STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
GRANT WORK PLAN
DEP AGREEMENT NO.: R2230

ATTACHMENT 3

I. TITLE PAGE

1. PROJECT TITLE: Scottsmoor Mosquito Control Impoundment Breakwater

2. GRANTEE Contact Information:

Organization Name: Brevard County Mosquito Control

Name of Authorized Signer: Frank Abbate

Title: County Manager

Address: 2725 Judge Fran Jamieson Way, Bldg. C

City: Viera

Zip Code: 32940

Area Code and Telephone Number: 321-633-2001

E-mail Address: frank.abbate@brevardfl.gov

3. GRANT MANAGER Contact Information:

Organization Name: Brevard County Mosquito Control

Name: Jonathan Linder

Title: Environmental Specialist

Address: 3 Pilots Place

City: Valkaria

Zip Code: 32950

Area Code and Telephone Number: 321-507-2102

E-mail Address: jonathan.linder@brevardfl.gov

4. FISCAL AGENT Contact Information:

Organization Name: Brevard County Mosquito Control

Name: Bill Strittmatter

Title: Department Finance Manager

Address: 800 Perimeter Rd.

City: Titusville

Zip Code: 32780

Area Code and Telephone Number: 321-264-5032

E-mail Address: bill.strittmatter@brevardfl.gov

5. **FEID No. (a.k.a. Tax ID#):** F59-6000523 **Seq No.** 220

   DUNS No. 106520666

6. **WORK PERFORMED BY:** Grantee Only

7. **SUBCONTRACTORS CONTACT INFORMATION:** *(if applicable & known)*
   Organization Name: N/A

   Name: _____

   Title: _____

   Address: _____

   City: _____

   Zip Code: _____

   Area Code and Telephone Number: _____

   E-mail Address: _____

8. **PROJECT LOCATION**:

   A. List of County(ies): Brevard

   B. List of City(ies)/Town(s)/Village(s): Mims

   C. State Lands Lease Agreement Number(s): N/A
   Provide lease agreement number(s) for any work that will be performed on State Lands. If work will not be on any state lands, please indicate N/A.

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II. WORK PLAN

9. **PROJECT SUMMARY:** This project is intended to create breakwaters just offshore of approximately 1,100 linear feet of severely eroded shorelines of the Scottsmoor Mosquito Impoundment's lagoon-ward perimeter dike. These proposed breakwaters will protect the impoundment's dike from erosion caused by waves and maintain hurricane repairs previously completed in April 2021 to allow for the installation of a robust living shoreline in spring of 2022.

10. **PROJECT SCOPE OF WORK:** The Scottsmoor Mosquito Impoundment has historically suffered from erosion damage when Indian River Lagoon water levels are high and an east or southeast wind occurs. It has been observed that impoundment shoreline areas without black and white mangroves incur significantly more damage than shoreline areas with these trees. During Hurricane Irma in September 2017, southeast winds caused severe erosion damage to 1,100 linear feet of the impoundment's eastern dike. The damages were particularly concentrated in areas void of mangroves. Brevard County Mosquito Control aims to increase the impoundment's resiliency against future storm events by planting living shorelines along the areas currently unvegetated; however, recent attempts to use erosion control matting have failed due to wind-driven waves. The installation of breakwaters in this project will greatly reduce erosion caused by waves, creating conditions suitable for successfully planting vegetation along the Impoundment Dike's lagoon-ward slope in the future. The breakwater sections will be fabricated and installed by Mosquito Control biologists and technicians in 30 foot modules approximately 7 feet east of the dike's lagoon-ward slope toe.

11. **PROJECT NEED AND BENEFIT:**
    A. **Explain the demonstrated need, which the project addresses**. Brevard County was considered uninhabitable due to the dense mosquito populations prior to the creation of the Brevard County Mosquito Control District (the District) in 1937. Since the District's inception, mosquito populations have been greatly reduced making Brevard County such an attractive location that the population has boomed from 16,000 residents in 1940 to the current population of approximately 600,000. Mosquito Control Impoundments are tools used by the District to manage mosquitoes and associated mosquito-borne viruses. By flooding the impoundments, the mud flats remain under water and the marsh mosquitoes cannot lay their eggs; and since these insects cannot lay their eggs directly in water, this strategy serves to short circuit the marsh mosquitoes' life cycles, preventing billions of biting mosquitoes from emerging. Properly functioning and fully intact impoundments greatly reduce the amount and frequency of insecticides used throughout the County. The Scottsmoor Impoundment dike has been damaged by storm-related erosion and repaired multiple times in the past at a great expense to taxpayers. This proposed breakwater project is needed to reduce the effects of erosion on the impoundment's dike so that dike slope stabilizing vegetation can be planted in a future project, helping to ensure that the impoundment functions during and after storm events and decreases the costs to maintain this valuable mosquito control tool. The East Central Florida Regional Resiliency Action Plan (the Plan) identifies Scottsmoor Impoundment within an area susceptible to projected sea level rise. This project will fulfill the following goals of the Plan: Protect high-value assets from natural hazards; Prioritize the use of Green Infrastructure as a first line of defense; and improve water quality in surface water bodies. Installation of a breakwater to prepare for the future installation of a living shoreline along the impoundment dike's lagoon-ward slope would protect the impoundment during future high water and wind events. Without protection the impoundment will not be able to hold water, allowing the mud flats to become exposed, either creating large broods of mosquitoes or requiring the continuous use of insecticides throughout the 84 acre marsh. Installation of a breakwater would facilitate the use of Green Infrastructure as the first line of defense for the impoundment against natural hazards such as high tides, wind driven waves, and storm events. Turbulance and re-suspension of fine sediment negatively impact seagrasses;

however, the breakwater would create an area of reduced turbulance behind it creating suitable conditions for seagrass beds to form.

B. Explain how the proposed project meets the purpose of one or more of the Goals and Priorities for FRCP. The Scottsmoor Mosquito Control Impoundment Breakwater project fits into the nature-based options for erosion control project type. This project will be the first step toward creating a living shoreline to protect the impoundment from erosion instead of more traditional shoreline hardening techniques such as retaining walls or rip rap. The use of breakwater modules will allow organisms access to the impoundment's lagoon-ward slope, create conditions for vegetation to survive on the impoundment's lagoon-ward slope, and ensure that the entire ecosystem benefits, not just the impoundment dike. The tangible community resilience and conservation outcomes from this project can be determined by the impoundment dike's resiliency against wave erosion. This can be measured as shoreline lost or gained during storm or wind events. Overall, mosquito impoundments are the ultimate nature-based means of managing mosquitoes, and this proposed Scottsmoor project is one important piece of the puzzle. Impoundments were constructed beginning in the late 1950's based upon the philosophy of controlling mosquito populations by reducing their breeding habitat, thereby profoundly reducing the need for pesticides. Today we manage approximately 28,000 acres (44 square miles) of these impoundments, strategically located within the mosquito flight range of human-populated areas throughout the County. To complement our unique impoundment program, we recently launched an ambitious mosquitofish hatchery and stocking program. Our fish stocking team stocked over 20,000 mosquitofish in the Scottsmoor Impoundment in late May 2020, when rain and tidal flooding was on the rise. This project will support the structural integrity of a completely functional and intact impoundment dike, which is critical for our operation and the community.

C. Discuss how the project is feasible and can be completed by the grant period deadline. The Scottsmoor Mosquito Control Impoundment Breakwater can easily be completed prior to the grant period deadline of April 30, 2022. This project is intended to establish erosion control by installing 33 modules, each 36 linear feet long, along approximately 1,100 linear feet of severely eroded shorelines of the Scottsmoor Mosquito Impoundment's lagoon-ward perimeter dike. Each module will be made of 10 prisms, each 4 feet long, with the first and last prism of each module turned to a 45 degree angle. The prisms are constructed by wraping concrete soaked jute around a form. Once the concrete has hardened, the form is removed from the inside of the prism. One side of the prism is then sealed using a square of concrete soaked jute. Two concrete blocks are placed inside each prism as the prisms are installed in the lagoon. The concrete blocks add weight ensuring the prisms do not move. The materials required for the proposed project will be purchased either locally or through vendors in Florida. We anticipate having all materials purchased and on site not more than 12 weeks after execution of the funding agreement. Mosquito Control has a workforce of 50 employees, including biologists and impoundment technicians who are readily available to fabricate the prisms in a timely manner. This team has successfully repaired over 30,000 linear feet of hurricane-damaged impoundment dikes over the last few years throughout the Indian River Lagoon. Given the team's experience and availability, fabrication and installation of the breakwater modules for the proposed project should not require more than 16 weeks. Permit applications for St. Johns River Water Management District and the United States Army Corps of Engineers are currently being composed for submission and permits are expected to be in hand by mid-November 2021. Prisms can be fabricated soon after the anticipated receipt of permits in mid-November and installed by the end of January 2022. This schedule allows three months of contingency time prior to the deadline of April 30, 2022.

D. **Explain how this project is addressing social vulnerability or vulnerability of historic resources or stormwater management systems.** Brevard County lost 6,800 jobs directly from NASA ending the shuttle program in 2011, followed by a rippling effect on support industries, many of which were based in northern Brevard County. Over the last few years, many of the lost jobs and support industries have been recovered as private sector space programs have filled the gap created when the shuttle program ended. Mosquito control has been and continues to be a key component in the County's economic success. Brevard County used to be known as Mosquito County and was thought by many to be uninhabitable. Mosquito Control has made the mosquito population tolerable through integrated mosquito management, of which, impoundments are a major part. The Scottsmoor Mosquito Control Impoundment contributes greatly to the reduction of mosquitoes in northern Brevard County. One acre of salt marsh can produce up to two million adult mosquitoes per brood. These salt marsh mosquitoes are capable of flying up to 25 miles. If the 84 acre Scottsmoor impoundment did not exist the marsh could produce up to 168 million adult mosquitoes after water level fluctuations in the marsh. These mosquitoes would spread throughout the northern third of the County and lead to either increased insecticide usage or a higher baseline population in mosquitoes, potentially creating an environment less conducive to economic development. The larger mosquito population would also increase the chances of mosquito-borne disease outbreaks in the northern third of Brevard County. According to HUD's 2011 – 2015 Low- and Moderate-Income Summary Data, almost 40% of the population within 25 miles of the impoundment is economically disadvantaged. The Scottsmoor Mosquito Control Impoundment Breakwater project will protect the impoundment's dike from erosion caused be wave energy. This project will ensure the dike's structural integrity and maintain the impoundment's ability to remain flooded during the wet season keeping the mud flats submerged where salt marsh mosquitos would otherwise lay their eggs.

12. **DESCRIPTION OF PROJECT OUTCOMES:** The anticipated outcome of the Scottsmoor Mosquito Control Impoundment Breakwater project is the insallation of breakwater modules providing erosion protection to the impoundment dike's lagoon-ward slope greatly increasing the resiliency of the impoundment. The increased resiliency will ensure that a living shoreline can be planted in a future project and that the impoundment is capable of carrying out its primary function of protecting human health from mosquitoes and arboviruses after storm events. The increased resiliency will also greatly reduce the cost of impoundment maintenance. Another anticipated outcome of this project is improved local water quality as the breakwater will reduce near shore turbulance and suspension of fine sediments, potentially create an environment condusive to the re-establishment of seagrass beds, and increase the survival potential of living shoreline vegetation. Lastly, this project will support the department's mission of providing environmentally safe methods to control mosquito populations in Brevard County. Brevard County Mosquito Control is historically known for its environmental stewardship and is in an ideal position to share information regarding this proposed project with other mosquito control districts at statewide industry conferences and workshops.

13. **BUDGET SUMMARY:** Allowable budget categories and form of payment with the costs for this project are listed in the table below.

ALLOWABLE BUDGET SUMMARY

Budget Categories	Payment	Task 1	Task 2	Grant Amount Awarded
Supplies	Reimbursement	$0	$10,160.65	**$10,160.65**
GRANT AGREEMENT TOTAL		**$0**	**$10,160.65**	**$10,160.65**

A. **Describe how the project costs were determined:**

The $10,160.65 requested for the Scottsmoor Mosquito Control Impoundment Breakwater project was determined based on equipment and supplies to build eight prism frames and 330 prisms. Each of the eight frames are constructed using three 2"x2"x8' pieces of lumber, twelve 1.5" hinges, two 6"x6" pieces of plywood, and 4'x10' poly-backed canvas drop cloth. Each of the 330 prisms are constructed using 4'x10' of jute, 30 pounds of rapid set cement, and two 16"x8"x8" concrete blocks. The prisms will be fabricated using two stations. Each station requires three 5 gallon buckets for weighing cement; two scoops for adjusting the cement weight; two 2 gallon buckets for weighing water; an electronic bench scale for weighing the cement and water; a single-paddle mixer with large spiral mixing paddle to mix the cement and water; four shop shear scissors to cut the jute; four heavy duty 45 gallon mixing tubs to soak the jute in the cement; two saw horses and a 4'x8' melamine white panel for a work table where the jute is wrapped around the frame; plastic sheeting to line the table, wrap around the frame, and wrap around the prism during cement curing; and masking tape to secure the plastic sheeting. Only the cost of equipment and supplies needed for prism fabrication is being requested for this project.

14. **PROJECT TIMELINE:** All tasks are to be completed and submitted no later than the task/deliverable due date listed in the table below. Requests for any change must be submitted prior to the current task/deliverable due date listed in the project timeline. Requests are to be sent via separate email to the Department's Grant Manager, with the details of the request being made and the reason for the request.

PROJECT TIMELINE

Task No.	Task Title	Task Due Date	Funding Amount
1	SLIP Study Report	*Refer to Task 1 Description	$0
2	Material Acquisition & Breakwater Installation	4/22/2022	$10,160.65
Grant Total			**$10,160.65**

15. **PERFORMANCE MEASURES:** The Grantee will submit all deliverables for each task via **one pdf document** to the Department's Grant Manager on or before the Task/Deliverable Due Date listed in the Project Timeline. The Department's Grant Manager will review the task/deliverables to verify that they meet the specifications in the Grant Work Plan and this task description, to include any work being performed by any sub-contractor(s). Upon review and written acceptance by the Department's Grant Manager of all deliverables under this task, the Grantee may proceed with payment request submittal.

16. **CONSEQUENCES FOR NON-PERFORMANCE:** The Department will reduce each Task Funding Amount by 5% for every day that the task/deliverable(s) is not received on the specified due date in the most recent Project Timeline, for the Agreement. Should a Change Order or Amendment be requested on the date of or after the most current task/deliverable due date, the 5% reduction of that Task Funding Amount will be imposed until the date of the requested change is received, via email by the Department.

17. **PAYMENT REQUEST SCHEDULE:** Grantee may submit a request for the Task Funding Amount to be paid using the Exhibit C, after all deliverables for that task have been approved by the Department. Request(s) for payment must include the Exhibit A showing 100% completion of that task and must be submitted within 45 days of the task/deliverable due date. Please refer to the website Grants page for "How to Request Payment", and "Checklist for Requesting Payment".

Or

Grantee may submit one request for the Grant Amount Awarded, by using the Exhibit C, after the project is 100% completed. The request for the Grant Amount Awarded, must include an Exhibit A showing 100% completion for all tasks, and must be submitted within 45 days of the last task/deliverable due date.

18. **FUNDING SOURCE:** Grantee agrees to include on all publications, printed reports, audiovisuals (including videos, slides, and websites except that unless required under special terms of this Agreement, this requirement does not apply to audiovisuals produced as research instruments or for documenting experimentation or findings and which are not intended for presentation to the general public) or similar materials must include the DEP logo (which can be found on the Department's website at https://floridadep.gov/resilience or by contacting the Grant Manager for a copy) and the following statement on, the following language.

"This work was funded in part through a grant agreement from the Florida Department of Environmental Protection, Florida Resilient Coastlines Program, by a grant provided by the Office of Resilience and Coastal Protection. The views, statements, findings, conclusions and recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of the State of Florida or any of its subagencies."

The next printed line shall identify the month and year of the publication.

III. TASKS & DELIVERABLES

Task #1

A. Title: SLIP Study Report

B. Goal: IF THE PROJECT LOCATION IS WITHIN THE COASTAL BUILDING ZONE AS DEFINED IN s. 161.551, F.S., submit a Sea Level Impact Projection (SLIP) study report.

C. Description: Pursuant to s. 161.551, F.S. and Chapter 62S-7, F.A.C, certain state-funded new construction in the coastal building zone must have an associated SLIP study report which must be submitted to the Department, approved, and published for at least 30 days before construction begins. This will inform the project owner about the potential effects of sea level rise and coastal flooding on the structure so that they can utilize this information in project planning and adaptation. Visit the SLIP tool website (https://floridadep-slip.org) for more information.

D. No-Cost Deliverables:

1) A SLIP Study Report submitted to the Department, approved by the Department, and then published on the Department's website for no less than 30 days before construction commences. If the project is not located in the Coastal Building Zone, the Grantee will submit **one pdf document** to the Department's Grant Manager containing a written explanation to show that the project is not subject to s. 161.551, F.S. based on its location.

Task #2

A. Title: Material Acquisition & Breakwater Installation

B. Goal: The goal of this task is delivery of equipment and supplies followed by installation of the fabricated breakwater modules for the Scottsmoor Mosquito Control Impoundment Breakwater project to Mosquito Control.

C. Description: Equipment and supplies will be procured to build eight frames and fabricate 330 breakwater prisms. Upon delivery of the equipment and supplies, the forms will be constructed using the 2" x 2" lumber, hinges, plywood, and canvas drop clothes. Once the eight forms are complete the 330 prisms will be fabricated from rapid-set cement, water, and jute using 5-gallon and 2-gallon buckets, electronic bench scales, scoops, single paddle mixers with large spiral mixing paddles, 45 gallon heavy duty mixing tubs, shop shear scissors, plastic sheeting, masking tape and waterproof gloves. Much of the prism fabrication will be performed on portable work tables made using the saw horses and melamine white panels. Upon completion of the 330 prisms the 33 breakwater modules, each 36 linear feet, will be installed at areas on the Scottsmoor Impoundment dike's lagoon-ward slope that had been severely eroded and are void of vegetation. These areas are depicted on the Scottsmoor Mosquito Control Impoundment Severe Erosion Locations map. Each module will consist of 10 prisms with the eight middle prisms parallel to the shore and the first and tenth prisms at a 45 degree angle oriented from the eight central prisms towards the impoundment dike. Two concrete blocks will be placed into each prism as weights during module deployment so the prisms will not move. Prior to deployment and once the modules are arrayed, photos of the shoreline to the north, east, and south will be taken at eight points along the Scottsmoor Impoundment perimeter dike as a monitoring baseline.

D. Deliverables: The Grantee will submit all task/deliverables for each task via **one pdf document** to the Department's Grant Manager on or before the task/deliverable due date listed in the Project Timeline.

1) Purchase Order(s) for equipment: 45 gallon heavy duty mixing tubs, 5 gallon buckets with lids, 2 gallon buckets, scoops, electronic bench scales, saw horses and melamine white panel for portable work tables, shop shear scissors, and single paddle mixers with large spiral mixing paddles.
2) Purchase Order(s) for materials to construct breakwaters: jute rolls, rapid set cement bags, concrete blocks, plastic sheeting, masking tape and waterproof gloves.
3) Purchase Order(s) for materials to construct eight breakwater frames: drop cloths, 1.5 inch hinges (12 each per frame), 2"x2" lumber (3 per frame), and 2'x4' pressure-treated plywood.
4) Vendor Invoice(s) for delivery of equipment and supplies listed above.
5) Map showing location of the eight photo points on the Scottsmoor Impoundment perimeter dike
6) Three photos from each of the eight photo points on the Scottsmoor Impoundment showing the shoreline before and after breakwater installation
7) Copy of United States Army Corps of Engineer's Self-Certification Statement of Compliance