

Virgin Islands NSF EPSCoR Evaluation Report- Year 3

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RII Track-1: Ridge to Reef Processes and Interdependent Drivers of Small Island Resilience

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External Evaluators:

Kelvin Chu, Ph.D.
kchu@tigdc.com

Samantha Huffaker, Ph.D.
samantha@huffakerconsulting.com

Heather McInnis, Ph.D.
hmcinnis@tigdc.com

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Introduction

Ridge to Reef (R2R) Processes and Interdependent Drivers of Small Island Resilience is an NSF EPSCoR RII Track-1 project among investigators from the University of the Virgin Islands (St. Thomas and St. Croix campuses). The project aims to address the impacts of changing environmental conditions on small island social-ecological systems.

The project started in July 2020 and is scheduled to end in June 2025. The evaluation team worked with the project leadership to develop an External Evaluation Plan to help guide evaluation activities. Three survey instruments were created and deployed during Year 3 to collect information from faculty and students associated with the project: Faculty Survey, Graduate Student Survey, and Undergraduate Student Survey.

This report summarizes project data collected from multiple sources: ERCORE, TIG evaluator site visit interviews in October 2022, faculty and staff zoom interviews in Spring 2023, VI EPSCoR Office, and the Participant Surveys.

Research Productivity

Project participants reported various types of research outputs they produced in Year 3. Publications are summarized by publication year in Table 1, below:

Table 1. Publications

Year	Publications
2020	6
2021	18
2022	6
2023	8

Importantly, the 2022-2023 publications appeared in high-impact journals (Table 2):

Table 2. Impact Factor

Journal	Frequency	Impact Factor
Animal Biotelemetry	2	2.364
Aquatic Botany	1	2.473
Aquatic Ecology	2	1.641
Communications Biology	1	5.489
Coral Reefs	2	3.88
Ecography	1	6.500
Ecosphere	1	3.171
Environmental Microbiology	1	5.491
Estuaries and Coasts	1	3.186

Journal	Frequency	Impact Factor
Frontiers in Marine Sciences	6	4.912
Harmful Algae	2	4.273
ISME Communications	2	9.6
Journal of the Acoustical Society of America	1	1.819
Journal of Operational Oceanography	3	3.471
Marine Biology	1	2.941
Marine Ecology Progress Series	7	2.824
Microbiology Resource Announcements	1	0.877
Molecular Ecology	1	6.185
Restoration Ecology	1	4.181
Science Advances	1	14.136
Scientific Reports	2	4.996
Toxins	1	4.146

The project publications are increasingly collaborative. Figures 1-3 show the increase in Intra-VI-EPSCoR collaborative papers in 2020-2022 publications. In 2020, three publications involved collaborations among VI-EPSCoR participants. In 2021, this number increased to eleven. The team reported three collaborative publications in 2022. We expect that the large number of collaborative publications in 2021 was due to changes in focus due to COVID, with less ability to do fieldwork and more time to analyze data and write.

Figure 1. 2020 Collaborative Publications

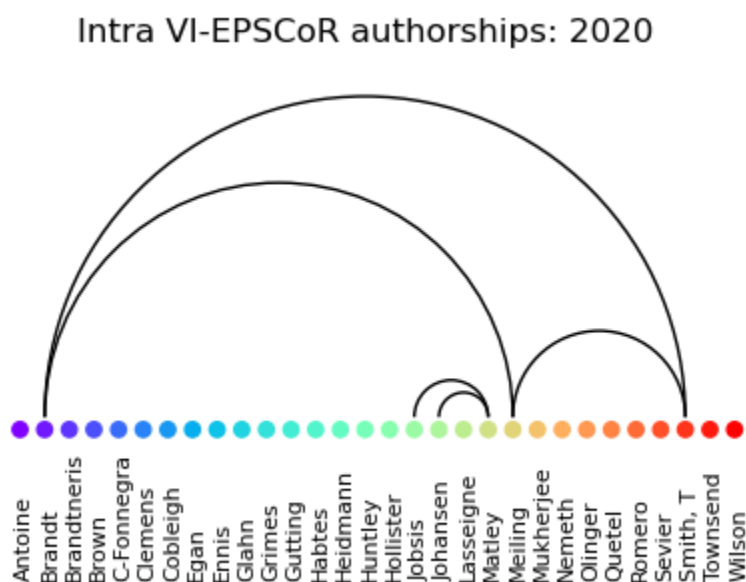


Figure 2. 2021 Collaborative Publications

Intra VI-EPSCoR authorships: 2021

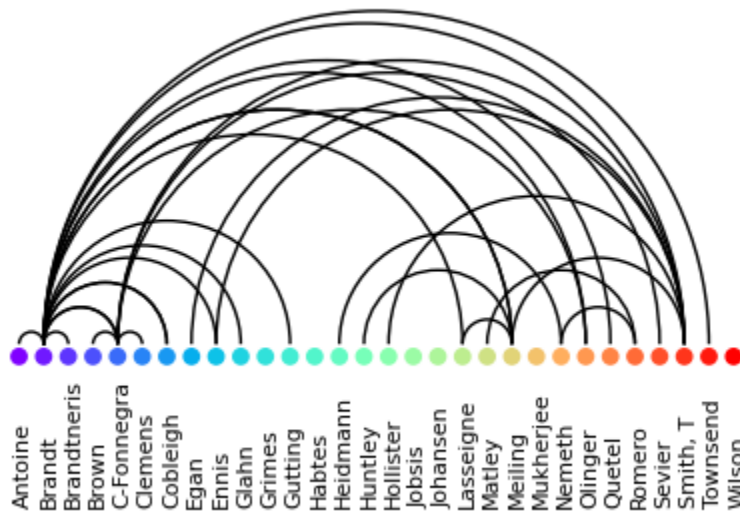
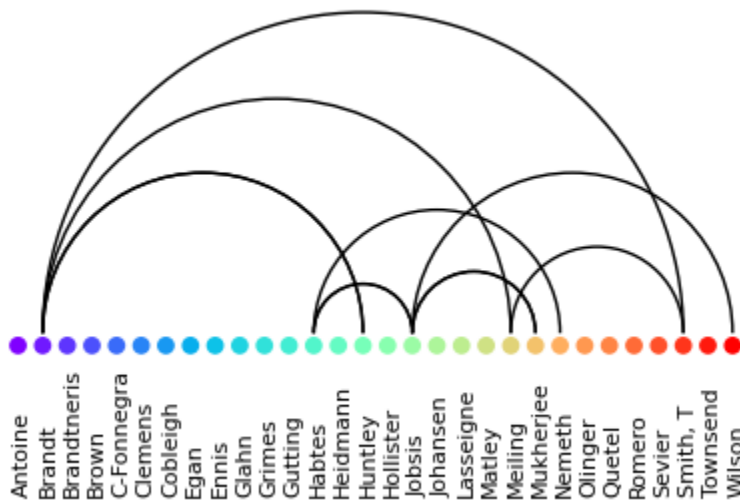


Figure 3. 2022 Collaborative Publications

Intra VI-EPSCoR authorships: 2022



The project reports submission of 17 non-EPSCoR research proposals during the reporting period, requesting a total of \$11,026,337 (Table 3). While this number of proposal submissions is essentially the same as in Project Year 2, the funding request is an increase of 137%. R2R is **building research capacity** in the USVI.

Table 3. Proposal Submissions

	Year 1	Year 2	Year 3
Proposals Submitted	13	18	17
Requested Funds	\$2,765,622	\$4,640,060	\$11,026,337

Research Theme 1: Watershed Monitoring and Land Use (WL)

This research theme examines how human land-based activities impact the health and function of marine habitats of the USVI at the Salt River Bay, St. Croix and Fish Bay, St. John watersheds. The team will determine terrestrial-based inputs into the coastal and marine ecosystems by connecting land use practices in upland and nearshore habitats to downstream impacts including offshore habitats and reefs. There are three research goals:

- WL1 – Identify and characterize the sources of sediment flux in two watersheds in the USVI.
- WL2 – Characterize the impacts downstream by experimentally testing several conservation land use interventions.
- WL3 – Share communication, community education, and integration activities to educate and inform the public of the benefits of land use research.

This impact of this Research Theme will identify which land uses are majority contributors to problematic erosion and runoff into the marine ecosystems of the Virgin Islands.

One of the major risks for the WL group was the drought that spanned Project Years 1 and 2. In Project Year 3, heavy rains have enabled extensive water sampling campaigns, stream stage data, streamflow velocity measurements, weather data, streambank soil moisture data, and passive sediment sampling. The WL team has tested the hydrological effect of living and organic ground covers on runoff and soil moisture retention. One MMES Student (Stryker) defended a thesis; this work illustrated the relative conservation potential of fast-establishment conservation buffer strips.

In Project Year 3, the team has made **excellent progress** towards project goals.

- WL1 – R2R sampling proceeded as originally planned. Much of these data are currently being analyzed. Some data have been sent off-island as a mechanism for ground truthing the analyses being performed on island. WL1 activities also include characterization of the salinity pattern in the Salt River and River Gut on STX. Lancellotti, Hensley and Stryker have a manuscript in press. Stryker has received an USGS fellowship; WL team members have received a NASA seed grant and an award from USGS-WRRI.

- WL2 – the team continues to characterize downstream impacts by testing interventions at the sub-catchment, field, and plot scales. Other studies have compared natural secondary forest land cover with controlled agroforestry production, and an analysis of the impact of breadfruit orchards on runoff and groundwater recharge will be presented at the 2023 annual meeting of the Caribbean Food Crops Society. Basic statistical analyses have been used to determine the impact of ground covers in plantain production.
- WL3 – activities include community engagement, Project Based Learning (PBL) activities, and guest lectures. The team has engaged with breadfruit and plantain farmers on STX. MMES student Sorace has been trained in geospatial analysis. Undergraduate Alexander has worked on processing and both Stryker and Alexander have presented at the UVI student research symposium.

Outputs: One MS thesis, one publication in preparation.

Assessment: This research theme has met its goals in the Strategic Plan. The major risks for this research theme were the drought conditions, which are no longer a factor.

Research Theme 2: Mangrove Function, Recovery & Restoration (M)

This Research Theme develops science-based opportunities for mangrove restoration by determining the current and historic distribution, loss and recover of mangrove species in the USVI territory. The goals are:

- M1 – The Mangrove Ecosystem Function & Recovery: Determine the current and historic distribution, loss, and recovery of the different mangrove species in the territory using a mix of archival maps and new technologies. This will identify stressors and other factors that influence their current distribution, health, and function in provisioning ecosystem services.
- M2 – Mangrove Restoration: Develop science-based opportunities for restoration by field testing restoration techniques and the factors that influence seedling success and resilience. These activities are coupled with citizen science programs.
- M3 – Work with our R2R communications, informal learning and education and workforce development (EWFD) teams to engage the local community including K-12 students, their teachers, and local citizenry.

In Project Year 3, the M team has made **excellent progress** towards its goals.

- M1 – The team performed a second year of field surveys of 19 mangrove forests. These data are being analyzed to determine the differences in forest-stand structure and composition. Preliminary analyses show differences by island, habitat type, and site. The team has achieved the appropriate FAA certification

and will be able to perform imagery runs for 12 of the 19 sites. Seven of the sites are National Park land and drone work is forbidden. MMES student Plotkin is working on analyzing sediment cores collected in Year 2 as part of her MMES thesis. Plotkin also traveled to U South Carolina to learn how to conduct sediment carbon analysis with Earth Ocean and environment College of Arts and Sciences collaborator E. Smith.

- M2 – the team has made progress in spite of the lack of a finished Marine Science Center. They have constructed a land-based nursery. Twenty-five tanks are fully plumbed with fresh and salt-water. The lab is working on three mangrove species (*Rhizophora mangle*, *Avicennia germinans*, and *Laguncularia racemosa*) at the land-based nursery. In M2, MMES student Holevoet defended her thesis, which identified the suitability of crushed recycled glass as a substrate for red mangroves. These results inform future nursery efforts and restoration practitioners. Outplantings on STT are being monitored for survival and growth. M2 reports significant engagement: 328 K-12 students, 72 participants in Mangroves in the Classroom, 256 students participated in Storm Strong programming, 824 USVI youth and public at outreach events, and 164 student partners through mangrove planting. IRB approval has been acquired by the M2 team. This has allowed collection and analysis of mangrove perception surveys as part of MMES student Palomino.
- M3 – activities include development of website content and a virtual, live Science Saturday event for the VI Department of Planning and Natural Resources. M3 activities include hosting 164 students and impacted 824 USVI youth. The M3 team held a workshop in March 2023 to develop a shared vision for mangrove restoration. Mangrove restoration activities have impacted 21 grad students, 8 undergrads, and a USVI/BVI mangrove restoration learning exchange. Other highlights of M3 activities include an AGU fellowship for graduate student Hoelvoet, and four Great Mangrove Cleanups. Other quantifiable impacts include 2 students who participated in the NSF INCLUDES Eddie Bernice Johnson SEAS Islands Alliance, 7 UVI students in R2R mangrove research, and awards to undergraduate students for poster presentations at the UVI Fall Research Symposium. Especially notable is participation in this work by Kwami Alexander, who is supported by an EPSCoR RII-BEC award. The team has been part of seven awards, including an EPSCoR RII-BEC, BIO-LEAPS, and a Transformation in the Geosciences Community.

Outputs: The team has one publication and one manuscript under review.

Assessment: This research theme has met its goals in the Strategic Plan.

Research Theme 3: Emerging Areas of Research (EA)

This Research Theme has three integrated projects centered around seagrass communities, the effects of *Sargassum* on beaches, and their connections to ridge-to-reef processes. The Emerging Areas will improve understanding of the physical variables that influence coastal and nearshore ecosystem function and resilience, including the role of seagrasses and impacts of the brown algae *Sargassum*. There are three integrated areas of focus with two research projects specific to Brewers Bay on the southwest coast of St. Thomas.

- EA1 – Determine the impacts of invasive seagrass that may alter movement, habitat, and food resources for invertebrates, fish, sea turtle species.
- EA2 – Quantify the role of seagrass type in short and long-term beach evolution.
- EA3 – Measure the spread of the invasive seagrass *Halophila stipulacea* in the territory and the mechanisms affecting its expansion.
- EA4 – Analyze the effects of *Sargassum* golden tides on Virgin Islands ecosystems.

The EA team made **good** progress towards its goals in Year 3.

- EA1 – The EA1 team has finalized the assessment of impacts of coastal systems, represented in a USVI Coastal Zone Management report. Efforts to work with University of South Alabama (USA) have been problematic UVI administrative issues that delayed creation of a subaward to USA.
- EA2 – The EA2 team has submitted a report to the USVI DPNR on the coastal vulnerability index, also developed for EA1. The team is making progress in developing beach monitoring methods and has one peer-reviewed publication.
- EA3 – Most of the efforts for EA3 are focused on the mechanisms for expansion, including herbivore feeding behavior and inventories of species biodiversity. One student defended a thesis in December 2022 and one will defend in Fall 2023.
- EA4 – The EA4 team is still spinning up efforts caused by COVID delays. There are some victories – sequencing is occurring and there is the possibility of a comparative analysis from historical samples.

Outputs: One graduate student thesis, two reports to municipal authorities, one publication.

Issues: Some of the activities have recovered from COVID but there are delays caused by administrative issues.

Assessment: The research theme is making good progress to achieving its goals. Problems associated with delays for subawards are hindering progress in some sub-themes. Other sub-themes are spinning up nicely given the problems from COVID.

Research Theme 4: Fish Ecology

This Research Theme addresses the question, “How do environmental impacts and food quality affect reproduction in parrotfish?” The focus is on the relationship between habitat composition and sedimentation rates on herbivorous species composition, and the effect of these factors on feeding rates and reproduction of the yellowtail parrotfish (*Sparisoma rubripinne*), as well as how oceanographic variability influences reproductive output.

The Fish Ecology Research Theme has four research goals:

- FE1 – Advance understanding of how natural and anthropogenic stressors on coral reefs change herbivore assemblages.
- FE2 – Advance understanding of how benthic characteristics of impacted reefs affect feeding rates and reproduction (frequency of spawning, fecundity) of herbivorous parrotfishes.
- FE3 – Improve understanding of oceanographic and environmental variables that influence reproductive rates (frequency of spawning and fecundity) of coral reef fish that spawn in aggregations.
- FE4 – Share results of fish ecology research with stakeholders and provide opportunities for new partnerships.

The FE team has made **excellent progress** towards goals in Year 3.

- FE1 – The team has analyzed historical data of parrotfish assemblages looking for the impact of natural and anthropogenic stressors. They have tested the hypothesis that major bleaching/disease events (i.e. 2005 and 2010) and sedimentation from land development lead to changes in parrotfish abundance and diversity. An important outcome of this study is that they have shown that the *Scarus* parrotfish populations declined steadily with increasing sediment load, whereas the *Sparisoma* biomass showed a temporary increase at low sediment flux but then declined as sediment flux continued to increase. This supports an FE team model showing a shift from parrotfishes that function as scrapers (genus *Scarus*) to grazers (genus *Sparisoma*). This work is being drafted as a manuscript for publication.
- FE2 – To determine how benthic characteristics affect feeding and reproduction of parrotfish, the team analyzed sediment flux, benthic algal composition, and yellowtail parrotfish feeding rates; the results allow them to hypothesize that higher sediment loads adjacent to land development may affect both benthic algal composition and reducing parrotfish feeding rates on turf algae due to sediment-laden turf. The FE2 team completed a first complete year of acoustic data collection in Reef Bay as well as 50 parrotfish to examine diet among sites

and seasons using metabarcoding. Analysis by Harmes-Tuohy, Schizas, and Tuohy (Puerto Rico) is ongoing, as is on-island sediment analysis of gut contents. Data from acoustic receivers are currently being analyzed by the team to determine the effects of benthic algal composition, sedimentation and parrotfish feeding rates on parrotfish spawning site visitation rates and duration but there is no statistically significant effect of total sediment or composition of turf or macro algae on spawning site visitation or duration.

- FE3 – To determine potential correlations among ocean and environmental variables with parrotfish reproductive output the team has processed gonads from female fish to examine fecundity and egg size among varying levels of sedimentation and benthic algal composition. This involves a collaboration with the Brandt group. The team is also collaboration with Wilson (and Nortek) to analyze the echosounder data as a novel measure of parrotfish reproductive output. To validate and calibrate the echosounder data to parrotfish egg production we recruited graduate student Stefanie Maxin, who will be using a video hydrophone to measure frequency of spawning events and calculate reproductive output.
- Broader Impacts – Master's student Jenna Cheramie successfully defended her thesis in March 2023. Faculty, post-docs and graduate students within the Fish Ecology research focus area made multiple oral and poster presentations at the 14th International Coral Reef Symposium (n=6) in Bremen, Germany (July 3-8, 2022), VI-EPSCoR annual conference (n=3) in St. Thomas, USVI (October 27-28, 2022), Gulf and Caribbean Fisheries Institute (n=1) in Ft. Walton Beach, Florida (November 7-11, 2022) and at the Gordon Research Conference on Mesophotic Reefs (n=1) in Ventura, California (February 19-23, 2023).

Other impacts include recruitment of four Master's and two undergraduate students. Postdoc Blincow-Israel has continued her training of graduate students in *R*.

Outputs: The FE team has submitted 12 proposals including an MRI award for ocean gliders.

Assessment: FE has achieved all its goals. The team has leveraged R2R activities to apply for and receive external funding.

Research Theme 5: Oceanography (OC)

This Research Theme is focused on understanding oceanographic variables affecting the spawning of yellowtail parrotfish and coral reef resilience, specifically the oceanographic conditions that drive connectivity patterns related to the increased

biodiversity at more resilient coral reefs, and the influence of oceanographic, environmental, and terrestrial inputs on the reproductive rates of a ubiquitous reef fish, the yellowtail parrotfish (*Sparisoma rubripinne*), between algal turf vs. macroalgal dominated nearshore reef sites. The Oceanography Research Theme has three research goals:

- OC1 – Quantify the influence of oceanographic and environmental variables on the variability in reproductive rates (frequency of spawning and fecundity) of *S. rubripinne*.
- OC2 – Determine larval dispersal pathways from point-source spawning aggregation sites of *S. rubripinne*. Insights into the linkage and distribution of larval and juvenile populations with the spawning sites of the parents is a powerful fisheries management tool that can help manage the species.
- OC3 – Share USVI Oceanography Research with Stakeholders & Provide Opportunities for New Partnerships.

In Year 3, the OC team has made **very good progress** towards its goals.

- OC1 – The team has met most of its goals for this project year. ACDP trackers have been purchased; two are deployed at Reef Bay and two are being used for parrotfish spawning research. The team will conduct egg collection this year.
- OC2 - The Caribbean Regional Ocean Model, led by postdoc Mukherjee, has been published. This model allows the OC2 team to slot into the larger framework from Holstein (LSU) and integrate results from the coral reef biodiversity and parrotfish (and other fish) larvae dispersal pattern data. The team has submitted a proposal to the Office of Insular Affairs, based on Mukherjee's work, to address sargassum mitigation.
- OC3 – The OC3 team has performed outreach activities at the VI-EPSCoR conference and as part of the VI-EPSCoR newsletter. The team is collaborating with the US Navy, Rutgers University, and the Ocean and Coastal Observing Virgin Islands organization to deploy ocean gliders for the study of ocean heat content. This effort was instrumental in acquisition of ocean gliders from the NSF MRI program. The OC3 team has made a strategic decision to sell the RV *Derektor* and purchase a smaller vessel with a faster cruising speed to enable the team to reach all of the USVI within a single day's range.

Outputs: Outputs include a successful NSF Major Research Instrumentation award for ocean gliders, and a project decision to replace the *RV Derektor*.

Issues: Replacement of RV *Derektor* does not have a timeline for action.

Assessment: This research theme is making strong progress taking into consideration the changes in personnel. The team is adapting to the departure of Habtes and has made strong progress. Replacement of the RV Direktor should have a timeframe associated with it since this impacts other project components. The team should be commended on receiving an MRI award.

Research Theme 6: Marine Disease and Restoration (MD MR)

This Research Theme will identify how the interactions of species diversity and environmental stressors affect disease susceptibility and coral restoration success. The team will specifically test for species interactions for coral outplantings. The eight goals for this Research Theme include those for Marine Disease (MD) and Marine Restoration (MR):

- MD1 – Determine how species biodiversity affects the spread and impact of coral disease.
- MD2 – Determine how local stressors (e.g., nutrients, turbidity) and global stressors (e.g., temperature stress) drive temporal and spatial distributions of disease.
- MD3 – Predict the spread and impact of multi-species coral disease.
- MD4 – Share Disease (and Restoration) Research with Stakeholders through participation in outreach and education activities.
- MR1 – Expand capacity for restoration ecology research in the US Virgin Islands.
- MR2 – Determine how diversity affects success of coral outplanting configurations.
- MR3 – Determine how gradients in water quality affect success of coral outplanting.
- MR4 – Share Restoration Research with Stakeholders through participation in outreach and education activities.

This research area addresses knowledge gaps in how species diversity and different water quality regimes affect the growth, health, and survival of coral outplants.

In Year 3, the MD MR team made **very good progress** towards meeting project goals:

- MD1 – The team met the goals for MD1 in Project year 3. There are additional publications in preparation that will be submitted in summer 2023.
- MD2 – The team has sampled on STT and STJ. These data impact the thesis projects for students Bestrom and Dade. Bestrom has travelled to Woods Hole Oceanographic Institute to acquire skills for processing of microbial samples with collaborator Aprill. Student Mason will defend her thesis, focused on SCTLTD transmission, by the end of this calendar year.

- MD3 – Work on MD3 has proceeded according to plan, with postdoc Mukherjee collaborating with Holstein (LSU). This work resulted in an NSF RAPID award (lead: Correa, Rice U), involving Brandt, Apprill, Holstein, Correa, and Mydlarz (U Texas Arlington).
- MD4 – Outreach activities are online via the vicoraldisease.org site, international meetings (oral and poster presentations at the International Coral Reef Symposium) and on-island (VI-EPSCoR conference). Brandt presented at the Gordon Research Conference in 2022.
- MR1 – Based on R2R work, R. Smith has received external funding from the National Marine Sanctuary Foundation for coral larval propagation. Brandt has a contract from the National Park Service for coral restoration.
- MR2 – The MR2 team has performed outplanting experiments at Perseverance Bay. Preliminary data suggest that single species, multi-genotype outplanting plots show less mortality and higher growth. Photo monitoring analysis is underway.
- MR3 – The MR3 team has performed outplanting experiments in both clera and turbid waters. This impacts student Shelby's Master's project. The experiment is currently underway.
- MR4 – The team is working with the Lovango Resort and Beach Club for coral restoration and a demonstration outplanting. This includes demonstration signage (with the VI-EPSCoR communications team) and booklets for distribution. This has generated five graduate and undergraduate research opportunities.

Outputs: Three Master's theses (Bestrom, Dade, Mason); one international presentation (Mukherjee); one RAPID award (Correa, Rice U); one contract (National Marine Sanctuary Foundation); production of Lovango Bay communications materials; numerous local, national and international presentations.

Assessment: This research theme has met or made excellent progress towards meeting its goals.

Research Theme 7: Coral Reef Resilience (CR)

This Research Theme will determine the attributes that support resistance and recovery from disturbances. The team will determine the impact of multiple drivers (variation in biodiversity, magnitude and frequency of thermal and storm disturbances, resistance to coral disease, herbivory rates, and exposure to land-based run-off and water quality) for why some locations show resilience where others show precipitous declines in coral cover. CR Research will determine internal and external drivers underlying resistance and recovery of coral reefs to stress and disturbance in the northeastern Caribbean.

The team will create a mechanistic understanding for management actions to improve coral reef condition and can be contrasted with other systems, such as the Indo-Pacific. Coral connectivity research will create an understanding of how connectivity networks shape biodiversity of coral reefs. The CR Research Theme has three goals:

- CR1 – Determine the internal and external drivers most critical to coral reef ecosystem resilience in the USVI and identify targets for restoration of resilience.
- CR2 – Understand the impact of regional larval connectivity patterns on biodiversity patterns.
- CR3 – Share Coral Reef Resilience Research with Stakeholders through participation in outreach and education activities.

In Year 3, the CR team has made **very good progress** towards project goals.

- CR1– Databases of internal and external drivers have been constructed and/or updated for all variables for 34 sites of the Territorial Coral Reef Monitoring Program and are ready for use in the overall resilience analysis with little or no further analysis. Data sets from the National Park Service and Dr. Peter Edmunds (Cal. State Northridge) either require additional data collection or modeling. A postdoctoral associate, Dr. Lauren Olinger (2022 University of North Carolina Wilmington), has been hired to co-lead the resilience study with a position start date of April 21, 2023.
- CR2 –The connectivity model is under development by Dr. Daniel Holstein at Louisiana State University. LSU student Farmer has created seascape maps of coral diversity using published and unpublished data sources to be used in the analysis and has begun incorporating outputs of the US Caribbean Regional Ocean Model in consultation and guidance from Holstein, T. Smith, and Mukherjee. This database will be used with the finalized connectivity model to test hypotheses concerning the influence of larval connectivity on biodiversity patterns.
- CR3 – Marine resilience material has been contributed to EPSCoR promotions, newsletters, and the website.

Outputs: The team did not report publications for this project evaluation period.

Assessment: This research theme has made very good progress on each of their goals.

Education & Workforce Development (WF)

This team trains local K-12 STEM teachers and junior faculty to be mentors and produce STEM education research to improve students' success and inclusion. The long-term goal is to transform STEM education in the USVI to be more grounded within

the local environmental context. WF will require increased engagement from both stakeholders and the EWFD, and more encouraging of community action.

The Education and Workforce Development (WF) team has four goals:

- WF1 –To integrate resilience research themes (i.e. mangrove restoration, coral reef ecosystems, and land-sea interactions) into teacher professional development to improve K-12 student preparation.
- WF2 – Increase recruitment, retention, and persistence of URM undergraduates in STEM and resilience-related majors, minors, and certificate programs.
- WF3 – Support student/ faculty research infrastructure via support for pre and in-service STEM workforce, with the goal to increase STEM career interest, skills, and retention.

The WF component has made **excellent progress** toward completing the Year 3 goals.

- WF1 – The teacher PD component facilitated over 4000 teacher hours of professional development. Planned and hosted the 2022 VI STEM Institute serving 86 local teachers. During the academic year, the STEM Institute facilitated 3 Teacher Talk Fridays and 3 virtual training courses as part of continued professional development opportunities for practicing and prospective STEM educators. There is a meeting scheduled with the VI EPSCoR informal learning team and teachers on St. Croix for early June 2023 to discuss and schedule the implementation of the marine debris curriculum using a PBL approach. A field trip is planned for the Summer Institute in Summer 2023 to continue to inspire and expose teachers to R2R Research and related fields.
- WF2 – During Year 3, resilience-themed experiential learning (RTEL) projects were conducted by a total of 59 students in Science 100 and Social Science 100. During R2R years one to three, the team has nearly doubled the number of students engaged in RTEL projects: from 18 students (Year 1) to 33 students (Year 2), to 59 students (Year 3). Curriculum revisions to Science 100 and Social Science 100 were made in Year 3.
- WF3 – The Mentoring and Research Infrastructure (MRI) team conducted 9 professional workshops from Summer 2022 to Spring 2023 including one workshop for mentors, two workshops for graduate students, and six workshops for undergraduate students on individual development planning, career planning, abstract writing, and resume and CV writing. In collaboration with the Department of Education Title III Program and the College of Science and Mathematics, MRI assisted in the development of new course (BIO/CHE 250 Professional Practice in Biomedical Science), for the newly developed Certificate in Biomedical Laboratory Science. Currently, the MRI team practicum supports two K12 teachers working on their PBL focused on agriculture for implementation in K12

education. In Spring of 2023, three junior faculty in STEM disciplines applied for the educational research mini-grant (ERMG) funding to conduct and expand educational research on the UVI Campus. The 2022 recipient of the ERMG utilized the funds to conduct research and start a productive line of research in STEM education through a study titled: *Expanding Water Quality Analyses in AAS Campus*.

Outputs: Two service-learning related proposals were funded. One full chapter manuscript accepted. The Teacher PD team disseminated research results at the National Association of African American Studies (NAAAS) Annual Conference [student presenter], NSF EPSCoR National Conference, and NSF EPSCoR EOD Conference. The MRI team disseminated research results at the Project Kaleidoscope (PKAL) Regional Network Conference in Massachusetts and North Carolina, NSF EPSCoR EOD Conference, and the International Conference on Humanities, Social and Education Sciences (IHSES) 2023.

Assessment: In Year 3 of R2R, the EWFD team met all but two of the specified goals and objectives.

Informal Learning (IL)

The goal of the Informal Learning (IL) Team is to advance the comprehensive and culturally responsive Education and Outreach plan that will expand to be more inclusive of URM groups within the Virgin Islands. The IL Team will increase the level of engagement with existing and new external partners as well as foster collaborations with other universities/research entities. The IL Team has six goals:

- IL1 – Increase and sustain the reach of the IL Team throughout the Territory.
- IL2 – Diversify the range of topics presented in informal education and outreach initiatives, drawing upon the research outputs and related activities from the R2R research teams.
- IL3 – Promote and guide K-12 underrepresented minority students into the geosciences and broader STEM pipeline as part of the larger R2R objective to build and enhance the local STEM workforce.
- IL4 – Become a recognized information and resource hub for STEM and environmental education, awareness, and sustainability for the Territory's largely underserved communities.
- IL5 – Build new and improved-upon existing connections and lines of communication to better reach and understand target audiences.
- IL6 – Build self-sufficiency and innovation within the IL team and its efforts by pursuing funding that puts the IL team in a position to be more independent in building out and promoting its initiatives.

The IL team made **very good progress** towards its goals in Year 3.

- IL1 – A total of 2,167 Virgin Islanders have engaged in activities hosted or attended by the Informal Learning component. “STEM Saturdays” which provide the public with the opportunity to interact with R2R researchers were reintroduced in Year 3.
- IL2 – While many of the prominent R2R themes (Coral Reef Ecology, Mangrove Restoration, Sea Turtle research etc.) continue to be focal points for community engagement and outreach, IL has begun putting more time and resources into other disciplines related to the current project. This has resulted in more collaborations with more R2R scientists, and better representation of their work in the public eye.
- IL3 – 1,005 K-12 students were engaged in activities promoting Geosciences during the past year.
- IL4 – The outreach team and several masters students supported by IL attended the first National EPSCoR EOD Conference in 2023 where the group gave an interactive poster presentation that highlighted the implications of Virtual Reality in science education and communication. The STT/STJ Community Engagement Specialist participated in a science communication panel held at the 27th EPSCoR National Conference in Portland, Maine.
- IL5 – IL participated in a total of 4 Teen Time events using Virtual Reality to introduce marine science concepts to teens from surrounding underserved communities. IL has also begun engaging members of various underserved communities (such as special needs individuals/advocates).
- IL6 – Building relationships with other EPSCoR jurisdictions for future collaborations.

Outputs: One poster presentation; panelist at 27th EPSCoR National Conference.

Assessment: The IL team has ramped up operations/activities this year reaching over 2,100 Virgin Islanders as COVID restrictions were lifted and are getting back on track with goals.

Communication and Dissemination (CD)

The Communications Team develops and shares information and content that captures the research outputs and related activities emerging from the work and success of the R2R teams and affiliated students. The tools to do so include updates to the R2R website (viepscor.org), the production and dissemination of a biannual newsletter, updates on social media outlets including Instagram, Facebook and Twitter and YouTube. The CD team has three goals:

- CD1 – Inform stakeholders and community of R2R project research and educational goals and progress made toward achieving those goals.
- CD2 – Produce a biannual VI EPSCoR Newsletter for broad audiences.
- CD3 – Support R2R project team’s promotional needs.

The CD team made **very good progress** towards Year 3 goals.

- CD1 – The website viepscor.org is currently undergoing a major redesign and upgrade. New R2R Infographics have been created during Year 3. One blog post was made. In Year 3, the VI EPSCoR Facebook page reached 51,749 individuals and Instagram reached 12,587.
- CD2 – One newsletter focusing on restoration is in production for Year 3.
- CD3 – Promotional materials have been created and posted to the VI EPSCoR website and on social media. The *Coral Chronicles* magazine has been published in partnership with Dr. Brandt’s lab. Intensive year-long CSS coding training program has been completed and will enhance researcher and viewer experiences on the EPSCoR website. Elisa Bryan conducted an Adobe Illustrator workshop for 12 R2R participants.

Outputs: “Searching for Sea Turtles in Carriacou, Grenada” documentary video; *Coral Chronicles* magazine (design and most photos); presentation at EPSCoR EOD Conference.

Assessment: The Communication and Dissemination team continues to create informative and engaging communications to highlight the work of R2R.

R2R Management (RM)

R2R has a thorough and responsive management structure overseen by Leadership and Management Teams, assisted by two panels of authorities and experts (External Advisory Board and Governing Committee). The Leadership and Management teams ensure that R2R meets the goals and objectives in the Strategic Plan.

R2R Management has three goals:

- RM1 – Meeting the data management needs of the R2R team.
- RM2 – R2R Project management, including project implementation, development and coordination of workshops, and preparation of the USVI Science and Technology Plan.
- RM3 – Collaboration with the external evaluator and NSF EPSCoR program teams to meet NSF’s expectation for R2R Project Evaluation and Assessment.

The RM team has made **very good progress** towards Year 3 goals.

- RM1 – The IT department in collaboration with VI-EPSCoR researchers and the Data Manager regularly assesses the internet capacity throughput speeds for research data needs. Research building cabling and fiber work is in progress. Researcher reports streamlined for ease of use.
- RM2 – Team and staff meetings are conducted monthly. R2R Annual Conference held in October 2022. Consultant hired for creation of USVI Science and Technology Plan.
- RM3 – External evaluators attended R2R meetings as requested by PD/PA. Quarterly check-in meetings were held with PD/PA. Evaluators attended the October 2022 R2R Annual Conference. R2R faculty and staff were interviewed both in person and virtually. Undergraduates and graduate students were surveyed. A focus group was held with postdocs. Proposals and awards were analyzed as part of the Year 3 Evaluation Report.

Assessment: The R2R project management is effective in managing the project and ensuring resources are made available for researchers, postdoctoral fellows, and student participants. Management is to be commended on the increased communication to R2R participants during Year 3. The team has maintained their high number of publications and proposal submissions to NSF and other agencies, and is to be commended for the larger amount of requested funds in those proposals.

R2R Participant Interviews/Focus Group

The external evaluation team met with R2R participants (administrators, faculty, and postdoctoral fellows). Interviews were conducted both in-person during the site visit to USVI in October 2022 and via Zoom in Fall 2022/Spring 2023. A focus group was also held in Spring 2023. These conversations were framed by results from past and current year surveys and were used to identify issues raised by R2R participants.

During these discussions, several common themes were identified:

Team Resilience

1. Despite the difficulties, barriers, and delays presented by COVID, the teams are performing and resilient. The majority of R2R participants remain engaged and enthusiastic about the work. For many of the research faculty, the RII Track-1 project provides a mechanism for performing high-quality research and building research capacity. For tenure-track teaching faculty R2R has allowed them the ability to engage beyond remote delivery of classes. Teams have been able to pivot from COVID-induced barriers. These impacts on the personal lives of team members have been harder than on the continental United States. For example, it is notable that the

Territory public school district was remote for two full years and that intra island connectivity presented major hardships for personal lives. More than one faculty member expressed satisfaction with the project because it gave them important place-based work that allowed them to not think about COVID.

2. The teams have adapted to and recovered from the departure of Habtes and Cruz-Rivera. R2R leadership continues to adapt in a way that allows the project to meet its short-term goals and has given the teams room to adjust to meet long-term goals.

Team members have stepped in to ensure that research, mentoring, and career guidance are being covered for students and postdocs. Concerns expressed by postdoctoral researchers about isolation and the need for guidance have been largely addressed by new initiatives from R2R leadership.

3. The Education and Workforce Development Team is rising to the challenge of filling the role of Dr. Cummings who recently moved on from her position within R2R. The team is continuing to meet their goals. As the project passes its mid-point, it is clear that succession planning for each component (including EWFD) should be a priority.

Institutional Support

R2R participants reported a lack of institutional support from UVI. This is a systemic condition that predates R2R and the pandemic and is representative of the need for R2R to be a mechanism for developing a stronger culture of research at UVI rather than just be used as a source of indirect funds. The need for support manifests at the project and institutional levels, as well as throughout the teams.

1. At the institutional level, there is a clear need for policies on return of F&A as a mechanism for promoting an environment of scholarly productivity by incentivizing University researchers. UVI is both an HBCU and a PUI. Currently UVI does not return F&A to faculty on any federal awards, and research faculty are appointed on annual contracts. However, members of the tenure-track faculty need this incentive to go after research grants, especially given their heavy teaching loads, which can be as high as 5 and 5. Members of the research faculty need similar returns of F&A – while they must cover their own costs with research grants, their soft money status means they need to be able to provide protection and bridge funding during potential gaps between awards. In addition, they need to be able to provide mechanisms for tapering as they near retirement or encounter illnesses.
2. At the institutional level, there is a clear need to provide a new mechanism for support of research faculty. Research faculty, who are reappointed annually, do

not have mechanisms for longer-term security. There is no mechanism for hybrid positions whereby research faculty can count on salary support from the institution but still raise much of their compensation from outside sources. The current policies, coupled with the lack of return of F&A, do not match policies of UVI's peer and aspirants.

3. At the institutional level, UVI continues to make progress on addressing building infrastructure needs. The Environmental Analysis Lab (EAL) has opened and some R2R participants are in new offices. The EAL is fully operational and supporting R2R research teams. The Marine Sciences Center (MSC) is still not complete, and opening is projected to occur in late summer 2023. If this opening is not further delayed, R2R should be back on target for the strategic plan at the end of Y4.
4. At the institutional level, the accounting office is short staffed and according to faculty and staff, not timely in processing needed items. There appears to be a lack of policy enforcement, as staff are sometimes told to do something one way and then following the same process again will result in rejection of the item. The lack of enforcement of policies and adherence of processes, hinders the accounting office and offices across UVI.

Building research capacity and a culture of research and scholarship on campus means creating opportunities for faculty to embrace research and scholarship. Many HBCUs with robust research programs (e.g., Howard University, North Carolina A&T) articulate specific F&A return policies with the understanding that transparency and open policies will support faculty as they navigate their instructional and research duties. The Council on Undergraduate Research (CUR) has established mechanisms for PUIs to enhance the culture of research on campus. This includes meeting faculty where they are and providing mechanisms that allow for some increased security. **These steps are all essential to building research capacity and ensuring that faculty are attracted to, and retained at, UVI.**

Stronger Communication

In Year 3, faculty and staff noted an increase in the frequency and quality of communications from project leadership and management. In Year 2, postdocs reported the need for better communication with their mentors. Part of this was couched in terms of the remoteness from COVID but others articulated specific needs for more engagement with mentors. This was most notable from postdocs who joined the project in the past year. As a result, Dr. Waddell has initiated scheduled professional development meetings with the postdocs, and the change has been positive. Postdoctoral researchers appreciate the ability to see how their work contributes to larger R2R goals and to interact with other research areas.

Student Survey Development Approach

The development of the Undergraduate and Graduate Survey instruments was informed by the project evaluation logic model, a review of project documents, and discussions with the project leadership.

The undergraduate and graduate student survey instruments had 10 questions/items each, which included a participant background section and questions regarding career aspirations, research interests, mentoring, R2R specific work/research, and a section on research competencies for graduate students.

The survey instrument was then converted into a web-based survey using the SurveyMonkey™ platform.

Undergraduate Student Survey

Based on the project team roster shared by the Project Administrator (PA), there are 10 undergraduate students directly involved in the R2R project. All undergraduate students received an invitation to participate in the survey. The Undergraduate Student Survey received 8 responses, which constitutes a response rate of 80%. The respondents had the option to skip questions that they did not wish to answer.

Table 4 summarizes the main characteristics of the survey participants, including institution, year in school, and demographics.

Table 4. Characteristics of Survey Participants

Participant Characteristics	Number (%)
Institution	
University of the Virgin Islands (St. Thomas)	7 (87.50%)
University of the Virgin Islands (St. Croix)	1 (12.50%)
Year in School	
Senior	6 (75%)
Junior	1 (12.50%)
Sophomore	1 (12.50%)
Gender	
Female	6 (75%)
Male	2 (25%)
Race	
African American or Black	6 (75%)
White	2 (25%)

Ethnicity	
Not Hispanic or Latino or Spanish Origin	7 (87.50%)
Afro-Caribbean	1 (12.50%)

Survey Highlights

Five of eight undergraduate students responded that their career goals or aspirations include plans to attend graduate school or work within themes related to R2R research. Of the respondents, 88% stated that their involvement in R2R affected what they want to do post-graduation, one student noted that “Before working with R2R I was sure that I wanted to work with maps and geographic information systems but wasn’t sure what exactly I would focus on. Now I have been able to combine two areas of interest, mapping and the environmental science. I can now use my skills with GIS software to help make an impact on our environment.” Another student stated that “I was interested in corals before but after the working with R2R it has turned that interest into a passion.”

When the undergraduate students were asked about what they expected to learn from their work with the R2R project, they noted items such as:

- Gain more leadership and communication skills
- Research techniques
- The experience of working in a lab setting and how to produce scientific data in different formats
- Detailed scientific methodology and effects of land use on ecosystem and economy

Approximately 63% of respondents stated that they discuss research with their faculty mentors each week. All undergraduate students rated their relationships with their faculty mentors in the two highest categories as either “effective” or “very effective.”

Undergraduate survey participants were given the opportunity to provide comments or suggestions for ways in which the R2R project could further support undergraduate students. The following are some of the common responses:

- Create more job opportunities for undergraduates across both campuses
- More communication to students

Graduate Student Survey

Based on the project team roster shared by the Project Administrator (PA), there are 25 graduate students directly involved in the R2R project. All graduate students received an invitation to participate in the survey. The Graduate Student Survey received 22 responses, which constitutes a response rate of 88%. The respondents had the option to skip questions that they did not wish to answer.

Table 5 summarizes the main characteristics of the survey participants, including institution, year in school, and demographics.

Table 5. Characteristics of Survey Participants

Participant Characteristics	Number (%)
Institution	
University of the Virgin Islands (St. Thomas)	21 (95%)
University of the Virgin Islands (St. Croix)	1 (5%)
Year in Graduate School	
First Year	5 (23%)
Second Year	11 (50%)
Third Year	6 (27%)
Gender	
Female	19 (86%)
Male	3 (14%)
Race	
African American or Black	2 (9%)
White	19 (86%)
Prefer to not answer	1 (5%)
Ethnicity	
Hispanic or Latino or Spanish Origin	4 (18%)
Not Hispanic or Latino or Spanish Origin	18 (82%)

R2R Involvement Expectations

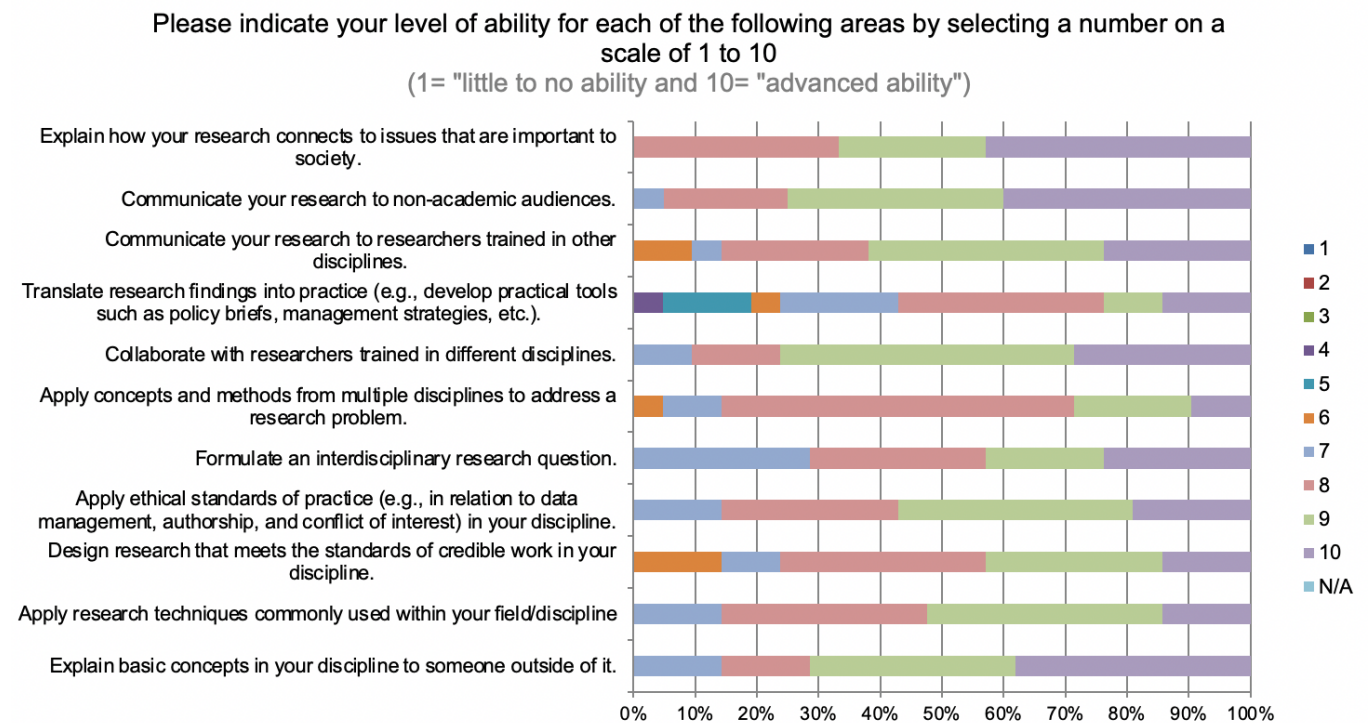
Study participants were asked about what they anticipate getting out of their work with the R2R project in addition to a graduate degree. Of the respondents, 86% had prior experience in research. Results were summarized into categories highlighted below:

- Research experience
- Publishing experience
- Expanded network (academic institutions, scientists and researchers, and environmental agencies and organizations)
- New/expanded skillset
- Career guidance and connections
- Mentorship/Support

Competencies

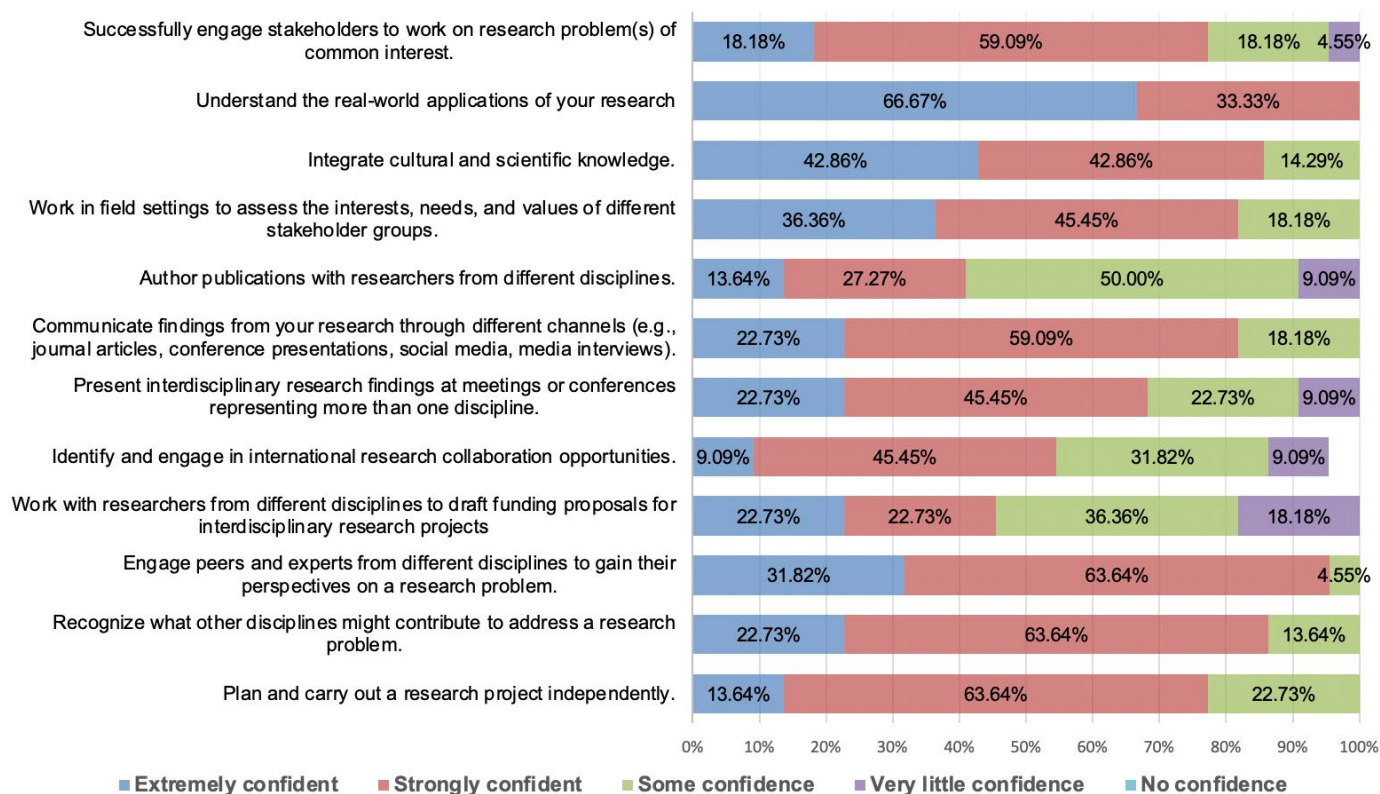
R2R graduate students were asked to self-rate their level of ability for several competencies related to research and applying learned skills. The average rating across the 11 areas was a 9 out of 10 as shown below in Figure 4. Therefore, R2R graduate students feel they have advanced ability across the competencies. The three competencies with the highest average (9) related to collaboration with others and connection of research to societal issues.

Figure 4. Graduate Student Research Competencies



As shown in Figure 5 below, graduate student respondents also highly rated their confidence in their ability to apply competencies in new contexts or situations.

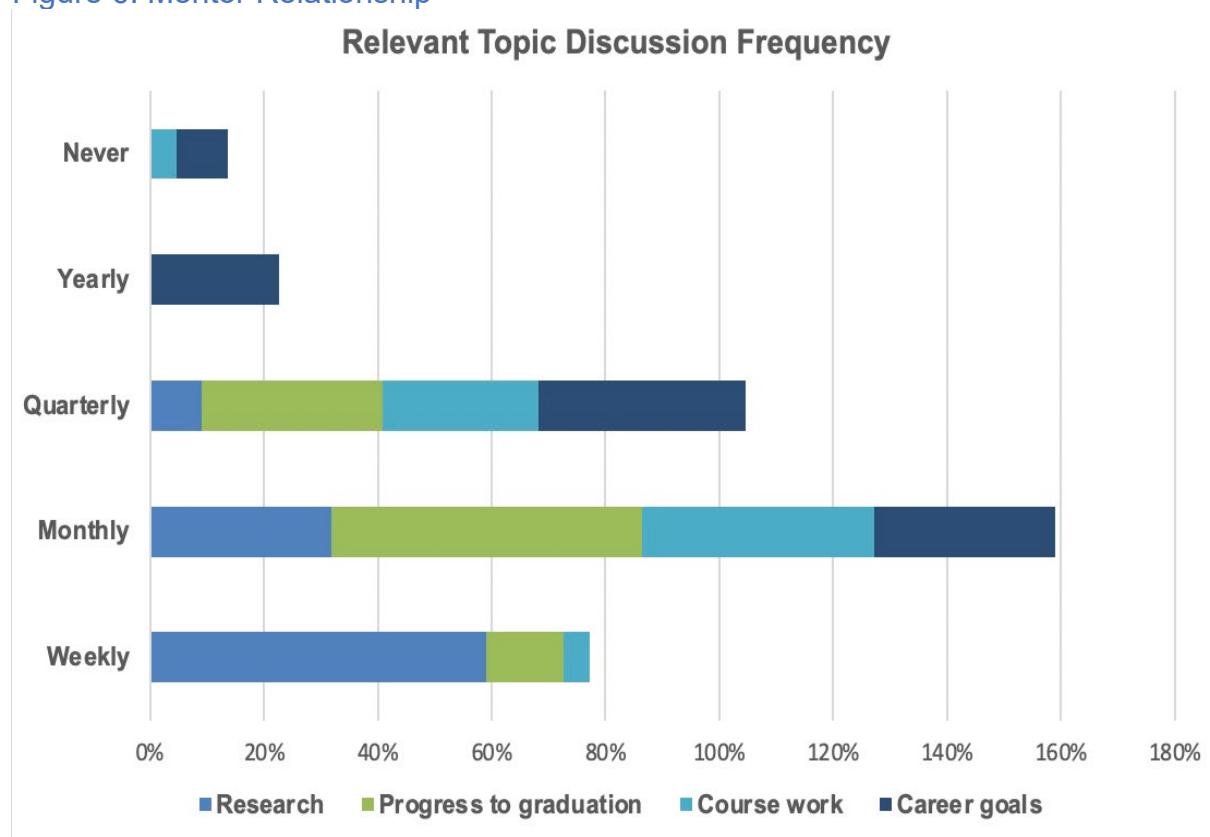
Figure 5. Graduate Student Competencies in New Contexts or Situations



Mentor/Mentee Relationship

When asked about the frequency of interaction with faculty on common subjects (Figure 6), 59% of graduate students reported discussing research with their faculty mentor each week and 32% each month. Of the respondents, 95% reported the relationship with their mentor was either “very effective” or “effective”, which is a 7% increase from Year 2.

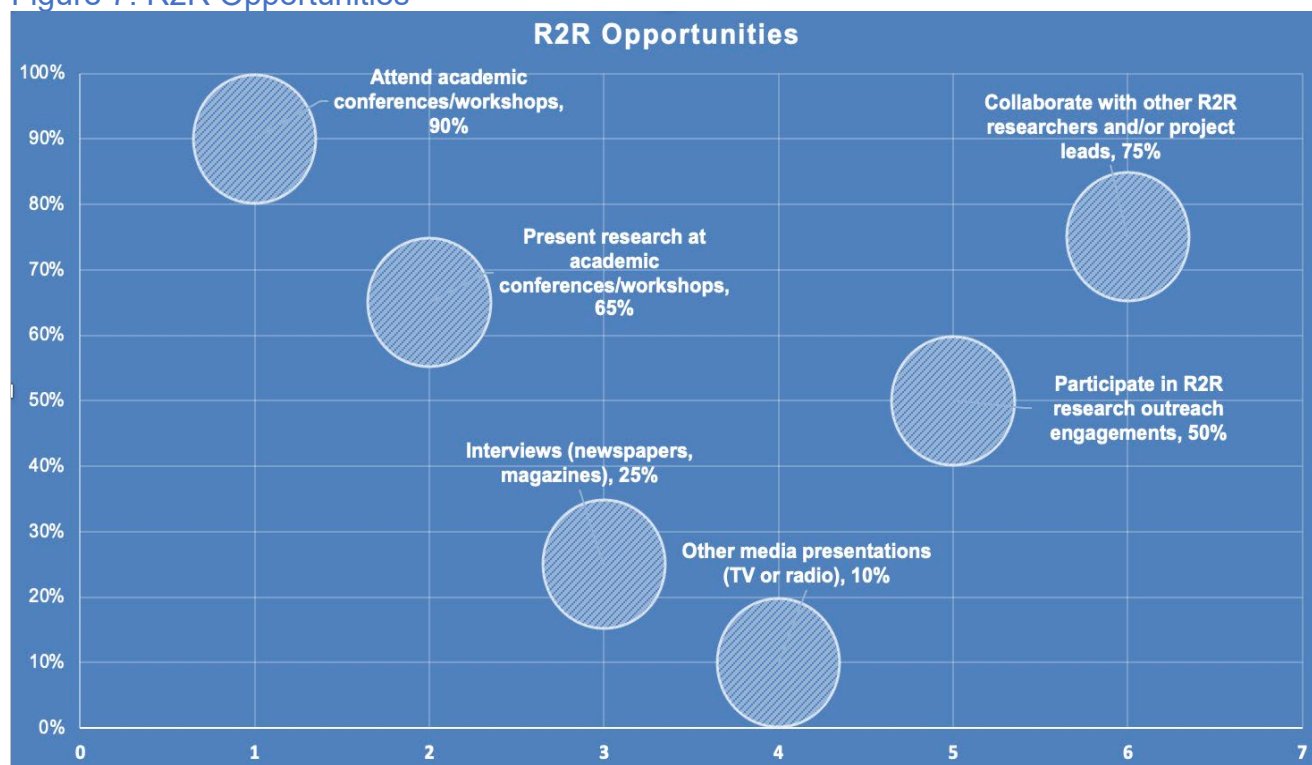
Figure 6. Mentor Relationship



R2R Opportunities

Of the respondents, 90% reported having the opportunity to attend academic conferences and workshops, which is a 40% increase from Year 2. 65% have had the opportunity to present research at conferences and workshops. 75% reported collaborating with other R2R researchers and/or project leads. Also noteworthy is that 50% of graduate student respondents reported participating in R2R research outreach engagements.

Figure 7. R2R Opportunities



Graduate student survey participants were given the opportunity to provide comments or suggestions for ways in which the R2R project could further support graduate students. The following are some of the common responses:

- Prioritize increasing R2R publications
- More grant writing workshops
- More communication about relevant opportunities for graduate students
- More mentorship/resources around career goals
- Increased travel funding

Faculty Survey

Based on the project team roster shared by the Project Administrator (PA), there are 21 faculty members (18 from the University of the Virgin Islands and three collaborators) directly involved in project. All 21 faculty members received an invitation to participate in the survey. The Faculty Survey received 20 responses, which constitutes a response rate of 95%. The respondents had the option to skip questions that they did not wish to answer.

Table 6 summarizes the main characteristics of the survey participants, including institution, academic rank, and demographics. The team is diverse and spans all academic ranks within both tenure track and research lines.

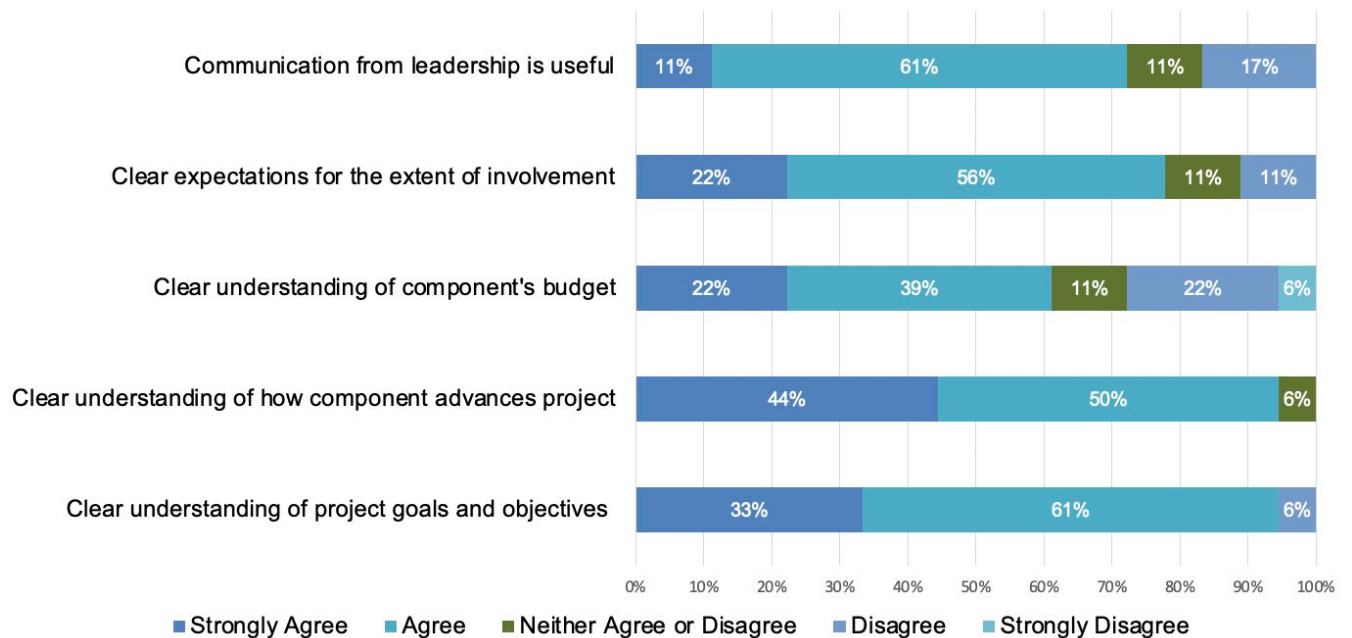
Table 6. Characteristics of Survey Participants

Participant Characteristics	Number (%)
Institution	
University of the Virgin Islands (St. Thomas)	15 (72%)
University of the Virgin Islands (St. Croix)	2 (10%)
University of Kansas	1 (5%)
University of Alabama at Birmingham	1 (5%)
Louisiana State University	1 (5%)
Academic Rank	
Research Assistant Professor	1 (5%)
Assistant Professor	8 (40%)
Research Associate Professor	1 (5%)
Associate Professor	5 (25%)
Research Professor	3 (15%)
Research Scientist/Specialist	2 (10%)
Gender	
Female	11 (55%)
Male	9 (45%)
Race	
African American or Black	4 (20%)
White	13 (65%)
Other	1 (5%)
Prefer not to answer	2 (10%)
Ethnicity	
Hispanic or Latino or Spanish Origin	1 (5%)
Not Hispanic or Latino or Spanish Origin	17 (85%)
Prefer not to answer	2 (10%)

Project Management

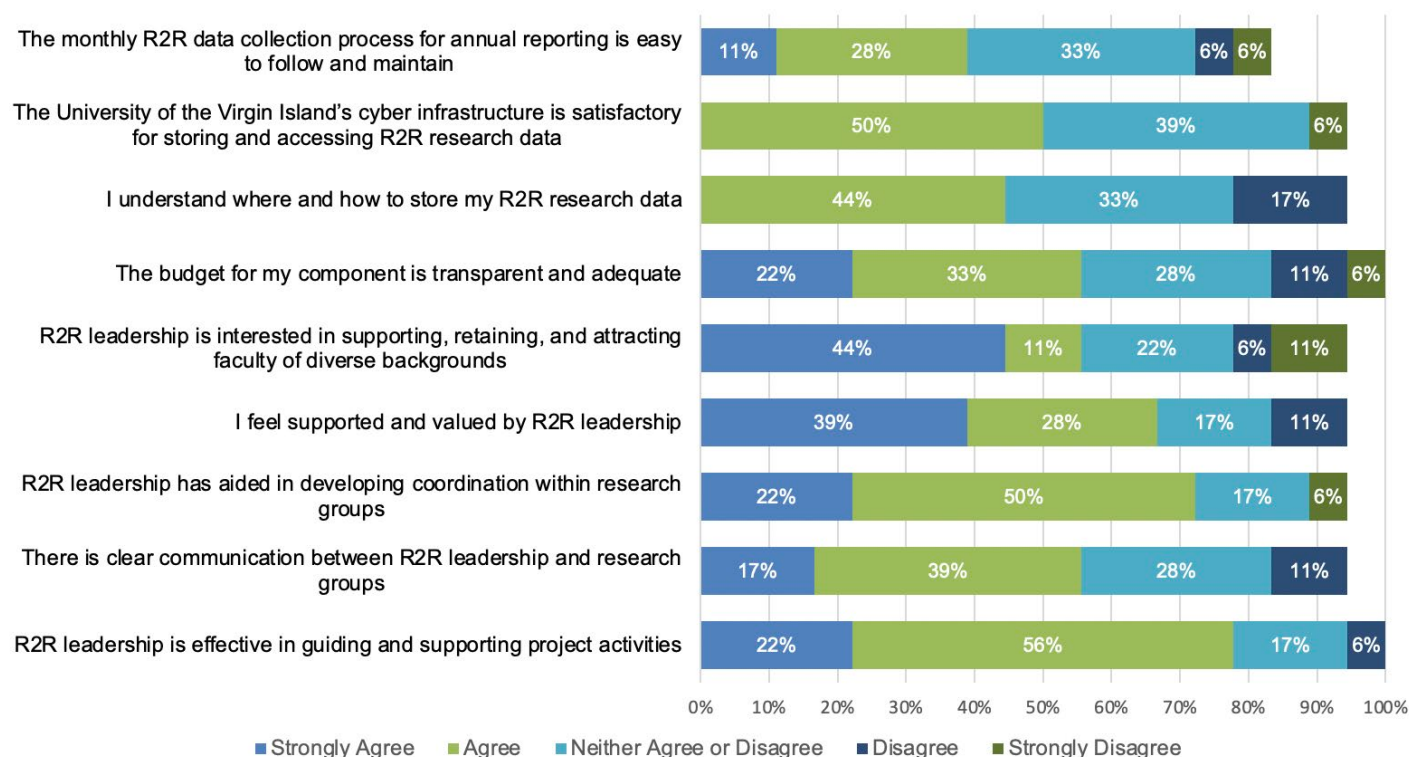
The Faculty Survey included questions that asked participants to indicate the extent of their agreement with several statements that describe their understanding of the project's goals and priorities as well as their role and expected contributions to the project. On average, approximately 80% of respondents indicated strong agreement or agreement with the statements as shown in Figure 8.

Figure 8. Communication from Project Management



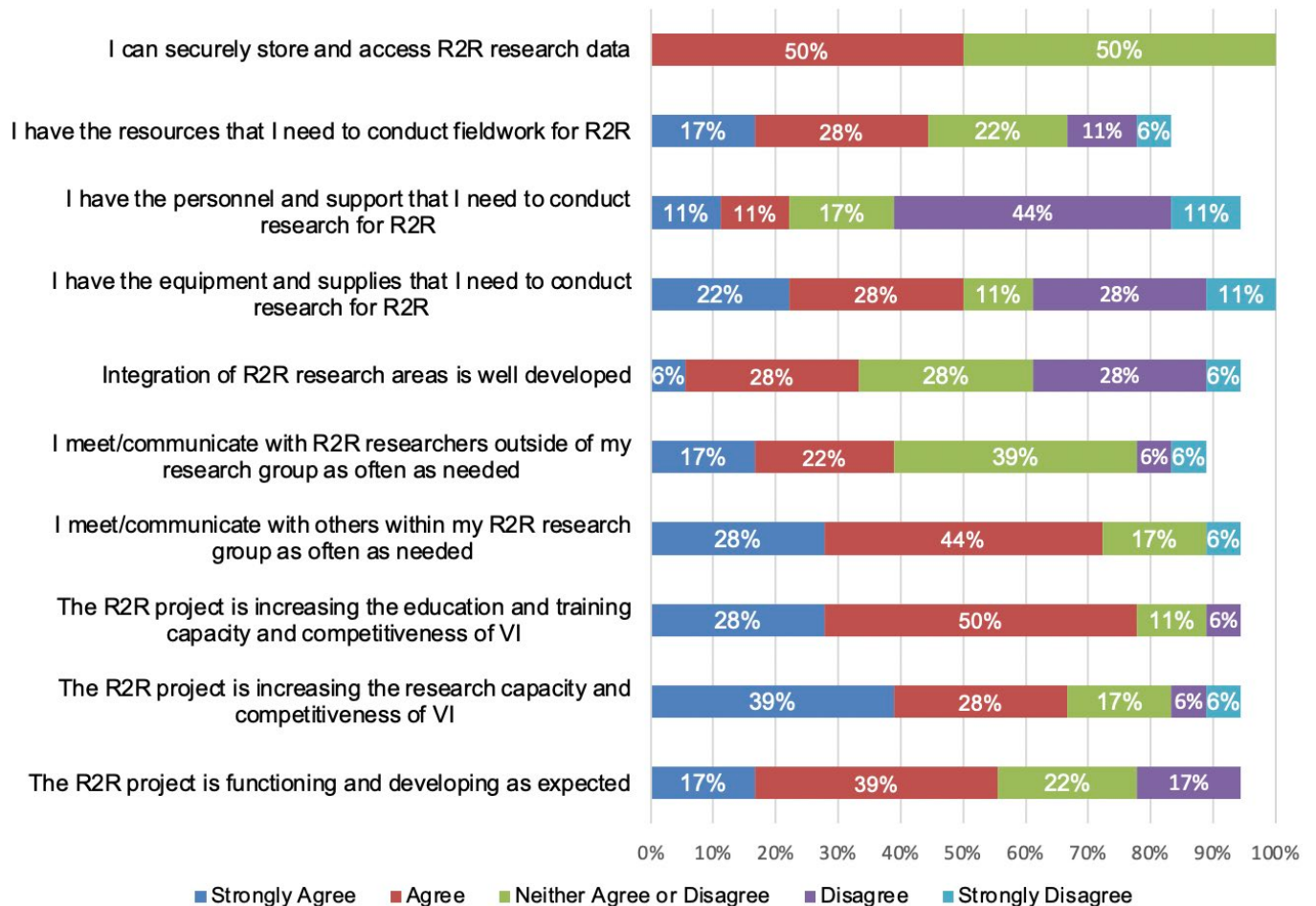
While most faculty reported feeling supported by R2R leadership and management, there are a few areas that could be strengthened such as data collection processes and placing further emphasis on supporting, retaining, and attracting faculty of diverse backgrounds (Figure 9).

Figure 9. Support from R2R Leadership/Management



A key component of EPSCoR Track 1 awards is increasing capacity. Of faculty respondents, 78% either strongly agree or agree that “R2R is increasing the education and training capacity and competitiveness of VI”. Further, 67% either strongly agree or agree that “R2R is increasing the research capacity and competitiveness of VI” (Figure 10).

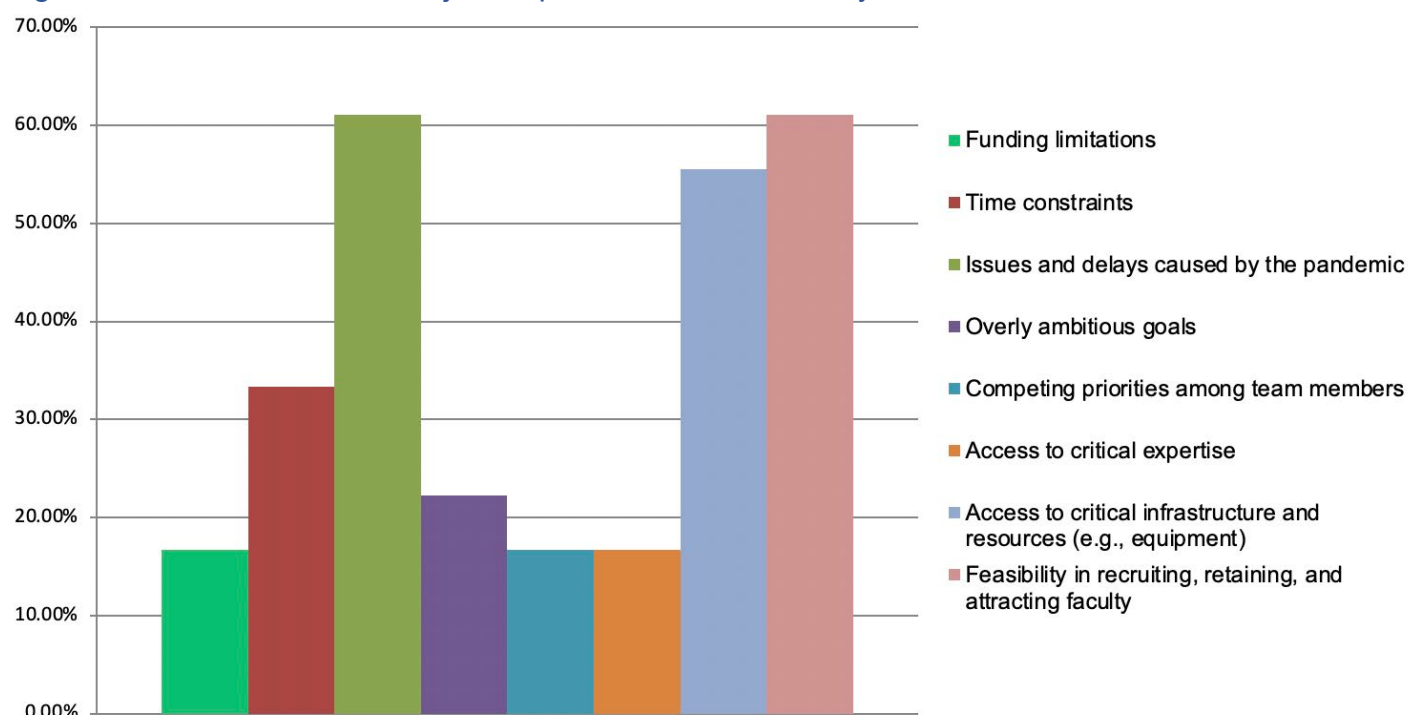
Figure 10. R2R Capacity Building



Implementation Feasibility

Participants in the survey were asked about possible concerns with the project implementation feasibility. As shown in Figure 11, the top three concerns selected by faculty are: Issues and delays caused by the pandemic, access to critical infrastructure and resources, and feasibility in recruiting, retaining, and attracting faculty.

Figure 11. Concerns about Project Implementation Feasibility



Collaboration

Of the 20 faculty who completed the survey, 14 reported engaging in cross-disciplinary and cross-jurisdictional collaborations related to R2R research themes. Of those collaborations, an average of 66% have resulted in collaborations on studies or grants. Other collaborations (Table 7) have resulted in co-authorship of publications, developing models and tools, stakeholder engagement activities, and developing and teaching courses.

Table 7. Collaboration Outcomes

Collaboration Outcomes	%
Study or grant	66%
Developing models and tools	55%
Co-authorship publication(s)	40%
Stakeholder engagement activities	37%
Developing and teaching a course	7%

Importantly, R2R faculty have reported many perceived benefits resulting from cross-disciplinary and cross-jurisdictional collaborations. 72% of respondents either strongly agreed or agreed that the collaborations have facilitated knowledge generation and transfer among researchers from different disciplines.

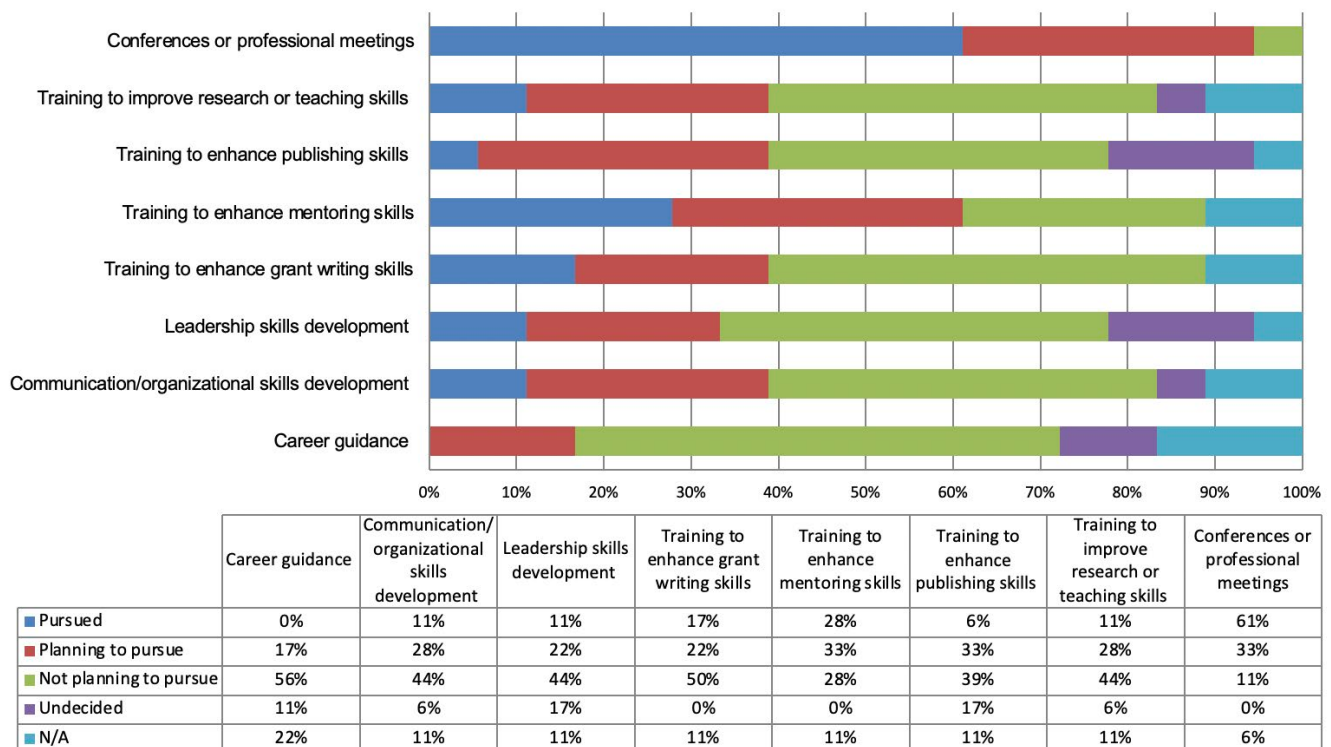
Mentoring and Professional Development

R2R faculty reported involvement in mentoring relationships as mentors, mentees, or both. Of the 18 respondents to this set of questions, only 22% reported being mentored by a senior faculty member associated with the project. This is significant due to 55% of respondents being classified as junior faculty. These numbers are similar between Years 2 and 3. 83% of R2R faculty respondents report mentoring a graduate student(s) and 72% report mentoring a undergraduate student(s).

Of the faculty who report mentoring students, educational choices/strategies and career interests were cited as the top two areas of focus. Mentoring activities for faculty tended to focus primarily on research.

The Faculty Survey included questions that asked participants to indicate if they have pursued (since joining R2R) or planned to pursue professional development activities/opportunities. As illustrated in Figure 12, conferences and professional meetings constituted most of these professional development activities, followed by training to enhance mentoring skills.

Figure 12. Professional Development Activities/Opportunities



The participants were also asked to identify the main barriers for them to pursue professional development activities (Table 8). Of the respondents, 69% identified “insufficient time for professional development due to high workload” as the main barrier.

Table 8. Barriers for Pursuing Professional Development Activities

Barrier	%
Q. What are the main barriers for you to pursue professional development activities?	
Insufficient time for professional development due to high workload	69%
Lack of institutional / department support or incentives for professional development	44%
Lack of relevant professional development being offered	19%
Lack of resources for professional development (at the project and/or institution level)	38%

External Stakeholder Engagements

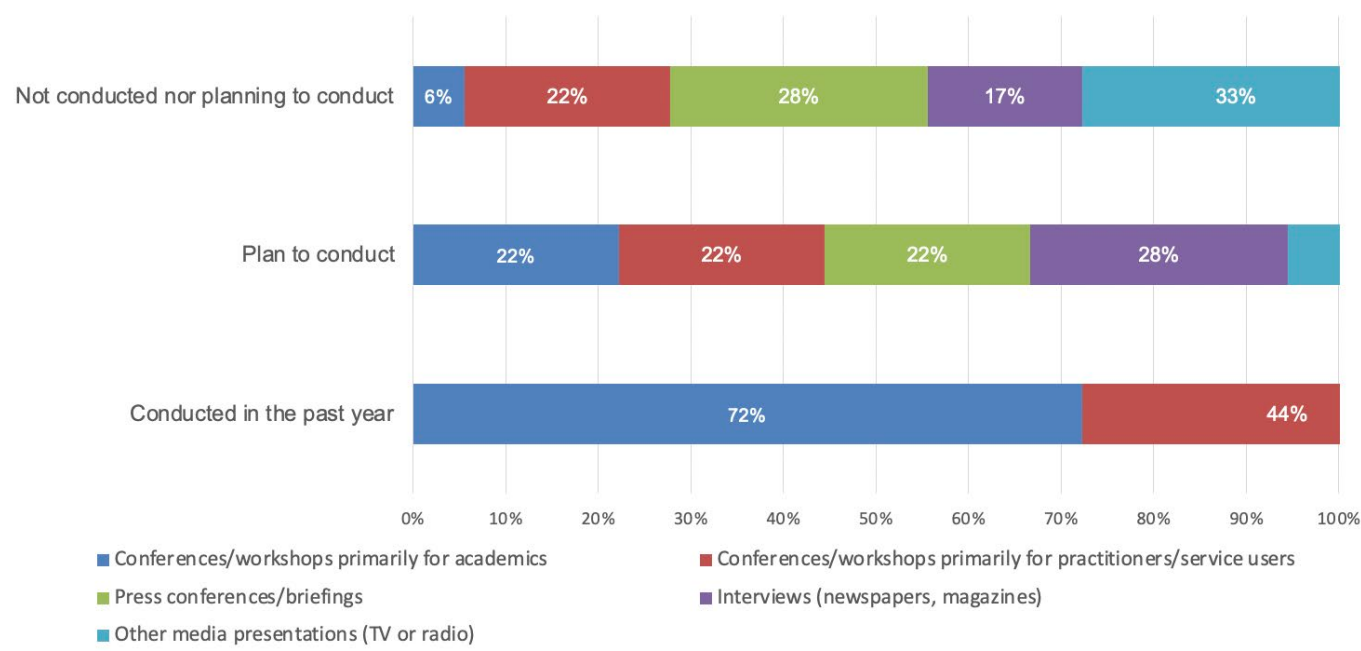
Of 18 faculty respondents, all indicated that their work as part of this project involves engaging external stakeholders. Of those, 72% report participating in outreach to external groups to share information about R2R. Sharing knowledge/information/data and training workshops are the top two reported outreach/engagement activities. 33% of respondents cited a need for further support from R2R project leadership to facilitate outreach/engagement. The following are common participant suggestions for further support:

- Assist with introductions and networking
- Provide more administrative support
- Assist in facilitating events
- Provide training for developing website, promoting research, and social media

Dissemination Activities

The Faculty Survey included a question that asked participants if they have conducted (or plan to conduct) any dissemination activities as part of their work on the project (Figure 13). Of 18 respondents, 94% reported conferences or workshops primarily for academics. Also, 56% reported interviews (newspapers, magazines).

Figure 13. Dissemination Activities



Faculty were given the opportunity to provide additional comments or suggestions for ways in which the project could further support individual researchers and teams, and more effectively achieve its goals. The following are some of the most common responses:

- More support for administrative burden on researchers
- Assist research teams in developing more outreach activities

In addition to the above suggestions, survey participants expressed concerns regarding the continued loss of diverse faculty.

Summary and Recommendations

This section summarizes the main outcomes from assessment of the progress achieved toward project goals in each of the R2R areas based on findings from the External Evaluation Site Visit Interviews and Focus Group, ERCORE, Undergraduate Student Survey, Graduate Student Survey, Faculty Survey, and documents provided by R2R Management.

Overall R2R evaluation questions concentrate on three main themes: 1) project implementation and infrastructure; 2) research activities and outcomes; and 3) R2R impacts.

Project Implementation and Infrastructure

In Year 3, R2R participants have accomplished a great deal as evidenced by research outputs and by reaching most strategic plan goals and milestones this year. The project is well on its way to achieving the overall goals and communication has been strengthened. Project participants continue to desire greater connectivity and mechanisms to see the bigger picture of R2R which would further advance the success of the project. The project infrastructure has continued to develop and would be aided by more support from UVI. Notable are the efforts from R2R leadership in guiding and mentoring the postdoctoral fellows.

Research Activities and Outcomes

Despite barriers caused by the COVID-19 pandemic and construction delays in rebuilding the Marine Science building and Environmental Analysis Laboratory, the R2R team has maintained its high research productivity. Outputs include publications in high impact-factor journals, increased connections within VI-EPSCoR teams as evidenced by publications and presentations, and strengthening of ties beyond the Territory as the team members increase publications with investigators at other institutions. The team should be commended on several new funded projects including the NSF Major Research Instrumentation proposal.

R2R Impacts

The impacts of R2R for the Territory are tremendous. Foundational research on coral health, fish ecology, and oceanography have resulted in knowledge generation and have broader impacts for other sectors of the USVI economy. Use-inspired research from the mangrove restoration, coral restoration, and emerging areas teams have a direct impact on the economy and citizenry of the Territory. The teams are making generally strong progress despite echoes of the pandemic and research administration barriers at UVI.

Recommendations

1. R2R should continue to position itself to be an agent of change and for building research capacity in the jurisdiction. To do this, the project needs to be a strong advocate for creating a culture of research at UVI. Continuing into Year 3, the most critical of the issues identified by faculty is a policy for return of F&A to the project.
2. R2R should advocate for the accounting office to be fully staffed. This is a prominent concern amongst R2R staff. There are currently only two grant

accountants (previously there were four), even though there are many more grants. Similarly, the purchasing office is unable to process work if a key staff member is out of the office. Work essentially halts and departments have to wait for that person to return and catch up. The offices of accounting and purchasing are both very important to the administrative side of R2R and management should do all they can to advocate for those offices to be fully staffed/higher functioning.

3. The Informal Learning team should continue to try to engage all research areas and provide resources to assist researchers with outreach. This was noted again this year in the faculty survey responses. For example, in the strategic plan, an “outreach menu” is listed as being started in Year 1, but it is still not completed. This may assist research areas that need more direction/ideas.
4. R2R faculty and leadership should provide more resources and mentorship to graduate students around their career goals and how to attain their desired goals.
5. Emphasis should be placed on recruiting and retaining diverse faculty.
6. Given the emergence of two new NSF EPSCoR programs (E-CORE and E-RISE) and the termination of the RII Track-1 program after the 2023 competition, the team is urged to revisit the sustainability goals of the project with an eye towards how to best leverage current assets and position for future opportunities, without changing project scope.