

**STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DEP AGREEMENT NUBER: OWP09**

**ESTABLISHING A PROTECTIVE PHOSPHORUS TARGET FOR THE
WESTERN EVERGLADES RESTORATION PROJECT REGION OF BIG CYPRESS
NATIONAL PRESERVE**

**STATUS REPORT
REPORTING PERIOD: 6/04/2025–6/30/2025**

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I. Project information

- a. *Project title:* Establishing a Protective Phosphorus Target for the Western Everglades Restoration Project Region of Big Cypress National Preserve
- b. *Project location:* Four experimental flumes will be constructed at the following locations (Table 1 and Fig. 1) within the Western Everglades Restoration Project region of Big Cypress National Preserve:

Table 1: GPS locations of four experimental flumes.

<u>Latitude</u>	<u>Longitude</u>
26.194195	-81.051426
26.19342	-81.048969
26.194051	-81.047297
26.194936	-81.048604

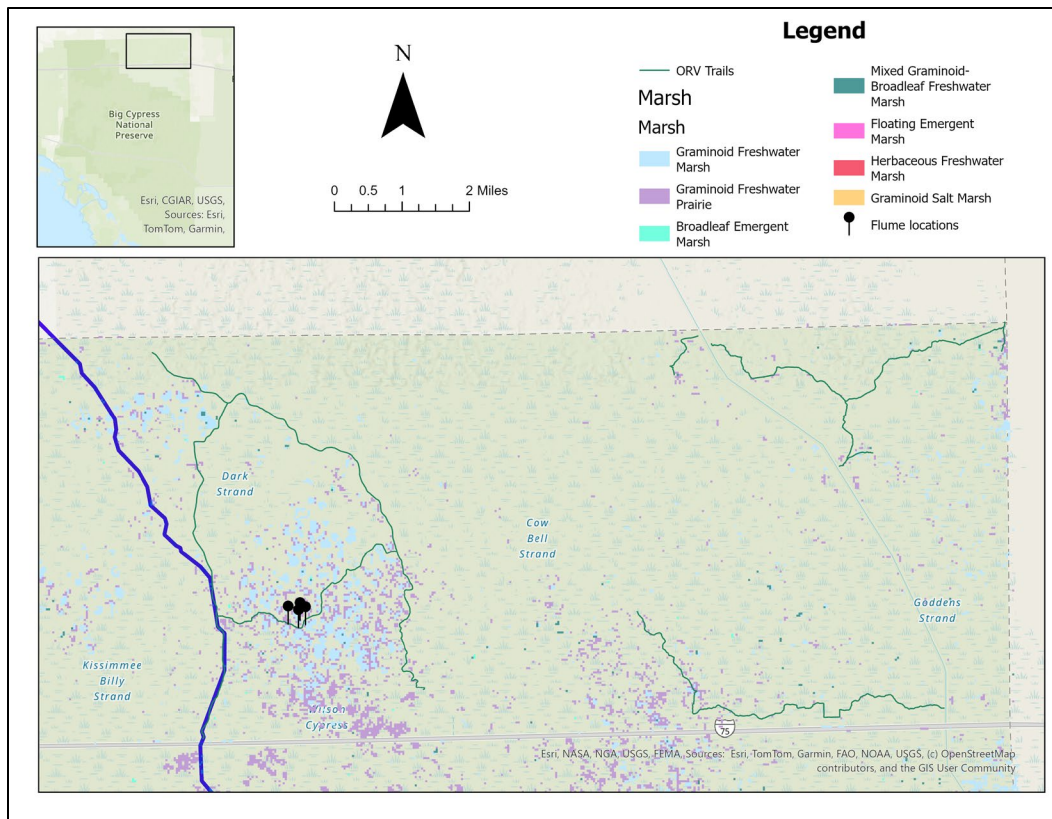


Figure 1: Locations of experimental flumes, indicated by the black pins, within the Western Everglades Restoration Project Region of Big Cypress National Preserve.

- c. *Project background:* Big Cypress National Preserve (BICY) is a remnant of the greater Everglades ecosystem in southwest Florida. Its waters are designated by the Florida Department of Environmental Protection (FDEP) as “Outstanding Florida Water” that require the highest protection by the state of Florida (62-302-700 F.A.C.). The marshes and sloughs of BICY are dominated by sawgrass and periphyton. Studies of water quality and aquatic communities in these wetlands indicate that the northwest portions are degraded, likely resulting from canal water inputs that contain runoff from fertilized lands in the upstream watershed. Evidence for water quality impairment include higher than expected water column phosphorus (P) levels at stations sampled between 1994-2010. In addition, degraded periphyton has been detected across dozens of square kilometers of wetland through monitoring beginning in 2009 by the National Park Service’s South Florida/Caribbean Inventory and Monitoring Network (SFCN). Impaired periphyton communities associated with persistent above-ambient P exposure in the Everglades are known to be associated with cascading consequences leading to impaired ecosystem states. The desired reference state for BICY has been equated with Everglades marshes where water column P concentrations are consistently below 10 ppb. Restoration plans to increase water flow to BICY while protecting wetlands from further degradation will require that inflowing water does not exceed critical P thresholds. However, while numerous experimental and long-term studies provided a defensible basis for establishing a protective P criterion for Everglades Protection Areas, the BICY has not received similar attention. Protecting the BICY from further degradation will require documenting regional reference conditions and P-driven ecological transition thresholds.
- d. *Project description:* The central objective of this study is to quantify a protective P target for BICY. The Grantee will identify the P concentration above which an imbalance in the natural populations of aquatic flora or fauna occurs. A wealth of studies has provided support for periphyton as a key indicator of water quality change, especially P, in the greater Everglades. Moreover, published experimental enrichment studies show that periphyton-based attributes provide the first indication of ecosystem imbalance in response to elevated P concentrations above background levels. Therefore, the Grantee will use periphyton-based attributes to quantify a protective P target for BICY. The experimental approach utilizes a flow-through flume design to assess periphyton response to P additions. For spatial replication, the Grantee will construct four flumes along a wetland transect near tree islands in the BICY. Each flume will consist of four 10-m channels – one control channel and three treatment channels. P will be added to increase TP concentrations in experimental channels to above ambient concentrations. Water flux will be measured continuously, such that the system will maintain constant levels of P addition by concentration. The Grantee will sample

periphyton and other major ecosystem components (water biogeochemistry, soil, macrophytes, and fauna) in these flumes prior to P additions.

e.

f. *Project timeline for current FDEP project period (6/4/2025–6/30/2025):*

Task/Deliverable No.	Task or Deliverable Title	Task Start Date	Task End Date
1	QAPP		
	• Draft QAPP	Upon execution	04/30/2025
	• Final QAPP	04/30/2025	06/04/2025
2	Monitoring	06/04/2025	06/30/2025
3	Status Report	06/04/2025	06/30/2025

g. *Project timeline for entire dosing experiment (2024–2028):*

	HIRING		RECONN.		PROJECT YEAR 1												PROJECT YEAR 2												PROJECT YEAR 3												PROJECT YEAR 4																			
Calendar year	2024												2025												2026												2027												2028											
Month	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M										
Hire PM																																																												
Reconn. trip			1		1		1		1		1																																																	
REMAP sample analyses																																																												
Flume construction																																																												
P dosing																																																												
Meteorological													C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C										
Water chemistry													1	4	2	3	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2							
Periphyton/Chl-a													1			1	1		1		1		1		1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1									
Floc													1			1	1		1		1		1		1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1										
Peri accumulation																	1	1		1		1		1		1		1		1		1		1		1		1		1		1		1		1		1		1										
Soils													1						1																																									
Macrophytes													1			1			1																																									
Consumers													1						1																																									
Sample analyses																																																												
Flume deconstruction																																																												
Generate reports																																																												

Figure 2: Approximate timeline for experiment. Sampling events are indicated by a number per month and color coded by project year.

h. *Grant award amount for current FDEP project period (6/4/2025–6/30/2025):*
\$66,478.18

i. *Anticipated benefits:* The anticipated benefits of this project include establishing a scientifically defensibly P threshold for the Western Everglades Project Region of Big Cypress National Preserve that will protect the integrity of its unique ecosystems. By identifying the P concentrations that trigger ecological imbalance in periphyton and other biological communities, the study will directly inform restoration and water management strategies that prevent further degradation of these

Outstanding Florida Waters. Ultimately, the project will support long-term preservation of water quality and ecosystem healthy in BICY.

II. Financial summary

The project budget summary is as follows:

Task No.	Budget Category	Budget Amount
1	Salaries	\$851.71
	Fringe	\$306.18
	Overhead/indirect	\$173.68
	Total For Task:	\$1,331.57
2	Salaries	\$851.71
	Fringe	\$306.17
	Travel	\$642.85
	Miscellaneous/Other	\$53,690.63
	Overhead/indirect	\$8,323.70
	Total For Task:	\$63,815.06
3	Salaries	\$851.70
	Fringe	\$306.17
	Overhead/indirect	\$173.68
	Total for Task:	\$1,331.55
Total for All Tasks:		\$66,478.18

III. Project schedule

During this reporting period, project efforts were primarily directed toward constructing the experimental flumes (Fig. 3) within Big Cypress National Preserve. Although this phase is slightly behind the original project schedule (originally intended to be completed by May 2025; Fig. 2), the delay was due to the extended permitting process, which included additional coordination with the Seminole Tribe of Florida. Permits from the National Park Service were issued on May 9th, 2025, and construction with BICY commenced promptly thereafter.

Additionally, although the pre-dosing monitoring event was originally scheduled for this reporting period (June 2025; Fig. 2), we were unable to conduct any sampling due to insufficient water levels at the sites as of June 27th, 2025. According to our QAPP protocol, a minimum water depth of 10 cm is required to collect water, periphyton, and other biological samples. However, water depth at the sites was measured at 0 cm on June 27th, preventing sampling efforts during this period.

A detailed description of flume construction and other project activities that occurred during the reporting period (6/04/2025–06/30/2025) is provided below:

- a. *Construction and placement of floating docks:* A major component of this work involved the transportation and placement of floating docks and steel pilings, which will form the channel walls of the flume structures (Fig. 3). Over the course of multiple field days, a total of 80 floating docks (20 per flume) and 160 steel pilings were transported from Florida International University to Big Cypress using four trucks per trip (Fig. 4). Each dock weighs approximately 230 pounds, requiring substantial physical effort and coordination to load, unload, and maneuver them both during transport and in the field. Once onsite, we partnered with Earth Balance, who provided a Marsh Master vehicle and operator to assist with transporting the docks to the designated flume locations within the marsh (Fig. 5). This phase required careful coordination of logistics and field operations to ensure the safe and efficient delivery and positioning of all materials (Fig. 6). Field days for the construction and placement of the floating docks occurred May 28th-30th as well as June 4th -6th, 2020.

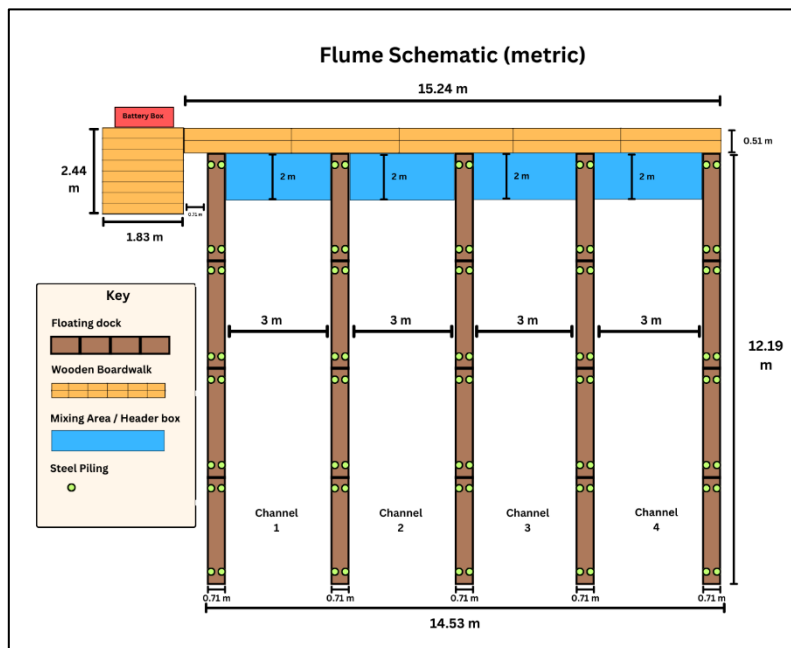


Fig. 3: Schematic of experimental flume design.



Figure 4: Floating docks and steel pilings being loaded into transport trucks at Florida International University for delivery to Big Cypress National Preserve (BICY) as part of flume construction efforts.



Fig. 5: Loading floating docks from transport trucks into a Marsh Master for delivery to flume construction sites within the marsh. Each dock weighs approximately 230 pounds, requiring coordinated effort during transfer and deployment.



Fig. 6: Floating docks positioned within steel pilings at the flume installation site C. These docks will form the channel walls of the experimental flumes and are secured in place to withstand hydrologic conditions within the marsh.

- b. *Construction of front wooden boardwalk and command center:* Another major component of the experimental flume construction involved building the command center and front wooden boardwalks (Fig. 2; Fig. 7). The command center will house essential equipment, including electronics and the phosphorus dosing system, while the front boardwalks will provide access to the experimental channels for sampling and maintenance. These critical infrastructure elements were constructed by hand in the field using wood on June 11th and 16th, 2025



Fig. 7: Front wooden boardwalk and command center alongside installed floating docks at Site B. The boardwalk provides access to the flumes, while the command center will house electronics and phosphorus dosing equipment.

- c. *Building and placement of channel walls:* Another key aspect of the experimental flume build involved assembling and installing the channel walls. These walls are composed of durable plastic curtains, which will be anchored to the marsh substrate using custom-made sandbags (Fig. 8). This setup is designed to contain and direct water flow within each flume. The building of the curtains has been ongoing during the project time period.



Fig. 8: Building of custom channel walls, made of black, UV-resistant plastic, and secured to marsh ground with custom sandbags.

- d. *Site visits with key project personnel:* During the reporting period, we also hosted a site visit on June 23rd, 2025, with representatives from Xylem/YSI to prepare for the installation of key experimental and monitoring equipment, including the phosphorus dosing system, the SonTek velocity meters, and the EXO sondes for measuring physical and chemical water parameters. Additionally, we conducted a site visit on June 27th, 2025, with members of the Seminole Tribe of Florida to share project updates and maintain engagement with tribal parties.

Below is a timeline of project activities expected to occur in upcoming weeks:

- Week of July 7th, 2025
 - Transport boardwalk/command center materials into BICY using a Marsh Master
 - Continue construction of front boardwalk and command center
 - Conduct pre-dosing sampling event (if water depths are sufficient)
- Week of July 14th, 2025:
 - Begin installation of phosphorus dosing system, the SonTek velocity meters, and the EXO sondes by Xylem/YSI employees
 - Complete construction of front boardwalks and command center
 - Conduct pre-dosing sampling event (if water depths are sufficient)
- Week of July 21st, 2025:
 - Continue and complete installation of phosphorus dosing system, the SonTek velocity meters, and the EXO sondes
 - Install channel walls
 - Conduct pre-dosing sampling event (if water depths are sufficient)
- Week of July 28th, 2025:
 - Complete channel wall installation
 - Conduct pre-dosing sampling event (if water depths are sufficient)
 - Initiate phosphorus dosing

VI. Monitoring activities

Although the pre-dosing monitoring event was originally scheduled for this reporting period (June 2025; Fig. 2), we were unable to conduct any sampling due to insufficient water levels at the sites as of June 27th. According to our QAPP protocol, a minimum water depth of 10 cm is required to collect water, periphyton, and other biological samples. However, water depth at the sites was measured at 0 cm on June 27th, preventing sampling efforts during this period. We anticipate there will be sufficient water for sampling by the end of July, and will conduct this sampling event and begin other monitoring activities as soon as possible.