



***WINDWARD
ISLANDS
RESEARCH
& EDUCATION
FOUNDATION***



2023 Annual Report



Front cover photo:

Some members of the WINDREF 2023 team on the monument in front of the WINDREF Research Institute.



Mission Statement

WINDREF seeks to advance health and sustainable environmental development through multi-disciplinary research and education programs. WINDREF strives for program excellence by promoting collaborative relationships between internationally recognized scholars and regional scientists, and by adhering to the highest ethical and academic standards in the design and conduct of research.

Goals

- To provide a scientific resource centre capable of coordinating international collaborative research of the highest caliber in the areas of medicine, medical and veterinary public health, environmental health, anthropology, sociology, ecology, marine and terrestrial biology, and ethics.
- To provide a first rate academic opportunity to scientists from the Caribbean and around the world through unique research opportunities that enhances the knowledge and welfare of local and international communities.
- To conduct applied scientific research for the benefit of community and health development at the local, national and international levels.
- To share relevant scientific information with local and international communities in the pursuit of evidence-based policies.

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Director's Report on WINDREF Activities in 2023

2023 consolidated the 11 externally funded research and education programs being conducted by almost 100 of its employees and contractors working in more than a dozen countries in the region, from Suriname to Jamaica. There was an increasing focus on the projects examining ways to adapt or mitigate the impacts of climate change.

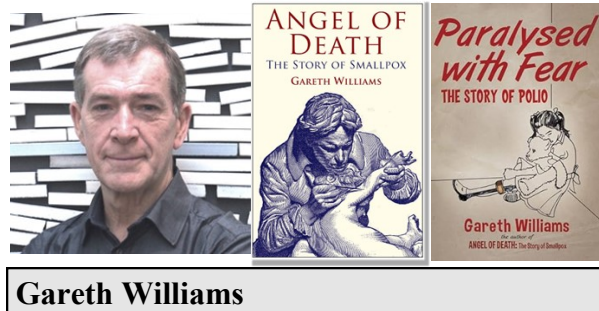
In December 2023, four new grant awards were finalized, which included:

“Safeguarding Telescope’s Coastline, using a Living Shoreline Approach” funded by The Caribbean Biodiversity Fund; “Sample-to-Answer, Rapid, Multiplexed and PCR-Free Diagnostics of Arboviral Diseases in Resource Limited Settings” we received a sub-grantee of an NIH grant provided to the University of California, Santa Cruz; “Assessing Excessive Heat Vulnerability in Caribbean Countries” funded through the University Corporation for Atmospheric Research who received a grant from the National Oceanic and Atmospheric Administration; “Conscious Discipline Grenada” funded by The Becky Bailey Foundation.

These new awards exceeded USD 3.5 million in new awards. The funding received in 2023 and going forward was greater than any previous year and places WINDREF in a very healthy financial position. The Foundation partners with a growing number of universities and global institutions, and has consolidated a number of its long-term projects which are providing community based solutions to a number of health and environmental issues. WINDREF’s projects that were continued in 2023 generated a

number of international conference presentations, peer reviewed publications, and virtual contributions to a number of international webinars on a range of topics; these outcomes are listed in this report.

The Keith B. Taylor Memorial Lecture for 2023 was presented by Emeritus Professor Gareth Williams entitled “Edward Jenner: a man who changed the face of the world”. Professor Williams is Emeritus Professor of Medicine and Dentistry at the University of Bristol, UK, where he formerly served as the Dean. He has recently authored a number of popular books on the history of medicine, including: *Angel of Death*, and *Paralysed with Fear*.



A second WINDREF Lecture was presented virtually by Dr. Peter Hotez. Dr. Hotez is the Dean of the National School of Tropical Medicine and Professor of Pediatrics and Molecular Virology & Microbiology at Baylor College of Medicine where he is also the Co-director of the Texas Children’s Center for Vaccine Development and Texas Children’s Hospital Endowed Chair of Tropical Pediatrics. The title of his lecture was “Global Vaccines: The Science & The Anti-Science”.



Dr. Peter Hotez, MD, PhD



Audience for Dr. Peter Hotez's lecture, which also included a number of participants who were online.

The Mike Fisher Memorial Award for 2023 was awarded to Professor Jacqueline McGlade, PhD. Professor McGlade is a lecturer at the Strathmore Institute for Public Policy and Governance (SIPPG) at Strathmore University Business School. Since 2000, Prof. McGlade has been a Professor in the Institute for Global Prosperity and Engineering at University College London, UK, and is the current Frank Jackson Gresham Professor of the Environment (2018). Between 2013-2017, she worked as the UN Environment's Chief Scientist, Director of Science and Chief Statistician, spearheading the 2030 Agenda on Sustainable Development Indicator Development.



Professor Jacqueline McGlade, PhD



Drs. Calum Macpherson and Trevor Noel presenting the Mike Fisher Memorial Award Plaque for Professor McGlade, which was received on her behalf by Ms. Jennifer Koikai, Assistant Registrar (Administration) at the Masai Mara University, witnessed by the Kenya Selective MD students from St. George's University.

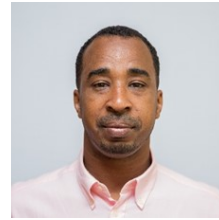
In 2023, three new Research Fellows were appointed in WINDREF, as below:



Stephan Bandelow, DPhil



Maxine Macpherson, DVM, MSc, MRCVS



Steve Nimrod, PhD

On behalf of the members of the Grenada, United Kingdom, and United States Boards of Trustees and Directors, I would like to thank our collaborators and donors for making 2023 a very successful year for WINDREF. We thank all of our donors for supporting the work of WINDREF over the past year, and look forward to another successful year in 2024, which will be WINDREF's 30th Anniversary.

**Calum N.L. Macpherson
Director, WINDREF**

WINDREF Organization

Board of Directors

- Baroness Howells of St. David's, OBE (Emeritus President)
- Calum N. L. Macpherson, PhD, DIC, FRSPH (Vice President & Director)
- Trevor P. Noël, MPH, PhD, FRSPH (Deputy Director)
- Margaret Lambert, MA, (Secretary/Treasurer)
- Karen Lawson, PhD
- Ellen Ratner, MEd, LLD
- Joseph Feldman, MD
- Esperance Schaefer, MD, MPH
- Kirani James, BSc, CBE
- George McGuire, MSc

Board of Trustees (United Kingdom)

- Baroness Howells of St. David, OBE , Emeritus President
- Lord Stevens of Kirkwhelpington, KStJ, QPM, DL, FRSA,
- Lord Trees of The Ross, DVM, PhD
- Neil Poulter, MD
- Patrick Orr
- Margaret Lambert, MA (Ex Officio)
- Calum Macpherson, PhD, DIC, FRSPH (Ex Officio)

Scientific Advisory Board

- John R. David, MD
- Malcolm A. Ferguson-Smith, MBChB, FRCP, FRCPath
- Calum Macpherson, PhD, DIC
- Anselm Hennis, MBBS, PhD, FRCP, FACP
- Ian McConnell, BVMS, FRSE, F. Med. Sci.
- Hugh Montgomery, MD
- Baron Peter Piot, MD, PhD, CMG, FRCP
- Neil Poulter, MD, PhD
- Melinda S. Sothorn, PhD, CEP
- Richard Scribner, MD, MPH
- Lord Trees of The Ross, DVM, PhD

- Joy St. John, BSc, MBBS, MPH
- Thomas Meade, CBE, DM, FRCP, FRS
- Graham Serjeant, MD, FRCP, CMG
- John Ferguson, MBChB, FRCGP

Administration—Grenada

- Mr. Kareem Coomansingh, Grants Coordinator
- Ms. Isha English, Assistant Administrator
- Mrs. Nakita Francis, Grants and Finance Officer
- Mrs. Naomi Whyte, Executive Secretary
- Mrs. Yvette Simon, Secretary
- Ms. Leslie-Ann Seon, Legal Support
- Ms. Carol Forbes, Project Manager, Innovative Nature-based Solutions to Enhance Community Resilience
- Mrs. Ramona Otway, Accountant
- Mr. Michael Cahill, Legal Support, USA
- Ms. Roberta Evans, Zika and Neurodevelopment Project Manager
- Mrs. Stephanie Holmes, Saving Brains Project Manager
- Mrs. Elsa Chitan, Co-Project Manager, Laboratory
- Ms. Markeda Fletcher, Co-Project Manager

Administration—United States

WINDREF (USA) was established as a 501(c)3 non-profit organization to facilitate coordination of the USA activities and to administer charitable donations from the United States and worldwide. Its goal is to enhance the development of WINDREF's research and educational programs. The office is located in New York and is administered by Ms. Margaret Lambert, Secretary/Treasurer of WINDREF. Mr. Michael Cahill provides legal support.

Administration—United Kingdom

WINDREF (UK) was set-up as a charitable trust in Winchester, England in 1999 to promote

collaboration between WINDREF scientists and academic centers of research in the United Kingdom and the European community. A Board of Trustees was appointed in 1999 to oversee the activities of WINDREF (UK). The office is located in London. Mr. Patrick Orr serves as the WINDREF (UK) accountant, along with Mr. Stan Lee serves as the treasurer, provide oversight of the financial operation and charitable status of WINDREF (UK).

Senior Research Fellows

- Hugh W. Ferguson, BVM&S, PhD, Dipl. ACVP, MRCVS, FRCP
- Paul Fields, PhD
- Paul Garner, MBBS, MD
- Mary Glenn, PhD
- Duane Gubler, ScD
- Stephen Morse, PhD
- Leslie Ramsammy, PhD, DSc (Hon)
- Douglas Slater, MD, MPH
- Stanley Weiss, MD
- Melinda Southern, PhD
- Richard Schribner, MD, PhD
- Cheryl Cox-Macpherson, PhD
- Marios Loukas, MD, PhD
- A. Desiree LaBeaud, MD, MSc
- Timothy Endy, MD, MPH
- Roger Radix, MD, MPH, MIB, FRSPH
- Jonathan Ashcroft, MD, MSc
- Anselm Hennis, MBBS, PhD, FRCP, FACP
- Neil Poulter, MD, PhD

Research Fellows

- John Adamski, MD, MSc, MPH
- Muge Akpınar-Elci, MD, MPH
- Glennis Andall, PhD
- Charles Avgeris, MD, MSc
- Satish Bidaisee, DVM, MSPH, MSB, FRSPH, EdD
- Grant Burgess, PhD
- Reccia Charles, PhD
- Sonia Chehil, MD, FRCPC

- Andrea Easter-Pilcher, PhD
- Martin Forde, ScD
- Mark Gibson, MA
- Richard Kabuusu, DVM, MPH
- Victoria Kimotho, MPH
- Barbara Landon, PsyD
- Clare Morrall, PhD
- Shamdeo Persaud, MD, MPH
- Christine Richards, PhD, MPH
- Bonnie Rusk, MSc
- Karen Schioler, PhD
- Shanti Singh, MD, MPH
- Kamilah Thomas-Purcell, PhD, MPH
- Randall Waechter, BBA, PhD
- Trevor Noël, PhD, MPH
- Laura Colket, PhD
- Tracy Penny-Light, PhD
- Carlene Radix, MD, MPH
- Vishaka Vasuki, BVSc, MSc
- Michelle Fernandes, MRCPC, DPhil
- Karen Blackmon, PhD
- Lindonne Telesford, PhD, MPH
- Allana Roach, PhD
- Maxine Macpherson, DVM, MSc, MRCVS
- Stephan Bandelow, DPhil
- Steve Nimrod, PhD

Research Scientists

Sadiq Al-Tamini, Sumita Asthana, Yitzhack Asulin, Bishara Baddour, Jean-Pierre Barakat, Matthew Beeson, Matthew Boles, William Brown, Ella Cameron, Nicholas Caputo, Rae Connolly, Abraham El-gross, Sedfy, Daniel Firer, Kristy Fisher, Scott Forman, Brandon Francis, Vamsi Guntur, François Hallé, Anthony Junck, Megan Kaminskyj, Sebastian Kreitzschitz, Erik Lacy, Ede Tyrell, Richard Lehman, Jason Lowther, Setshidi Makwinja, Paul Mancuso, Baher Maximos, John McCormack, David Melamed, Kirk Minkus, Jerry Mitchell, Jessica Morlok, Kevin Neill, Bayela Nfila, Yolanda Ng, Michael Nillas, Andre Panagos, Barry Politi, Sandeep Pulim, Sean Ramsammy,

Justin Rebo, Laura Robinson, Corey Schwartz, Sarah Scott, Christopher Skaff, Nadia Solomon, David Steinberg, Derrick Tlhoiwe, Sarah Treter, Nghia Truong, James Tsai, Dan Twyan, Frank Van Natta, Ru-Amir Walker, Juliette Williams, David Winokur, Colleen Wunderlich, Elliot Yung, Regan Schwartz, Katherine Briggman, Mmakgomo Coangae, Felicity Lillingston, Keith Bensen, Sadik Uddin, Rakesh Patel, Mathew Browne, Jessica Clayton, John Hollerman, Alan Rhoades, Nikita Cudjoe, Karen Brennan, Stephanie Holmes, Roberta Evans, Victor Ashby, Jeffon Telesford, Karla Farmer, Molly Ziegler, Christopher Gibson, Shanice McKain, Elsa Chitan, Nandy Noel, Bhumika Sharma, Vanessa Matthew-Belmar, David Bhilhar, Elizabeth Thomas.

WINDREF Lectures

Research Lecture Series:

1994: Stephen Morse- "Emerging and Re-emerging Viruses"
1995: Stanley Weiss- "The HIV Pandemic"
1996: Duane Gubler- "Dengue: A global problem of increasing importance"
1997: Graham Sergeant- "Sickle Cell Disease"
1997: David C Clyde- "Health and Disease in Grenada: A historical perspective"
1998: Leslie Ramsammy- "Tackling our Agricultural and Medical Problems through One Health One Medicine Approach"
1998: Robert Redfield- "The Epidemiology of HIV/Aids"
1999: MS Swaminathan- "The Green Revolution"

WINDREF Lecture Series:

2000: Sir Kenneth Stuart, MD, DSc (Hon)- "Caribbean Health Research Needs"
2001: Professor Adedokumbo Lucas, MD, DPH, DSc (Hon)- "International Collaboration

for Health Research"

2002: Lord Walton of Detchant, MBBS, MD, DSc, MA (Oxon), FRCP- "A Doctor in the House"

2003: Professor David Molyneux, MA, PhD, DSc, FIBiol- "Success and Failure in Parasitic Disease Control: Lessons Learnt?"

2004: Lord Soulsby of Swaffham of Prior, MRCVS, DVSM, MA, C.Biol., F.I. Biol., DSc (Hon)- "Zoonoses, Old and New. . . the Price of Freedom is Eternal Vigilance"

2005: Mary-Jeanne Kreek, MD- "Drug Abuse and Addictions: Some Scientific Approaches to a Global Health Problem"

2006: Eric Ottesen, MD- "Understanding the Science, Attacking the Problem: Lymphatic Filariasis and Beyond"

2007: John Rouben David, MD- "Leishmaniasis: A novel approach to control visceral leishmaniasis and another to treat cutaneous leishmaniasis"

2008: Professor Sir Andrew Haines, MBBS MD FRCGP FFPHM FRCP FMedSci- "Climate Change, Energy Use and Health in the 21st Century"

2009: Yvette Sheline, MD- "Brain Imaging: New Insights into Neuropsychiatric Disorders"

2010: Valentin Fuster, MD, PhD- "The worldwide challenge of cardiovascular disease"

2012: Baron Peter Piot, MD- "Global health in a changing world"

2013: Robert Gallo, MD- "Viruses and Epidemics: Our attempts to control them with an emphasis on HIV and AIDS"

2014: John Strasswimmer, MD, PhD- "Dr Albert Schweitzer, his life, legacy and the future: A celebration of his centenary"

2014: Desiree LaBeaud, MD, MS- "Chikungunya and Dengue in Grenada and the Americas: What are we in for?"

2015: Ruth Macklin, PhD- "Ethical Challenges in Confronting Disasters: Some Lessons Learned"

2016: Ian McConnell, BVMS, PhD, MA, FRSE-
“One Health: Lessons from the Past, and Future Opportunities”

2017: Kenneth R. Bridges, MD- “Rise of Sickle Cell Disease and Novel Approaches to its Treatment”

2018: Timothy Endy, MD, MPH-
“Understanding Dengue Pathogenesis and Essential Areas for Research”

2019: Timothy Endy, MD, MPH- “Overview of Dengue disease research at SUNY Upstate Medical University and prospective primary dengue study with St George’s University/ WINDREF”

2022: Prof. Paul Garner, Scandals in Global Public Health

2023: Prof. Gareth Williams, Edward Jenner: a man who changed the face of the world

2023: Dr. Peter Hotez, Global Vaccines and Vaccinations: The Science vs The Antiscience

Mike Fisher Memorial Award Recipients

Mike Fisher graduated from King’s College, London with a PhD in chemistry/ pharmacology. He joined Merck in 1957 and worked with them as vice president of research and headed a lab of 60 research scientists until 2004.

It was his scientific intellect and observational scholarship which led to perhaps his most profound discovery: that of the fungus, *Streptomyces avermillois* from which the drug ivermectin was derived. In the 1970’s his lab was receiving thousands of soil and plant samples from all over the world which he was screening for their effects on a number of organisms. One sample sent to Mike Fisher from Dr. Satoshi Omura from a golf course bunker in Japan, contained *S. avermillois* which was lethal to Mike’s lab mice and when others may have discarded the compound Mike persevered and tested ever more minute doses of the substance. He thus discovered a new

powerful drug which was discovered to be effective against roundworm parasites. Mike received the Thomas Edison award for creative discovery and the veterinary and medical world received a compound that revolutionized the treatment and cure of a myriad of infectious diseases. Today as a result of the discovery of ivermectin over 35 million people no longer live under the threat of inevitably going blind from onchocerciasis (river blindness), millions more have been spared the gross disfigurement from lymphatic filariasis (elephantiasis and hydrocoele) and dogs and cats (heartworm), pigs, cattle, sheep, goats and horses live a healthier life because of ivermectin. Mike passed away at his Bel Air plantation home in Grenada on 20th April 2005. So many people and animals have benefited from Mike’s work. In 2015, the Nobel Prize for Physiology or Medicine was awarded jointly to Drs. William C. Campbell and Satoshi Omura for their role in the discovery of ivermectin.

The Mike Fisher Memorial Award Recipients

2006 – Lord Lawson Soulsby

2007 – Dr. Keith B. Taylor

2008 – Lord May of Oxford

2009 – Dr. John David

2010 – Lord John Walton

2011 – Prof Ade Lucas

2012 – Dr. Donald Hopkins

2013 – Prof R.C. Andrew Thompson

2014 – Prof Alan Fenwick

2016 – Sir Gordon Conway

2017 – Dr. Charles R. Modica

2018 – Prof Sarah Cleaveland

2019 – Prof Janet Hemingway

2020— Prof. Robin B. Gasser

2021—Prof Richard Horton

2022—Dr. Peter Hotez

2023—Prof. Jacqueline McGlade

Current Research Projects

Innovative Nature-based Solutions to Enhance Community Resilience in Grenada (ING) Program

Background

The Windward Islands Research and Education Foundation Innovative Nature-Based Solutions to Enhance Community Resilience in Grenada- (WINDREF ING) project is geared toward improving the lives of the community members within the area of Soubise, St. Andrew, with an encompassing of the whole of the Grenville Bay Area (GBA), which comprises Marquis, Telescope and the town of Grenville, Grenada. This community is located along the northeast corridor, where the impact of climate change has shown its relentless force over the years and continue to do so. The core objective of this project is “To enhance the climate resilience of coastal communities in Grenville Bay, Grenada (in particular Soubise) through a series of targeted, complementary and innovative nature-based interventions which will provide significant social, environmental and economic benefits to the community.”

During the year 2023, the WINDREF team worked on its core objective by:

1. Building the residents' capacity through targeted training for ongoing project activities.
2. Increasing the awareness of the adverse impacts of climate change and presenting solutions to reduce those impacts on the communities.
3. Building relationships through voluntary and non-voluntary involvement in project activities from within the community.
4. Working on project activities to achieve the results of the project objective.

Interventions for the year 2023

Shoreline Stabilization (Grey-Green Hybrid):

The “Living Shoreline” activity is a hybrid method with a grey-green approach. This activity is part of component 4, “Shoreline Stabilization,” of the ING Project. The green fraction involves the planting of vegetation along the coast. In 2023, collection of those plants took place in March, November, and December and housed at our established plant nursery. The plants collected were:

Coconut, Sea grapes, Almonds, Neem, Flamboyant, Buttercup, Fat pork

The latter collected plants will serve three purposes: (i) erosion prevention.

(ii) beautification of the area and

(iii) preserving and enhancing the recreational space for the residents of Soubise and surrounding areas.

At the beginning of 2023, Mr. Nigel John of “Latitudes Consult,” was hired as the consultant contracted to lead and guide the “Living Shoreline” installation process. Both the design and build contracts were bid on and the “Living Shoreline” were approved by WINDREF in consultation with, the consultant, the TNC team, the Government of Grenada, and the community of Soubise. The construction for those designs will be executed at the beginning of 2024. The successful design bidder was DIWI Caribbean Inc. and the successful build bidder was CCCCi.



Figure 1: Shoreline stabilization community engagement conducted in Soubise, St. Andrew during December 2023.

Coral Reef Restoration:

The work of coral propagation continues. This includes Micro-fragmentation, coral nursery maintenance, and out-planting onto the fringing reef in Soubise. The project experienced some challenges in achieving its objectives with the onset of increasing temperatures in our waters and neighboring islands as experienced worldwide. This has resulted in coral bleaching, a phenomenon that has spread within the region and South American coast, devastatingly affecting coral health and growth. This has not stopped the work as we have successfully housed and outplanted over 500 individuals from 4 species of corals along the reef in Soubise with continuous monitoring and maintenance work. The effort accounted for a total restored area of 0.1 Ha.

Our coral gardeners got the opportunity to be certified by PADI (Professional Association of Diving Instructors). In November, they engaged in the required training (PADI Open Water Certification) facilitated by Mr. Orlando Harvey of The Nature Conservancy (TNC). This course consists of knowledge development (theoretical) sessions, confined water sessions, and open water dives. The eight (8) coral gardeners must complete all the sessions to be able to obtain the PADI certification. To date, the participants have completed the knowledge development component of the course and are set to continue and complete the practical component, prior to being PADI certified. The practical sessions are due to be completed in January 2024. With a PADI certification, the divers are certified with a recognized proficiency anywhere in the world.



Figure 2: Knobby Brain coral (*Pseudodiploria clivosa*) cluster outplanted in October 2023 onto the southern end of the fringing reef of Soubise, St. Andrew.

This PADI course will allow capacity building of our coral gardeners to dive and conduct coral restoration work in deeper waters and be confident in their diving skills and abilities.



Figure 3: Dive instructor, Mr. Orlando Havey, assisting one of the coral assistants with sternum strap adjustment during the knowledge development component of the PADI Open Water Training.

In addition to the work within the nursery and on the reef, the coral lab will be completed within the year. This space will facilitate a coral restoration workstation and include an office for the manager.

PADI Training:

Baseline Assessment:

The capacity building is an essential activity within the Baseline Assessment component of the project. To achieve this, the project team planned and executed the training of fourteen (14) seamoss farmers in the most recent techniques in seamoss farming. The three-day session was both theoretical and practical, which ended with the farmers creating new plots and transferring the knowledge of what was taught within the classroom.

This training was then followed by the Hazard Analysis Critical Control Points (HACCP) training to highlight good food safety and handling practices when dealing with seamoss farming and the product creation after seamoss harvesting. This training took place over two (2) days, with certificates to be issued to all ten (10) participants. Notably, most participants were from the initial batch of people trained previously in sea moss farming.

ing the knowledge and behavior of the residents towards climate change. The overall analysis of the survey was that members of the community were in support of the interventions proposed and were willing to be engaged throughout the project's lifetime.

At the end of the year (2023), more than one thousand five hundred (1,500) persons were engaged in the project through training, workshops, community meetings, surveys, and school visits. The overarching objective was to get to know the community of Soubise better and to be able to increase their adaptive capacity to the impacts of climate change, to equip them with the tools necessary to be resilient and to take charge of their surroundings with the knowledge they acquired. We appreciated the critical nature of this process with the community members of Soubise and surrounding areas enabling them to share their experiences.



Figure 4: Participants from the sea moss cultivation workshop establishing their newly constructed plot on the final day of training during November 2023.



Figure 5: An eager group of primary school students learning all about mangrove ecosystems from our Technical Officer, Mr. Kendon James, during a plant nursery tour in collaboration with The Nature Conservancy to commemorate World Environment Day (June 2023).

The WINDREF team conducted its Knowledge, Attitude, and Practices Survey (KAPs) in March and April, with over 300 members from the Soubise community participating in the survey. The survey was geared toward ascertain-

ing the knowledge and behavior of the residents towards climate change. The overall analysis of the survey was that members of the community were in support of the interventions proposed and were willing to be engaged throughout the project's lifetime.

(HOG) meeting, which took place in Grenada. During the WINDREF ING project presentation, all project activities were highlighted to the Prime Ministers of the different CARICOM countries. This will allow for exposure to the project and open the way for it to be used as a case study for the other Small Island Developing States (SIDs) to follow.

In addition the WINDREF ING project was featured at COP28 in Dubai in November/December 2023 as part of the Government of Grenada's delegation presentation, highlighting the project's activities on the island.



Figure 6: (L-R) Ms. Carol Forbes; Project Manager of WINDREF-ING Project, Nealla Frederick; Climate Change Project Manager (Eastern Caribbean) - TNC, Hon. Dickon Mitchell, MP; Prime Minister of Grenada, Carriacou & Petite Martinique, Senator the Honourable Dr. Dessima Williams; President of the Senate (Grenada), Dr. Trevor Noël; Deputy Director of WINDREF, Mr. Kendon James; Technical Officer of WINDREF-ING Project at 2nd Caribbean SIDS High-level Dialogue on Climate Change held in Grenada on 28th & 29th September 2023.

Acknowledgement:

We want to acknowledge the work of those who have contributed to the WINDREF ING project's achievements for 2023, without

whom we would not have achieved the above:

Hon. Kerryne James, MP PS Merrina Jessamy, PS Peron Johnson, Ms. Aria St. Louis, – Ministry of Climate Resilience, The Environment & Renewable Energy

Mr. Kevin Blache – Ministry of Infrastructure and Physical Development, Public Utilities, Civil Aviation & Transportation

Community Members in Soubise and Telescope, St. Andrew

Ms. Nealla Frederick & TNC team – TNC

Mr. Nigel John – Latitudes Consult

Mr. Willon Andrew – Sea moss cultivation facilitator

Mr. Kenly Edwards – HACCP facilitator
Caribbean Biodiversity Fund Team

Upcoming Activities for 2024

- Completion of the "Living Shoreline"
- Continuation of coral propagation and out-planting onto the reef
- More community engagements
- Project close-out and handover

Submitted by:

Carol Forbes and Kendon James on behalf of the WINDREF ING Project Team

Fisheries Projects 2020 – 2023

Climate change is having a profound impact on our oceans, and its effects are changing the distribution of fish stocks around Grenada and the region, thereby causing fishers to travel further out to sea to find productive fishing grounds. To mitigate against the risk of travelling further out to sea, Grenada implemented safety at sea training for fisherfolks.

In June 2020, WINDREF signed a Letter of Agreement (LOA) with the Food and Agriculture Organization of the United Nations (FAO)

to implement fourteen (14) one (1) week Fishing Captain Training Courses throughout the tri-island state in collaboration with the Ministry of Climate Resilience, Environment, Forestry, Fisheries and Disaster Management under the “Climate Change Adaptation of the fisheries sector in the Eastern Caribbean (CC4FISH) Project”. This project was the first of three projects that were carried out by grants awarded to WINDREF in collaboration and cooperation with Ministry of Fisheries.

Project 1: Project Title: “Services Towards Regional Implementation of the Climate Change Adaptation of the Fisheries Sector in the Eastern Caribbean Project (CC4FISH)”

This training program has successfully completed fourteen (14) courses; thereby training a total of three hundred and one (301) current fishing captains from the six (6) fishing districts (i.e. St. George, St. John, St. Mark, St. Andrew, St. Patrick and Carriacou and Petite Martinique)(Figure 1, 2 and 3). The fourteen (14) training courses were held between July 27th to November 20th 2020. The courses covered twelve (12) modules including; rules of the road, navigation, conflict resolution, global positions systems, seamanship and boat handling, VHF communication, Safety at sea, distress procedures/search and rescue, first aid, marine conservation, fisheries regulations and outboard engine care and maintenance.



Figure 1: CC4Fish Project closing ceremony for Gouyave Fishing Vessel Captain’s training module – St. John’s, Grenada



Figure 2: : CC4Fish Project closing ceremony - WINDREF’s Deputy Director, Dr. Trevor Noël presenting graduation package to one of the 301 captain participants in St. George, Grenada.



Figure 3: : CC4Fish Project graduation ceremony for all 301 Captains at the end of the training course in St. George, Grenada.

The funding for the first FAO project was provided by the GEF Special Climate Change Fund SCCF through the Food and Agriculture Organization of the United Nations (FAO).

Project 2: Development of a Framework for a Risk Assessment on the Implementation of a Gear- Marking System in Grenada

In June 2021, WINDREF signed a letter of Agreement with the FAO and the Ministry of Climate Resilience, Environment, Forestry, Fisheries and Disaster Management to implement the project for a ‘Development of a Framework for a Risk Assessment on the Implementation of a Gear- Marking System in Grenada’

The following were the activities implemented:

Activity 1. Collated Grenadian Fisheries profile data to allow the implementation of a risk-based approach to determine the needs and requirements of gear marking systems in Grenada.

Activity 2. Organized and delivered the workshop where the framework to develop a risk-based assessment to implement gear marking systems were developed. (Figure 4)

Activity 3. Conducted a Risk Assessment based on criterion/framework developed in the workshop.



Figure 4: Development of a Framework for a Risk Assessment on the Implementation of a Gear-Marking System in Grenada – Participants at the stakeholder workshop in St. George, Grenada

The funding for the second FAO project was provided by the Government of the Kingdom of The Netherlands through the Food and Agriculture Organization of the United Nations (FAO).

Project 3: Provision of Practical Climate Change Adaptation in Fisheries Interventions in Grenada

In October 2022, WINDREF signed the third Letter of Agreement with the FAO in collaboration and cooperation with the Ministry of Agriculture & Lands, Forestry, Marine Resources & Cooperatives to implement the project for ‘Provision of Practical Climate Change Adaptation in Fisheries Interventions in Grenada.’

This project commenced in November 2022, and will be completed in April 2024 (18

months). The following are the activities that have been implemented in collaboration and cooperation with the Government of Grenada Fisheries Sector and are either completed or nearing completion:

1. Conducting a Climate Finance workshop for key stakeholders. (Completed)



Figure 5: Climate finance workshop for key stakeholders

This national Climate Finance workshop was conducted and aimed at providing training to develop strategies and enhance the capacity of key stakeholders’ entities (namely, government, civil society, and NGO’s) to improve Grenada’s access to climate finance.

2. A Coral Reef Restoration programme for one coastal reef with an importance for fisheries. (Ongoing)



Figure 6: Coral Reef Restoration Programme Training Workshop with key stakeholder participants.



Figure 7: Coral Reef Restoration Programme – community participants fabricating coral trees in Gouyave, St. John, Grenada.



Figure 10: Coral Reef Restoration Programme community participant affixing corals to the coral tree frame in the Gouyave coral nursery



Figure 8: Coral Reef Restoration Programme community participant transports divers and equipment to the Coral Nursery at St. John, Grenada.

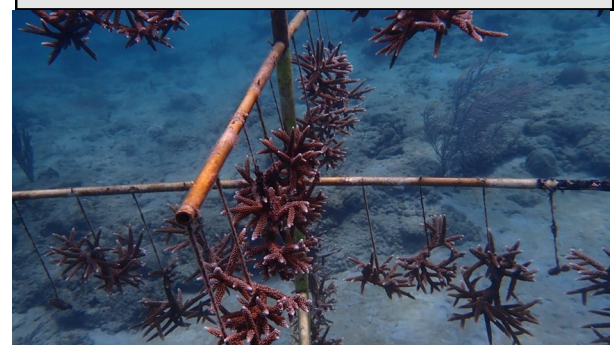


Figure 11: Coral Reef Restoration Programme. Staghorn coral growing on coral trees at the Gouyave coral nursery



Figure 9: Coral Reef Restoration Programme – Coral Trees transported to the coral nursery within the Gouyave MPA.



Figure 12: Coral Reef Restoration Programme Staghorn coral growing on a coral tree



Figure 13: Coral Reef Restoration Programme Biorock technology component - floating solar panels, powering the Biorock coral reef structures



Figure 14: Coral Reef Restoration Programme Biorock technology component - community members welding structural components for the coral nursery



Figure 15: Coral Reef Restoration Programme Elkorn coral growth currently facilitated by Biorock technology - Gouyave MPA, St. John, Grenada.

A coral reef nursery along the coastline off the town of Gouyave has been established. The use of the Biorock technology has allowed the resilient growth of the corals in this area. The increasing temperatures in Grenada and the Caribbean region are a source for concern with the effects on coral development.

3. An assessment of the energy needs of the four (4) fish market centers around the country and proposing the costs and benefits of solar powered energy. (Completed) This is being conducted with the purpose of collaborating and cooperating with Government of Grenada for the dissemination of information to facilitate their installation of a solar panel array at each fish market site.

4. The Review of Safety at Sea Regulations. This has been completed and was a comprehensive review of the existing Safety at Sea regulations of Grenada with a view to modernizing and upgrading the existing regulations in line with the advancements in technology and an adherence to international standards for the industry.



Figure 16: The Review of Safety at Sea Regulations consultation with St. George fisherfolk

5. Fishing Safety Training (FARE). The six (6) one-week Safety at Sea certification training workshops were completed for 108 Level 1 Fishing Captains and have been conducted in all the fishing districts including Carriacou and

Petite Martinique. The training program successfully trained and certified one hundred and eight (108) fishers including 8 females, as fishing captains. Six (6) training courses were held between July 24th to September 22nd, 2023. The courses covered twelve (12) modules including rules of the road, navigation, conflict resolution, global positioning systems, seamanship and boat handling, VHF communication, Safety at sea, distress procedures/search and rescue, first aid, marine conservation, fisheries regulations and outboard engine care and maintenance.



Figure 17: Fishing Safety Training for fishers learning to program waypoints into handheld GPS units

Some of the latest technologies introduced to local fishers during the training include the use of VHF Radio Transceivers equipped with 'Digital Selective Calling' (DSC), Satellite Vessel Tracking Devices, SOS LED Electronic Flares and SOS Marine Rescue Laser Flares.

This safety at sea training component of the program, through the two FAO projects,



Figure 18: Fishing Safety Training participant

brings the number of trained fishers to 409 fishers.



Figure 19: Fishing Safety Training participant graduation in Petite Martinique, Grenada

6. A Bulbous Bow Pilot Test: A pilot test is being carried out on the feasibility of introducing bulbous bows on large longline fishing vessels within the Grenadian longline fishing fleet. This test will be completed in April 2024. A parallel program is being carried out in Sri Lanka and we have recently received the design lines plan. The longline fishing vessel that was selected for this pilot is from Petite Martinique, and it is anticipated that the new design bulbous bow will result in significant fuel savings for the boat owner.



Figure 20: Petite Martinique Longline fishing vessel selected for the pilot testing of the Bulbous Bow



Figure 21: The bulbous bow under construction in Petite Martinique, Grenada



Figure 22: The bulbous bow under construction in Petite Martinique, Grenada

7. The seventh (7) project activity is the Curriculum Development for a Vocational Fishing School to serve Grenada, Carriacou and Petite Martinique and other regional countries.

The process of the development of a comprehensive curriculum developed for a vocational fisheries training school has begun and has culminated in the consultation meeting held on the 13th of December 2023.

WINDREF, in collaboration and cooperation with the Government, has been charged with developing an operational plan for creating a curriculum. This collaborative operational plan will include several parts including but not limited to:

- The naming of an institution through which the school can be implemented.
- The cost for running that school and the identification of potential instructors for the different modules that have been created.
- The facilitation of all the consultation workshops with government personnel and other key stakeholders of the fishing community.
- The creation of a draft curriculum.

In its first iteration, the curriculum will consist of 11 modules and a total of 39 units within

these modules. The recommended curriculum modules include Safety at Sea, Radio Communications, Fishing Gear & Methods, Marine Electronics, Marine Conservation, Fisheries Management & Development, Marine Engines, Fish Handling & Preservation, Boat Repair, Auxiliary Systems, and Coastal Navigation & Seamanship.



Figure 23: Consultation meeting with key government and non-government stakeholders for the development of the curriculum for the Vocational Fishing School – St. George, Grenada



Figure 24: Consultation meeting with key government and non-government stakeholders for the development of the curriculum for the Vocational Fishing School – St. George, Grenada

All three projects were supervised by WINDREF's Deputy Director, Dr. Trevor Noël and coordinated by Fisheries Consultant, Roland A. Baldeo. The funding for the third FAO project was provided by the Norwegian Agency for Development Cooperation (NORAD) through the Food and Agriculture Organization of the United Nations (FAO).

Submitted by Trevor Noël and Roland A. Baldeo

Grenada Wastewater Treatment and Recycling Project

The Grenada Wastewater Treatment and Recycling project, carded for the Mirabeau Hospital and surrounding cultivated lands, undertook some significant activities in 2023 to strategically position the project for completion in 2024.

Supervision Missions

The Caribbean Development Bank (CDB) conducted two Supervision Missions in 2023. In February, Mr. George Yearwood, Portfolio Manager of the Social Sector Division at the CDB conducted a Supervision Mission accompanied by Mrs. Indi Mclymont-Lafayette, public relations specialist, to observe and document the progress of the project and to meet with key stakeholders, including the beneficiary farmers, to understand the socio-economic and environmental impacts addressed by the project. Discussions were centered on the challenges associated with biological and chemical wastewater disposal into the environment from and Princess Alice Hospital in Mirabeau. The farmers, who are potential beneficiaries of the project, discussed the mounting challenges of water supply from cultivation during the dry season.



Figure 1: Princess Alice Hospital and the surrounding agriculture lands is the proposed site for the Grenada Wastewater Treatment and Recycling Project

The second Supervision Mission was conducted by Mr. Karl Pivot, Senior Operations Officer at the Bank in October, 2023 during which meeting were convened with officials from the Windward Islands Research and Education Foundation (WINDREF), Ministry of Health, Wellness and Religious Affairs (MOH), Ministry of Mobilisation, Implementation and Transformation (MIT), Ministry of Economic Development, Planning, Tourism, ICT, Creative Economy, Agriculture and Lands, Fisheries and Cooperatives (MOA), and the National Water and Sewerage Authority (NAWASA). The outcome of the Mission was beneficial to update and provide clarity on the objectives and activities for officials of the new government and to chart a way forward for accelerating implementation of the project.

Consultant Site Visits

Dr. Stephanie Brown and Mr. David Maclennan, Pure Water International (PWI) representatives, visited Grenada in June to reassess the project site and complete specifications for the treatment and recycling facility to align with the site landscape. The final designs were developed and shared with stakeholders for review and inputs.



Figure 2: PWI Consultants and local stakeholders assessing the project site at Princess Alice Hospital

Tripartite Agreement

A tripartite agreement was drafted for the implementation of the project by WINDREF, MOH, and NAWASA and reviewed by the organizations. The Agreement is expected to be signed in 2024.

Stakeholders Consultation

Two consultation meetings were held involving a cross section of government and non-government stakeholders. In March, the Minister for Health presided over a consultation, including representatives of Windward Islands Research and Education Foundation (WINDREF), Ministry of Health, Wellness and Religious Affairs (MOH), Ministry of Mobilisation, Implementation and Transformation (MIT), Ministry of Infrastructure, Public Utilities, Civil Aviation, and Transportation, and the National Water and Sewerage Authority (NAWASA). Updates on the project were provided and questions were addressed to provide clarity for the cross section of stakeholders.



Figure 3: Stakeholder Consultation at the NAWASA Headquarters in December, 2023

The second consultation was held in December involving technical officers and the Manager of NAWASA, WINDREF representatives, Ministry of Works, Ministry of Mobilisation, Implementation and Transformation (MIT)

representatives, Steering Committee members, Ministry of Infrastructure, Public Utilities, Civil Aviation, and Transportation representatives, CDB representative, and PWL and other consultants. During the consultation, parties reaffirmed commitment to the project and drafted a plan to continue to accelerate designing and procurement of the equipment.

WINDREF expresses gratitude to the Caribbean Development Bank, the Government of Grenada through the Ministry of Health, Wellness and Religious Affairs, and NAWASA for the support provided for the project. Special thanks is extended to the members of the Steering Committee for continuing to contribute technical knowledge and providing guidance for the project. Ms. Terrisha Walcott in the Department of Microbiology, Immunology, Pharmacology is recognized and thanked for her assistance in the management of this project.

Submitted by Lindonne Telesford and Calum Macpherson

The President Emergency Plan for Adaptation and Resilience (PREPARE) Caribbean Early Warning System Project

The United States President Emergency Plan for Adaptation and Resilience (PREPARE) Project has approved funding for WINDREF to coordinate the development of the Caribbean Early Warning System in collaboration with the National Oceanic and Atmospheric Administration (NOAA). In partnership with the World Meteorological Organization (WMO), regional organizations including the Caribbean Institute of Meteorology and Hydrology (CIMH), the Caribbean Public Health Agency (CARPHA), Pan American Health Organization

(PAHO), and local organizations, NOAA will use state-of-the art scientific methods to develop drought monitoring and outlook tools, provide training to stakeholders in the Caribbean, and work with regional and national institutions in the Caribbean to co-develop drought risks in agriculture, water resource management, and food security. The project will help support the development of an effective and sustainable early warning system for vulnerable island countries to climate variability and change.

The social component of the regional project is led by Dr. Lindonne Telesford, WINDREF Research Fellow and Associate Professor in the Department of Public Health and Preventive Medicine, and includes work in Suriname, Trinidad and Tobago, St. Lucia, Jamaica, and Dominican Republic to assess vulnerability to climate change in sub-population groups. Under the climatology component, led by NOAA, regional meteorologists will be trained in the use of the heat wave forecasting tools and interpretation of the forecasts, and the use of Geographic Information System (GIS) for mapping the heat hazards outlooks. Graduate level students and other faculty at St. George's University are expected to participate in training and other activities aimed at strengthening capacity for climate change adaptation and resilience programming in the region.

Small Island Developing States (SIDS) are extremely vulnerable to climate variability and change, exacerbated by the limited delivery of actionable climate services. Combining results from the social and climatology components, NOAA will work with regional institutions to advance early warning systems with an initial focus on health early warning systems (HHEWSs) and drought outlooks in the

Caribbean, develop heat wave forecasting tools including Urban Heat Island outlooks for the Caribbean, prepare heat hazards outlooks, and share the forecasts with regional organizations. A kickoff workshop will be held in the first quarter of 2024.

Submitted by Lindonne Telesford

The Baroness Howells Sports for Health Program

WINDREF Sports for Health program for 2023 continued with its focus on health aging aligned with the United Nations (UN) declared for health aging from 2020 – 2023. The concept of health from a physical or sporting perspective was expanded to explore overall wellbeing. Demographic changes due to the reduced birth rate and aging in the population increase the proportion of elderly persons in the workforce. The health and wellbeing of the aging workforce served as the main focus of community engagement and research.

The increase in the elderly population results in a considerable proportion of people above 65 years old in the workforce. The issue of quality of life for the elderly includes health and the absence of disease or infirmity. Quality of life is increasingly associated with health and wellbeing which includes physical, mental, social, spiritual, occupational, and financial (Chalise, 2019). The ability to retain physical attributes for work is the common approach for managing the aging workforce. Human Resources Management (HRM) themselves are challenged with the aging workforce due to a need to adjust approaches to the changing structure of the labor force and organizational productivity (Egdell et. al., 2022). The purpose of the 2023 study was to

examine experiences of aging on quality of life and work motivation among the aging workforce. The study hypothesized that variable socio-economic factors determined the quality of life and motivation for work. As the aging workforce increases, there is a focus to engage persons who are in the workplace or near retirement age and focus on their ability to work and their quality of life at the personal level (Salminen et. al., 2019). The focus is on retaining physical and experience abilities to remain or return to work. Intellectual and occupational wellness among aging workers can also determine cognitive stimulation and workplace performance which also determines and depends on different dimensions of wellness (Kim et al., 2021). Efforts to promote the aging workforce must address the quality of life of the elderly to ensure their capacity to work is one of addressing their health and wellbeing and motivational factors to remain in or return to work (Sakulsri, 2020).

Using a mixed methods approach from both surveys and interviews of elderly persons, the quality of life of the elderly was assessed to be variable and dependent on their health and socioeconomic statuses. Among 408 participants, for health, optimal (9-10) was identified by 56 (13.7%) for physical health and 104 (25.5%) for mental health. Average (5-8) was the rating for physical health by 327 (80%) and for mental health by 297 (72.8%). Social networks and support towards social health was considered poor (1-4) by 11 persons (2.67%), average (5-8) by 12 (3.03%) of participants and optimal (9-10) by 385 (94.3%) persons. For happiness, 117 (28.7%) of persons considered their current happiness perception as the optimal (9-10) with 212 (52%) of persons considered their happiness perception in the average scale of 5-8 as their

current life experiences. From a financial wellbeing perspective, 211 (51.8%) identified the 5-8 average range as their reality while 119 (29.2%) assessed their financial situation in the optimum 9-10 range. Relational wellbeing towards quality of life assessment was assessed for both family and community. Optimal (9-10) assessment was selected by 232 (56.9%) of participants for their relationship with family and 307 (75.2%) for relationship with community. Average (5-8) consideration for relationships with both family and community was considered by 119 (29.2%) and 79 (19.4%) respectively. Loneliness as an emotion was described as average (5-8) by the majority of participants (211, 51.7%) while 120 (29.5%) participants had poor experiences with loneliness and 77 (18.8%) did not consider loneliness as their experience.

Work motivation was derived from participants based on their responses on level of agreement with factors towards work retention or return. Good pay and promotion were motivating factors for 281 (68.8%) and 271 (66.4%) of participants, respectively. Organizational policy was also selected by 268 (65.7%) of participants together with a desirable work environment by 273 (66.9%). A good welfare package and good bonus system was considered by 274 (67.2%) and 278 (68.2%) respectively. Work related relationships including good interpersonal relationships and good supervisors were chosen by 276 (67.7%) and 270 (66.2%) respectively. A workplace that allows for the opportunity to use abilities, provide a sense of challenge and achievement as well as receive positive recognition was recognized by 274 (67.2%), 285 (69.8%) and 279 (68.3%) respectively. Autonomy and self-actualization were chosen by 282 (69.1%) and 284 (69.6%). An interesting

job was selected by 293 (61.8%) and job security was recognized by 274 (67.1%).

Returning to or remaining at work was determined by the nature of work and personal and financial situation. A concept model connected the concepts of Relational, Income, Care and Environmental factors from the analysis of themes towards determining quality of life and work motivation outcomes. Quality of life together with work motivational factors for the aging workforce is also essential for the sustainability of occupational and economic performance measures and production outcomes. Efforts focusing on financial literacy, occupational policies, and practices together with promoting family relationships, health status and social engagements should be a strategy to prepare for aging and support a better quality of life and work experience. The workforce will continue to get older, their quality of life, work performance, and production depend on multiple interdependent influences, which requires an integrated response. Efforts to prepare for aging will promote a better quality of life and work experience.

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Submitted by Satesh Bidaisee

The Caribbean Cancer Portal Program

Following the pilot study to determine interest of various groups in utilizing the Caribbean Cancer Portal (CCP) and recommendations to improve the utility and effectiveness to provide appropriate, timely, and user-friendly cancer prevention and patient support education, five additional Caribbean countries, through the ministries of health, have responded positively to partner with Grenada in Phase II of the CCP program. The countries are St. Lucia, St. Vincent and the Grenadines, Antigua and Barbuda, St. Kitts and Nevis and Dominica. The overarching goal of the CCP program is to improve the quality of life of Caribbean people through the experience of enhanced knowledge, informed decision-making, and receipt of support for cancer prevention and care. The CCP will allow for a community of diverse users to interact in a comfortable and supportive environment. Galvanizing the services on a central virtual platform enables a wider cross section of the region's population to access

education and support services that complement existing initiatives.

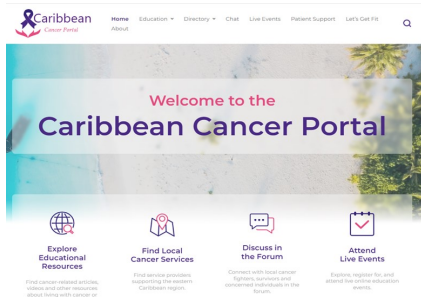


Figure 1: Landing Page of the Caribbean Cancer Portal

In 2023, the CCP program was presented at two international conferences and at the Office of Research Day, expanding its global and regional visibility. Following a publication in the Lancet Regional Health – Americas last year, a second manuscript, titled Transferring Cancer Research to Implementation: Key Enabling Factors in Caribbean Settings was prepared and submitted for publication in a peer-reviewed journal. In March, Dr. Sonia Nixon made an oral presentation on the CCP at the Office of Research Day at St. George’s University in Grenada and, in August, a virtual oral presentation at the Caribbean Association of Oncology and Hematology (CAOH) conference, which was hosted in Jamaica. In April, Dr. Lindonne Telesford presented a poster at the 11th Annual Symposium on Global Cancer Research (ASGCR) of the US National Cancer Institute.

Phase II activities are expected to cost approximately US \$129,000 with eight areas of work over a 2-year period, 2024-2025. This phase will include upgrade and development of the portal site; capacity building for cancer support groups; education materials sourcing and posting; establishment and strengthening cancer registries; formation of the CCP Advisory Committee; Institutionalization of the CCP program; training in cancer patient navigators; and administration. To introduce Phase II, an initial meeting was convened in the last quarter of 2023 with representatives of the ministries of health in the six countries. Implementation will be at the level of the respective countries, guided by the ministries of health, and with support from the PAHO Country Offices. Local organizations, such as cancer support groups and community health organizations, will be mobilized to participate in country-based and regional activities. The Advisory Committee will work closely with the Steering Committee to deliver the Workplan with the expected outcomes to:

- Create greater awareness of cancer risk management among Caribbean populations;
- Larger segment of Caribbean population accessing cancer education;
- Expanded range of government-supported services for cancer patients;
- Enhanced capacity of Caribbean-based cancer support groups to deliver effective services to patrons.

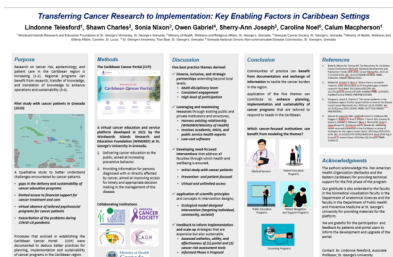


Figure 2: Caribbean Cancer Portal Poster Presented at International Conferences

The CCP program is administered by the WINDREF in collaboration with the Ministry of Health (Grenada), Caribbean Association of Oncology and Hematology (CAOH), Grenada Cancer Society (GCS), Grenada National Chronic Non-communicable Disease Commission (NCNCD). Other regional organizations have expressed interest in partnership with

the CCP program, subject to a positive FENSA with PAHO. PAHO provided technical support, through the Ministry of Health, for the initial development of the Portal in 2021 and discussions are advanced to secure technical support from PAHO for the second phase of the program Oversight is provided by the Steering Committee, comprising representatives of the partner organizations.

WINDREF acknowledges the support of the individuals and organizations represented on the Steering Committee: Ministry of Health in Grenada, Dr. Shawn Charles; Caribbean Association of Oncology and Hematology (CAOH), Dr. Owen Gabriel; Grenada Cancer Society (GCS), Dr. Sonia Nixon; Grenada National Chronic Non-communicable Disease Commission (NCNCDC), Dr. Caroline Noel; Ms. Sherry-Ann Joseph; and the program founders, Dr. Lindonne Telesford and Mr. John Swope at St. George's University. Special thanks to the students in the Master of Public Health program and the biomedical illustrators in the School of Medicine at St. George's University, and Mr. Rennie Rougier at Alpha primary school for producing content for the CCP. WINDREF also thanks PAHO for providing technical support for the development of the portal.

Submitted by Lindonne Telesford, John Swope, and Calum Macpherson

Engaging Young People as Agents of Change

This school-based project in the tri-island state of Grenada, Carriacou and Petite Martinique engages Grade 4 students to aid in the mitigation of arboviral and feco-orally transmitted protozoal diseases by using a randomized controlled study design among fifty-three public primary schools in Grenada, Carriacou

and Petite Martinique. Fifty-three (53) schools were randomized; twenty-seven (27) schools were selected to receive the educational intervention (case) and twenty-six (26) were selected to receive no intervention (control) (Fig. 1). This project assesses the knowledge, attitudes, and prevention practices regarding arboviral and feco-oral protozoan diseases. It also collects data on vector abundance at the school sites.



Figure 1: Distribution of the primary schools (N=53) in Grenada, Carriacou and Petite Martinique

Timeline

This project involves 3 phases; Phase 1: Baseline; Phase 2: 3-month follow up; Phase 3: 6-month follow up (Fig 2). Phase 1 was completed in December 2022. Phase 2, commenced in January 2023. Phase 3, the final stage, runs from April – June 2023.

In phase 2 and 3, students were given the post questionnaire to assess the long-term knowledge, attitudes and practices (KAP) along with continued vector abundance measurements to assess and identify the school's local environment for mosquito breeding sites and mosquito abundance for further interventions.



Figure 2: Project timeline



Figure 4: Demonstration – Water filtration (student using a Brita filter) St. Andrew’s Methodist, St. Andrew

Case and Control Schools

Phase 1

The case school students undergo a pre-questionnaire (25 questions), power-point presentation, interactive teaching sessions with demonstrations of the mosquito life cycle (Fig 3), water filtration (Fig 4), proper handwashing technique (Fig 5), followed by a post-questionnaire (25 questions). See below for two examples of arboviral and feco-oral transmitted protozoan preventative questions (Fig 6).



Figure 5: Demonstration – Proper hygiene (hand washing) at Chantimelle Government School, St. Patrick



Figure 3: Demonstration – Mosquito Life Cycle (egg, larvae, pupa, adult mosquito) at Chantimelle Government School, St. Patrick

19. What do you think:

Does turning over unused containers protect you against diseases caused by mosquito bites?

- A. Does Not Protect
- B. Protects a little
- C. Protects a lot

20. What do you think:

Will handwashing after using the bathroom and before eating protect you against diseases caused by feco-orally transmitted germs?

- A. Does Not Protect
- B. Protects a little
- C. Protects a lot

Figure 6: Examples of arboviral and feco-oral transmitted protozoan preventative questions

The control schools take a pre- and post-questionnaires (25 questions), without any intervention. (Fig 7).



Figure 7: Control school (delivery of pre-questionnaire) at St. Joseph's Roman Catholic school, St. David

Phase 2

The 3-month questionnaire (25 questions) was administered to case and control schools along with the Vector Control component (Fig 8 & 9).



Figure 8: The 3 month questionnaire administered to Calliste Government School (case school)



Figure 9: The 3 month questionnaire administered to Mt. Moritz Primary School (control school)

Phase 3

The case and control schools received the 6-month questionnaire (25 questions). After the administration of the questionnaire in the control schools, the students received the power-point presentation, interactive teaching sessions with demonstrations of the mosquito life cycle (Fig 10), water filtration (Fig 11), proper handwashing technique (Fig 12) and erected arboviral and feco-oral protozoan posters that were administered by the case team in Phase 1. This ensures that the control schools benefit from the study thus maintaining ethics.



Figure 10: Demonstration – Mosquito Life Cycle (egg, larvae, pupa, adult mosquito) at St. Joseph's RC Pomme Rose, St. David (control school)



Figure 11: Demonstration – Water filtration (student using a Brita filter) St. Joseph's RC Pomme Rose, St. David (control school)



Figure 12: De Demonstration – Proper hygiene (hand washing) at Blessed Sacred School, St. Andrew (control school)

At the end of our final session, all students were awarded a Certificate of Participation (Fig 13-16) and a wristband engraved with “I am an Agent of Change” and “WINDREF” (Fig 17). In addition, all schools received a Certificate of Completion of the Engaging Young People as Agents of Change Programme collected by the Principal/Vice Principal of the school (Fig 16).



Figure 13: A Grade 4 student at St. Dominic’s RC (control school) was award his Certificate of Participation



Figure 14: Students at Grand Roy Government (control school) were awarded their Certificates of Participation



Figure 15: A Grade 4 student at Blessed Sacrament (case school) was award his Certificate of Participation by Dr. Trevor Noël, Deputy Director of WINDREF



Figure 16: Students at St. John’s Anglican (left) and Blessed Sacrament (right) were awarded their Certificates of Participation



Figure 17: “I am and Agent of Change” wrist-band provided to all Grade 4 students

nesses, Opportunities and Threats (SWOT) (Fig 18).



Figure 17: Students using the Our Voice Discovery tool at Mt. Pleasant Government, Carriacou

Our Voice Tool

The case school intervention cohort includes a subgroup that receives an additional intervention where students capture aspects of their schools’ environment that make it easy or hard to prevent diseases transmitted by mosquitoes using the “Our Voice” Discovery Tool mobile app from Stanford University. Students use the app installed in study tablets to record geotagged photos as well as audio comments of why they took the picture. Later in the same week, students review their collective data to brainstorm themes, solutions and identify potential allies to advocate for and make changes to mitigate vector-borne disease in a facilitated process. Our goal is to test the multi-level impacts of Engaging Young People as Agents of Change not only in preventing mosquito-borne diseases and fecorally transmitted protozoans but also in improving local environments in a more sustainable way. Students are given study tablets to facilitate the data collection (Fig 17). Within 3 -4 days, team members re-visit the school to facilitate Day 2 of Our Voice Session. Day 2 allows for brainstorming Strengths, Weak-

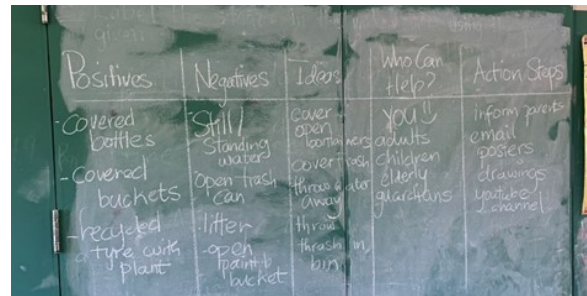


Figure 18: Discussion board (Day 2) of Our Voice Discovery tool at Constantine Methodist, St. George

Vector Control Component

Ministry of Health; Vector Control personnel accompany case and control team to the various schools. The vector control personnel assess the school’s environment, place ovitraps (Fig 19) and use the Propopak (Fig 20) to conduct assessments of mosquito vector abundance. The vector control personnel in Carriacou and Petite Martinique were also able to accompany the case and control teams during those educational interventions (Fig 21).



Figure 19: Vector Control personnel setting of ovitraps



Figure 20: Use of Propopak, Ministry of Health Vector Control personnel (Capacity Building)



Figure 21: Case team and Vector Control Unit in Carriacou

Volunteerism

The program included the involvement of 4 volunteers within the School of Medicine program and 3 Master’s in Public Health – Practicum students. All students participated in the intervention, control aspect, vector control component and data entry into REDCap (Fig 22). Students gained various skills and enhanced existing ones allowing them to gain an appreciation and insights into arbovirus and feco-oral protozoal diseases in combination with cultural aspects and the possible challenges faced and ways of overcoming such.



Figure 21: Volunteers and MPH Practicum students involved in the Engaging Youths Program

Results

Phase 1:

All data from the 53 primary schools (case & control) was uploaded by the case/control team and School of Medicine (SOM) students into REDCap, a cloud base secure data

platform. The data was analyzed and the preliminary results from September – December 2022 that have been reported by the case (intervention) group showed significant improvements in arboviral and protozoal disease knowledge (14.8% increase, $p=0.016$), attitudes (9.0% increase, $p<.0001$), and practices (19.0% increase, $p<.0001$) for primary school participants. The case (intervention) participants also reported a 79.8% increase in correctly answering: “Where do *Aedes aegypti* female mosquitoes lay their eggs?” between pre and post-tests. In comparison, the control (no intervention) group only reported significant improvements in arboviral and protozoal disease behaviors (9.8% increase, $p<.0001$), but not in knowledge (4.1% decrease, $p=0.46$) or practices (2.9% increase, $p=0.15$). Using the Our Voice Discovery Tool app, students have recorded 291 photos (115 good and 153 bad for the environment) and 309 audio comments.

Phase 2

The intervention group reported significant improvements in arboviral and protozoan disease knowledge (14.8% increase, $p=0.016$), attitudes (9.0% increase, $p<.0001$), and practices (19.0% increase, $p<.0001$). Intervention participants also reported an 80% increase in correctly answering: “Where do *Aedes aegypti* female mosquitoes lay their eggs?” between tests. In comparison, the control group only reported significant improvements in arboviral and protozoan disease attitudes (9.8% increase, $p<.0001$), and behaviors (12.3% increase, $p<0.001$), but not in knowledge (4.8% decrease, $p=0.30$). Among the case schools, those who had the Our Voice component showed an increase in knowledge but not in behaviors or attitudes.

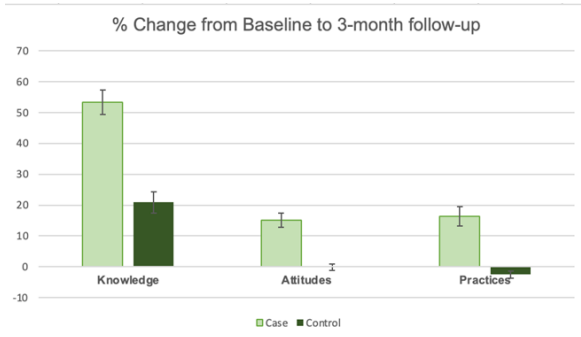


Fig. 22: Knowledge Attitudes and Practices (KAP) changes from Baseline to 3-month follow up

From the case schools, 2,442 total mosquito egg counts (1,484 outdoors and 948 indoors) and 29 larvae counts outdoors were recorded. In the control schools, 2,546 total mosquito egg counts (1,887 outdoors and 659 indoors) as well as 161 total larvae counts (156 outdoors, 5 indoors) were recorded.

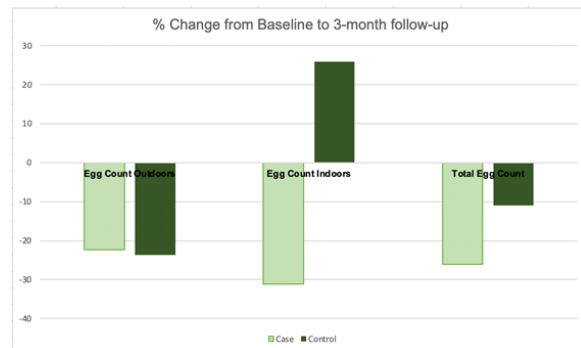


Figure 23: Egg count changes from Baseline to 3-month follow up

Phase 3: (Pending)

Presentations

The Engaging Youths Project was presented at the 20th Research Day/Phi Zeta Research Emphasis Day on 18 March 2023 (Fig. 24)



Fig. 24: The Engaging Young People Project (WINDREF Team) at the 20th Research Day/ Phi Zeta Research Emphasis Day held on 18 March 2023

Submitted by (Alphabetized):

Ann Banchoff (Stanford University)
Basil Williams (WINDREF)
Bethel Bayrau (Stanford University)
Markeda Fletcher (WINDREF)
Nikita Cudjoe (WINDREF)
Prathik Kalva (Stanford University)
Sarah Telesford (WINDREF)
Zakaria Doueiri (Stanford University)
Dr. Abby King (Stanford University)
Dr. Desiree LaBeaud (WINDREF & Stanford University) – Co - Principal Investigator
Dr. Trevor Noël (WINDREF & St. George’s University) – Co – Principal Investigator



Volunteers:

St. George’s University, School of Medicine students (Lashawnd Johnson (Term 5), Arani Thirunavukarasu (Term 5) and Nicole Nguyen

(Term 5) and Nicole Areta (Term 2), Michael Emslie (Term 5) and Brandon Ozier (Term 5).
Collaborators

This study is a collaboration / cooperation among the Windward Islands Research and Education Foundation, Stanford University; Dr. LaBeaud Lab and Dr. King Lab, Government of Grenada, Ministry of Education and Ministry of Health.

Submitted by Trevor Noël

CREEi and the CREEi-Hastings Center Climate Bioethics Program

NIH-FIC Award number 3R25TW 009731-11S1

In September 2023, a new NIH-Fogarty International Center supplemental award was provided to Cheryl Macpherson, PI for the Caribbean Research Ethics Education initiative (CREEi). The new award, the CREEi-Hastings Center Climate Bioethics Program (CBP) will entice graduates of the parent CREEi program to spend a year learning about climate change and health (CCH) and asking normative ethics questions often overlooked in related research, policy, and practice. With a focus on the Caribbean region, the CBP will integrate bioethics into CCH dialog and research to educate trainees and illuminate for climate scientists and health professionals some of the values that bear on whether CCH research gets funded, how it is designed, and how impactful are its outcomes.

Those who complete the CBP program will be better positioned to integrate bioethics and CCH into their teaching, become more equal partners in international research, become collaborators and co-authors in trans-disciplinary CCH research and public health interventions, and ultimately improve health

equity in the Caribbean – a region of unique vulnerability to climate change due to its diverse geography (SIDS and low lying countries with relatively large coastlines) and socioeconomics (LMICs). Structured interaction between climate scientists, regional health professionals, and CREEi-trained research ethicists will enrich and expand the CCH research community. This has particular significance for Caribbean LMICs and SIDS which are under-represented in global CCH research.

The aims of the CBP are to

1. Improve critical thinking and writing skills among a cohort of 8 Caribbean scholars to enhance their contributions to scholarship and collaborative research
2. Cultivate a network of CCH scholars to forge multidisciplinary collaborations among bioethicist and non-bioethicist CCH researchers and practitioners.

Outputs will include open access to an online casebook written by trainees, teaching materials, and a public facing webinar.

The CBP is a partnership between CREEi partner institutions (SGU, WINDREF, Clarkson University, and Universidad Autónoma de Querétaro) and The Hastings Center.

The CREEi-Hastings Center Bioethics Scholars Program awarded in 2022 was completed at the end of 2023. Outputs include the forthcoming publication of essays by the eight scholars enrolled in the program as a special volume available in both English and Spanish on The Hastings Center website.

CREEi is in its final year and will graduate and credential its final cohort by December 2024. Outputs will include publicly available curricu-

lar materials and submission of several publications by graduates and faculty.

The CBP is supported by NIH-FIC Award number 3R25TW 009731-11S1 (Administrative supplement to the Caribbean Research Ethics Education initiative (CREEi) for the period September 2023 for one year.

Submitted by Cheryl Cox-Macpherson

Saving Brains Grenada Outcomes and Neuropsychological Assessment Activities in 2023

The Early Childhood Assessors of the Caribbean Center for Child Neurodevelopment (CCCN) continued to build their assessment expertise in 2023. This past year data was collected from mothers, children aged 1-14, and teachers in the SARS-CoV-2, GLAMS Psychometrics, and Conscious Discipline (CD) Intervention studies.

SARS-CoV-2 Grenada

The SARS-CoV-2 study continues to examine the potential impact of exposure to the COVID-19 virus on child neurodevelopment. After initial challenges with recruitment, the study enrolled n=118 mothers and their children. The study is arranged into three visits: (i) pregnancy visit, (ii) postpartum visit, (iii) one-year follow-up. All pregnancy visits have concluded and 44% of postpartum visits were completed. Serum samples were taken from mothers at visits one and two to determine COVID-19 status during pregnancy. Samples were sent to the US for analysis. SARS-CoV-2 was detected in approximately 70% of the samples, and 3% of mothers seroconverted between their first and second visit. The next stage of this study is to collect child neurodevelopmental data at the one-year follow-up visit.

GLAMS Grenada

In July 2022 a grant was secured from the Charles Matthews Fund at the International Neuropsychological Society to continue work on the Grenada Learning and Memory Scale (GLAMS). The GLAMS is a locally designed assessment tool to measure learning and memory in preschool-aged children. Following the success of the pilot study, the grant was secured to establish the psychometric characteristics - reliability and validity - of the GLAMS. St. George's University Institutional Review Board (IRB) approval was sought and obtained for this project (IRB# 22030). Following ethical approval, the CCCN team contacted parents within its project networks and explained the purpose of the study. A total of n=90 children across Grenada between the ages of 3-5 were then enrolled. Children were randomly assigned to complete the GLAMS assessment two weeks apart at their school, home, or local health center. Assessments were video recorded on 10% of the sample to ascertain assessor protocol adherence to the measure. Upon completion of the second assessment, children were given a package containing colouring books, crayons, playdoh, and paint as a thank you for their participation. The data will be analyzed to determine the psychometric characteristics of the GLAMS including its test-retest reliability and its ecological validity. The video data will be used to assess inter-rater reliability. At this time, the team continues to work on data analysis and manuscript preparation for submission in 2024. Following publication, the team hopes to make the GLAMS available for clinical and research use within the region and other developing regions worldwide.

Conscious Discipline Grenada

The aforementioned Conscious Discipline (CD) School Intervention Program continues

with great success. Following setbacks as a result of the coronavirus pandemic, the assessment team was able to begin collecting quantitative data to track the effectiveness of the program. The assessment methodology includes pre- and post-intervention measures of both the teachers and students in the program. In the Michaelmas 2023 school term, the assessors administered pre-intervention assessments to n=27 teachers and n=231 students. Teachers were interviewed on various scales including personality, mental health, perceptions of safety, and knowledge of CD to establish comprehensive baseline data. Baseline data were collected from students in n=27 intervention schools, including two Special Education schools, using the NEPSY-II, GLAMS and a measure of social-emotional well-being. At the end of the school year, the assessors will return to the schools to administer the same measures post-intervention.

Fifteen schools in Grenada, Carriacou, and Petite Martinique have been identified to serve as a waitlist control group. Randomly selected teachers and students in these schools will complete the same assessment as the intervention schools. A direct comparison will be done between the current intervention schools and waitlist control schools to further assess the impact of the intervention. In September 2024, waitlist control schools will begin their intervention, and the pre-post-intervention assessment process will be repeated. This project aims to spread CD to schools across Grenada and for the first time - to Carriacou and Petite Martinique.

Our team will continue the momentum of assessments in 2024 particularly focusing on post-assessments in our current schools and pre-assessments in schools selected to start their intervention in September 2024. Data

collected throughout the project will be organized and analyzed for manuscript preparation.

Submitted by Roberta Evans and the CCCN/ Saving Brains Team

Saving Brains Grenada CD Intervention Activities in 2023

The Saving Brains Grenada intervention, in collaboration with Grenada Roving Caregivers, continued to roll out in schools, individual homes and via community-based sessions in 2023.

Schools

In January 2023, five (5) Conscious Discipline (CD) Coaches continued to work with forty (40) teachers and five hundred and twenty-four (524) children in thirty (30) pre-primary and primary schools. These schools were recruited in September 2022, which is when the CD Coaches started working with them. Coaching comprised of bi-weekly visits to each school with one-to-one Zoom meetings held in the week between visits. Coaches worked predominantly in one classroom with one teacher. The coach's role involved observation, modelling CD skills, coaching the teacher in the moment, and discussing CD principles in one-to-one meetings to help teachers see classroom behaviours from a different perspective.

The Skills and Powers of Conscious Discipline are related to Safety, Connection, Problem Solving and the School Family. One of the main skills needed for Safety is Composure. In January 2023 the CD coaches brought together the previous term's focus on Composure with the introduction of the Safe Place. The Safe Place is a physical location that

serves as a self regulation centre where children can remove themselves from the group whenever they are feeling angry, scared, frustrated, etc. Teachers were coached to help children through the five steps of self-regulation to bring them to a place of calm, ready to refocus on learning. Once this skill has been acquired children are then able to remove themselves from stressful situations, go to the Safe Place and manage their own feelings.

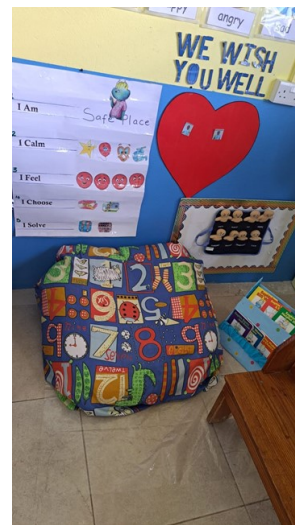


Figure 1: A Safe Place in the classroom



Figure 2: Child practicing self-regulation with the Feeling Buddies

For the remainder of the spring term the emphasis remained on safety with the introduction of The Power of Attention and the skill of Assertiveness. Teachers were encouraged to reflect on their communication style and give clear, calm instructions, focusing on what they wanted to see rather than emphasizing what children had done wrong. Children were taught how to set their own boundaries and resolve conflict by using their assertive, “Big Voice”, and by using the CD Time Machine, which is a process designed to help resolve conflicts. An example of this was seen in a school when a child snatched the broom from a friend in order to sweep the floor. A classmate witnessed this and used an assertive voice to say, “if you want to help you should say ‘Can I have a turn please?’” She then encouraged the aggressor by saying “You can do it!”. This is powerful in that it reinforces the skill of assertiveness for the victim and more importantly highlights how children can be ‘mini - teachers’ resolving their own conflicts. Once children utilize these skills, the teacher is free to focus on teaching.



Figure 4: The Time Machine painted in the playground

All schools received a Time Machine mat to support this skill and many schools also painted the structure outside in the playground. Additionally, each school received materials to support the skills and structures of Conscious Discipline, including a Bluetooth speaker, a set of I Love You Ritual posters, a Mini Feeling Buddies Kit a set of Shubert or Sophie books and a CD teacher’s book.



Figure 3: Students resolving a problem with The Time Machine

In the summer term 2023, the emphasis shifted to Connection. Coaching focused on building and strengthening The School Family through the Power of Unity (we’re all in this together). Teachers and students were introduced to The Friends and Family board, I Love You Rituals, School Family jobs and prioritizing helpful and kind acts. As teachers began to encourage helpful and kind acts, they began to see a change in children’s behaviour. As one teacher stated: “all of a sudden, all the children want to be helpful!”

The Friends and Family board includes photos of all the people who love and support the children and whose role it is to keep

them safe, highlighting the links between the home and the school family. It is also used to help children feel greater connection to their school family members, resulting in more helpful and respectful interactions.

With continued funding from the Becky Bailey Foundation, recruitment of schools for the academic year 2023/24 began in April 2023 with a five (5) week (10 session) CD foundation course. Of the 120 participants approximately 30% were teachers or teaching assistants, 40% roving caregivers and the remaining 30% were parents and other professionals. Due to high demand this course was repeated in October 2023, with a further 100 online participants.

Schools for the academic year 2023/24 were selected by word of mouth, following the CD coaching guideline of focusing on the most willing schools and teachers first. With feedback given by the schools and coaches in July 2023, it was decided that the most effective coaching method was to visit the schools weekly rather than bi-weekly. Two additional CD coaches were recruited to accommodate this change. Ms. Kenisha Francois, Grencase Roving Care supervisor and Ms. Carlene Byam, a teacher, who had been successfully implementing CD in her classroom joined the team in July 2023, bringing the total to 7 CD coaches. Presentations were given in 30 schools, outlining the coaching plan for 2023/24. By September 2023, twenty-seven (27) new schools had been recruited targeting 29 teachers and 417 children. CD Coaching will continue in these schools until July 2024.

Community

Five Hundred and forty-eight (548) parents with six hundred and seven (607) children in

selected Grenada communities received CD instruction as part of the Roving Caregiver weekly home visit program. Additionally, the Roving Caregivers offered a series of community classes in St. George, St. Patrick, St. Andrew and St. David. Parents within each parish were invited to attend 3 group classes with the goal of building community, meeting like-minded parents, and practicing CD skills along with their child. One hundred and sixty-five (165) families and one hundred and seventy (170) children attended in total, with an average of fifteen (15) families participating in each class.



Figure 5: Parents participating in community classes with their children

Conscious Discipline coaches ran 4 x 1-day (6-hour) top up trainings throughout 2023, with a focus on the CD skills of connection and attunement. The training was held for 74 Grencase Roving caregivers, covering one day per region.

Fifteen (15) Camp Glow (Girls Leading the World) Councilors received a 3-hour presentation - Introduction to CD, presented by Ms. Christiana Lashington. Conscious Discipline skills were taught and practiced with stu-

dents attending the Grenada Community Library summer camp.

We look forward to maintaining the CD coaching momentum across schools, homes, and communities in Grenada over the coming years. We believe a “tipping point” has been reached in which CD concepts and skills are starting to spread through Grenada beyond the immediate teaching of the CD coaches and Roving Caregivers. Teachers and community members are now actively seeking CD training. This is very encouraging.

Submitted by Stephanie Holmes and the CCCN/Saving Brains Team

Genotyping and satellite tracking of Hawksbill and Green sea turtles in Grenada

Research Objectives

Grenada supports aggregates of endangered green sea turtles and critically endangered hawksbill sea turtles. The research objectives for this study included: 1) Characterizing overall health of green and hawksbill sea turtles using clinically examination, infectious disease testing, and plasma biochemistry analysis; 2) Identification of genetic haplotypes to identify the corresponding rookeries (natal origins) for hawksbill and green turtles and the foraging grounds nesting hawksbill turtles; 3) Qualitative description of the family population structure and genetic diversity of sea turtles in Grenada; 4) Track 6+ months of sea turtle movement data within and outside of Grenada’s territorial waters use satellite tags to; 5) Associate genetic and satellite tag data to provide comprehensive analysis of regions and habitats critically important to sea turtle conservation; 6) Prioritize stakeholders with shared intrinsic and extrinsic

investments in Grenada’s sea turtles for further conservation and research collaboration.

Research Summary To Date

Clinical examination, morphometric assessments, flipper tagging, and sample collection were carried out for foraging green turtles (n = 105), foraging hawksbill turtles (n = 22), and nesting hawksbill turtles (n = 18) within Grenada. Study sites included the foraging grounds for green and hawksbill turtles surrounding Grenada’s northern islands and near Grande Anse Beach, and hawksbill nesting grounds on Isle de Caille nesting beach (Figure 1). Physical examination and plasma biochemistry data indicated that Grenada’s turtles are in good physical and physiologic health. Chelonid alphaherpesvirus 5-specific antibodies were identified in serum samples in 9.4% of green turtles defining the prevalence of infection in Grenada.

Mixed stock analysis (MSA) using mitochondrial DNA (mtDNA) sequencing was used to assess the level of genetic connectivity of Grenada’s sea turtle populations with other populations in the Atlantic region. Analysis revealed seven different genetic haplotypes within Grenada’s foraging green turtle population, including one novel haplotype (CM-A82.1) that had not been previously described. Grenada’s foraging green turtle population were found to migrate to the island from rookeries in Aves Island, Venezuela (46.1%), Florida (Hutchison Island) (25.4%), Costa Rica (19.6%) and Guinea-Bissau (8.9%). Seven haplotypes including two rare haplotypes (Ei-A45, Ei-A72) were identified in foraging hawksbill turtles. The main contributor to Grenada’s foraging hawksbill turtle population is the Tobago rookery (80.9%), with smaller contributions from Guadeloupe (5.9%) and Barbados Leeward (3.1%), and

minor contributions from Cuba (Doce Leguas Cays) (1.9%), Dominican Republic (Jaragua) (1.6%) and Brazil (Pipa and Bahia sites) (<1.3% each).

Isle de Caille was identified as the nesting grounds for haplotype Ei-A68, which previous to this study had no known identified natal origin. Isle de Caille supports nesting hawksbill turtles that migrate from foraging grounds in Brazil (six sites, cumulative contribution of 79.7%), with smaller contributions from Puerto Rico (7.7%), Ascension Island (3.2%) and Tobago Windward (2.5%), and minor contributions from the Cayman Islands (1.7%), Turks and Caicos (1.5%), Mexico (Quintana Roo) (1.3%) and Tobago Leeward (0.8%).

In 2023, satellite tags were deployed on five nesting hawksbill turtles (Figure 2). Data will be collected through the end of the year to identify important regional habitat for nesting sea turtles and to identify migration corridors used by turtles to reach Grenada from their foraging grounds.

Overall, this project indicates that Grenada’s green and hawksbill turtle populations are currently clinically healthy although ChHV5 infection remains a notable health risk. The turtles are shared resources with 15 other countries throughout the Atlantic region and comprise rare and/or unique haplotypes that offer valuable genetic diversity to the wider region. Further conservation strategies are warranted to protect these populations including at-risk haplotypes. This research supports the introduction of a regional management approach for Grenada’s green and hawksbill turtle populations, perhaps through incorporation into existing Regional Management Units.



Figure 1: Sampling sites for foraging green and hawksbill turtles designated by ellipsoids. Nesting hawksbill sea turtle site designated by red dot on Isle de Caille



Figure 2: Current migration status for “Libbo”, one of five critically endangered hawksbill sea turtles satellite tagged while nesting in Grenada, as she migrates back to her foraging grounds

Collaborators

- Kate Charles and Clare Morrall, Ocean Spirits, Inc. (Grenada)
- Martin Attrill and Clare Embling, University of Plymouth (U.K.)
- Brian Shamblin, University of Georgia (USA)
- MSc student: Naomi Westlake, University of Plymouth (U.K.)

Submitted by Dave Marancik

One Health Initiative: Animal Welfare

The One Health initiative in 2023 prioritized animal welfare and treatment of animals in the pursuit of research in the Caribbean as its focus area. Considering the history of human research, we must acknowledge that crimes against sentient beings have never been resolved by ethics alone and there is a need for official policies and legislations to protect against the unconscious cruelties that may emerge against animals despite ethical guidelines (Nussbaum 2018). While legislations can be found readily among developed nations (Institute of Medicine (US) and National Research Council (US). 2012). Conversely, limited information has been found within the Caribbean regarding the practice or use of animals for research.

This study proposed three main objectives. The first objective aimed to describe the current state of legislation and policies toward the care and use of animals for research within the Organization of Eastern Caribbean States (OECS) as a subset of developing countries within the Caribbean region. The second objective sought, through comparative review and analysis, to identify differences between policies identified within the OECS and international standards. Finally, the third objective was to use information obtained on existing ethical and legislative guidelines to make recommendations with an emphasis on research for improving animal welfare within the developing portion of the Caribbean.

All data was obtained via online published sources using search engines such as PubMed, Google Scholar, University Library databases, and official governmental or organizational websites. Free full-text literature, like journal articles, reports, and book chapters

published between 2012 and 2022, was retained for review using search engine filters. Literature published outside this timeline was not accepted unless it provided hallmarked information pertinent to the study. No time limit was used for legislative retrieval as the year of legislative enactment was not thought to impact the validity of information once the Act was under enforcement by the respective countries.

All legislative information for the seven OECS countries and the USA were reviewed and compared with the laws of the USA and OECS. Variations and trends within and between the regions were identified and recorded. This analysis identified 166 search results, with only 34 utilizing animals in research within the OECS over five years. Of the seven countries assessed, Grenada accounted for 29%, while St. Kitts & Nevis accounted for 52.9% of relevant search results, indicating that more animal research occurs within these two countries than the rest. Dominica accounted for 14% of research, while Antigua and Barbuda accounted for 2.9%, with no relevant research found in Montserrat, St. Lucia, and St. Vincent & Grenadines. Based on the information obtained, each of the seven OECS countries have existing animal care and use provisions which are predominantly cruelty prevention laws. Antigua Barbuda, Dominica, and St. Kitts and Nevis Protection of Animals Act are identical. Only two countries, Montserrat, and Grenada, have targeted legislation for animal experimentation through their "Animals (control of experiments) Act," which are identical. Grenada and St. Kitts and Nevis are the only two countries with institutional policies for animal research.

In the search to determine which international guideline would be used for close com-

parison to the OECS, the USA ranked highest, followed by the UK, Canada, and Australia. Latin America, the nearest representative to the Caribbean, held the lowest published results among all search terms.

All OECS legislations under review were established between 1935 and 2003. Except for St. Lucia all countries would have been under British rule during the enactment of their animal laws. The wording and establishment of these laws are therefore a likely remnant of the region's history of British colonization, but like many other Latin American countries, they may not accurately represent the current social and political climate (Trent et al. 2005). All seven full member countries of the Organization of Eastern Caribbean States retain legislation for the care and use of animals. However, with many focused on the prevention of cruelty, policies toward protection in research and regulatory oversight are limited within the region when compared to nations with more established legislations and policies like the USA.

Legislative amendment and addition of policies and ethics specific to animal experimentation are needed to ensure the care and welfare of research animals within the Caribbean basin are held to similar standards or surpass those within the USA and other international territories. While animal use continues, we must provide protections for these valuable co-inhabitants of the earth. There is also a need for the digitalization of records and education to assist in spreading information and improving animal welfare within the region.

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Submitted by Stacy Francis-Charles and Satish Bidaisee

Climate Crisis, Human Conflict and Animal Refugees: Case of Myanmar Elephants in Thailand

The issues of climate crisis, human conflict, and animal refugees are all interconnected and raise important concerns for our planet and its inhabitants. The consequences of the climate crisis include rising global temperatures, melting ice caps and glaciers, more frequent and severe weather events (like hurricanes and droughts), sea-level rise, and disruptions to ecosystems and biodiversity. Environmental issues, such as resource scarcity and climate-induced dis-

placement, can also contribute to human conflicts. For example, competition for limited resources, like water and arable land, can escalate tensions and lead to violence. Conflict often leads to displacement, loss of life, and destruction of infrastructure, causing severe social and economic disruption. Addressing the root causes of conflict and promoting peace is essential for global stability. Animal refugees results from animals that are forced to migrate or seek new habitats due to environmental changes, such as climate change or habitat destruction. These changes disrupt their natural ecosystems and can lead to population declines and even extinctions.



Climate change is one of the main drivers of animal displacement. Rising temperatures altered precipitation patterns, and habitat loss can make it difficult for species to survive in their traditional ranges. Protecting animal refugees involves conservation efforts, habitat restoration, and creating corridors to allow animals to migrate and adapt to changing conditions. This is essential for preserving biodiversity and maintaining healthy ecosystems.

Myanmar, like many other countries, is experiencing the impacts of the climate crisis. The

climate crisis in Myanmar is characterized by a range of environmental and socio-economic challenges associated with climate change. Myanmar is vulnerable to extreme weather events, including cyclones, floods, and droughts. The human conflict in Myanmar refers to a complex and long-standing series of conflicts and disputes that have plagued the country for many decades. It involves various ethnic groups, the central government, and a range of political, economic, and social factors. The conflict is characterized by its ethnic, political, and social dimensions, and it has led to significant humanitarian and security concerns. Myanmar elephants are known to undertake long-distance migrations in search of safety from ongoing human conflict and violence, food, water, and suitable habitats.

WINDREF partnered with Kasetsart University in Thailand during the period July to September to support the management and the health of migrating Myanmar elephants across the border into Thailand towards promoting as a critical aspect of their conservation and well-being. The project activities were focused to:

- Conduct ongoing monitoring and research to understand the migration patterns, behavior, and habitat preferences of the Myanmar elephants to identify critical migration routes and movement.
- Establish of protected migration corridors that connect viable elephant habitats in Thailand as well as reduce human-elephant conflicts from border crossing.
- Protect and preserve the natural habitats where migrating elephants forage, drink, and rest towards ensuring these habitats

are healthy and secure is essential for their survival.

- Provide access to veterinary care for migrating elephants when needed. Injured or sick elephants should be treated by trained veterinarians to ensure their well-being.
- Regularly monitor the health of elephant populations for diseases that could affect them during migration. Implement vaccination and disease control programs where necessary.
- Collaborate with local communities, government agencies, non-governmental organizations (NGOs), and international bodies to coordinate efforts in managing the health and conservation of migrating Myanmar elephants.



Submitted by Satesh Bidaisee

Managing the health of migrating Myanmar elephants into Thailand is a multifaceted effort that requires a combination of scientific research, community engagement, conservation measures, and policy support. Advocacy for and enforcement of laws and policies that protect the habitats and migration routes of elephants are essential ensure their safety and well-being. Promoting sustainable land use and development practices that consider the needs of elephant populations and other wildlife while meeting human needs. It's essential to prioritize the preservation of these magnificent animals and the ecosystems they rely on for their survival.



Rice is life: Health and Wellbeing of Rice Farmers in Southeast Asia



The health and well-being of rice farmers in Southeast Asia where rice farming is a major agricultural activity, are influenced by a variety of factors, including physical health, mental well-being, economic stability, and social support. WINDREF partnered with Kasetsart University and the Royal Thai Government to assess health and wellbeing of rice farmers towards promoting their life expectancy and rice productivity. The Tha Chin River Basin including the provinces of Suphanburi, Nakhon Ratchasima, Ubon Ratchathani, SiSaket, and Surin were sites where farmers participated in the study. The health and wellbeing issues that emerged from surveys and interviews included:

- Rice farming can involve exposure to pesticides, herbicides, and other chemicals, which can pose health risks. Farmers should use protective equipment and follow safety guidelines to minimize these risks.
- Farmers often engage in physically demanding work, such as planting, harvesting, and threshing, which can lead to musculoskeletal problems. Proper ergonomics and mechanization can help reduce the physical strain.
- Access to a balanced diet and adequate nutrition is crucial for farmers' health. Their work may require a high level of physical activity, so ensuring they have enough food, and a well-rounded diet is essential.
- The unpredictable nature of farming, dependence on weather conditions, and market prices can create stress for rice farmers. Access to mental health support and stress management tools is important.
- Rural areas may lack access to mental health services and support systems. Farmer cooperatives, community organizations, and government initiatives can help combat social isolation.
- The economic well-being of rice farmers is closely tied to their income from farming. Fluctuations in crop prices and yield can impact their financial stability. Diversifying income sources and financial literacy can help farmers manage their finances effectively.
- Rural areas, where many rice farmers reside, may have limited access to healthcare facilities. Expanding healthcare infrastructure and providing health insurance can improve the health and well-being of these communities.
- Women often play a significant role in rice farming. Efforts to promote gender equity, land rights for women, and access to resources can enhance the wellbeing of female rice farmers.
- Initiatives that promote community development, infrastructure, and access to education can improve the overall wellbeing of rice farmers and their families.
- Access to information and training on modern farming techniques, sustainable practices, and effective pest and disease management can improve both the quality of rice production and the wellbeing of farmers.
- Government programs that offer subsidies, agricultural extension services, and disaster relief can play a vital role in improving the well-being of rice farmers.



The health and well-being of rice farmers are interlinked with various factors. Promoting sustainable agricultural practices, improving

access to resources, providing social and economic support, and addressing physical and mental health needs are essential to enhance their quality of life and livelihoods.

Submitted by Satish Bidaisee

Global Water Partnership-Caribbean (GWP-C)

GWP-C Works to Bridge the Gap between Science and Policy by Hosting its 2nd Virtual Caribbean Science Symposium on Water

“Conservation and Innovation: Changing the Regional Water Paradigm” was the theme of the Global Water Partnership-Caribbean’s (GWP-C) second virtual Caribbean Science Symposium on Water (CSSW).

At its core, the Symposium seeks to actively engage persons from the research and policy communities to bridge the gap between research outputs on water management and related areas, and their transposition from science to the policy domain to inform evidence-based decision-making.

The 2023 Symposium focused on the urgent need to identify opportunities for advancing conservation efforts in the Caribbean water sector that offer sustainable solutions which are culturally relevant, affordable, and accessible. Integrally tied to this is the need for innovation and new thinking around water conservation, storage, use and management.



Figure 1: Graphic produced during the opening ceremony of the CSSW

Partnering to Build Integrated Water and Wastewater Management Capacity in Grenada

The Global Water Partnership-Caribbean (GWP-C) was pleased to partner with the Government of Grenada, through the Ministry of Climate Resilience, the Environment and Renewable Energy, to host a national workshop in Grenada to build capacity on Integrated Water and Wastewater Management (IWWM).



Figure 2: Stakeholders at the IWWM hybrid workshop held at the National Cricket Stadium)

The two-day hybrid workshop took place on March 14th and 15th, 2023, at the request of the Government of Grenada to sensitise stakeholders from various sectors in wastewater management. The workshop

featured a mix of presentations from experts in the field and allowed for great participant engagement over the two-days.

GWP-C, GEF CReW+ and UNEP CEP Cartagena Convention Secretariat Support IWWM Capacity Building Projects in the Caribbean, Central and South America

In late 2022, the Global Water Partnership-Caribbean (GWP-C) in collaboration with the GEF CReW+ and UNEP Caribbean Environment Programme (CEP) and Cartagena Convention Secretariat, re-opened a Call for Project Proposals on Integrated Water and Wastewater Management (IWWM) Capacity Building Projects in any of the [GEF CReW+ Participating](#) countries.

The successful grantees were based in the Caribbean, Central and South America. Of the five (5) grant recipients, the following three (3) have been awarded funding through GWP-C’s collaboration with GEF CReW+ and the UNEP CEP and Cartagena Convention Secretariat.

Public Consultation on the Rehabilitation of the Mt. Granby Water Distribution Network in Grenada

The Global Water Partnership-Caribbean (GWP-C) is collaborating with the Mt. Granby Water Committee on a project which aims to increase the capacity of the dam and rehabilitate the Mt. Granby community’s water distribution system in Grenada.

Key to the event was an “Open Forum” segment which enabled members of the community and other participants to further discuss the project, ask related questions and to find out about the project’s next steps.



Figure 3: Members of the Mt. Grandby Water Committee and community members during the public consultation held at Mt. Grandby Community Centre

Empowering Caribbean Youth: The Second Water Academy for Youth by GWP-C

The Global Water Partnership-Caribbean (GWP-C) hosted its second Water Academy for Youth (GWP-C WAY).

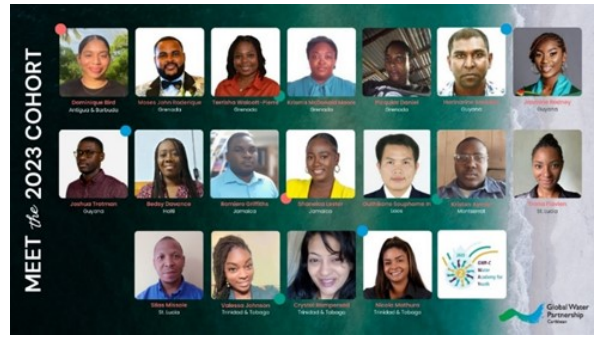


Figure 4: The 2023 Cohort of the GWP-C WAY

The 2023 edition of the GWP-C WAY spanned three (3) months, from July to September, with at least twenty (20) participants completing the Water Academy.

The curriculum of the GWP-C WAY was diverse, covering a wide range of topics crucial for the sustainable management of water resources. Highlights of the programme included:

- Climate Resilience and IWRM Short Course;
- Communication Tools and Techniques in Water Resources Management Training; Project

Concept Note Development; Scientific Writing Training and Problem-Solving through Innovation/Design Thinking Training.

The IWRM Ambassador was democratically elected from among the Cohort who will be awarded a water-related one-week internship at a GWP-C Partner organisation in the Caribbean. Academy participants who completed the programme were also be awarded a GWP-C WAY certificate.

Unlocking Sustainable Agriculture with Climate-Smart and Agro-Processing Caribbean Workshops

The Global Water Partnership-Caribbean (GWP-C), in partnership with the Global Environment Facility Small Grants Programme (GEF SGP) of St. Vincent and the Grenadines (SVG), hosted two hybrid workshops.

The first workshop was the Agro-Processors' Workshop, "The Importance of Good Agro-Processing Practices in Adding Value," from July 17th – 18th, 2023. A Farmers' Workshop titled "The Benefits of Implementing Climate-Smart Agricultural Practices in St. Vincent and the Grenadines (SVG)" followed from July 19th – 21st, 2023.

This workshop was instrumental in empowering farmers and entrepreneurs with the knowledge and skills to efficiently transform raw agricultural materials into high-value processed goods. By doing so, it not only reduces waste but also creates opportunities for income generation and employment, fostering economic resilience and diversification.

Grenada Hosts National SDG Indicator 6.5.1 Survey Workshop

The Sustainable Development Goal (SDG) Indicator 6.5.1 tracks the degree of Integrated Water Resources Management (IWRM) implementation by assessing the four (4) key IWRM components.

In collaboration with the Global Water Partnership-Caribbean (GWP-C), the Government of Grenada hosted a national SDG Indicator 6.5.1 Survey Workshop on June 28th – 29th, 2023.

GWP-C has and continues to support the data collection on SDG 6.5.1 in the Caribbean, made possible through the SDG 6 IWRM Support Programme. A programme executed under the guidance of UNEP and coordinated by Global Water Partnership (GWP) in collaboration with the UNEP-DHI Centre and Cap-Net UNDP.

GWP-C Scholarship Testimonials: UTech Water & Wastewater Operators Course

GWP-Caribbean, in collaboration with the GEF CReW+ and UNEP Caribbean Environment Programme (CEP) and Cartagena Convention Secretariat, awarded over fifteen full and partial scholarships to successful applicants interested in completing a Water and Wastewater Operators Course.

The Water and Wastewater Operators Course was delivered by The University of Technology (UTech), Jamaica, through their Faculty of Engineering and Computing.

GWP-C Scholarship Testimonials: Fundamentals of Water Sampling

The T.A. Marryshow Community College in Grenada, in collaboration with the Global Water Partnership-Caribbean (GWP-C) pre-

viously offered a short course on and UNEP Cartagena Convention Secretariat "Fundamentals of Water Sampling." & Caribbean Environment Programme.

This was an introductory course covering the basics of the water resource, related environmental policy, common water contaminants and basic water sampling techniques. GWP-C provided a total of ten (10) scholarships to (10) participants from seven (7) Caribbean countries.

GWP-C Technical Committee completes New Perspectives Papers

The GWP-Caribbean Technical Committee has completed two (2) new Perspectives Papers as follows:

- Wastewater Management in the Caribbean: A Jamaican Case Study by Dr Arpita Mandal and Stephanie Parker
- A Toilet Paper by Dr Adrian Cashman

These papers were published on the GWP-C website: [Technical Resources Developed by GWP-C](#)

GWP-C releases Video Series on IWWM in the Caribbean

In April 2023, the GWP-Caribbean issued an Open Call to Caribbean Journalists, Content Creators, Media Practitioners, and other interested persons to produce a high-quality 5-minute video on Integrated Water and Wastewater Management (IWWM).

This fed into the creation of a Wastewater Video Series intended to build awareness and share knowledge on the topic of Integrated Water and Wastewater Management (IWWM) in the region.

The Video Series was made possible through GWP-C's collaboration with the GEF CReW+

The Series consists of seven (7) videos from five (5) countries.

The Video Series can be viewed on our [web-site](#) or [YouTube Channel](#).

GWP-C Feature: First Shit Flow Diagram (SFD) created in the English-speaking Caribbean

In 2022, GWP-Caribbean, along with partner agencies, including the GEF CReW+, UNEP Caribbean Environment Programme and the Cartagena Convention Secretariat in collaboration with the Centre for Science and Environment (CSE) and Caribbean WaterNet (the Caribbean arm of Cap-Net UNDP), hosted the first-ever International Online Training Programme on the "Preparation of Shit Flow Diagrams (SFDs) for Caribbean Countries".

With further support from GWP-C and CSE, an additional outcome of this capacity building initiative was a Jamaican woman Jodian Pinder developing a SFD for the Parish of St. Mary in Jamaica. It is the first ever SFD created for an English-speaking Caribbean municipality.

The SFD for Saint Mary can be viewed on the SuSanA Platform.

GWP-C releases New IWRM Case Studies

During the period 2022 to 2023, the Global Water Partnership-Caribbean provided six (6) of its Partners with grant funding to implement a small-scale Integrated Water Resources Management (IWRM) project in their respective countries.

In September 2023 GWP-C released the final three (3) Case Studies from this project, which showcase the important work accomplished by our Partners throughout the Caribbean.

The new case studies are focused on projects in Belize, Dominica and Guyana:

- Hydrogeological Mapping of Aquifers: The Belize Experience
- Stream Gauging Data Collection: The Dominica Experience
- Youth in IWRM: The Guyana Experience

GWP-C supports IWRM Trainings and Dam Expansion in Mt. Granby, Grenada

During the course of 2023, the GWP-Caribbean worked closely with GWP-C Steering Committee Member, Mrs. Joyce Thomas Peters to provide extensive in-kind services throughout the course of a Dam Expansion Project in Mt. Granby, Grenada. The project, which also included IWRM Trainings, sought to increase the capacity of the dam and provide capacity building for community members and members of the water committee.

On October 7th 2023, a capacity building session on climate change vulnerability, water resources management, and water safety planning was held and attended by eighteen (18) participants.

This was followed by an additional training session on October 28th 2023, which focused on avenues to improve the functioning of the Water Committee.

GWP-C hosts Inaugural Session on Transboundary Issues in the Caribbean at the CWWA Conference 2023

In October 2023, the GWP-Caribbean attended the Caribbean Water and Wastewater Association 32nd Annual Conference and Exhibition in Guyana, from the 23rd to 27th of October. The theme of this conference was “Accelerating Change in the Water, Wastewater and Solid Waste Sectors”.

At this conference on the 24th October, 2023, the GWP-Caribbean hosted the region’s first-ever Transboundary Event entitled “Bridging Borders: Collaborative Solutions for Transboundary Waters in the Caribbean”.



Figure 5: Participants, facilitator and presenters at the inaugural transboundary session held at the Marriott Hotel in Georgetown Guyana

Submitted by the GWP-C team

The UNFCCC Regional Collaboration Center for the Caribbean

In July this year, the UNFCCC RCC St. George's, now RCC Caribbean and WINDREF marked 10 years of partnership! In the last year, the expansion of the RCC team has resulted in the deployment of dedicated experts to support the capacity building program on Article 6 and carbon pricing, the enhancement and implementation of NDCs and LT-LEDS, the work of the United Nations Global Innovation Hub and the continuous interaction with regional partners to identify regional priorities and collaborations. The

RCC Caribbean team is currently led by Mayra Santaella. Throughout this year, Patrick Munyaneza worked as the regional expert on Article 6 and Carbon Pricing, Jason Williams as the Innovation Specialist, Martina Duncan as the NDC/LT-LEDS expert and Ama Boateng as the Senior Climate Change Officer.

Summary of RCC achievements in 2023

Aimed at building momentum towards the conclusion of the first global stocktake at COP28 in Dubai this year, the RCC Caribbean provided direct technical support to both Party and non-Party stakeholders across a diverse portfolio of work programmes including mitigation, adaptation, climate finance, transparency, and other cross-cutting areas such as innovation and youth engagement. An illustration of some of these activities are indicated below.

Mitigation

On the mitigation front, a two-day capacity-building workshop was organized in collaboration with Dominican Republic's Consejo Nacional para el Cambio Climatico (National Council for Climate Change) to increase understanding on the possible use of carbon markets - Emission Trading System (ETS) - as a carbon pricing instrument. The carbon market simulation exercise was a valuable learning experience for the participants; it provided them with a hands-on opportunity to learn how carbon markets function and to develop their own strategies for reducing emissions. The workshop was highly engaging and interactive, fostering active participation and collaboration among the participants. The role-playing and competitive format encouraged participants to make difficult decisions about how to allocate their

allowances and how to trade in the market. More information on our [website](#)



Figure 1 & 2 Participants at the ETS simulation workshop in Santo Domingo, DR

Climate Finance

Under the Needs-based climate finance (NBF) project, the UNFCCC through its RCC hosted the OECS NBF Training Workshop on access to and mobilization of climate finance for OECS Member States in Grenada in March. In collaboration with the Green Climate Fund, Adaptation Fund, and Global Environment Facility, the training workshop produced three regional projects concepts to be further developed into full proposals for submission to multi-lateral climate funds.



Figure 3 Participants at the climate finance workshop for OECS Member States held in Grenada

RCC Caribbean @ Latin America and Caribbean Climate Week

Hosted by the Government of Panama, the 2023 edition of the Latin America and Caribbean Climate Week was held from 23 - 27 October 2023. The discussions at the climate week fed information into the year-end UN Climate Change Conference (COP28) in Dubai. The RCC Caribbean organized and supported several events at the LACCW Climate Week 2023, which aimed to facilitate climate action implementation in the region. Over four days, the RCC Caribbean and RCC Latin America hosted the Regional Dialogues on Carbon Pricing, Article 6 Training, and DNA Forum. In particular, the training clarified what different approaches to carbon pricing are and emphasized how they differ. It also provided Parties with information on participation requirements, an overview of the different ways in which countries can cooperate under article 6.2 to achieve their Nationally Determined Contribution (NDC) targets, the roles and responsibilities of Article 6.4 DNAs and an outlook on the CDM transition to the Article 6.4 Mechanism. The dialogue on carbon pricing covered the need for countries to assess key stakeholders to take their concerns into consideration and iden-

tify priority sectors, define implementation pathways, and more. More information can be found [here](#).



Figure 4 Redicap, Article 6 training and DNA forum

Gathering of Regional Partners to reflect on collaboration mechanisms for climate action in Latin America and the Caribbean

The NDC Partnership has actively supported countries in Latin America and Caribbean region in climate action. Despite significant progress, there remains a support gap. As a result, the NDC Partnership teamed up with RCC Caribbean and RCC Latin America, as well as with Euroclima to organize an interactive event that brought together diverse development partners including UNDP Climate Promise, UNEP, GIZ, amongst others. In addressing the current support gap, the event offered a platform for regional partners to share insights on how to strengthen regional collaboration as it relates to NDCs and broader climate action. Participants expressed the need to create a mechanism for efficient resource mobilization in alignment with country needs.



Figure 5 & 6 show opening remarks from Andrea Camponogara, RCC Global Lead and event organizers

Engagement with party and non-party stakeholders

Between August and September, the RCC facilitated a virtual “meet and greet” with Parties including Grenada, Trinidad and Tobago, Dominican Republic, Dominica and Antigua and Barbuda. The RCC team used this medium to introduce new members of RCC Caribbean team, gather intelligence on country needs and priorities and identify how best to support countries.

As a way of engaging with non-party stakeholders, in October, the RCC team joined the TV show Our Climate Reality TV which is hosted by the Grenada Broadcasting Network. The RCC Caribbean used this medium to inform and educate the public about the work programmes of the RCC focusing mainly on the elements of the Nationally Determined Contributions (NDCs) and how the RCC is en-

gaging youth in climate action in Grenada and other countries in the Caribbean.

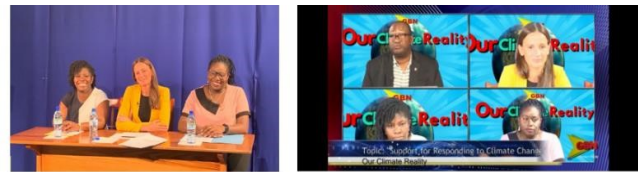


Figure 7 & 8 RCC Caribbean team @ our climate reality tv program

Interview with Belmopan City Council on UGIH

In November, the RCC Caribbean met in-person with representatives from the Belmopan City Council to respond to a questionnaire developed by the UN Climate Change Global Innovation Hub (UGIH). The questionnaire captured the specific needs and priorities of the Belmopan representatives as it relates to three core human needs, i.e. nutrition and health, access-including mobility and shelter. The information collected will be used to identify and inform the development of innovative climate and sustainability solutions. The engagement with the Belmopan City Council members was facilitated by the UNFCCC National Focal Point for Belize Mr Lennox Gladden.



Figure 9 & 10 Engagement with representatives from the Belmopan City Council in Belize

Engaging youth in climate action

The RCC Caribbean continued to engage with young people in advancing climate action in the region. In Grenada, the RCC participated as one of the key stakeholders in a disaster and climate resilient event organized by the Youth Emergency Action Committee (YEAC) in collaboration with Ministry of Climate Resilience, the Environment and Renewable Energy. Additionally, the RCC interacted with a few Caribbean-based youth networks during the 2-day youth4capacity session at the Latin America and Caribbean Climate Week in Panama. These engagements aim to explore potential synergies on youth-related work of the RC



Figure 11 Youth affiliated event at Latin America and Caribbean Climate Week

RCC Caribbean @ COP28

Hosted by the United Arab Emirates, the 28th Conference of Parties concluded on 12 December with the global stocktake considered as the central outcome. This outcome invites organizations in a position to do so and the secretariat, including through its regional collaboration centres, to provide capacity-building support for the preparation and communication of the next nationally determined contributions. On the margins of the COP, the RCC team together with the Director of the Mitigation Division of the UNFCCC Secretariat engaged with Executive

Directors of the Caribbean Community Climate Change Center and Island Innovation. Discussions of shared experiences in the region led to considering potential future collaborations. The RCC Caribbean Lead and Innovation specialist took the opportunity to meet with a few Caribbean countries, including Grenada and Belize representatives. Additionally, the RCC Caribbean and RCC Asia Pacific jointly organized a side event that offered an opportunity to showcase transformative climate solutions from the Caribbean and Pacific islands.



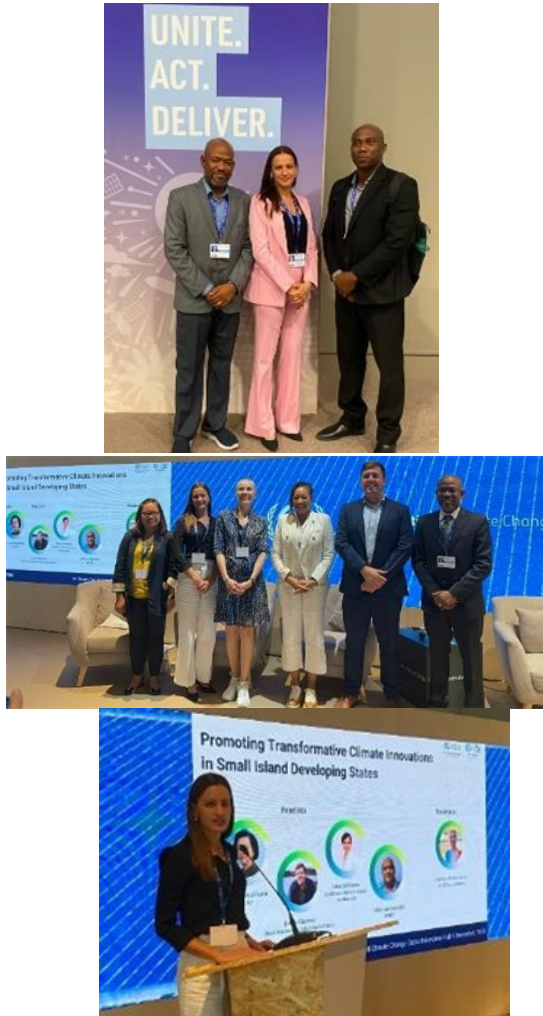


Figure 12-17: Activities and engagement held at COP28 by RCC Caribbean

Submitted by the RCC team

Caribbean Center for Child Neurodevelopment Activities in 2023

Attitudes Towards Corporal Punishment (ACP): Scale Development

In March 2023, St. George’s University (SGU) institutional review board (IRB) approval was received for the “Attitudes Towards Corporal Punishment (ACP): Scale Development” project (Co-Principal Investigators: Barbara Lan-

don and Randall Waechter). The purpose of this study is to: (1) Better understand attitudes towards corporal punishment among parents in Grenada, in order to improve measurement of attitudes and practices so that we can compare these determinants between populations and over time; and (2) Pre-test items to measure corporal punishment attitudes and practices for comprehension and clarity as part of quality assurance.

This study builds on preliminary quality assurance for the Caribbean Center for Child Neurodevelopment (CCCN)-developed Attitudes Towards Corporal Punishment Scale (ACP) (see: doi: 10.3389/fpubh.2023.1127687).

As part of initial data collection for this study, nine semi-structured interviews were completed in March 2023 with parents recruited from existing CCCN study populations in Grenada. During interviews, we explored participants’ definitions of corporal punishment and related terms, as well as their attitudes and beliefs related to corporal punishment. Participants were then administered a selection of questionnaire items from existing tools to assess attitudes towards corporal punishment and related constructs, with concurrent probing about item content, phrasing, and response options to explore clarity and comprehension of items.

This initial phase of data collection provided helpful information on the boundaries of the definition of corporal punishment and related terms in this setting, and helped to inform study team members’ thoughts on the objectives and boundaries of the existing ACP. The initial phase of data collection also served as the Master of Public Health practicum requirement for Rachel Austin from the Johns

Hopkins Bloomberg School of Public Health. Findings from preliminary data collection will be submitted for consideration for the CARPHA annual conference in 2024.

Additional data collection is required, and will be planned in 2024.

Rachel Austin, visiting MPH student

Rachel Austin, Master of Public Health student from the Johns Hopkins Bloomberg School of Public Health visited Grenada from March 19-29 for her degree practicum requirement, which she completed with CCCN. Rachel supported two projects as part of her practicum:

1. The “Attitudes Towards Corporal Punishment (ACP): Scale Development” project, where she supported literature reviews, data collection, and data analysis, and
2. An evaluation of CCCN staff perspectives on organization successes, challenges, and recommendations.

Rachel completed her degree requirements in May 2023 and remains engaged with the ACP project, including with preparation of an abstract and manuscript to submit for consideration for the CARPHA annual conference.

Presentations at SGU Research Day and CARPHA Conference

Thomas, E.D. et al (2023). “Evaluation of the Stop, Take a Deep Breath, and Relax (STAR) violence prevention media campaign in Grenada, West Indies”. Caribbean Public Health Agency Conference Annual Meeting. [Oral Presentation, presented by Roberta Evans]

Thomas, E.D. et al (2023). “Evaluation of the Stop, Take a Deep Breath, and Relax (STAR)

violence prevention media campaign in Grenada, West Indies”. SGU Research Day, St. George’s University, Grenada, West Indies. [Oral Presentation]

Thomas, E.D. et al (2023). “It sounds like two different questions’—Quality Assurance to Improve the Attitudes Towards Corporal Punishment Scale”. SGU Research Day, St. George’s University, Grenada, West Indies. [Poster Presentation]

Smarzinski, J. et al (2023). “Recommendations for Future Violence Prevention Efforts in Grenada, West Indies.” SGU Research Day, St. George’s University, Grenada, West Indies. [Poster Presentation]

Noel, J. et al (2023). “Quality of Life Among English-speaking Caribbean Adults Raised Without Corporal Punishment—Comparing Quantitative and Qualitative Assessments.” SGU Research Day, St. George’s University, Grenada, West Indies. [Poster Presentation]

Submitted by Elizabeth Thomas and the CCCN/Saving Brains Team

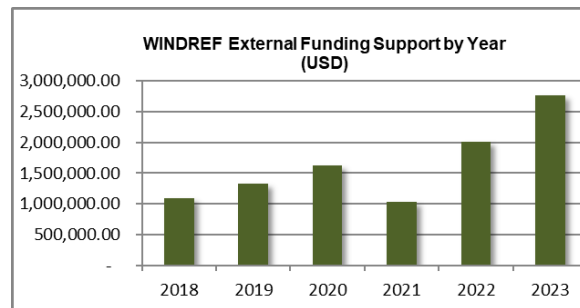
External Grants and Funding

We thank all the donors who have made WINDREF’s work possible in 2023:

- Global Water Partnership (GWP) – For the GWP Caribbean Regional Office
- National Institutes of Health, Fogarty International Center – For the Caribbean Research Ethics Initiative (CREEi) and CREEi supplement

- Stanford University – For the Engaging Young Persons as Agents of Change project and Zika follow-up study
- Stanford University – For the Zika Child Neurodevelopment Follow-up Study
- UK Research and Innovation Global Challenges Research Fund (GCRF) via the British Institute in East Africa – For the Global Health and Clean Water project
- United Nations Food and Agriculture Organization (FAO) – For the Practical Climate Adaptation in Fisheries Interventions in Grenada project
- United Nations Framework Convention on Climate Change Secretariat (UNFCCC) Secretariat – For the Caribbean Regional Collaborating Center St. George’s
- Caribbean Biodiversity Fund, Ecosystem-based Adaptation Facility – For the Innovative Nature-based Solutions to Enhance Community Resilience in Grenada project
- Becky Bailey Foundation – For the Conscious Discipline Grenada project
- American Psychological Association Helping Hands Grant – For the Novel Reintegration into the Community Program
- Caribbean Development Bank – For the Grenada Wastewater Treatment and Recycling Project
- Oscar Montgomery Environmental Foundation – Sea Turtle Research
- The National Oceanic and Atmospheric Administration through the University Corporation for Atmospheric Research – Assessing Excessive Heat Vulnerability in Caribbean Countries
- German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety, International Climate Initiative (via the Greenhouse Gas Management Institute) – For the WINDREF-based Measurement, Reporting & Verification Hub (CCMRVH)
- The Pan American Health Organization (PAHO)– The Caribbean Cancer Porta
- The Morris Animal Foundation– Screening for Batrachochytrium dendrobatidis and ranavirus in Grenadian amphibians, potential threats to native Grenada Whistling Frog *Pristimantis euphronides*
- The American Association of Veterinary Medical Colleges (AAVMC) – Threshold Concepts and Capabilities in Veterinary Pharmacology; a Multi-Center International Study of Students' Perspective

Total funding received in 2023 was \$2.76 million. This was a 17% increase from the previous year.



2023 Grant Applications

Eight grant applications were submitted to external funding agencies in 2023. The total potential value of these grant applications was \$3.9 million USD. Four of these applications were successful and three are still waiting for a final decision about funding and one was not funded (green = funded, black = waiting for a decision, red = not funded):

- Telesford. Assessing Excessive Heat Vulnerability in Caribbean Countries’ (UCAR)

- WINDREF & TNC. Safeguarding Telescope's Coastline, using a Living Shoreline Approach (Caribbean Biodiversity Fund)
- WINDREF & TNC. To enhance coral reef restoration efforts within the Grenville Bay Area through the integration of community knowledge and leadership (GEF)
- Cox-Macpherson. CREEii Climate Bioethics Program Supplement (NIH, Fogarty International Center)
- Landon & Waechter. Conscious Discipline Grenada Renewal (Becky Bailey Foundation)
- Sharma. Vector-borne Diseases (Seegene Inc - Open Innovation Program)
- Telesford. The Caribbean Cancer Portal (phase 2) (PAHO)
- **Bandelow et al. Advancing commercial, scalable processing or storage of Caribbean Sargassum' (Evidence Fund)**
- The Effectiveness of Life Seasons' Diabet-X in reducing HbA1c among Grenadians with Metabolic Syndrome. LifeSeasons
- Neglected Tropical Diseases (NTDs) and Rheumatic Fever in Grenada: a project to prevent/eliminate helminthic and rheumatic fever infections among children (5-15 years of age). Bartholomew J. Lawson Foundation
- Angiotensin converting enzyme and angiotensinogen gene polymorphisms in the Grenadian population: relation to hypertension
- Development of a decision rule for screening Obstructive Sleep Apnea and its epidemiologic relevance to the people of Grenada
- Prevalence and associated risk factors of hypertension in a sample population of native Caribbean's in Grenada, West Indies
- Assessing the prevalence of diabetic complications by examining type I and type II adult diabetics for signs of retinopathy, neuropathy, nephropathy and dermatological changes associated with poor glucose control within the native Caribbean population of Grenada

Past Research Projects

Non-communicable Diseases

- The Elimination of the Soil Transmitted Helminths from Grenada and Beyond
- Perspectives on the Uptake of Breast and Cervical Cancer Screening in the English-Speaking Windward Islands: A Collaborative Approach
- Woman to Woman: A Cervical Cancer Education Program for Grenadian Women
- Genetic Correlates of the Addictive Diseases: Cocaine, Alcohol and Marijuana Addiction -Grenada, WI, Dr. Mary-Jeanne Kreek, Kreek Laboratory, Rockefeller University. \$60,000
- Hypertension management and control in two Caribbean countries
- Assessment of the effectiveness of broad-spectrum treatment to children with protozoan and nemathelminthic parasitic infections on diarrhea and school attendance
- The effects of iron-deficiency anemia on cognition and behavior in infants
- Diurnal variation of urinary endothelin-I and blood pressure: related hypertension
- Alcohol consumption in Grenada

- The incidence and mortality of cancer in Grenada over the ten-year period: 1990-1999
- The prevalence of abnormal haemoglobin traits in Grenadian secondary school adolescents
- Knowledge, attitudes, beliefs and practices of sickle cell anemia in Grenadian primary and secondary school children.
- Decompression sickness among the indigenous fishing population in Grenada: Assessing the burden of disease
- WINDREF / SGU Hurricane Relief
- Spice Research Program
- Sulfate-reducing bacteria in oxidized freshwater of tropical mangroves
- Novel antibiotics from tropical marine environments: drug development in Grenada
- Study of the mutacin C-7A
- Gram-negative bacteria isolated from aquatic environments of Grenada (61.4° W, 12.0°N), West Indies
- Identification of bacteria producing antibiotics isolated from deep marine biofilms of Grenada
- SGU Environmental Testing Unit (ETU)
- Post-hurricane water surveillance in problematic areas of Grenada
- Evaluation of the relocation potential for villagers residing in Queen Elizabeth National Park, Uganda
- Study of the calls of the spotted hyena at feeding
- Survey on the attitude of villagers in Queen Elizabeth National Park, Uganda towards the threat of lions, leopards and hyenas
- Epidemiology of human injuries resulting from wildlife in ten villages within Queen Elizabeth National Park, Uganda
- Rural Ugandan village perspective on lion, leopard and hyena conservation
- Epidemiology of human injuries by wildlife in six villages within Queen Elizabeth National Park, Uganda
- Prevalence of *Campylobacter fetus* subspecies *venerealis* and other microorganisms in the reproductive tracts of cattle from the southern region of Santo Domingo, Dominican Republic
- Antimicrobial properties of skin secretions from *Eleutherodactylus johnstonei* on bacteriological isolates
- Examination and analysis of prostate cancer in Grenada
- A Church-based intervention to improve hypertension prevention and control among women in Grenada
- Occupational Health Problems among Nutmeg Factories Workers, SGU Small Research Grant Initiative
- Sport for Health Programme
- Grenada School Nutrition Study: Evidence to Inform Policy
- Genetic Correlates of the Addictive Diseases: Cocaine, Alcohol and Marijuana Addiction -Grenada
- Promoting Resilience Among Medical Students: A Comparison of Mindfulness, Yoga, and Exercise
- Grand Challenges Canada – For the Saving Brains Grenada Scale-up project
- UNICEF – For the Saving Brains Grenada Scale-up project and Combatting Violence Against Women and Girls: Development of GBV Victims’ Rights Policy for Grenada

Infectious Diseases

- COVID 19 Screening and Surveillance Programme Report and Vaccination Report
- Covid 19 Screening and Surveillance Programme in 2021
- LaBeaud, Waechter, Blackmon, Noël,

- Landon, & Macpherson. Zika and Neurodevelopment among Infants in Grenada: 36-month Assessment. Stanford University
- LaBeaud, Noël, & Macpherson. Engaging Young People as Agents of Change. Stanford University.
- Neurodevelopment and Vector-borne Diseases: Building Research Capacity in the Tropics. National Institutes of Health - Fogarty International Center.
- Assessment of Neurocognitive Functioning in 2-year-old ZIKV-exposed Children. USAID via jhpiego.
- The Spectrum of Zika Disease in Grenada. Stanford University.
- The Spectrum of Zika Disease in Grenada. Stanford University.
- Zika Surveillance in the Southern Caribbean and Reference Lab Support. Naval Medical Research Center.
- Investigation of the prevalence of SIV in the mona monkey (*Cercopithecus mona*) in Grenada
- Seroprevalence of HIV-I and HIV-II in pregnant women in Grenada, W.I. – their knowledge of AIDS and their exposure hazards to the virus
- A cross sectional study of the current status of *Schistosoma mansoni* in St. Lucia by field surveys and supplementary data collection
- Identification and characterization of hantaviruses among the mammal population of Grenada
- HIV/AIDS health education and evaluation program in Grenada
- The seroprevalence of *Toxoplasma gondii* in a population of pregnant women and cats in Grenada, West Indies
- The efficiency of diagnosing women of *Toxoplasma gondii* using PCR techniques in comparison with ELISA
- Dengue virus in Grenada: seroprevalence and associated risk factors
- A current appraisal of dengue virus in Grenada –serotype analysis and vector assessment
- A site receptivity study determining the threat of reintroduction of malaria into Grenada through the study of *Anopheline* spp. mosquito vectors
- Chlamydial infection among STD clinic attenders in Grenada
- Fever in Grenada
- Mosquitoes and tourism in Grenada
- Effectiveness of a formula feeding/ weaning intervention program in preventing transmission of HTLV-1 from seropositive mothers to newborns in Grenada
- A multi-center longitudinal research study of the behavioral significance of the prevalence of HIV-1 infection in pregnant women and their babies on the islands of Grenada and St. Vincent
- A multi-center longitudinal research study of the ethical analysis of informed consent of the prevalence of HIV-1 infection in pregnant women and their babies on the islands of Grenada and St. Vincent
- Determining the role of IL-15 in mediating function of viral-specific CD8+ T cells in the myelopathogenesis of HTLV-1: symptomatic versus asymptomatic patients
- Intestinal protozoan infections in 6-12 year old children in Grenada
- Intestinal helminth infections in 6–12-year-old children in Grenada

- The prevalence of intestinal parasites in school children in rural Guyana
- The prevalence of filariasis and its effects on children aged 8-14 in the central corentyne region of rural Guyana
- The prevalence of streptococcal infection in school children aged 5 –15 years in Grenada, Carriacou and Petit Martinique
- Studies examining the elimination of lymphatic filariasis as a public health problem in Guyana
- Seroprevalence of heartworm infection in dogs in Grenada
- Dengue in Grenada
- Assessing the potential risk factors of dengue and dengue hemorrhagic fever in the tri-island state of Grenada, Carriacou and Petit Martinique
- A comparative study to find out if there is an association between sexual practices and knowledge in adult populations of Botswana and Grenada with the prevalence of HIV/AIDS
- HIV/AIDS in rural Botswana differentiating between informing and educating
- Evaluating the level of perceived fear and desensitization towards HIV/AIDS in Botswana
- Rheumatic Fever in Grenada
- Streptococcal program in St. Vincent
- Isolating Tcells from Rheumatic Fever positive blood: immunofluorescent assay of T lymphocytes via fluorescently labeled monoclonal antibodies
- Possible geneticpredisposition to Rheumatic Fever: demonstrating the inheritance fashion of non-HLA B lymphocyte alloantigen D8/17, a marker for Rheumatic Fever
- ELISA antibody titres against group A streptococcal M protein moiety and cell wall N-Acetyl-D-Glucosamine in Grenadian Rheumatic Fever patients
- Evaluating the effectiveness of educational methods in the prevention of Rheumatic Fever and knowledge, awareness and practices
- Prevalence of intestinal helminth infections in rural Grenadian school children
- Cystic echinococcosis in Morocco and Uganda
- Macpherson, C.N.L.. Elimination of Lymphatic Filariasis in Guyana Program
- Noël, T. Neglected Tropical Diseases and Rheumatic Fever in Grenada: A project to prevent/eliminate helminthic and rheumatic fever infections among children (5-15 years of age)
- Ferguson, H. (2011-2014). Investigation of Disease in Pre-growout Fish in a Commercial Aquaculture Operation in Ecuador. Produmar, S. A.
- Heath, C., LaBeaud, D., Macpherson, C., & Noël, T. (2016). Characterization of Immune Factors of Chronic Chikungunya Disease. American Society for Tropical Medicine & Hygiene Robert E. Shope International Fellowship.
- Janssen (via State University of New York) – For the Dengue Surveillance in a Caribbean Travel Population

Unique Projects

- UNICEF 2022 Spotlight Initiative STAR Public Service Announcements in Grenada, West Indies
- Caribbean Cooperative MRV Hub
- Cox Macpherson, Waechter & Macpherson. Caribbean Research Ethics Education

- Initiative. NIH-Fogarty International Center.
- McGlade, Gibb, Temmerman, OkelloOriale, Michieka, Forrester, & Macpherson. Health, Polluted Water and Soils: Pathways to Impact. UK Research and Innovation, Global Challenges Research Fund, Global Engagement Networks.
 - Penny Light & Colket. The Center for Research on Storytelling in Education - Spring 2021 Research Conference. Spencer Foundation
 - Caribbean Research Ethics Education Initiative (CREEi)
 - Knowledge, Attitudes, and Practices Regarding Rabies in Grenada: A Cross Sectional Study. Pan-American Health Organization/Government of Grenada.
 - Building Climate Resilient Health Systems in the Caribbean: A One Health Approach. Pan-American Health Organization (PAHO).
 - Janicke, H., & Stone, D. (2018). Microgrant Award - Council on International Veterinary Medical Education.
 - In-country Project Coordinator for the Eastern Caribbean Marine Managed Areas Network (ECMMAN) Project. The Nature Conservancy.
 - Caribbean Research Ethics Education Initiative (CREEi). Fogarty International Center National Institutes of Health.
 - Conservation Leadership in the Caribbean (CLiC). U.S. Fish and Wildlife Service, Division of International Affairs, via the International Fund for Animal Welfare (IFAW).
 - Characterization of five amphibians inhabiting Grenada and subsequent isolation and antimicrobial assay of potential antibiotics derived from their skin
 - Mona monkey studies in West Africa
 - Investigation of medicinal plants in Grenada
 - Use of medicinal plants in Grenada
 - Medicinal drugs from the sea: what do Grenada's waters have to offer?
 - Beekeeping in Grenada: effects of the mite *Varroa jacobsoni* and its control
 - Effects of Grenadian medicinal plants on endemic microbial causes of diarrhoeal diseases
 - The neurobiological basis of hypoglycemia associated autonomic failure
 - Stimulation of angiotensin 4 in cardiac fibroblasts activates matrix metalloproteinases through MAP kinases pathways: A model for astrocytes
 - REM sleep and memory
 - NDA Toolkit & No -Objection Procedure and the Establishment of a Monitoring, Reporting and Verification System (MRVS) -Saint Vincent and the Grenadines
 - Center for Research on Storytelling in Education (CRSE)
 - The Spencer Foundation – For the Center for Research on Storytelling in Education
 - St. George's University – For the One Health Research Initiative
 - United Nations Food and Agriculture Organization (FAO) – For the Caribbean CC4 Fish project
 - US Fish and Wildlife Service – For the Consumer Behavior Change Campaign and Intelligence-led Conservation Capacity Assessment to Address the Illegal Wildlife Trade in Trinidad and Tobago

- WS Atkins International Limited – For the Blue Economy Assessment project

WINDREF Associated Research Publications

Publications

Journal Articles (11)

- Charles KE, Morrall CE, Edwards JE, Carter KD, Afema JA, Butler BP, Marancik DP. Environmental variables affecting Atlantic leatherback sea turtle (*Dermochelys coriacea*) embryonic and hatching success rates in Grenada, West Indies. *Animals (Basel)*. 13(4):685. doi:10.3390/ani13040685, 2023.
- Cheetham S, Stone D, Marancik D, Kaplan RM, Olson NC. Biomedical research with a Caribbean one-health perspective. *Am J Vet Res*. 2022 Dec 19;84(1):ajvr.22.10.0175. doi: 10.2460/ajvr.22.10.0175. PMID: 36516011.
- Dookeeram D, Borquez S, Seetharaman H, Bidaisee S, Maharaj S, Dookeeram D. Multilateralism as a Determinant of COVID-19 Outcomes in Small Island Developing States: Mitigating Disaster Impact Through Foreign Affairs Investment. *Prehospital and Disaster Medicine* 38 (S1), s98-s98
- Fernandes, M.; Evans, R.; Cheng, M.; Landon, B.; Noel, T.P.; Macpherson, C.N.L.; Cudjoe, N.; Burgen, K.; Waechter, R.; LaBeaud, A.D.; Blackmon, K. (2023). Does Intra-uterine Exposure to the Zika Virus Increase Risks of Cognitive Delay at Pre-school Ages? Findings from a Zika Exposed Cohort from Grenada, West Indies. *Virology*, submitted.
- Hewson I, Ritchie IT, Evans JS, Altera A, Behringer D, Bowman E, Brandt M, Budd KA, Camacho RA, Cornwell TO, Countway PD, Croquer A, Delgado GA, DeRito C, Duermit-Moreau E, Francis-Floyd R, Gittens S Jr, Henderson L, Hylkema A, Kellogg CA, Kiryu Y, Kitson-Walters KA, Kramer P, Lang JC, Lessios H, Liddy L, Marancik D, Nimrod S, Patterson JT, Pistor M, Romero IC, Sellares-Blasco R, Sevier MLB, Sharp WC, Souza M, Valdez-Trinidad A, van der Laan M, Vilanova-Cuevas B, Villalpando M, Von Hoene SD, Warham M, Wijers T, Williams SM, Work TM, Yanong RP, Zambrano S, Zimmermann A, Breitbart M. A scuticociliate causes mass mortality of *Diadema antillarum* in the Caribbean Sea. *Scientific Advances*. 9(16):eadg3200. 2023.
- Kabuusu RM, Aire TA, Stroup DF, Macpherson CNL, Beltran S, Reyes E, Ferguson HW. Hematologic changes observed in syncytial hepatitis of farmed tilapia (*SHT*), *Oreochromis niloticus*. *Journal Fish Diseases*, 2023; 00:1-4. doi.org/10.1111/jfd.13872
- Kiener, M.; Cudjoe, N.; Evans, R.; Mapp-Alexander, V.; Tariq, A.; Macpherson C.N.L.; Noel, T.P.; Gérardin, P.; Waechter, R., LaBeaud, A.D. (2023). Factors Associated with Chikungunya Infection Among Pregnant Women in Grenada, West Indies. *American Journal of Tropical Medicine and Hygiene*, 109(1), 2023, pp. 123–125; doi:10.4269/ajtmh.23-0157.
- Macpherson CNL (2023). Zoonotic helminths of dogs and risk factors associated with polyparasitism in Grenada, West Indies. *Parasitology*. 2023 Jul;150(8):754-759. doi: 10.1017/S0031182023000495.
- Macpherson, M.L.A.; Zendejas-Heredia, P.A.; Sylvester, W.; Gasser, R.B.; Traub, R.J., Colella, V.; Macpherson, C.N.L. (2023). Zoonotic helminths of dogs and

risk factors associated with polyparasitism in Grenada, West Indies. *Parasitology*. 2023 Jul;150(8):754-759. doi: 10.1017/S0031182023000495. Epub 2023 May 15.

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- Wiens GD, Marancik DP, Chadwick CC, Osbourn K, Reid RM, Leeds TD. Plasma proteomic profiling of bacterial cold-water disease resistant and susceptible rainbow trout lines and biomarker discovery. *Frontiers In Immunology*. 10.3389/fimmu.2023.1265386.

Abstracts/Presentations at International Conferences (13)

- Bethel Bayrau, Nikita Cudjoe, Prathik Kalva, Zakaria Nadeem Doueiri, Basil Williams, Markeda Fletcher, Sarah Telesford, Arani Thirunavukarasu, Lashawnd Johnson, Calum Macpherson, Ann W. Banchoff, Abby C. King, Trevor Noël, A. Désirée LaBeaud (2023). Engaging Young People as Agents of Change: A Primary School Educational Intervention to Decrease Arboviral and Protozoal Risk in Grenada. *ASTMH 2023 Conference*. 18th-22nd October 2023.
- Bidaisee, S. Assessment of Compliance towards Public Health Measures: Case of COVID-19. 67th Annual CARPHA Health Research Conference, The Bahamas, April 27th - 29th, 2023
- Bidaisee, S. Action for Climate Empowerment (ACE) Career Expo for University

Students to facilitate Higher Education Sustainable Initiative (HESI) which focused on Green Jobs Initiatives for University Students, June 17th, and 18th. Queen Sirikit National Convention Center, Bangkok, Thailand

Bidaisee, S. Action for Climate Empowerment (ACE) Career Expo for University Students to facilitate Higher Education Sustainable Initiative (HESI) which focused on Green Jobs Initiatives for University Students, June 17th, and 18th. Queen Sirikit National Convention Center, Bangkok, Thailand

Bidaisee, S. Action for Climate Empowerment (ACE) Career Expo for University Students to facilitate Higher Education Sustainable Initiative (HESI) which focused on Green Jobs Initiatives for University Students, June 17th, and 18th. Queen Sirikit National Convention Center, Bangkok, Thailand

Charles, R. The Academy of International Business South East Annual Conference, USA, October 26th - 28th, 2023

Cudjoe N, Fields PJ, Matthew-Belmar V, Sharma B, Chitan E, Noel TP, Yearwood K and Macpherson CNL (2023). Impact of a Vaccine Mandate on infection rates at a Tertiary Education Institution in Grenada. Presented at the 67th Annual CARPHA Health Research Conference. April 27-29, 2023

Cudjoe N, Fields PJ, Matthew-Belmar V, Sharma B, Chitan E, Noel TP, Yearwood K and Macpherson CNL (2023). Heterogeneity of SARS-CoV-2 Transmission within Departments at a Tertiary Educational Institution, Grenada, and its implications for control. This was a poster presentation which won first prize at

the 67th Annual CARPHA meeting. April 27-29, 2023

- Cudjoe, N. 67th Annual CARPHA Health Research Conference, The Bahamas, April 27-29, 2023
- Evans R, Fernandes M, Cudjoe N, Blackmon K, Cheng M, Landon B, Noël T, James, K (2023). Safeguarding Telescope's Coastline, using a Living Shoreline Approach (Telescope's Living Shoreline –TLS). Caribbean Biodiversity Fund (CBF) Ecosystem-based Adaptation (EbA) 4th CfP Project Inception Workshop. 1st – 2nd November 2023
- Kiener M, Cudjoe N, Evans R, Mapp-Alexander V, Macpherson C, Noel T, Waechter R, LaBeaud AD (2023). Prevalence of Dengue and Chikungunya Antibodies Among Children in Grenada, West Indies. 18th-22nd October 2023.
- Macpherson C, Waechter R, LaBeaud AD (2023). Zika and Neurodevelopment Among Children in Grenada: The First Four Years. Presented at the 67th Annual CARPHA Health Research Conference. April 27-29, 2023
- Nimrod S (2023). Gulf and Caribbean Fisheries Institute (GCFI) Conference, 6 – 10 November 2023, Atlantis, Bahamas

Thesis Defenses (7)

- Dr. Keith K. Kalasi: "Grenada feral cats as a potential reservoir for zoonotic *Leptospira*" March 1st 2023
- Racheal Ross: "A Qualitative Study of Crisis Management and Technology Integration in Higher Education During the COVID-19 Pandemic" April 19th 2023
- Dr. Connor Gallagher : "An Assessment of the Functional Anatomy of the Blood-Gas Exchange Structures in the Lungs of the

Green Iguana (*Iguana iguana*) using vascular casting" April 26th 2023

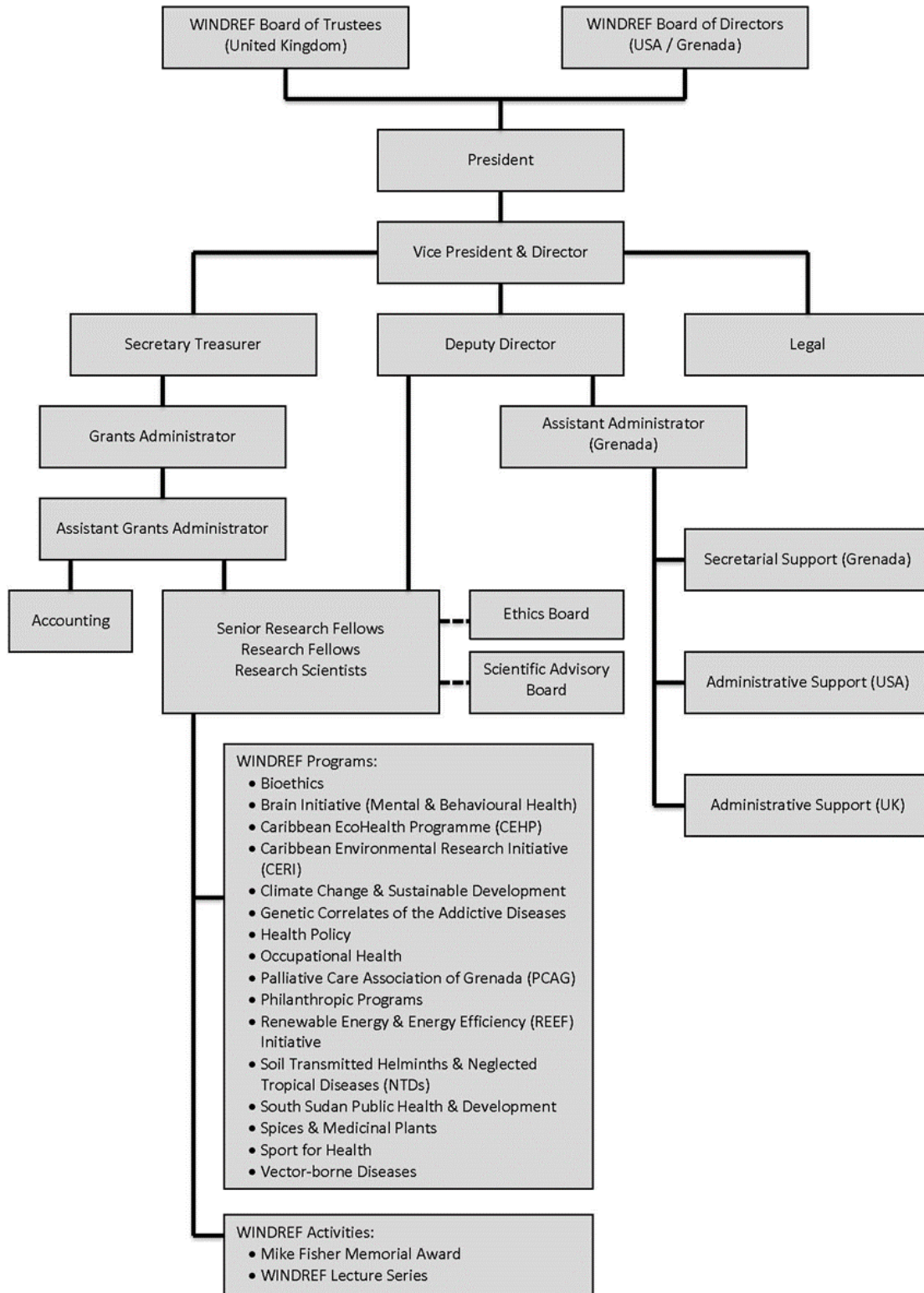
- Dr. Dexton St Bernard: "Establishing the prevalence of viruses associated with parasitic *Varroa* mites (*Varroa destructor*) in Grenadian honey bee apiaries" May 3rd 2023
- Donella Telesford: "An Investigation into the relationship between CSEC performance and overall academic performance in the School of Arts & Sciences at St. George's University" May 10th 2023
- Dr. Kamaria Jordan: "The modulating influence of mindset on the testing effect among medical students in the basic sciences" May 24th 2023
- Jocelyn Shorts, MSCB STUDENT: "Should African American women mistrust physicians?" August 23rd 2023

Graduate Seminars (13)

- Hedy Aardema: "Sampling ocean and atmosphere biogeochemistry with the research sail yacht, Eugen Seibold" January 18th 2023
- Jerry Enoe: "Mining Human mobility data from social media to support exposure assessment: A conceptual model" January 25th 2023
- Myrna Julien: "The environmental vision from 2023 onwards of the Grenada Solid Waste Management Authority" February 1st 2023
- Professor Gareth Williams: "Edward Jenner: a man who changed the face of the world" February 15th 2023
- Dr. Stacy Francis Charles: "Animal Welfare Legislation and Guidelines: A Comparative Approach" February 22nd 2023
- Dr. Tonia Frame presenters, Amber Evans: "Pandemic Emergency Response Protocol" March 8th 2023

- Dr. Tonia Frame: “Family Planning in Grenada: A Male Perspective” March 15th 2023
- Katharina Kopp: “Virus Discovery in Wildlife and domestic animals” September 13th 2023
- Dr. Pooja Lakhanpal, MD, MPH (Candidate): “Sexual Abuse in India: Cause, Effect and Prevention” October 11th 2023
- Dr. Amit V. Shah: “The Wonders of General Practice in the UK” October 20th 2023
- Dr. Satesh Bidaisee: “Rice is Life: Assessment of quality of life among the aging farmers in Suphanburi, Thailand” November 1st 2023
- Makeda Matthew-Bernard: “Cryptococcus neoformans a human fungal pathogen” November 29th 2023
- Makeda Matthew-Bernard: “Wastewater based epidemiological surveillance of Escherichia coli - What can we learn from it?” December 6th 2023

WINDREF Organizational Chart



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