

## Report field visit Roatan, Honduras



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## 1. Introduction

This field research was executed following a viral video on plastic pollution in the Caribbean sea that was produced and distributed by Underwater Photographer Caroline Power, who is a resident of Roatán Island, Honduras (<https://www.facebook.com/bbcnews/videos/10155953914506108/>). Roatán is surrounded by the Meso-american barrier reef which is the second largest reef in the world. The Island is a tourist destination with a lot of US citizens visiting the many beautiful beaches, resorts and dive schools.



Figure 1.1. Half moon bay, West End, Roatan, Honduras.

The Caroline Power video went viral and reactions came from all over the world, including from (potential) visiting tourists asking about the situation. As a result of that not all local entrepreneurs in the tourist sector were happy with the questionable attention, but it deed identify a real problem that has been worsening for years. In the video a diver jumps into the polluted sea. The diver is Nicholas Bach. I have met and had discussions with both Caroline Power and Nicholas Bach.



Figure 1.2. Nicholas Bach and Caroline Power.

This study was commissioned and funded by {please let me know whether to include a name}.



## 2. Approach

The time I have been on the island was April 4<sup>th</sup> to 14<sup>th</sup>, with a one and a half day trip to mainland Honduras and Guatemala on April 11<sup>th</sup> and 12<sup>th</sup>. Prior to my trip I send out two mails following internet research for relevant connections with no response. Once on the island I have started by getting connected to the people with an 'Ocean plastic awareness' on the island.

In the mean time I started looking at the waste management system and current cleanup activities. In addition research on the composition and origin of floating waste at a selected location was done. I found a stretch of beach that seemed to be a small deserted beach resort, with a nicely sculptured beach front that had not seen maintenance, cleaning or raking for a while (front page picture).

One of the first persons I met was Nicholas Bach who told me that diver masters would be a good source of information on plastic pollution events. One of them connected me to a Dutch family owning a Restaurant in West End, which is the diving and tourist Hotspot on the Island. From that contact I was connected to another Restaurant owner – Adam 'Barefoot' - who is employing a 11 man crew for litter and beach cleanups around West End on a daily basis from restaurant earnings.

Adam set up a morning where he gathered a number people he knew around Plastic pollution, Recycling on Roatan and Reef protection. From that moment on I knew or had appointments with most relevant people involved in the plastic pollution problem on the island.

In the first days of my visit it became apparent to me that with only 60.000 to 80.000 people living on the island depending on season, and with a form of waste management in place, it was highly unlikely the island itself was the largest source of pollution to the surrounding sea. I was informed that on the mainland rivers in several countries have a large floating waste load and the Motagua river in Guatemala had a particularly bad reputation.

Through my contacts on the island (Karen Leahy, Caroline Power, Ian Drysdale) I was connected to the head of environment of the municipality Puerto Cortés, Kay Bodden. Kay was raised on the Island Roatán and is now deeply involved in the specific problem of plastic pollution on the beaches and port of Puerto Cortés, and the open seas throughout the bay of Honduras.

Puerto Cortés is the largest natural harbor of Central America. Due to a national law that a municipality can enforce a 4 % transshipment tax on all transshipment activities to the benefit of the local budget. This makes Puerto Cortés a financially strong municipality for Honduras standards.

One day prior to my trip to mainland I had a meeting with Humberto Kluck. Humberto is a Dutch native having lived in central America for over 30 years. Until his recent retirement he was the Honorary consul of the Netherlands to Honduras and still is the local representative of Damen Shipyards. He connected me to the mayor of Puerto Cortés and arranged a meeting for me during the mainland trip.

On April 11<sup>th</sup> I was accompanied to the mouth of Motagua river ('Rio Motagua' in spanish) in Guatemala just next to the border with Honduras. The visit to the heavily polluted beaches next to the river mouth are described in this report in chapter 5.

On April 12<sup>th</sup> I visited the (badly polluted) beach of Omoa, the Honduran municipality adjacent to the Guatemala border. I was guided around by the mayor of Omoa. Later that day I had a meeting with the mayor of Puerto Cortés with Jeroen Kluck, the son of Humberto, acting as translator.

The results of visits and research are summarized in this report and videos.

### 3. Circumstances at Roatan

#### 3.1. General

Roatán is an Island in the Bay of Honduras of 60.000 to 80.000 inhabitants (depending on time of year). The original Islanders speak English as their main language. In recent years Spanish speaking people from the mainland have moved to the island by now making up approximately half of the population.

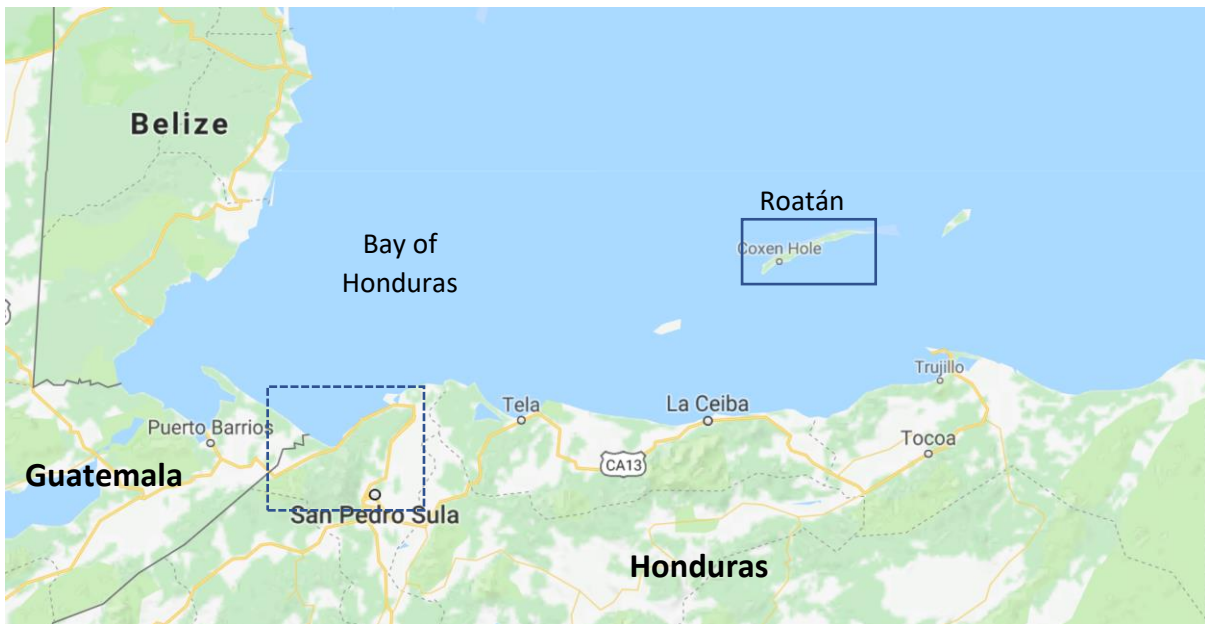


Figure 3.1. Overview of Bay of Honduras with Roatán and mainland-visit area marked

(source: Google Maps)

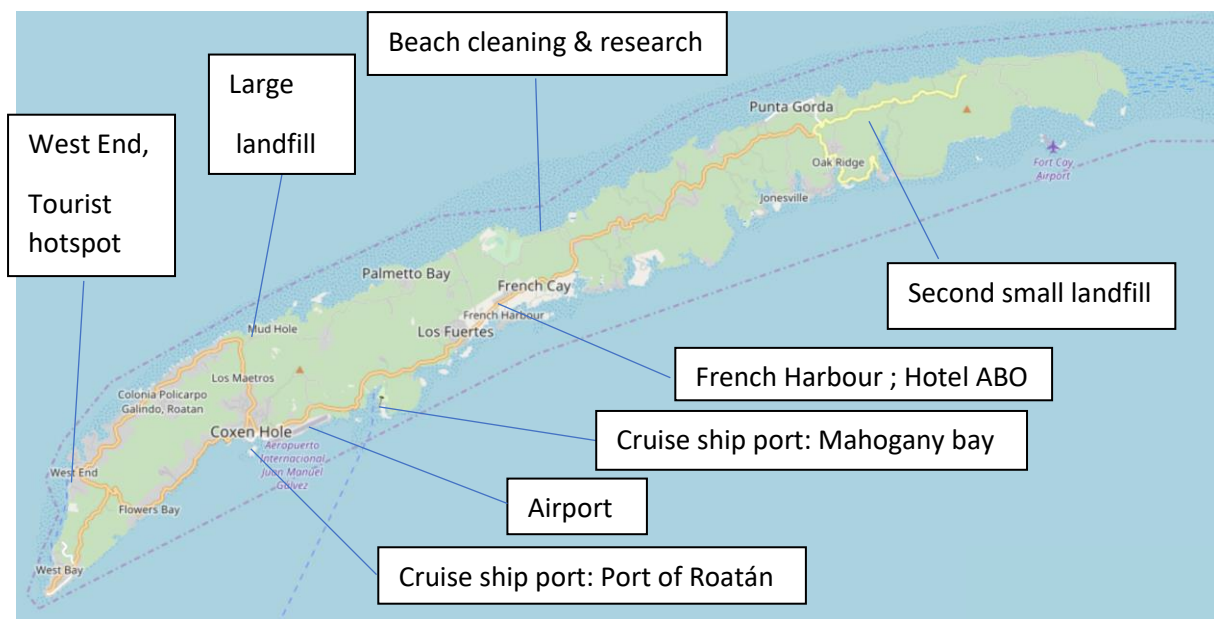


Figure 3.2. Depiction of Roatán.

(source: map.openstreetmap.org)

Roatan is approximately 60 kilometers long and 8 kilometers wide at its widest point. The island can be divided in three areas; the west is tourist area, the middle is the most industrial zone and the eastern most part is rural and unspoiled with access only by dirt road. The one main road is paved for most of its length but is in bad condition with traffic having to slow down to walking speed because of potholes throughout the middle part of the island.

### 3.2. Economy

Generally speaking the standard of living is lower midrange on the island. The relative prosperity compared to the rest of Honduras – which is among the poorest countries in central America- can partially be explained by the English mother language on the island which has allowed inhabitants to be employed onboard cargo vessels and which has allowed the growth of tourism from the USA.

There are few beggars. The most vulnerable group is Mosquito Indians who have migrated from mainland. They are poorly educated (“you cannot give them a hand drill but raking the beach works”) and will work for 300 Lempiras or 13 US\$ per day.

One Islander owns the large supermarkets and most fuel stations on the Island as well as the main supplier of bottled water and the DIY outfit. The professionalism in all these sites is remarkable.

The Electricity company RECO runs its main plant on LNG, has installed (second hand) wind turbines and is working on a solar plant. RECO is owned by an US investment company which in turn is owned by a Texan with a house on the Island.

Tourism is the main source of income, directly or indirectly. With hundreds of cruise ships visiting Roatán each year at two locations with a total of 5 berthing places (one ship crashed into one of the piers during the week of my stay, <https://www.nu.nl/233535/video/cruiseschip-botst-tegen-pier-op-hondurees-eiland.html> ).



Figure 3.3. Cruise ships at Mahogany bay.

Fishing is the second source of income with the largest fishing fleet of the western Caribbean situated in French Harbour.



### 3.3. Waste management

The largest land fill on the island is situated between Sandy bay and Mud hole (see figure 3.2 for map) and is known to be overloaded and overflowing. It is very close to the seashore (and a beach resort as a matter of fact). Even though it is surrounded with trees the landfill is visible from the sea and it is very likely that waste from the landfill is taken by the elements and ends up in the sea. The mayor of West End has indicated to be working on a new land fill site and it has been considered to take waste to mainland.



Figure 3.4. Large landfill between Sandy bay and Mud hole.



Figure 3.5. Details of large landfill.

The informal sector (waste pickers) take material such as bottles, cans and metals from the landfill for recycling. They have a site next to the landfill.





Figure 3.6. Informal sector next to the large Landfill.

The second largest landfill (see figure 3.2. for map) is on the east side of the island but is poorly accessible (dirt road) and is a minimum 45 minutes away from the large Landfill.

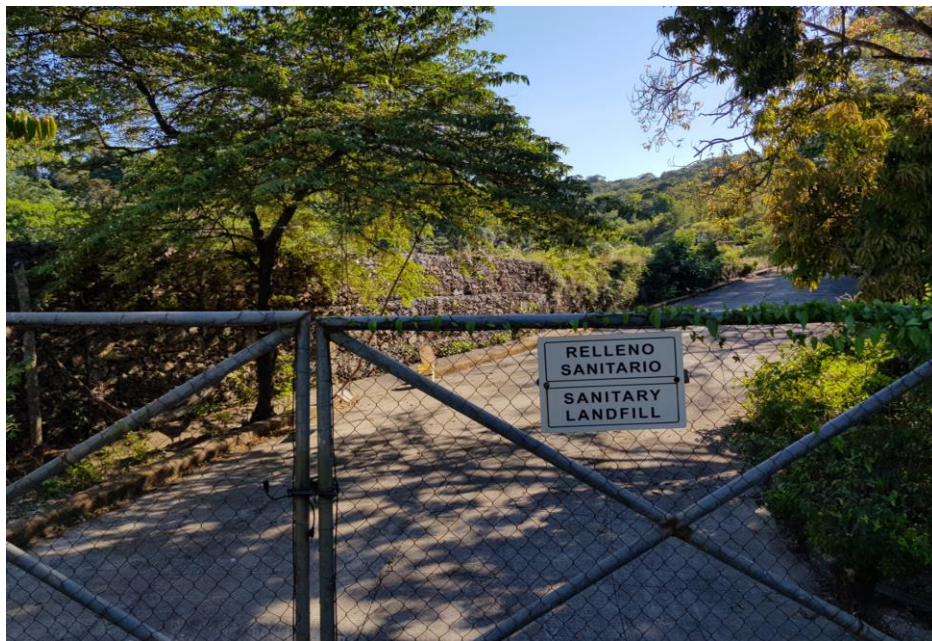


Figure 3.7. New location of second largest landfill in Diamond Rock.

The previous location of the (second largest) landfill in Diamond rock was close to sea and has been closed down officially. However, the new location – despite the new infrastructure – is apparently hardly used in reality. It was closed when I visited it, and I was not allowed access to take photographs, possibly because of the unused state (see figure 3.2. for location).

I have witnessed some smaller waste dumps, their legal status being unclear. One of them had a recycling shed on the side.

House hold solid waste is collected in large plastic buckets at wooden stands or in small sheds on the side of the road. Dump trucks serve as garbage trucks with 5 people on board (one driver, two men in the loading area, two men running next to the truck to hand over the garbage to the men in the truck, see picture 3.8.). It is visible throughout the island that this system is actively being used and is more or less functional. However, especially away from the tourist areas less tidy garbage collection points can be found.





### 3.4. Logistics

The main roads on the islands are paved for the largest part but are poorly maintained. The busy stretches are full of potholes. The new mayor of the west part has initiated exchanging asphalt roads for concrete which is less susceptible to wear. Parts of the island can only be reached by dirt roads. Cranage and truck transport are available.

There are shipping connections to mainland via ferry type ships. Any shipment from Europe or America will likely be handled first in the ports on mainland, such as La Ceiba or Puerto Cortés.

The island has an International airport, with a focus on the USA (Houston, Dallas, Miami) and with several daily connections to mainland and selected flights to surrounding Caribbean countries (Cuba, Haiti, Cayman Islands). My flights to and from Europe took 34 and 35 hours.

### 3.5. Operational support

Operational support for cleanup activities should be possible. The existing cleanup activities are almost without exemption run by expats. There are a number of Europeans and Americans residing on the islands, with several year of stay being the standard. Also Islanders with a relevant maritime or engineering background are available and could be used.

Blue collar workers are available.

### 3.6. Existing clean up activities and environmental care organizations

Beach and street cleaners are often active on tourist frequented locations. They seemed to be both private initiatives as well as government organized actions.



Figure 3.10. Street sweeping in French Harbour.





Figure 3.11. Beach raking close to port of Roatán

A noteworthy initiative is driven by Adam Freshauf. This American owner of Coconut restaurant in West End employs a 11 person crew of Mosquito Indians as a cleaning crew. This has a social perspective in providing a low privileged group a daily income (300 Lempiras or 13 US \$) and also yields visible results such as a clean beach as well as less visible results such as a clean mangrove shoreline outside the public eye. Adam funds this initiative from restaurant earnings and donations by other local tourism entrepreneurs. A video giving more detail of this initiative is available.



Figure 3.12. Mangrove cleanup by crew of Adam Freshauf, left before cleanup and right after.



Figure 3.13. Bottle and can collection baskets can be found all around West End.

In West End the environmental awareness can be felt in a number of ways. Bottle and can collection baskets can be found all over, and are emptied regularly. Some of the restaurants are expressive about their environmental footprint, and what they do to minimize it. Figure 3.14 depicts the title page of the menu of the restaurant of Splash Inn resort.



Figure 3.13. Menu title page at Splash Inn Restaurant.

Most environmental organisations on the island are housed in or close to West End. Examples are:

- Roatan Marine Park (office in background of picture 1.2, left photo), Organisation started as a small group of volunteers, now a Non-profit operating a number of patrol vessels with official mandate. Main role is protection against poachers and illegal fishing (e.g for turtles). [www.roatanmarinepark.com](http://www.roatanmarinepark.com)
- Roatan Institute for Marine Sciences, [www.roatanims.org](http://www.roatanims.org), educational institute, part of a large resort.
- Healthy Reefs (for Healthy People), [www.healthyreefs.org](http://www.healthyreefs.org). International organisation working on the Mesoamerican Reef Ecosystem. The Honduras coordinator Ian Drysdale resides in West End.
- Roatan Recycling now; [www.roatanrecyclenow.com](http://www.roatanrecyclenow.com). They started an initiative to no longer use plastic straws ('The last straw'). In most restaurants you get a paper or no straw.
- Abundant life foundation Roatán; organizes the 'Annual Reef Cleanup Event' for divers

Some of the initiatives are well intended but small in scale.



## 4. Plastic in environment

### 4.1. On Land

The areas frequented by tourists are usually well kept. Tourists do not like trash and specifically close to cruise ships a lot of effort is put into creating a clean environment.

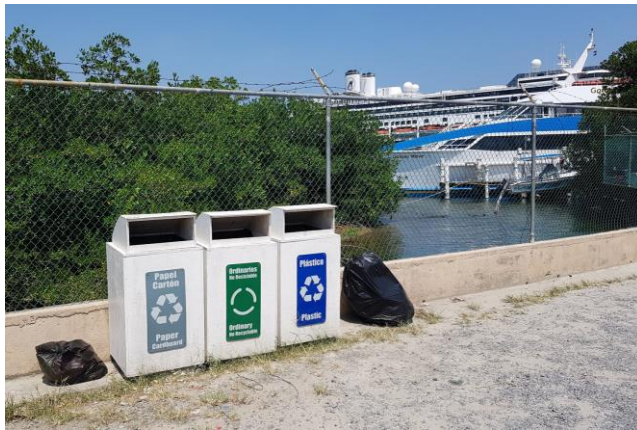


Figure 4.1. Garbage bins at boat terminal and beach cleaners next to cruise port 'Port of Roatán'

At some other areas there is less care for cleanliness, however the overall situation is much better than what I have seen in Asia.



Figure 4.2. Less cared for areas.

### 4.2. In Sea

The sea waters around Roatán are generally clean. Plastic pollution patches as in the Caroline Power video are concentrated events taking place in September and October, lagging a bit behind the rainy season on the surrounding mainland. According to a helicopter pilot the pollution also forms kilometer long 'lines' in the waters between the island and mainland Honduras.

The Patches are a mix of plastic and organic material, such as Sargassum seaweed. This provides excellent conditions for small fish and turtles for nourishment, and according to divers small animals are present in abundance. This would be a challenge when taking the patches out of open sea.

### 4.3. On Beach and shore

The beaches visited by tourists are well maintained, meaning manual or machine raking every day.





Figure 4.3. Machine 'groomed' beach at Pristine bay resort.

Beaches on Roatán that are not in active use are obviously much more polluted. Digging into the sand usually exposes even more plastic. In chapter 4.4. an analysis of the content of a deserted beach is given.



Figure 4.4. Unattended shoreline



#### 4.4. Sampling of debris on beach

A stretch of deserted beach of approximately 15 to 20 meter was cleaned and analysed in order to get a typical sample of plastic pollution composition and origin. The beach was situated in Big Bight (see picture 3.2 for location). A 3 minute video providing more detail has been prepared.



Picture 4.5. Overview picture Big bight beach that was used for analysis.



Picture 4.6. Overview of beach harvest analysis.



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Picture 4.7. Table displaying the origin of packaging that could be traced.

Four bags of material weighing some 40 kilogram has been removed from the beach. In Picture 4.6. the material has been displayed giving a perspective of how much waste 15 meter of unattended beach yields and what composition it has on this location. The amount of bottle caps, polystyrene, and disposable cutlery were eye-catching. Three toothbrushes were found.

Some sargassum and coconuts and organic material have remained on the beach.

In picture 4.7. a clear perspective is given on origin of the floating debris. Throughout the harvested waste we have looked for (traces of) markings indicating the origin. The vast majority can be traced to central America (and honduras itself) directly, with Haiti considered to be part of that. The USA produced products are likely imported to and distributed into Central America.



## 5. Main land visit

Soon after arriving on the island I concluded that the amounts of waste seen in the Caroline Power video could not originate from the island Roatán itself due to the small number of inhabitants and the functional waste management level.

After I expressed the wish to visit main land in search of the source of the plastic waste in the video I was connected to Kay Bodden (head of environment of the municipality Puerto Cortés). She arranged two site visits for me:

1. To Motagua river mouth in Guatemala (on April 11<sup>th</sup>)
2. To Omoa beach (on April 12<sup>th</sup>)

Last minute I also had a meeting arranged with Allan Ramos, Mayor of Puerto Cortés, and chairman of a cooperation of 11 municipalities from Honduras, Guatemala and Belize with a waterfront to the Bay of Honduras. This meeting took place on April 12<sup>th</sup>.

Kay Bodden and Dilsia Croasdaile accompanied me on both site visits. Dilsia Croasdaile works for the 11 municipality cooperation. I received information outlining the extent of the problem from Dilsia. That information makes clear that these municipalities have been suffering from floating waste load on their beaches and in their waterbodies for a number of years. Up to now a suitable effective solution to get rid of the plastic waste has not been found.

The plastic pollution has resulted in declining tourism over years and has interfered with efforts and ambitions to increase tourism to this area.

A very impressive video of both visits is available.

### 5.1. Motagua River, Guatemala

The Motagua river ('Rio Motagua' in spanish) is situated in Guatemala just next to the border with Honduras. The Motagua river is a generally known source of floating waste and has been in the news in Honduras for that: <https://www.youtube.com/watch?v=7n5G1XkQ6EA&t=175s>.

A peak in the amount of floating waste is present at the start of the rainy season (around August) when the first heavy rains take large amounts of household waste from village unofficial dumpsites.



Figure 5.1. Still image from video depicting Rio Motagua in Rainy season.

Our site visit to the beach right next to the river mouth showed heavy littering, even this time of the year. The amount of plastic on this beach was overwhelming and could be the largest amount of unmanaged waste I have ever seen.



Figure 5.2. Situation of beach next to Motagua river mouth.

During our visit we have witnessed a very simple locally developed boom system that has been deployed in the river with limited success from a location with a work shed. 15 People are employed for cleaning operations year round at this location.



Figure 5.3. Simple DIY boom system and work shed for cleaning operations



## 5.2. Omoa Beach, Honduras

On April 12<sup>th</sup> Kay, Dilsia and me visited the beach of Omoa. We were received and guided around by the Mayor of Omoa; Ricardo Alvarado. Omoa is an Honduran municipality adjacent to the Guatemala border close to Motagua river mouth. The mayor explained that the previous year there was no (funding for a) landfill and so the 'gras covered sand dunes' in picture 5.4 are actually the debris from the beach that year piled up and covered with sand...



Figure 5.4. Plastic debris on Omoa beach.



Figure 5.5. Plastic debris on Omoa beach.



The national government employs 200 people year round on the 42 kilometers of beach of OMOA with limited visual effect.



Figure 5.6. Members of the Omoa beach cleaning crew.

### 5.3. Circumstances for cleanup activities

Most circumstances for cleanup activities are positive:

- We were received by dignitaries, I met two mayors in person (Omoa and Puerto Cortés) and got the business card mayor of the Guatemala municipality that includes the Motagua river mouth (with a request to contact him). The problem is taken seriously.
- Reports of previous years indicate the severity of the problem and the awareness around it.
- In Puerto Cortés a cement factory has offered to take the waste and use it as fuel for a cement kiln, provided it does not contain too much chlorine. This is an interesting form of waste to energy.
- Puerto Cortés is a port with direct connections to Europe and the USA. A transit time of two to three weeks for a container through Antwerp was mentioned.
- The local contact persons, Kay Bodden and Dilsia Croasdaile, are capable and committed to the problem.
- In Puerto Cortés the son of the former Dutch honorary consul runs a small shipyard and the honorary consul himself is the local representative of Damen Shipyards. This potentially allows for construction or assembly work on a yard relatively closeby.
- A cleanup location is already present on the river, so the locals are used to the idea. Also most locals are fisherman, and with fishing going down due to plastic pollution, the fishermen are likely cooperative.
- The river provides a sheltered location, a limited width and has options to connect to vessel or truck transport.
- Compared to extracting the pollution at sea there will be less mixing with sargassum. This gives less organic bycatch when extracting and gives less risk of fishing out small fish and turtles along with the plastic waste. Also chlorine and salt content are likely better as is the quality of plastic harvested (less degradation).





A circumstance that is likely challenging is getting a budget. Even though the local and national government have spent money on the problem, for instance by paying for studies and cleaning crews, it remains to be seen whether a budget will be made available.

The waste management in place seems to lack professionalism or determination, likely due to limited funding.

Because tourism is going down, despite efforts and ambitions for growth, there is financial pain. This will hopefully help providing for a budget for a comprehensive floating waste reduction plan.

## 6. Conclusions and recommendations

Roatán has a functioning waste management system and a small number of inhabitants. The floating debris witnessed in the Caribbean sea have their origin on mainland, not on the islands.

On Roatán activities are undertaken to clean up plastic from the environment on a small scale.

The Motuaga river is a very likely large source of floating debris and extracting in the river is the preferred option. The local circumstances are good for implementing a professional (temporary) extraction system but it remains to be seen whether sufficient budget will be made available (in time).





## 7. References

Websites:

[www.roatanisland.net](http://www.roatanisland.net)

[www.roatanimis.org](http://www.roatanimis.org)

All pictures taken by the author, except 3.1., 3.2. and 5.2. as indicated below the pictures