

**STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
GRANT WORK PLAN  
DEP AGREEMENT NO. DH011  
ATTACHMENT 3**

**Deepwater Horizon Natural Resource Damage Assessment (NRDA)**

Lower Charlotte Harbor Flatwoods Hydrologic Restoration Planning Initiative, Yucca Pens

**PROJECT LOCATION:** The Project will be in the Charlotte Harbor and Caloosahatchee watersheds (including the Fred C. Babcock-Cecil M. Webb Wildlife Management Area (Babcock-Webb WMA), the Yucca Pens Unit Wildlife Management Area, and the tidal creeks to Charlotte Harbor) in Charlotte and Lee Counties, FL. For a location map see Exhibit I.

**PROJECT BACKGROUND:** As a result of pollution and hydrological degradation to local coastal watersheds, the Charlotte Harbor Flatwoods Initiative (CHFI), comprised of multiple local, state and federal agencies, the Coastal & Heartland National Estuary Partnership, and other stakeholders was formed to restore natural drainage across the Gator Slough Watershed with water that has been unnaturally impounded on the Babcock-Webb WMA and diverted from the Yucca Pens WMA, Caloosahatchee, and tidal creeks to Charlotte Harbor. The objectives of the CHFI are sheet flow enhancement, natural flow enhancement to Charlotte Harbor and the Caloosahatchee River, water quality improvement, groundwater recharge, high water levels and flooding reduction, and fish and wildlife habitat enhancement.

**PROJECT DESCRIPTION:** The Coastal & Heartland Natural Estuary Partnership, which is hosted by the City of Punta Gorda (Grantee) will oversee the Lower Charlotte Harbor Flatwoods Hydrologic Restoration Planning Initiative, Yucca Pens (Project) to reduce pollution and hydrologic degradation to coastal watersheds in lower Charlotte Harbor through development of a science based, data driven, Strategic Hydrological Planning Tool that will provide guidance to resource management agencies for restoration and management of surface waters flowing from the Babcock-Webb and Yucca Pens WMA's through tidal creeks discharging into eastern Charlotte Harbor and the Caloosahatchee River. The Project includes the following: 1) Gathering Existing Data, 2) Monitoring Planning and Device Installation, 3) Water Level Field Verification and Historical Hydropattern Mapping, 4) Data Collection: Rating Curves, Station Maintenance, and Data Downloading, 5) Model Existing Conditions, 6) Modeling Natural and Future Conditions, 7) Strategic Hydrological Planning Tool Report, and 8) Project Oversight.

## TASKS AND DELIVERABLES

### TASK 1: Gather Existing Data

**Task Description:** Grantee shall gather existing data and modeling information for the Charlotte Harbor Flatwoods Initiative project area. Existing literature and modeling sources may include (but are not limited to): NOAA, USGS, USFWS, NRCS, SFWMD, SWFWMD, FWC, FDEP, FDOT, City of Cape Coral, Lee County, Charlotte County, MIKE-SHE and MIKE-11 models. Data gaps shall be identified.

**Deliverable:** Data Discovery Technical Memorandum summarizing data and modelling collection modelling efforts and key data gaps.

**Performance Measure:** The Department's Grant Manager will review the deliverables to verify that they meet the specifications in the Grant Work Plan and this task description. Upon review and written acceptance by the Department's Grant Manager of all deliverables under this task, the Grantee will proceed with payment request submittal.

**Payment Request Schedule:** Grantee will submit a payment request for cost reimbursement (including contractual services, if any) upon completion of the task and Department approval of all associated task deliverables.

**Budget:** Not to exceed \$10,000.

**Deliverable Due Date:** No later than four months from grantee's notification of start date, provided that start date is no later than December 31, 2019 (Start Date).

### TASK 2: Monitoring Planning and Monitor Device Installation

**Task Description:** Develop Groundwater and Flow Monitoring Plans based on data gathered during Task 1 and survey of existing monitoring wells, stations, and gages. Install a minimum of 12 groundwater monitoring wells, a minimum of 3 rain gages, and a minimum of 7 data loggers at existing staff gages. Install a minimum of 8 flow gages to collect needed data.

**Deliverables:** 1) Groundwater Monitoring Plan, 2) Flow Monitoring Plan and 3) Maps (shapefiles and pdf), coordinates and elevations, permit numbers (if permits are required by regulatory agencies for device installation), and photos of installed data collection devices.

**Performance Measure:** The Department's Grant Manager will review the deliverables to verify that they meet the specifications in the Grant Work Plan and this task description. Upon review and written acceptance by the Department's Grant Manager of all deliverables under this task, the Grantee will proceed with payment request submittal.

**Payment Request Schedule:** Grantee will submit a payment request for cost reimbursement (including contractual services, if any) upon completion of the task and Department approval of all associated task deliverables.

**Budget:** Not to exceed \$109,622 based on assumption that monitoring wells can be installed using hand auguring techniques.

**Deliverable Due Date:** No later than five months from Start Date.

### **TASK 3: Water Level Field Verification for Seasonal Highs and Historical Hydropattern Mapping**

**Task Description:** Referencing information gathered in Task 2 for installed wells, survey seasonal high water levels near location of installed wells. Water level field verification must be captured at minimum of one dry (typically Nov-April) and one wet season (typically May-Oct). Map historical hydropatterns of study area for Natural systems model. This will be done with historical information gathered during Task 1. Then Natural Systems will be modeled to (pre-development) ground water levels and surface water flows.

**Deliverables:** 1) Water level survey data with GPS coordinates and elevations and verification of seasonal high water mark and 2) Map of historical hydropatterns and technical memorandum explaining how map of historical hydropatterns was achieved.

**Performance Measure:** The Department's Grant Manager will review the deliverables to verify that they meet the specifications in the Grant Work Plan and this task description. Upon review and written acceptance by the Department's Grant Manager of all deliverables under this task, the Grantee will proceed with payment request submittal.

**Payment Request Schedule:** Grantee will submit a payment request for cost reimbursement (including contractual services, if any) upon completion of the task and Department approval of all associated task deliverables.

**Budget:** Not to exceed \$27,000.

**Deliverable Due Date:** No later than twelve months from Start Date.

### **TASK 4: Data Collection: Flow Rating Curves, Station Maintenance, and Data Downloading**

**Task Description:** Establish flow rating curves by comparing water level and velocity from a minimum of 10 monitoring events per station across a range of flows and depths. Data captured will include water levels and velocity, collection of water quality data will not be required for this task. Data must capture a minimum of one dry (typically Nov-April) and one wet season (typically May-Oct). Data captured in the first 12 months after commencement of task will be used as base to begin Existing Conditions model calibration. Data will continue to be collected and assimilated into the Existing Conditions model until conclusion of Task 5 for greater accuracy. Included in this task is continued maintenance and data download from monitoring stations. Flow meter calibration to be conducted according to USGS flow meter calibration methodology.

**Deliverables:** 1) Flow Rating Curves established from comparative analysis of output from flow meters including: water levels, water velocity, and timing and duration of inundation; 2) Field logs; and 3) Data Report with calibration verification data (photos).

**Performance Measure:** The Department's Grant Manager will review the deliverables to verify that they meet the specifications in the Grant Work Plan and this task description. Upon review and written acceptance by the Department's Grant Manager of all deliverables under this task, the Grantee will proceed with payment request submittal.

**Payment Request Schedule:** Grantee will submit a payment request for cost reimbursement (including contractual services, if any) upon completion of the task and Department approval of all associated task deliverables.

**Budget:** Not to exceed \$101,378.

**Deliverable Due Date:** No later than twenty-six months from Start Date.

#### **TASK 5: Model Existing Conditions**

**Task Description:** Grantee shall review the latest updated ground-surface water model completed for the Cape Coral Water Comprehensive Utility Update, this updated model will capture most recent existing land use files (2017) and other updates. Land use files will come from sources including (but not limited to): NOAA, USGS, USFWS, NRCS, SFWMD, SWFWMD, FWC, FDEP, FDOT, City of Cape Coral, Lee County, and Charlotte County. The updated model will then be recalibrated with new hydrological monitoring data gathered in earlier tasks of current project. Other possible parameters to be updated may include (but are not limited to): channel roughness, saturated hydraulic connectivity, and soil parameters. Using this model, existing conditions will be modeled. A report of existing conditions will be generated after the model is run including ground water levels as well as surface water levels and flows.

**Deliverables:** 1) Update Model Files Technical Memorandum; 2) Calibration Technical Memorandum; and 3) Existing Conditions Model Output Report which will include ground water levels as well as surface water levels and flows.

**Performance Measure:** The Department's Grant Manager will review the deliverables to verify that they meet the specifications in the Grant Work Plan and this task description. Upon review and written acceptance by the Department's Grant Manager of all deliverables under this task, the Grantee will proceed with payment request submittal.

**Payment Request Schedule:** Grantee will submit a payment request for cost reimbursement (including contractual services, if any) upon completion of the task and Department approval of all associated task deliverables.

**Budget:** Not to exceed \$125,000.

**Deliverable Due Date:** No later than twenty-six months from Start Date.

#### **TASK 6: Modeling Natural and Future Conditions**

**Task Description:** Grantee shall model Natural Systems (pre-development) ground water levels and surface water flows, using data gathered in previous tasks. Future Conditions: up to 3 potential future scenarios will be developed and modeled. Sources used to develop scenarios may include (but are not limited to) future land use data, future population increase data, data on climate change impacts and Sea Level Rise, as well as confirmed and potential future land acquisition and restoration projects. The outcomes predicted ground water elevations and surface water levels and flows, of the potential scenarios modeling will be shared in a Future Conditions Report.

**Deliverables:** 1) Natural Systems Model Report including pre-development water levels and flow patterns and 2) Future Conditions Report will include the outcomes of up to 3 potential future scenarios modeled (predicted ground water elevations and surface water levels and flows).

**Performance Measure:** The Department's Grant Manager will review the deliverables to verify that they meet the specifications in the Grant Work Plan and this task description. Upon review and written acceptance by the Department's Grant Manager of all deliverables under this task, the Grantee will proceed with payment request submittal.

**Payment Request Schedule:** Grantee will submit a payment request for cost reimbursement (including contractual services, if any) upon completion of the task and Department approval of all associated task deliverables.

**Budget:** Not to exceed \$95,000

**Deliverable Due Date:** No later than twenty-eight months from Start Date.

### **TASK 7: Strategic Hydrological Planning Tool Report**

**Task Description:** Grantee shall compile all project information into a draft and final report that includes electronic versions of models, model outputs, data files, and all supporting documentation; organized with sections including an Executive Summary, Introduction/Overview, Alternatives Analysis, Results, and Recommendations. Recommendations will be made by comparing outcomes (predicted ground water elevations and surface levels and flows) from potential future scenarios modeled in Future Conditions and identifying how well they each align with goals of the project outlined in project background (sheet flow enhancement, natural flow enhancement to Charlotte Harbor and the Caloosahatchee River, water quality improvement, groundwater recharge, high water levels and flooding reduction, and fish and wildlife habitat enhancement.)

**Deliverables:** 1) Draft Report and 2) Final Report. An electronic copy of the Draft Final Report in Word format submitted to the Department's Grant Manager for review prior to submission of the Final Report. Upon request, the Grantee will provide a paper copy of the Draft Final Report.

**Performance Measure:** The Department's Grant Manager will review the submitted Draft Final Report to verify that it meets the specifications in the Grant Work Plan and this task description and provide any comments to the Grantee for incorporation into the Final Report. The Department's Grant Manager will review the submitted Final Report to verify that it meets the specifications in the Grant Work Plan and this task description.

**Payment Request Schedule:** Grantee will submit a payment request for cost reimbursement (including contractual services, if any) upon completion of the task and Department approval of all associated task deliverables.

**Budget:** Not to Exceed \$7,000

**Deliverable Due Date:** No later than thirty months from Start Date.

**PROJECT TIMELINE:**

<b>Task No.</b>	<b>Task or Deliverable Title</b>	<b>Deliverable Due Date</b>
1	Gather Existing Data	
1a	Data Discovery Technical Memorandum	No later than four (4) months from grantee's notification of Start Date provided that Start Date is no later than December 31, 2019.
2	Monitoring Planning and Monitoring Device Installation	
2a	1) Groundwater Monitoring Plan; 2) Flow Monitoring Plan; and 3) Maps, coordinates, elevations, permit numbers, and photos of all data collection devices	No later than five (5) months from Start Date
3	Water Level Field Verification for Seasonal Highs and Historical Hydroperiod Mapping Technical Memorandum	
3a	1) Water Level Survey data with coordinates and elevations and 2) Map of historical hydropatterns	No later than twelve (12) months from Start Date
4	Data Collection; Rating Curves; Station Maintenance and Data Downloading	
4a	1) Flow Rating curves; 2) Field Logs; and 3) Data Report	No later than twenty-six (26) months from Start Date
5	Model existing conditions	
5a	1) Update Model Files Technical Memorandum; 2) Calibration Technical Memo; and 3) Existing Conditions Model and Calibration Report	No later than twenty-six (26) months from Start Date
6	Model Natural Systems with Future	

	Conditions	
6a	1) Natural Systems Model Report and 2) Future Conditions Model Report	No later than twenty-eight (28) months from Start Date
7	Strategic Hydrological Planning Tool Report	
7a	1) Draft Report and 2) Final Report	No later than thirty (30) months from Start Date

**BUDGET DETAIL BY TASK:**

Task No.	Budget Category	Budget Amount
1	Contractual Services	\$10,000
2	Contractual Services	\$109,622
3	Contractual Services	\$27,000
4	Contractual Services	\$101,378
5	Contractual Services	\$125,000
6	Contractual Services	\$95,000
7	Contractual Services	\$7,000
	<b>TOTAL BUDGET BY TASK</b>	<b>\$475,000.00</b>

**PROJECT BUDGET SUMMARY:**

Category Totals	Grant Funding, Not to Exceed, \$
Contractual Services Total	\$475,000
Overhead (at 7%)	\$33,250.00
<b>Total:</b>	<b>\$508,250.00</b>

Overhead Fee - An overhead fee of not more than seven percent (7%) will be allowed on subcontracted work).



# Exhibit I

## Deepwater Horizon Natural Resource Damage Assessment (NRDA) Lower Charlotte Harbor Flatwoods Hydrologic Restoration Planning Initiative, Yucca Pens

### PROJECT MAP

