in the Caribbean. An additional objective is to examine best practices in solid waste management that address marine litter reduction, and conduct an analysis to determine the costs of investment in them. A benefit:cost analysis will be conducted in order to determine the costs of problems caused by marine litter and most cost-effective approach for addressing marine litter in coastal environments including the cost of inaction.

##### **Activities**

This project will conduct case studies at two SIDS in the Caribbean region. The case studies will focus on the economic impacts of marine litter on coastal resources including the costs to clean litter from beaches and other coastal areas (such as mangroves), the cost of lost or abandoned fishing gear, and the loss of recreational activities associated with marine debris. A benefit:cost analysis will be conducted to determine the most efficacious approach to address marine litter in the two SIDS.

**Activity 1** – Identification of SIDS for analysis – Scoping meeting (GCFI, UNEP-CEP/RCU, and TBA). The SIDS that will be used in this study will be selected based upon the information available with regards to coastal (e.g., recreational) and marine (e.g., fishing) activities with which a comprehensive economic analysis can be conducted.

- 1.1 Review and examine current infrastructure to address marine litter in Caribbean SIDS – this task will focus on a review of the SIDS in the in order to identify the appropriate case studies. This will be based upon the information available with regards to coastal (e.g., recreational and tourism) and marine (e.g., fishing) activities with which a comprehensive economic analysis can be conducted. Each case study will be associated with a SID with different characteristics in order to achieve diversity in results.
- 1.2 Evaluate feasibility to include public health cost associated with marine litter.
- 1.3 Identify relevant expert and make administrative arrangement for expert to assist with economic analyses. This task will include both the advertisement and selection of the appropriate contract with sufficient experience in conducting economic valuations of natural resource activities.

<b>Deliverables</b>	<b>Delivery date</b>
<i>List of proposed SIDS for inclusion in the project and scope</i>	<i>1 month</i>
<i>Hire expert and develop contract</i>	<i>5 weeks</i>

**Activity 2** – SIDS #1 –Economic evaluation of the cost of applying best practices in solid waste management to address marine litter reduction, to clean marine litter from beaches and other coastal areas, or to maintain beaches and coastal areas free of litter.

- 2.1. Identification of management practices approaches that could be applied to reduce marine litter in SIDS #1.
- 2.1 Analysis of the costs associated with each method to manage marine litter and clean beaches and other coastal zones from marine litter in SIDS #1.
- 2.2 Analysis of costs associated with maintaining beaches and coastal areas free of litter in SIDS #1.

<b>Deliverables</b>	<b>Delivery date</b>
<i>Summary of management practices to reduce marine litter – SIDS #1</i>	<i>1.5 months</i>
<i>Summary of costs to manage marine litter in coastal areas – SIDS #1</i>	<i>2 months</i>
<i>Summary of costs associated with maintaining beaches free of litter – SIDS #1</i>	<i>1 month</i>

**Activity 3** – SIDS #1 – Economic valuation of the cost of lost or abandoned fishing gear.

- 3.1 Survey of lost fishing gear in SIDS #1. Fishers and relevant government officials will be surveyed to determine the amount and type of fishing gear lost or abandoned.
- 3.2 Analysis and report on results of the economic loss associated with lost fishing gear in SIDS #1.

<b>Deliverables</b>	<b>Delivery date</b>
<i>Create survey database and tool, and conduct survey</i>	<i>4 weeks</i>
<i>Findings of survey</i>	<i>2 weeks</i>
<i>Report on the economic evaluation of the loss of fishing gear (SIDS #1)</i>	<i>2 weeks</i>

**Activity 4** – SIDS #1 – Analysis of the loss of value of recreational activities and tourism amenity value of nature due to negative impacts of marine litter.

- 4.1 Conduct a review of the recreational activities and tourism associated with the coastal zone in SIDS #1. This task will provide a place-based context for recreational infrastructure that exists in SIDS #1 and provide a baseline status.
- 4.2 Conduct an economic analysis of the impact of marine litter on recreational activities and tourism amenity value.

<b>Deliverables</b>	<b>Delivery date</b>
<i>Summary of findings on lost value of coastal zone recreational and tourism activities</i>	<i>2 weeks</i>
<i>Report of review of SIDS#1 Recreational activities</i>	<i>1.5 weeks</i>
<i>Economic analysis of loss of recreational opportunities and tourism amenity value</i>	<i>3 weeks</i>

**Activity 5** – SIDS #2 – Economic evaluation of the cost of applying best practices in solid waste management to address marine litter reduction, to clean marine litter from beaches and other coastal areas, or to maintain beaches and coastal areas free of litter.

- 2.1. Identification of management practices approaches that could be applied to reduce marine litter in SIDS #2.
- 2.2 Analysis of the costs associated with each method to manage marine litter and clean beaches and other coastal zones from marine litter in SIDS #2.
- 2.3 Analysis of costs associated with maintaining beaches and coastal areas free of litter in SIDS #2

<b>Deliverables</b>	<b>Delivery date</b>
<i>Summary of management practices to reduce marine litter – SIDS #2</i>	<i>1.5 months</i>
<i>Summary of costs to manage marine litter in coastal areas – SIDS #2</i>	<i>2 months</i>
<i>Summary of costs associated with maintaining beaches free of litter – SIDS #2</i>	<i>1 month</i>

**Activity 6** – SIDS #2 – Economic valuation of the cost of lost or abandoned fishing gear.

- 6.1 Survey of lost fishing gear in SIDS #2. Fishers and relevant government officials will be surveyed to determine the amount and type of fishing gear lost or abandoned.
- 6.2 Analysis of the economic loss associated with lost fishing gear in SIDS #2.

<b>Deliverables</b>	<b>Delivery date</b>
<i>Create survey database and tool, and conduct survey</i>	<i>4 weeks</i>
<i>Reports on results of survey</i>	<i>2 weeks</i>
<i>Conduct economic evaluation of the loss of fishing gear</i>	<i>2 weeks</i>

**Activity 7** – SIDS #2 – Analysis of the loss of value of recreational activities and tourism value of nature due to negative impacts of marine litter.

- 7.1 Conduct a review of the recreational activities and tourism associated with the coastal zone in SIDS #2. This task will provide a place-based context for recreational infrastructure that exists in SIDS #2 and provide a baseline status.
- 7.2 Conduct an economic analysis of the impact of marine litter on recreational activities and tourism.

<b>Deliverables</b>	<b>Delivery date</b>
<i>Report on coastal zone recreational activities in the region</i>	<i>2 weeks</i>
<i>Report of review of SIDS#1 Recreational activities</i>	<i>1.5 weeks</i>
<i>Economic analysis of loss of recreational opportunities</i>	<i>3 weeks</i>

**Activity 8** – SIDS #1. Analysis of costs associated with reducing marine litter in the coastal zone including conducting a benefit:cost analysis of costs of reduction including option of doing nothing. This activity will provide an overview of best approaches for dealing with coastal marine litter issues and providing an analysis of the most economical decision. Pending outcomes of the small project related to marine litter and mosquito-borne public health concerns, we will include public health costs associated with marine litter in SIDS #1, based on costings of impacts of e (e.g. GDP loss, mosquito control measures, research and development, clean-up).

- 8.1 Examine the options and costs associated with each option for addressing marine litter in the coastal zones  
 8.2 Conduct a benefit:cost analysis of methods for dealing with marine litter including the option of doing nothing.

Deliverables	Delivery date
<i>Report of options available for addressing marine litter including a costs for each option for SIDS #1</i>	2 months
<i>Conduct a benefit:cost analysis of options for SIDS #1</i>	1 month

**Activity 9** – SIDS #2. Analysis of costs associated with reducing marine litter in the coastal zone. Benefit:cost analysis of costs of reduction including option of doing nothing. This activity will provide an overview of best approaches for dealing with coastal marine litter issues and providing an analysis of the most economical decision. Pending outcomes of the small project related to marine litter and mosquito-borne public health concerns, we will include public health costs associated with marine litter in SIDS #2, based on costings of impacts of e (e.g. GDP loss, mosquito control measures, research and development, clean-up).

- 9.1 Examine the options and costs associated with each option for addressing marine litter in the coastal zone  
 9.2 Conduct a benefit:cost analysis of methods for dealing with marine litter including the option of doing nothing.

Deliverables	Delivery date
<i>Report of options available for addressing marine litter including a costs for each option for SIDS #2</i>	2 months
<i>Conduct a benefit:cost analysis of options for SIDS #2</i>	1 month

## Part B – Activity Based Budget

Budget				
Activity	Quantity	Unit	Unit Cost (USD)	Total Cost (USD)
<b>Activity 1</b> – Identification of SIDS for analysis – Scoping meeting (GCFI, UNEP-CEP/RCU, and TBA)				
Identification of SIDS	1 month	\$/activity	\$4,500	\$4,500
Hire expert/contract development	5 weeks	\$/activity	\$300	\$300
<b>Sub-total</b>				<b>\$4,800</b>
<b>Activity 2</b> – SIDS #1 – Costs to clean marine litter from beaches and other coastal areas				
Report of methods to clean litter from coastal zone (SIDS #1)	1.5 months	\$/activity	\$2,500	\$2,500
Cost analysis to clean beaches	2 months	\$/activity	\$2,500	\$2,500
Report of costs to maintain beaches	1 month	\$/activity	\$1,500	\$1,500
<b>Sub-total</b>				<b>\$6,500</b>
<b>Activity 3</b> – SIDS #1 – Economic valuation of the cost of lost or abandoned fishing gear				
Survey fishers for lost and abandoned fishing gear	3 weeks	\$/activity	\$8,750	\$8,750
Report of results of surveys	2 weeks	\$/activity	\$1,700	\$1,700
Report of economics of lost fishing gear	2 weeks	\$/activity	\$1,750	\$1,750
<b>Sub-total</b>				<b>\$12,200</b>
<b>Activity 4</b> – SIDS #1 – Analysis of the loss of recreational activities associated with marine debris				
Report on Recreational Uses in region	2 weeks	\$/activity	\$1,750	\$1,750
Report on SIDS #1 existing recreational activities	1.5 weeks	\$/activity	\$1,500	\$1,500
Report on economic loss of recreational opportunities and tourism amenity value	3 weeks	\$/activity	\$1,500	\$1,500
<b>Sub-total</b>				<b>\$4,750</b>
<b>Activity 5</b> – SIDS #2 – Economic evaluation on costs to clean litter from coastal areas, and maintain beaches litter free.				
Report of methods to clean litter from coastal zone (SIDS #1)	1.5 months	\$/activity	\$2,500	\$2,500

Cost analysis to clean beaches	2 months	\$/activity	\$2,500	\$2,500
Report of costs to maintain beaches	1 month	\$/activity	\$1,500	\$1,500
<b>Sub-total</b>				<b>\$6,500</b>
<b>Activity 6 – SIDS #2 – Economic valuation of the cost of lost or abandoned fishing gear.</b>				
Survey fishers for lost and abandoned fishing gear	3 weeks	\$/activity	\$8,750	\$8,750
Report of results of surveys	2 weeks	\$/activity	\$1,700	\$1,700
Report of economics of lost fishing gear	2 weeks	\$/activity	\$1,750	\$1,750
<b>Sub-total</b>				<b>\$12,200</b>
<b>Activity 7 – SIDS #2 – Analysis of the loss of recreational activities associated with marine debris</b>				
Report of review of SIDS#2 Recreational activities	1.5 weeks	\$/activity	\$1,750	\$1,250
Report on economic loss of recreational opportunities	3 weeks	\$/activity	\$3,500	\$1,500
<b>Sub-total</b>				<b>\$2,750</b>
<b>Activity 8 – SIDS #1. Analysis of costs associated with reducing marine litter in the coastal zone including conducting a benefit:cost analysis of costs of reduction including option of doing nothing.</b>				
Report of options available for addressing marine litter including a costs for each option for SIDS #1	2 months	\$/activity	\$2,500	\$2,500
Conduct a benefit:cost analysis of options for SIDS #1	1 month	\$/activity	\$8,250	\$8,250
<b>Subtotal</b>				<b>\$10,750</b>
<b>Activity 9 – SIDS #2. Analysis of costs associated with reducing marine litter in the coastal zone including conducting a benefit:cost analysis of costs of reduction including option of doing nothing.</b>				
<i>Report of options available for addressing marine litter including a costs for each option</i>	2 months	\$/activity	\$2,500	\$2,500
<i>Conduct a benefit:cost analysis of options</i>	1 month	\$/activity	\$8,250	\$8,250
<b>2750Sub-total</b>				<b>\$10,750</b>
<b>Total</b>				<b>\$71,200</b>
Overhead (10%)				\$7,120
<b>Grand Total</b>				<b>\$78,320</b>

## ATTACHMENT A

**Title:** Regional assessment of marine litter initiatives in the Caribbean

**Project coordinator:** Gulf and Caribbean Fisheries Institute, Inc.

### Budget and Implementation Plan

#### Part – A – Implementation Plan

##### Background

The Gulf and Caribbean Fisheries Institute (GCFI) and UNEP’s Regional Coordinating Unit for the Caribbean (CAR/RCU), which also serves as Secretariat of the Cartagena Convention, are co-hosting a Regional Node for the for the Global Partnership on Marine Litter (GPML) in the Wider Caribbean Region (WCR). The purpose of the GPML node is in part to identify opportunities to support marine litter activities in the region, including small projects.

This concept note outlines a small project to conduct an analysis of existing initiatives related to marine litter reduction in in the Caribbean region. Although this project is not one of the projects to be implemented under the Small Scale Funding Agreement between UNEP and GCFI (which establishes the Caribbean node of the GPML), we have developed the concept note with a view to possible future funding opportunities.

##### Objective

The objective of this activity is to identify all initiatives related to marine litter reduction, whether being implemented by governmental or non-governmental organizations, as well as private entities (corporate or otherwise) in any of the countries or territories of the Caribbean region. These will be presented in a graphically compelling communications output in multiple languages that can be used to help share best practices and increase their uptake among partners in the Caribbean node of the GPML.

##### Activities

This activity will leverage our knowledge of the networks of existing marine conservation organizations focused on marine litter to identify all the organizations and other entities that are working on marine litter in the region. Specifically, GCFI will draw from contacts identified in the stakeholder mapping exercise undertaken through the Small Scale Funding Agreement between UNEP and GCFI. A review of literature for any relevant case studies will be undertaken. . GCFI will work closely with UNEP’s Regional Coordinating Unit’s (RCU) office focused on activities related to the Protocol on Land-Based sources of Marine Pollution to the Cartagena Convention and we will communicate with our best marine litter contacts in each country or territory in order to determine the existence of any initiatives related to marine litter in that location. Together, these organizations will represent the first tier in a list of organizations with existing initiatives related to marine litter. GCFI will use the information gleaned from this first pass to follow-up with each organization that was identified, so as to 1) gather more information about the nature of the initiative, and 2) identify who within the organization is the contact for the initiative. We will compile this information in an annotated list. Upon completion of this phase of the project, GCFI will contract with a visual designer in order to create a compelling communications product which can be used to further the recognition of the issue throughout the region. This will be produced in four languages: English, French, Spanish, and Dutch.

##### Activity 1 – Remote scoping meeting by Adobe Connect (GCFI, UNEP-CEP/RCU, and TBA)

1.1 Develop the scope of the project –Determine the definition of what sorts of solid waste-related initiatives will be included as marine litter reduction initiatives and how the various initiatives will be categorized

1.2 Discuss the vision for the project outputs in more detail.

Deliverables	Delivery date
<i>Detailed project scope</i>	<i>Two weeks</i>

##### Activity 2 – Identify organizations with initiatives related to marine litter reduction in the Wider Caribbean region

2.1 Query the GPML Caribbean marine litter stakeholder contact list to create the ‘first-pass’ list of governmental and non-governmental organizations, private corporations and other groups that are working on marine litter initiatives.

Also query other regional lists which may have knowledge of marine litter projects including the GCFINET and CAMPAM-L lists.

2.2 Undertake a literature review to identify existing cases studies about marine litter reduction initiatives in the Wider Caribbean region

Deliverables	Delivery date
<i>Preliminary contact list</i>	<i>Two weeks</i>

**Activity 3** –Consult with organizations identified on the preliminary contact list

3.1 Follow-up with the organizations that were identified in the ‘first-pass’ to verify the existence of relevant initiatives, gather further information and categorize the initiatives.

3.2 Integrate the information into a geo-referenced database.

Deliverables	Delivery date
<i>Annotated list of marine litter reduction initiatives by category</i>	<i>Three weeks</i>
<i>Geo-referenced database</i>	<i>Two weeks</i>

**Activity 4** –

4.1 Prepare summary communications materials (eg. a poster with a matrix of countries and categories of marine litter reduction initiatives) in four languages

4.2 Prepare geo-spatial representation of the findings

4.2 Share communications materials online .

Deliverables	Delivery date
<i>Communications materials</i>	<i>Three weeks</i>
<i>Online sharing of materials</i>	<i>One week</i>

## **Part B – Activity Based Budget**

Budget				
Activity	Quantity	Unit	Unit Cost (USD)	Total Cost (USD)
<b>Activity 1 – Scoping meeting (GCFI, UNEP-CEP/RCU, and TBA)</b>				
Detailed project scope	2 weeks	\$/activity	\$7,500	\$7,500
<b>Sub-total</b>				<b>\$7,500</b>
<b>Activity 2 – Identify as a ‘First-Pass’ the list of organizations</b>				
Query the GPML Caribbean and other stakeholder contact list	5 days	\$/day	\$350	\$1,750
Literature review	2 weeks	\$/week	\$1,000	\$2,000
<b>Sub-total</b>				<b>\$3,750</b>
<b>Activity 3 –Consult with organizations identified in activity 2 as well as organizations in the RAPMaLi</b>				
Consultation process	3 weeks	\$/week	\$1,250	\$3,750
Integrate data into database	1 week	\$/week	\$1,250	\$1,250
Develop geo-spatial database	1 week	\$/week	\$1,250	\$1,250
Reporting	2 weeks	\$/week	\$1,250	\$2,500
<b>Sub-total</b>				<b>\$8,750</b>
<b>Activity 4 – Create the Communications Outreach Document</b>				
Identify Scope of Outreach Document	1 week	\$/week	\$1,250	\$1,250
Create text of document	4 weeks	\$/week	\$1,750	\$5,250
Create design of document	2.5 weeks	\$/contract	\$3,500	\$3,500



Identify Contractor for translations	1 week	\$/activity	\$800	\$800
Develop contract including terms of reference	3 days	\$/activity	\$250	\$250
Translations	4 weeks	\$/activity	\$4,000	\$4,000
Printing of Document	1 week	\$/activity	\$2,500	\$2,500
Online distribution of materials	1 week	\$/activity	\$350	\$350
<b>Sub-total</b>				<b>\$17,900</b>
<b>Total</b>				<b>\$37,900</b>
Overhead (10%)				\$3,790
<b>Grand Total</b>				<b>\$41,690</b>