The Florida Senate
Local Funding Initiative Request
Fiscal Year 2024-2025

LFIR # 2543

1. Project Title Lake Okeechobee's Harmful Algae Bloom Index [HABI]

2. Senate Sponsor Gayle Harrell

3. Date of Request 12/28/2023

4. Project/Program Description

NOAA satellite photos show daily blue-green algae [BGA] coverage and density for Lake Okeechobee since 2017. Multiplying coverage percent by 5 different BGA densities into single number/day quantifies an accurate BGA. BGA usually turn toxic into harmful algae bloom [HAB]. A plot of BGA/HAB daily numbers vs. time will show if these algae values increase, decrease or stay constant since 2017. Compare this result to other same time lake metrics for correlations as BGA/HAB potential causes. Comparisons will be made to physical, chemical and weather factors available at SFWMD's DBHYDRO website for all of Lake Okeechobee since 1972. Highest statistical correlations with BGA/HAB episodes will indicate probable BGA/HAB causes of harmful algae blooms on the lake. Correlation is not always a cause but causes always correlate. Also, field tests on lake will be made to confirm satellite and DBHYDRO data and whether satellite algae density vs. water depth is reliable in calm and wave waters.

5. State Agency to receive requested funds Department of Environmental Protection

State Agency contacted? No

6. Amount of the Nonrecurring Request for Fiscal Year 2024-2025

Type of Funding	Amount
Operations	205,000
Fixed Capital Outlay	0
Total State Funds Requested	**205,000**

7. Total Project Cost for Fiscal Year 2024-2025 (including matching funds available for this project)

Type of Funding	Amount	Percentage
Total State Funds Requested (from question #6)	205,000	100%
Matching Funds		
Federal	0	0%
State (excluding the amount of this request)	0	0%
Local	0	0%
Other	0	0%
Total Project Costs for Fiscal Year 2024-2025	**205,000**	**100%**

8. Has this project previously received state funding? No

Fiscal Year (yyyy-yy)	Amount		Specific Appropriation #	Vetoed
	Recurring	Nonrecurring		

9. Is future funding likely to be requested? Yes

a. If yes, indicate nonrecurring amount per year. 50,000

b. Describe the source of funding that can be used in lieu of state funding.

Free In-kind work by Lake Okeechobee Restoration Initiative, Inc. a 501 (c) (3) organization or outside renumeration from citizens and local governments. Two years additional funding will extend data collection and results of correlation for a 10-yr. period; a longer time period, the higher the signal to noise ratio the greater the accuracy in finding algae bloom causes.

10. Has the entity requesting this project received any federal assistance related to the COVID-19 pandemic?

No

If yes, indicate the amount of funds received and what the funds were used for.

Complete questions 11 and 12 for Fixed Capital Outlay Projects

11. Status of Construction

a. What is the current phase of the project?

○ Planning ○ Design ○ Construction ○ N/A

b. Is the project "shovel ready" (i.e permitted)?

c. What is the estimated start date of construction?

d. What is the estimated completion date of construction?

12. List the owners of the facility to receive, directly or indirectly, any fixed capital outlay funding. Include the relationship between the owners of the facility and the entity.

13. Details on how the requested state funds will be expended

Spending Category	Description	Amount
Administrative Costs:		
Executive Director/Project Head Salary and Benefits		0
Other Salary and Benefits		0
Expense/Equipment/Travel/Supplies/ Other		0
Consultants/Contracted Services/Study		0
Operational Costs: Other		
Salary and Benefits	Salary and benefits for Joseph Gilio, as project director and researcher at 70% full time for year at $70.00/hr. $ 7,840.00 month, annually $ 94,080.00 + 401K at $14,112.00. Salary and benefits for Emmanual Vernon, assitant researcher, at 70 % full time at $3,808.00/hr. , annually $45696.00 + 401K $ 6,328.90	160,217

Expense/Equipment/Travel/Supplies/ Other	Field safety equipment to protect against harmful algae blooms at $1,200 Drone at $400 Boat rental from Roland Martin Marina or other at $200.00/day X 12 trips = $3,600 plus $400 gas. Travel & gas $ 2,100. Expenses: Workman's comp. insurance, $900, Office & supplies: telephone $1,400, Internet service $600, Electricity $300 , rent, $6,000. Equipment: Field YSI sonde [EXO^3] or ProDSS and six [6] water probes $14,993.	35,503
Consultants/Contracted Services/Study	Computer program consultants: One or more of Cornell's statistical assistance, Excel expert for multivariate statistics not included in standard Excel software, SAS /R advanced ecological statistical software packages. $9,200. Microcystin toxin analysis: 12 samples and Jupiter Enviromental Lab analysis for tests more sensitive than YSI probe sensors. $5,780.	9,280
Fixed Capital Construction/Major Renovation:		
Construction/Renovation/Land/ Planning Engineering		0
Total State Funds Requested (must equal total from question #6)		**205,000**

14. Program Performance

a. What specific purpose or goal will be achieved by the funds requested?

There are three goals to this experimental research request. Goal # 1 is to determine whether blue-green algae [BGA] blooms in Lake Okeechobee have increased, decreased or remained constant in two metrics, algae intensity and aerial coverage. Multiplying daily NOAA satellite photos of these metrics gives a single daily number, the Harmful Algae Bloom Index [HABI].
Goal # 2 is a plot of HABI vs. Years [2017 to 2027]. Compare HABI profile to probable causes of HAB in the lake. Probable causes are nutrients, physical factors [temperature, sunlight, turbidity, wind strength, direction, intensity, etc.] Comparing these metrics on the same time scale to find the highest statistically significant correlations. Correlations are not always causes but all causes are correlated.
Goal # 3, field test algae density with lake depth as measure of NOAA surface photo accuracy.

b. What activities and services will be provided to meet the intended purpose of these funds?

Goal # 1 activities are computerized data mining. NOAA satellite photos are on htpp//: coastalscience.gov for NCCOS HAB images as isolated for Lake Okeechobee in www.eyeonlakeo.com. An Excel HABI number will be generated from these photos as a multiple of algae intensity and aerial coverage from 2017 to 2027 and plotted in Excel. Goal # 2 is data mining of lake metrics that may be the causes of these annual lake algae blooms. All metrics except HAB species identification are in SFWMD's DBHYDRO data base. Goal # 3 is computing Excel plots of probable algae blooms by physical and chemical metrics on the same time scale as goal # 1. Teasing out the best correlations will require higher level statistics than Excel. Finding the highest correlations is the key to causes and from causes to potential control of BGA/HABs.

c. What direct services will be provided to citizens by the appropriation project?

The major HAB identified by FDEP on Lake Okeechobee with the highest human health impacts is Microcystis aeruginosa. It has been highly correlated with non-alcoholic human liver death. FL Dept. of Health and universities are having difficulty to get volunteers for medical studies from those most exposed to M. aeruginosa. Goal # 1 will provide a definitive answer to whether HAB on the lake is increasing, decreasing or is constant. At the very least it may give greater incentive to exposed persons to participate in the study. Also, if the highest correlation is weather related and beyond man's control, then removal of essential nutrients at pollution levels nitrogen and phosphorus concentrated in lake mud should become a major objective to the state and federal agencies, a concern lacking to date.

d. Who is the target population served by this project? How many individuals are expected to be served?

The target populations are direct and indirect. The BGA, M. aeruginosa, almost always upon dying releases a human toxin, microcystin. WHO's limit of skin contact is 80 micrograms/liter [80 parts per billion] and FDEP is at or above 0.8 ppb. Drinking water are much lower and FDEP is 0.0. About 40,000 people get potable water from the lake, directly or in wells close to the lake. This toxin is much smaller than 1 micron, hence not necessarily filtered by nature or man or even considered. Other direct served are fishers, hunters, etc. who ply the lake recreationally. Indirectly about 8 million people get potable water from a combined rain and lake Okeechobee southward flows into the water catchment areas that fill the very porous Biscayne aquifer for Broward, Miami-Dade and Monroe. Grantee does not know whether microcystin toxin is removed or looked for.

e. What is the expected benefit or outcome of this project? What is the methodology by which this outcome will be measured?

There are five potential major benefits, First, are annual HAB's on Lake Okeechobee increasing, decreasing or remaining the same in time. There is a major difference from finding satellite photos of HAB's on the lake if the intensity, duration or size of infestation is weak, short, or small. The HABI will compare and contrast these differences so that an intense, long duration and large size will clearly give a larger HABI number than the opposite. Second the HABI will quantify colored satellite photos over visual interpretation. Third, it will notify agencies and public to the future HAB direction on the Lake as to whether increased concern is needed or not. Fourth, potential major causes may be identified. Fifth, and if identified, will they be controllable? These questions are critical to reducing the health and ecological damages that Lake Okeechobee currently show.

f. What are the suggested penalties that the contracting agency may consider in addition to its standard penalties for failing to meet deliverables or performance measures provided for the contract?

Contractor delivers digitized yearly summaries starting on or before 8/30/2024 for 2017 to 2022 daily data to FDEP's Water Quality Division, Mr. Edward Smith, director or designate. Quarterly summaries for NOAA satellite data from 01/01/2023 to end of contract made starting 10/31/2024 and monthly thereafter to 12/31/2025. Penalty for non-performance will be 10% of total funding per each missed/ late yearly or quarterly report. Lateness shall be 15 days after each due date.

15. Requester Contact Information

a. First Name	Joseph	**Last Name**	Gilio
b. Organization	Lake Okeechobee Restoration Initiative, Inc.		
c. E-mail Address	jlgilio@lakeorestore.org		
d. Phone Number	(772)631-1157	**Ext.**	

16. Recipient Contact Information

a. Organization	Lake Okeechobee Restoration Initiative, Inc.
b. Municipality and County	Martin

c. Organization Type

- ☐ For Profit Entity
- ☑ Non Profit 501(c)(3)
- ☐ Non Profit 501(c)(4)
- ☐ Local Entity
- ☐ University or College
- ☐ Other (please specify)

d. First Name	Joseph	**Last Name**	Gilio
e. E-mail Address	jlgilio@lakeorestore.org		
f. Phone Number	(772)631-1157		

17. Lobbyist Contact Information

a. Name	None
b. Firm Name	
c. E-mail Address	
d. Phone Number	