

**Virgin Islands Water Resources Research Institute
University of the Virgin Islands**

**Annual Technical Report
2019**

Products

Two conference presentations resulted from project 2019VI265B:

- Ariel Stolz, Greg Guannel, "Making Sure Your Cistern Never Runs Dry: Creating a Model to Understand the Relationship Between Roof Rainwater Harvesting and Water Management Strategies in the USVI", Tropical Islands Water Conference, April 12-15, 2021. Accepted oral presentation.
- Kiwanee Smith, J'Nique Ronan, Megan Grant, Greg Guannel, "Self-Sufficient Solutions for Island Communities", 2020 Emerging Researchers National (ERN) Conference in STEM, February 6-8, 2020. Poster Presentation.

A webpage for the Virgin Islands Water Quality Education Program was developed and can be accessed at: <https://www.uvi.edu/community/virgin-islands-marine-advisory-service/st-thomas/water-quality-education-program.aspx>. This webpage currently contains information about the program, all lesson plans and student worksheets, video tutorials on how to utilize the contents of the classroom and At Home Water Testing Kits produced. Additionally, the summary document which details the findings of this educational program is also located on this webpage and will be shared with community partners to support the expansion of the program.

A new logo for the Virgin Islands Water Resources Research Institute was created; a new website was also developed during this reporting period and is near completion.

Information Transfer Program

Project Title: Virgin Islands Water Quality Education Program

Project Impact: This project created a 3-day, water quality curricula, adapted from www.teachengineering.org. All new lesson materials can be accessed electronically at <https://www.uvi.edu/community/virgin-islands-marine-advisory-service/st-thomas/water-quality-education-program.aspx>. When schools closed due to COVID-19, the project pivoted to create 300 At Home Water Testing Kits, providing hands-on, at-home learning opportunities for K-12 students and new opportunities for University Bound students. Overall, water quality information was shared with 235 students and 19 educators from St. Thomas and St. Croix. Students received instruction on water quality testing, water filtration, and water conservation practices. Through the combination of in-person and virtual trainings offered, 19 USVI educators are now knowledgeable about water quality testing and how to facilitate hands-on activities with their students using the provided lessons. Formative evaluation of lessons by educators resulted in revision and these are becoming included in teachers' school year lesson plans. Lessons fostered discussion of water quality both at school and home. For example, fecal coliform test kit results from St. Croix Educational Complex, revealed a total of 66 positive test results (57 from cistern users; 9 from public utilities or a combination of public and cistern water sources) and stimulated conversations and actions at the house-hold level for some students. UVI halted all human subjects research due to COVID-19; as a result, no data were collected on student knowledge and attitude changes with respect to the lessons. Between both Agricultural Food Fairs attended pre-COVID, the Project Team engaged an additional ~150 individuals by sharing program materials.

The Virgin Islands Water Quality Education Program was covered several times in local media:

- VIMAS Launches Pilot Water Quality Education Program at CAHS - November 26, 2019
<https://stthomassource.com/content/2019/11/26/vimas-launches-pilot-water-quality-education-program-at-cahs/>
- Program Seeks to Educate the Next Generation on Water - December 1, 2019
<https://stcroixsource.com/2019/12/01/program-seeks-to-educate-the-next-generation-on-water/>
- Water Testing Kits to Teach Kids STEM Skills from Home - August 25, 2020
<https://stthomassource.com/content/2020/08/25/water-testing-kits-to-teach-kids-stem-skills-from-home/>

In addition, the Virgin Islands Water Quality Education Program Project Team coordinated with one educator from the Charlotte Amalie High School to create Public Service Announcements (PSAs), specifically radio announcements after his students completed the three lessons. Of the 28 radio ads created, 3 of the best produced radio ads (based on message content, call to action, and enthusiasm) were selected to be aired on local radio stations on St. Thomas and St. Croix; these included WSTX AM/FM (May 1 - 30, 2020) and DaVybe 107.9 FM (April 26 - May 22, 2020). Project information (materials and results) was also shared at Agricultural Food Fairs on both St. Thomas and St. Croix, which engaged approximately 150 attendees.

Student Support

Five University of the Virgin Islands undergraduate students were supported through the project, "How much water can I get from my roof: historical efficiency of rainwater harvesting in the Virgin Islands," (2019VI265B) and mentored by Dr. Greg Guannel and Ms. Ariel Stolz.

Notable Achievements and Awards

Virgin Islands Water Quality Education Program, PI, Howard Forbes Jr., was selected as a keynote speaker for the 2021 Coastal & Estuarine Research Federation's Biennial Meeting where he will share reflections on educational and outreach programs in the USVI, including this 104b-funded program.

Two UVI undergraduate students, Kiwanee' Smith and J'Nique Ronan (2019VI265B), received 2nd place at UVI Emerging Caribbean Scientists Summer Symposium, which made them eligible to receive a travel award to present at the Emerging Researchers National (ERN) Conference. They presented on their analysis of water harvesting and discussed the consequences for water conservation and management in the USVI.

The global pandemic, COVID-19, significantly impacted 104b projects as envisioned pre-pandemic. However, project PIs were responsive to changing conditions and adapted to new restrictions to achieve most project goals; these efforts are notable, and are commended.

How Much Water Can I Get From My Roof: Historical Efficiency Of Rainwater Harvesting In The Virgin Islands

Project Type: Annual Base Grant

Project ID: 2019VI265B

Project Impact:

The project goal was to evaluate the effectiveness of rainwater harvesting for different types of roofs. We successfully built 3 replica of roofs and installed gutter systems on them. We also collected 40 years of rainfall data and developed a program to estimate how much rainwater is collected through time for given cistern sizes and harvesting coefficients. We employed 5 UVI undergraduate students on this project to design and build the roofs; taught them to use Excel to analyze rainfall data; taught them how to use Matlab to create a program to mimic a water levels in cisterns based on rainfall and water use. We finalized the program internally.

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