

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

**Annual Technical Report
2018**

U.S. Virgin Islands Water Resources Research Institute
FY2018 USGS Annual Report
Reporting Period: June 18, 2018-June 17, 2019

Products. Provide a list of all reports, journal articles, book chapters, theses, dissertations, etc. published during the reporting period as a result of projects supported with annual base (104b) federal and required matching funds, National Competitive Grant awards for which you are the lead institute, and Coordination Grants. Please provide URLs for publications where available.

Jensen, A. Predictors of and variability in seagrass sediment blue carbon from St. Thomas, U.S. Virgin Islands. Master's thesis, University of the Virgin Islands, 54 p.

Information Transfer. Provide a brief description of information transfer activities supported with annual base grants (104b) and required matching funds during the reporting period. Please limit your answer to <250 words.

UVI Watershed Specialist, Sydney Nick, and UVI Research Technician, Allie Durdall, traveled to the Environmental Statistics Collaborative at the University of Maryland Center for Environmental Science, Chesapeake Biological Laboratory, to assist in the analysis of 10+ years of weekly beach water quality data for 44 sites across the Territory and to learn new data visualization techniques. Analyses resulting from this training were presented by Nick at the Association for the Sciences of Limnology and Oceanography 2019 Aquatic Sciences Meeting in San Juan, Puerto Rico.

VI WRRI personnel and VI WRRI-supported work were well-represented at international and national professional conferences, as well as territorial stakeholder meetings and presentations to the local community (*indicates current student, ^indicates former student):

- Grimes, K., S. Habtes, H. Forbes, Jr., C.J. Bucklin, M. Taylor, C. Goodwin, S. Nick, M. Guannel. "Empowering communities to reduce land-based sources of marine debris to nearshore waters of the U.S. Virgin Islands through educational partnerships." Oral presentation. Universities Council on Water Resources and The National Institutes for Water Resources Annual Water Resources Conference. June 26-28, 2018, Pittsburgh, PA.
- Nick, S., and K. Grimes. "Do you really want to swim there? An investigation of *Enterococcus* bacteria at beaches of the U.S. Virgin Islands." Oral presentation. Association for the Sciences of Limnology and Oceanography 2019 Aquatic Sciences Meeting. February 23-March 2, 2019, San Juan, Puerto Rico.
- Jensen^, A., K. Grimes, E. Smith, M. Brandt. "*Halophila stipulacea* provides unexpected blue carbon benefit in the U.S. Virgin Islands." Oral presentation. Association for the Sciences of Limnology and Oceanography 2019 Aquatic Sciences Meeting. February 23-March 2, 2019, San Juan, Puerto Rico.
- Guannel, G. "Climate Change in the Virgin Islands." Oral presentation. St Croix Environmental Meeting. May 30-31, 2019, Carambola Hotel, St Croix.

- Guannel, G. "Community Resilience in the Aftermath of Hurricanes Irma and Maria." Oral presentation. Democratizing Resilience Planning and Disaster Recovery Meeting, June 18-19, 2019, San Francisco Federal Reserve, CA.
- Guannel, G. "Ecosystem Services in Action: Observations from the 2017 Hurricane Season." Poster presentation. National Council of Engineering and Sciences Conference. January 7-10, 2019, Washington D.C.
- Guannel, G. "Plans, People and Natural Hazards in the Virgin Islands." Oral presentation. American Planning Association Meeting, April 13-16, San-Francisco, CA.
- Guannel, G. regularly shares project information with the St. Thomas Recovery Team (long-term, community-based hurricane recovery group based in St. Thomas) and the Governor's Hurricane & Recovery Task Force.
- A lecture including some preliminary results was offered by co-PI Rogers for the BIO 430 class taught by PI Cruz-Rivera. The lecture was open to the public and attended by students, UVI personnel and non-UVI members of the community.

Student Support. How many students (broken down by the number of undergraduate, graduate, and post-docs) were supported with annual base (104b) and required matching funds, and National Competitive Grant Program awards for which you are the lead institute. Include the number of students supported under the NIWR-USGS Student Internship Program and other Coordination Grant awards during the reporting period.

Eight undergraduate students from the University of the Virgin Islands (a Historically Black College and University), 0 graduate students, and 0 post-docs were supported with annual base (104b) funds during this reporting period.

Notable Achievements and Awards. Provide a brief description of any notable achievements and awards resulting from work supported with annual base grant (104b) awards and required matching funds and Coordination Grant awards during the reporting period. Please limit your answer to 250 words.

With support from the Virgin Islands Water Resources Research Institute, the U.S. Virgin Islands is now experimentally included in the U.S. Drought Monitor (beginning in June 2019). Inclusion is critical as an automatic trigger for drought declaration to occur, rather than through personal appeal from the Territory's governor to the U.S. Secretary of Agriculture, which was the only option available previously.

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Project Synopses

Project ID: 2018VI274B

Project Title: Geo-referenced Inventory and Initial Modeling of Engineered Stormwater Network(s) in the Virgin Islands.

Grant Type: Annual Base Grant

Project Impact: Provide a synopsis of the primary findings and/or impact of this project. Please limit your answer to 250 words.

The Territory's first geo-referenced inventory of engineered drainage infrastructure was created and circulated for draft review to territorial stakeholders, which builds capacity and contributes to increased community resilience to future storm and coastal flooding events. This information was used in particular by personnel at the U.S. Virgin Islands Public Works to help with major United States Army Corps of Engineers and local project planning, and by non-governmental organizations to help with understanding of project needs at the local level. These efforts are particularly important during the post-2017 hurricanes recovery period in the U.S. Virgin Islands. Results from this project have been regularly shared with the St. Thomas Recovery Team (long-term, community-based hurricane recovery group based in St. Thomas) and the Governor's Hurricane & Recovery Task Force by PI Guannel. To-date, the project has trained 7 undergraduate students from the University of the Virgin Islands (a Historical Black College & University), in the use of geographic information systems, global positioning system, and field survey methods.

Project ID: 2018VI273B

Project Title: Freshwater Invertebrates of the Virgin Islands as Quantitative Indicators of Ecological Change

Grant Type: Annual Base Grant

Project Impact: Provide a synopsis of the primary findings and/or impact of this project. Please limit your answer to 250 words.

At least four peer-reviewed publications are projected from data collected in this project. These will focus on: 1) the quantitative water quality assessment method specific to the U.S. Virgin Islands; 2) description of a new, undescribed species of spinicaudatan clam shrimp; 3) new species records of aquatic macroinvertebrates (worms, snails, mites, insects, and crustaceans) from the U.S. Virgin Islands, and; 4) ecological partitioning of U.S. Virgin Island aquatic macroinvertebrates. The Project Team expects additional peer-reviewed papers will come from this study, as they suspect (but are still in the process of verifying) that additional undescribed species are present in collected samples. The Project Team also expects to produce at least two grey literature documents that will be useful to local stakeholders: 1) a manual for application of their quantitative water quality assessment method and; 2) identification keys to the aquatic macroinvertebrates of the U.S.

Virgin Islands (something that does not yet exist). They expect that their quantitative water quality assessment method will be a useful tool for assessing impacts to U.S. Virgin Island watersheds. They envision the tool being useful to federal and local environmental and public health agencies, conservation non-governmental organizations, environmental consultants, citizen monitoring groups, and researchers. To date, one undergraduate student has been supported by this project for two semesters and has continued his work through a Directed Independent Research course. Besides aiding with general collection and identification, he is analyzing the fine-scale distribution of the introduced freshwater snail *Melanoides tuberculata*. The collaborators plan to pursue further funding to continue this research beyond the life of this grant. Specifically, they aim to submit two proposals resulting from this work in the next year: 1) an analysis of the diversity of mosquitoes for the territory (to the National Institutes of Health or the Centers for Disease Control & Prevention); and 2) an assessment of how invertebrate diversity relates to organic matter processing in ghuts (local term that refers to ephemeral streams of the U.S. Virgin Islands; to the National Science Foundation).