

Work Plan for the Stormwater Management Device Toolkit for Neighborhood Groups and Homeowner Associations in the Coral Bay Watershed, St. John, USVI



Harold's Way road, Lower Bordeaux Subwatershed during a 2017 rain event four days after Hurricane Maria



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Abstract

The Coral Bay Community Council, located on the island of St. John in the U.S. Virgin Islands, will create, and implement a stormwater management device toolkit to assist neighborhoods in identifying, maintaining, and improving stormwater management devices. The island's rapid development led to increased flooding and erosion concerns due to road development and a lack of stormwater runoff controls, slope stabilization, natural resource protections, and solid waste management. The island's torrential rains regularly wash out roads and carry excess surface runoff from hillside developments, impacting the sensitive marine ecosystem. The Council will implement a management strategy identified in the Coral Bay Watershed Management Plan (WMP), a plan created under a previous Cooperative Watershed Management Program Phase I grant, building community resiliency and protecting the health of the Coral Bay Watershed.

Description

The Coral Bay Community Council (CBCC) has been awarded a grant to develop and implement The Stormwater Device Toolkit' to address the prevention of erosion and flooding issues in the Coral Bay watershed management area on the island of St. John, US Virgin Islands, and to support voluntary neighborhood groups and homeowner associations in creating better long-lasting written documentation and tools to encourage routine maintenance and best management practices of stormwater devices over the next two years. This project is being funded by the Department of Interior – Bureau of Reclamation (DOI-BR) waterSMART program with a grant of \$190,288, and anticipated in-kind participation valued at \$18,000 or more in volunteer hours from local experts and Coral Bay residents participating in meetings, toolkit development and implementation and field investigations.

St. John is in a long drought period interspersed with extreme rainfall events, therefore stormwater issues and maintenance of stormwater drainage devices like culverts and best management practices (BMPs) are not top of mind but are still very important for preventing destructive flooding and erosion in the future, on an ongoing basis.

These potential severe erosion and flooding issues can cause damage to the community's infrastructure and roads and heavily impact residents, especially those living in lower elevations where housing is more affordable for lower income earners. Muddy, excessive stormwater flows also impact shoreline businesses, visitors, and Coral Bay's diverse and sensitive marine ecosystem in its 5-square-mile bay.

This project emphasizes good stormwater management practices from "Ridge to Reef" and will also reduce potential negative impacts to the neighboring the federal Virgin Islands National Park lands and the waters of the Coral Reef National Monument which is partially in Coral Bay and impacted by any land-based pollution, including that from improperly functioning stormwater devices.

Since the hurricanes of 2017, it has been observed that with natural aging and changeover of residents, the location of culverts, other stormwater structures, and best management practices (BMPs) established from 2010 to 2012 along many of the private roadways are now forgotten. Routine maintenance may not be carried out if current residents are unaware of their existence and maintenance needs for safety in rainstorms.

Because this infrastructure and BMPs have been collectively forgotten in some neighborhoods, this project proposes a solution. To ensure this valuable information on where the devices are and how to maintain them is understood by the residents who have the responsibility complete this maintenance (whether they know it or not), Coral Bay Community Council, (CBCC) is partnering with Watershed Consulting, LLC (WC) to develop permanent ways to share this information and to assist neighborhoods in identifying, maintaining, and improving stormwater devices along their roads and in their neighborhood.

Background

Most of the network of roads in our watershed are privately owned and privately maintained by homeowners without the benefit of consistent legal obligations within deeds or local laws, or formal homeowner's associations (HOAs). Therefore, over the last 20 years, our nonprofit watershed management agency, CBCC, has been extremely useful in this remote community on the far side of the National Park on St. John in providing guidance, encouragement, and a conduit for government grant-funded projects to improve stormwater drainage and ground water recharge mainly to reduce the negative impacts of erosion on property and to protect ocean environmental resources.

As there is high resident turnover from residents aging out, and the passage of time, as well as the impacts of the 2017 hurricanes and COVID pandemic, our CBCC staff has found that the history and experience of stormwater device maintenance needs may have been lost or forgotten in many of the more than fifteen private neighborhoods that have access road and stormwater maintenance responsibilities. Even along secondary public roads, experience has shown very limited maintenance will be done by the local government, and residents need to provide their own maintenance and improvements to ensure access to their homes. Previous stormwater device construction work and the necessary maintenance practices have a tendency to be forgotten over time. This leads to improperly functioning stormwater drainage devices such as clogged culverts and drainage ways. Their failure usually means that water runs along the roads rather than being directed by the culverts or other devices into natural flow paths (the ghuts) allowing percolation to recharge the groundwater table. When these devices cannot function due to a lack of maintenance, stormwater high in the watershed flows past them and continues along the roads causing flooding and erosion issues downstream in the lower portions of the watershed.

CBCC goals in this project are to:

- 1) make the management strategies developed in the 2021 Coral Bay WMP actionable to reduce stormwater and flooding impacts from "Ridge to Reef" and increase groundwater recharge;
- 2) support and encourage residents who are collectively responsible for maintaining their access roads and managing stormwater drainage to form and utilize formal and informal road maintenance groups or HOAs to pool the costs and responsibilities;
- 3) educate residents about proper stormwater device management and options;
- 4) provide useful tools that are sustainable over time as residents age or properties are sold to new owners -- to ensure that valuable historical information is not lost;
- 5) prepare residents for the more unpredictable and extreme drought/rainfall events caused by local climate change; and
- 6) assist neighborhood groups and HOAs to be aligned for larger sources of funding, such the FEMA's HMGP or other federal infrastructure and climate resiliency programs, by having up-to-date, adequate, and easily accessible road improvement and maintenance records.

Watershed Restoration Planning - CBCC is developing a toolkit for voluntary neighborhood groups HOAs, and residents (including formal or informal HOAs) that will provide:

- Easy-to-read stormwater maps illustrating the locations of culverts and other important stormwater infrastructure, both on paper and online.
- Information about installation and maintenance records.

- Guidance on actions and timeframes for maintenance and visual checks.
- How to get support to address new concerns.
- Ability to share photos and updates.
- Archive of past permit, plans, costs, etc. – to FEMA HMGP and other grant program requirements.
- Help figure how to do it on the ground, with the absence of clear deed language or common law/regulations -- for sharing and covering access road and long-term stormwater maintenance costs.
- Help identify ways to have easier permitting processes to conduct work in a timely and constant manner.

To ensure its user-friendliness, easy access and resiliency, the toolkit will be available in both physical (paper) binders for each subwatershed, HOA, or neighborhood group and on-line through an application tool that can be used both on CBCC's website and on individuals' phones.

Additional objectives for this project include:

- 1) build upon past successful stormwater management projects¹ with the volunteer neighborhood groups and HOAs;
- 2) provide clarity and practical solutions to confusing local permitting requirements for private road maintenance as it has become more cumbersome;
- 3) develop an inspection and maintenance program for existing stormwater structures across the watershed; and
- 4) review and redistribute all previous sediment reduction materials and advice.

Building on Relevant Federal, State, or Regional Planning Efforts

This project will be informed by CBCC's focused 2022 H&H study for the main portion of the Coral Bay watershed addressing water flows for future road and BMP construction and to understand potential flooding issues in future development and needed drainage improvements and maintenance efforts. The higher-level H&H assessment that was conducted for the 2021 Coral Bay WMP for erosion and sediment control will also inform this project's findings and recommendations, making both H&H studies actionable.

This project implements (both directly and indirectly) several key management strategies from the DOI-BR and DPNR-CZM-funded 2021 Coral Bay WMP. Listed below are the management strategies being pursued and their reference codes from the WMP, in priority order for this project. Many of the issues extend throughout the USVI and will require broader management strategies; some such strategies are suggested below and designated with an asterisk (*).

- T-EO-6: Stormwater Device Map, Survey Tool, and Handbook for Residents
- S-MP-2: Create and Continue Road Maintenance Organizations (HOAs)
- T-EO-1a: Review and Redistribute all previous Sediment Reduction Materials and Advice
- S-RE-2-3: Private Road Maintenance/Repairs permitting issues
- T-EO-7: Neighborhood Road Maintenance Training
- T-EO-9: Resident and local Professionals workshops and quick seminars
- *W-S-1: DPW Working Relationship

¹ <https://coralbaycommunitycouncil.org/stormwater-management-2/#ProjectHistory>

The task activities of this project such as building neighborhood groups and HOAs relationships and education, developing the Toolkit and conducting field inspections will also secondarily further the following management strategies and promote existing tools.

- S-R-3: Stormwater Reuse Options
- T-MP-7: Updated Mapping
- T-EO-3: Local Vegetation Landscaping Manual
- T-EO-2: Unpaved Road Maintenance Manual
- T-EO-4: Impervious Surface Disconnect Manual
- T-S-9: All Coral Bay Impervious Surface Disconnect (specific locations to be determined)
- *T-S-10: All Coral Bay Ghut Restoration (specific locations TBD)
- *S-S-1: Install sediment reduction BMPs at critical locations
- *S-S-2: Repair or pave unpaved roads.
- *S-S-3: Repair hurricane damaged roads
- W-PA-5: Permit Application Comments and Critiques
- W-PA-6: Territorial Planning Processes
- *W-PA-7: Comprehensive Land and Water Use Plan

During the project period, DPNR will be developing the USVI Comprehensive Land and Water Use Plan, which will address water resource and use and future development conflicts. As partners, CBCC will work with DPNR to provide practical and resilient water resource conservation and stormwater drainage solutions to decision-makers and planners that this project produces.

DPNR with WC completed eight other watershed management plans² for St. Thomas and St. Croix that address flooding and stormwater impacts. The Toolkit and its development process will be shared with our DPNR partners, so that it can be adjusted and implemented with the other watersheds in the territory.

CBCC will also be working with our UVI partners, developing the USVI Hazard Mitigation & Resilience Plan (USVI HMRP)³, which has identified the need for more water resources as the islands continue to experience climate change impacts on its freshwater resources that heavily rely on rainfall. Groundwater resources are being investigated as the territory's brackish groundwater potentially requires less treatment and produces less waste in the Reverse Osmosis (R/O) process than ocean waters and appeared to be a more feasible option with current treatment technologies. However, concerns and more studies are needed to identify groundwater resources availability and resilient and consistent recharge solutions as much of the stormwater that is needed to recharge the groundwater system is carried off at high volumes and velocity directly to the bays along the road networks as stormwater devices are bypassed. The Stormwater Device Toolkit will be shared with UVI as a practical and resilient solution to recharge issues and for discussions future drought contingency solutions.

This project also aligns with DPNR's 2020 VI Coral Reef Management Properties plan's objective: "LBSP Obj. 4: Support inter-agency development of a comprehensive public and private road and stormwater mapping system/tool consisting of existing unpaved and/or eroding roads with priority given to those with the most erosion potential into downslope coral reef habitat (or sensitive benthic communities). (DPNR-CZM, 2020 p2)"

²<https://watershedvt.maps.arcgis.com/apps/MapSeries/index.html?appid=bc4e3799113d476ea23795fe4e2239b1>

³ <https://resilientvi.org/the-hmrp-plan>

The Stormwater Device Toolkit is a method to manage stormwater devices to reduce local sediment and wastewater Land-Based Nonpoint Source Pollutants of concern that impact the territory's and Coral Bay's water quality. This Toolkit is a management strategy that was developed following the EPA's Watershed Planning and Nonpoint Source Pollutant Management Program guidance.

Project Tasks

Task 1 – Beginning May 2023

Neighborhood Group / HOA Background Research & Development

This task is to develop and re-initiate groups, identify residents, interested group participants and leaders, prioritize areas and boundaries, and collect data and information. CBCC will work with 5 to 10 new or existing groups to determine their needs, obtain necessary information, and identify feasible and actionable best water-saving practices and storm device improvements and maintenance. Additional meetings with local and federal government agencies and other watershed partners will be held to continue relationships and identify permitting and stormwater device maintenance solutions not only for Coral Bay, but territory wide. This task also is to establish project goals and detail task approach, data collection and storage and communication with the subrecipient, WC.

Subtask 1.1 - Project Kick-off Meeting – June

A kickoff meeting will be held with CBCC and WC within the first month of the project to 1) discuss the project tasks, timeline, and deliverables; 2) determine data collection and management plan; 3) identify candidate neighborhood groups / HOAs (both existing and newly formed) to target for outreach; and 4) to identify foreseeable barriers and solutions.

The mapped infrastructure data collected during the 2021 H&H Study will be reviewed to help prioritize project interaction with neighborhood groups and HOAs with critical infrastructure that could cause major impacts if lack of maintenance causes devices to become clogged, as well as neighborhoods with higher concentrations of infrastructure and existing BMPs.

Deliverable(s): Meeting minutes

Subtask 1.2 - Neighborhood Groups, HOAs and Residents & Stakeholder Meetings -

Throughout the entire project, CBCC will work with WC to host meetings with stakeholders from candidate neighborhoods, both existing and potential new or informal neighborhood groups, HOAs and residents to determine participation, leadership, and needs as well as obtain historical information/records and current infrastructure knowledge. CBCC will also work with the 5 to 10 groups to determine the best methods of keeping records current, identify improvements and encourage maintenance. Additional meetings with government agencies and stakeholders may include:

- Government officials & NGOs to discuss and learn about permitting options for long term maintenance.
- Government officials to take into account FEMA requirements, DPW, DPNR, and NPS needs.
- Contractors for services, cost estimation, recommendations, and future services.
- Other watershed stakeholders – homeowners & business owners.

Virtual meetings, telephone calls, in-person meetings, and site visits will occur throughout the project and beyond to encourage continuous collaboration and participation. Meeting platforms and schedules for each group will be identified and tried during this subtask.

Deliverable(s): Meeting minutes & Pictures of in-person meetings

Subtask 1.3 – Existing Data Collection & Data Gaps –

Over the past 19 years, CBCC has worked with residents and groups to install and maintain stormwater devices and BMPs throughout the Coral Bay Watershed. CBCC, with the help of WC and the data they collected from the H&H study to be completed in May 2023, will gather and organize its existing data to include and follow up on identified data gaps, including field investigations. Historically, wet/rainy season peaks from August to November and with occasional rains in April and May, therefore CBCC will conduct the majority of stormwater device field investigations and collected-stormwater data gaps during these times. However, CBCC will be ready and flexible to capture rainfall events as rainfall patterns have become unpredictable. As drought conditions continue, some data and information may not be available during the project period.

Deliverable(s): Information, photos and data will be added to the project database and outreach materials, respectively.

Task 2 – Toolkit Development - Beginning May 2023

CBCC and WC will build the three main features of the Stormwater Device Toolkit for this task and conduct a mid-project evaluation at the end of year 1.

Subtask 2.1 – Neighborhood Group / HOA Binders

CBCC, with stakeholder input, will create binders for each of the selected neighborhoods to provide an organized physical paper record binder. Each record binder will include maps of stormwater infrastructure (devices) and BMPs, photos of these devices, installation and maintenance and cost records and recommended schedules and improvements, group contacts, etc. CBCC will prepare 5 to 10 binders based on experience knowledge of existing and potentially interested groups and residents. CBCC will implement the first 2 to 3 binders with the respective neighborhood groups and/or HOAs as a mid-point measurable to make adjustment as needed to ensure its success. A copy of each binder will be stored at the CBCC office and updated yearly to ensure records are duplicated and up to date during this project period and beyond.

Deliverable(s): Record Binders for approximately 5 to 10 Groups

Subtask 2.2 – “How To” Reference Section Update

Existing operations and maintenance “How To” [guidance and references](#)⁴ including CBCC’s [Stormwater Management tips](#)⁵, [BMP Maintenance Brochure](#)⁶, [Landscaping for Erosion Control Manual](#)⁷, and information from DPNR’s Revised Environmental Handbook (expected to be published in summer 2023) will be updated in the first 6 months and in the last two months of the project (for any additional information learned after the initial update) and made available online (Subtask 2.3). This section will include information pertaining to:

- “Sink it, Slow it and Spread it” practices and stormwater devices to encourage stormwater retention and groundwater recharge

⁴ <https://coralbaycommunitycouncil.org/stormwater-management-2/>

⁵ <https://coralbaycommunitycouncil.org/stormwater-management-retired/stormwater-management-tips/>

⁶ <https://coralbaycommunitycouncil.org/wp-content/uploads/2020/12/CBCC-NFWF-2-BMP-Maintenance-Brochure-Print-050919.pdf>

⁷ <https://coralbaycommunitycouncil.org/stormwater-management-retired/stormwater-management-hurricane-recovery/landscaping-for-erosion-control/>

- Inspection and regular maintenance frequency
- Inspection and regular maintenance checklists
- Regular maintenance equipment checklist
- Guidance on actions to be taken if maintenance concerns outside of routine maintenance are observed.
- Guidance on when a contractor should be hired to assist with maintenance needs.
- Other relevant information geared towards HOAs, residents, and business owners.

Deliverable(s): Online and printer-friendly updated “How To” Reference Section

Subtask 2.3 – User-Friendly Field & Data Input Application Development

A mobile tracking application, potentially using ArcGIS Survey123 software, will be developed in the first year of the project that can be used by CBCC, the residential group’s maintenance managers and members to schedule maintenance, catalog inspections and maintenance and improvement activities over time, including photos, and request support to address new concerns. The application will be pre-loaded with the mapped infrastructure and BMP dataset, which will be developed during the 2022 CBCC Hydrology & Hydraulic (H&H) Study. Information can be added by both residents and CBCC staff through this tool both online through CBCC’s website and on individuals’ phones, which will provide a real-time dataset for the groups.

Deliverable(s): Draft version of the User-friendly mobile and online application

Task 3 – Toolkit Field Investigation & Implementation - Beginning January 2024

During this task, CBCC and WC will work the neighbor groups and HOAs at the end of year 1 and throughout year 2 to implement the developed tools in Task 2 and ensure they meet their needs and are user-friendly; stormwater device information is not lost and keep up-to-date and maintenance activities continue as residents and group leadership and participation change.

Subtask 3.1 – Field Test Application for Refinement

The mobile tracking application developed in Task 2.3 will be tested in the field with CBCC staff and several residents from the various groups, who will conduct stormwater device surveys along a minimum of two roads to ensure that the application is user-friendly and intuitive to use, identify confusing sections and technological errors and that collected information and photos are uploaded and stored correctly. Improvements will be made to the application following testing by WC.

Deliverable(s): Summary of changes made to application following field testing and updated version of application.

Subtask 3.2 – Toolkit Implementation

The WC project team will schedule a week-long visit to work directly with the neighborhood groups and HOAs members in November of 2024 (during one of the typically wettest months of the year) to implement the toolkit. During this visit, Watershed Consulting will meet with the groups to provide an overview of the mobile application and how to use it, the inspection and maintenance process, an explanation of why it is important that regular maintenance is carried out, and an explanation of the available online resources from Subtask 2.2 and further support options and grant opportunities. Together with CBCC and WC, groups will conduct field inspections of the stormwater devices within their areas and fill out the mobile tracking application at stormwater device locations. Staff will answer any questions that the neighborhood and HOA members have and discuss the inspection and maintenance schedule for the specific infrastructure that exists in their neighborhood.

CBCC will also send out timely messages (at least quarterly) reminding residents and the groups' road committee-chairman / leaders to conduct maintenance on their stormwater devices and prepare for hurricanes, both during and after the project.

Deliverable(s): 1) Completed application data from the maintenance inspections and 2) Reminder messages sent to residents and groups.

Task 4 – Project Management

The following subtasks will contribute to the overall management of the project and will be conducted throughout the life of the project (May 2023 - December 2024) to ensure project tasks are completed within the project period and budget, and deliverables are met. All public documents will be made available via the CBCC's website. Additionally, all other documents will be made available to the appropriate party via email upon distribution needs and requirements.

Subtask 4.1 – Budgeting & Grant Reporting

CBCC's Environmental Projects Manager and other staff will complete all project scheduling, coordination, management, invoicing, budgeting, and reporting as part of this subtask. The benefits of the subtask include careful tracking of all project expenditures and meeting all project reporting requirements.

Subtask 4.2 – Project Oversight

CBCC's assigned project manager will provide day to day project oversight. CBCC's volunteer President will provide approximately 5 hours per month in direct oversight for this project, such as progress and document reviews. The benefits of the subtask include ensuring that the appropriate oversight and cross-checking is occurring on all project activities.

Environmental & Cultural Resource Compliance

The field data collection portion of this project will include recording existing conditions, locations of infrastructure, and extent of damage. The project team will use field data collection mobile application software to take photographs and notes with GPS-referenced locations. Publicly accessible sites will be prioritized. The project team will receive written landowner permission for any field site assessment on private property. This zero-impact data collection does not require review for environmental or cultural resource compliance.