



# CARICOOS

CARIBBEAN COASTAL OCEAN OBSERVING SYSTEM

## **Semi-Annual Progress Report Blue Water Task Force Rincón Program of Surfrider Foundation Rincón**

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***Performance Period: December 1, 2020 – May 31, 2021***

### **LONG-TERM GOALS**

To continue weekly monitoring and testing of various recreational beach sites in northwestern PR for water quality (WQ) assessment by detection of levels of fecal bacteria contamination using quantified EPA-approved technology under our Blue Water Task Force (BWTF) program. To expand BWTF coverage to other sites, both beaches and recreational fresh water, as volunteer time and finances permit. To continue to acquire the most sensitive WQ parameter detection equipment to augment and assist in WQ assessment, and research capacity. To continue to explore additional internet or social media platforms for the dissemination of this data, and provide CariCOOS with a larger audience / user base, including installing physical infrastructure (signage) at BWTF sites to inform beach users of the WQ testing and direct them to the latest testing results of that site via posting of Surfrider Rincón and CariCOOS websites addresses, as well as including QR codes to track 'hits' and serve as proxy data for comparative beach use rates and times.

### **MILESTONES / OBJECTIVES**

As well as continuing the weekly sampling program in our local area, the BWTF program began sponsoring a similar IDEXX – based weekly water sampling program at the Reserva Marina Arrecife de Isla Verde (RMAIV) by providing the necessary training, IDEXX lab supplies, consultation, and data management and publishing to a separate BWTF web page, to the non-profit group Ciudad Pro Arrecifes while they have the needed IDEXX equipment under a one year EPA Citizen Science loan. The attempt made to resume monitoring in the Aguadilla area by providing the needed IDEXX equipment, supplies, training, and data management and publishing to a single volunteer continued into 2021, however was unable to be continued for the entire report period. Thus the equipment and remaining supplies were returned to the chapter.

### **WORK COMPLETED**

For the reporting period, the weekly sampling of the 'core' BWTF program sites (Rincón and Aguada) was successfully accomplished for 100% for testing dates (n=26)  
The Balneario Tres Hermanos (Añasco 2) was tested on 15 dates.

For the Aguadilla program, the sites at Crashboat and Sardineras were tested on 8 dates before the program closed.

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For the RMAIV program, 5 sites within the Reserva were successfully tested weekly after Jan 1 2021 for 100% of sampling dates (n=19)

Numerous dates for additional WQ testing occurred in Feb – March as the BWTF investigated several failures of either septic or sewage infrastructure in the Rincón area.

## **MAJOR OUTCOMES**

No new capabilities were generated during this reporting period, aside from acquiring the equipment and training needed to process water samples for eDNA analysis by Cornell University, as described in the Related Projects section. However, the difficulty of source identification of the anomalous bacterial contamination detected as random 'hotspots' at marine sites continues to underscore the need to acquire sensitive digital equipment to measure on a real-time basis other WQ chemical / biochemical parameters to investigate their utility in indicating contemporaneous bacteria contamination.

As of the filing of this report, it remains uncertain how Ramey School plans to reopen under post-COVID restrictions, and thus whether the Environmental Sciences lab will be available to resume hosting the Aguadilla program. If unavailable, then another attempt will have to be made to find another group in that area to host the sampling (and perhaps testing) effort for that area. Due to uncertainty of access to the Añasco 1 site (Parque Vacacional) and current lack of public use, this site will most probably be retained as a 'residual' part of the BWTF and be tested only once a month to retain some continuity of that particular data set for research purposes (similar to how the Corcega site in Rincón is being retained, after Hurricane Maria eliminated the beach).

## **RELATED PROJECTS**

A pilot project began in May with Cornell University under the direction of Dr. Ruth Richardson of the Dept. Of Civil and Environmental Engineering for the genetic sequencing of eDNA found in contaminated marine and freshwater samples. Cornell provided the needed equipment and training (via Zoom) for the chapter to be able to conduct vacuum micro-filtering of suspect samples, and several samples were successfully processed and the frozen micro-filters were delivered by overnight FedEx express to Dr. Richardson. The results of the analyses are still pending.

Should the pilot project prove workable, then the results of future analysis could provide useful in two ways: for contaminated marine samples, eDNA analysis can indicate if the detected bacteria are strictly of human origin (thus most probably indicating a septic/sewage problem) or from mixed, other mammalian, sources (thus probably indicating bacterial transport from a freshwater outflow source); it is possible that various freshwater outflows may show a specifically characteristic bacterial 'profile' regarding the relative percentages contributed by human and non-human source species, which could be used to identify the specific outflow that is affecting marine WQ.

At this time it is unknown if this potential project would provide any additional leverage for CariCOOS objectives or funding.



## **WORK PLAN FOR UPCOMING PERFORMANCE PERIOD (June 1, 2021 – November 30, 2021)**

As public use patterns continue to change in response to the fact that the beaches devastated by Hurricane Maria are showing little or no natural recovery, the BWTF most probably will add new monitoring sites to the core program, to reflect these changes. In any case, the installing of new physical signage at all BWTF sites using the new 2 QR format will proceed, including the sites in Aguadilla if that program is successfully resumed with any regularity.

The Cornell / BWTF eDNA collaboration will continue, evolving as the logistical issues are resolved over time and as future results indicate.

Based on the current excellent performance of the RMAIV project, the chapter most probably will be in the process of acquiring the needed IDEXX equipment to provide to Arrecifes Pro Ciudad on a 'permanent loan' basis, so the WQ monitoring there can continue without interruption when the EPA provided equipment must be returned at the end of the calendar year.

The BWTF will continue to support by providing the required IDEXX lab materials as needed for the ongoing research being conducted by Dr. Pedro Resto for his project entitled "Enhancing Coastal Intelligence for the US Caribbean". The outstanding materials that were returned to the chapter previously due to COVID delays in his research were replaced per our MOU on March 5 2021.

### **REFERENCES**

BWTF Rincón performance for 2020 (not including research testing) outlined in:  
[http://publicfiles.surfrider.org/Clean\\_Water/Clean-Water-Report\\_042018.pdf](http://publicfiles.surfrider.org/Clean_Water/Clean-Water-Report_042018.pdf)

### **PUBLICATIONS & PRODUCTS**

Rincón BWTF results (including Aguadilla): <https://bwtf.surfrider.org/report/4>

Isla Verde RMAIV program results: <https://bwtf.surfrider.org/explore/67>

A report detailing the use of BWTF testing applied to a municipal septic tank failure at Domes Beach, Rincón by Mara Dias and Steve Tamar:  
<https://www.surfrider.org/coastal-blog/entry/tracking-sewage-up-the-beach-in-rincon-puerto-rico>