

**RESOLUTION NO. 19-09-82**

**A RESOLUTION OF THE VILLAGE COUNCIL OF ISLAMORADA, VILLAGE OF ISLANDS, FLORIDA APPROVING A RENEWAL OF THE AGREEMENT BETWEEN FLORIDA INTERNATIONAL UNIVERSITY AND ISLAMORADA, VILLAGE OF ISLANDS FOR WATER QUALITY TESTING AND MONITORING; AUTHORIZING VILLAGE OFFICIALS TO IMPLEMENT THE TERMS AND CONDITIONS OF THE AGREEMENT; AUTHORIZING THE VILLAGE MANAGER TO EXPEND BUDGETED FUNDS; AUTHORIZING THE VILLAGE MANAGER TO EXECUTE THE RENEWAL; AND PROVIDING FOR AN EFFECTIVE DATE.**

**WHEREAS**, at a meeting on May 28, 2015, the Water Quality Citizens Advisory Committee (the “Committee”) recommended a program of water quality testing to the Village Council of Islamorada, Village of Islands (the “Village”); and

**WHEREAS**, Florida International University (“FIU”) was approached by the Committee and Village staff to perform the recommended water quality testing programs for the Village; and

**WHEREAS**, on July 9, 2015, the Village Council directed the Village Manager to commence the recommended water quality testing as recommended by the Committee and on August 21, 2015, an agreement was executed between the Village and FIU, attached hereto as Exhibit “A”, whereby FIU is to provide testing and monitoring of water quality as described in Appendix “A” thereto; and

**WHEREAS**, the Agreement took effect on October 1, 2015 for an initial one-year term, with renewal provisions for four (4) additional one-year periods by the mutual written agreement of the Parties; and

**WHEREAS**, the Agreement has since been renewed in three (3) prior consecutive years and is scheduled to expire on September 30, 2019 with one (1) more eligible annual renewal remaining; and

**WHEREAS**, the Village and FIU both desire to renew the Agreement for a fourth renewal term as provided for in the Agreement attached as Exhibit "A" hereto.

**NOW, THEREFORE, BE IT RESOLVED BY THE VILLAGE COUNCIL OF ISLAMORADA, VILLAGE OF ISLANDS, FLORIDA, AS FOLLOWS:**

**Section 1.** **Recitals.** The above recitals are true and correct and incorporated herein by reference.

**Section 2.** **Approval of Renewal of Agreement.** The Village Council hereby approves renewal of the agreement between FIU and the Village to provide water quality testing and monitoring, a copy of which is attached as Exhibit "A," together with such non-material changes as may be acceptable to the Village Manager and approved as to form and legality by the Village Attorney.

**Section 3.** **Authorization of Village Officials.** The Village Manager and/or his designee and the Village Attorney are hereby authorized to take all actions necessary to implement the terms and conditions of the agreement.

**Section 4.** **Authorization of Fund Expenditure.** Notwithstanding the limitations imposed upon the Village Manager pursuant to the Village's Purchasing Procedures Ordinance, the Village Manager is authorized to expend budgeted funds to implement the terms and conditions of the agreement.

**Section 5.** **Execution of Agreement.** The Village Manager is authorized to execute the renewal on behalf of the Village, to execute any required agreements and/or documents to implement the terms and conditions of the agreement and to execute any extensions and/or amendments to the agreement, subject to the approval as to form and legality by the Village Attorney.

**Section 6. Effective Date.** This Resolution shall take effect immediately upon adoption.

Motion to adopt by Councilwoman Cheryl Meads, seconded by Councilman Jim Mooney.

**FINAL VOTE AT ADOPTION**

**VILLAGE COUNCIL OF ISLAMORADA, VILLAGE OF ISLANDS**

Mayor Deb Gillis	YES
Vice Mayor Mike Forster	NO
Councilman Ken Davis	ABSENT
Councilwoman Cheryl Meads	YES
Councilman Jim Mooney	YES

**PASSED AND ADOPTED ON THIS 19<sup>TH</sup> DAY OF SEPTEMBER, 2019.**

  
\_\_\_\_\_  
DEB GILLIS, MAYOR

ATTEST:

  
\_\_\_\_\_  
KELLY TOTH, VILLAGE CLERK

APPROVED AS TO FORM AND LEGALITY  
FOR THE USE AND BENEFIT OF ISLAMORADA,  
VILLAGE OF ISLANDS ONLY

  
\_\_\_\_\_  
ROGET V. BRYAN, VILLAGE ATTORNEY

**AGREEMENT  
BETWEEN  
ISLAMORADA, VILLAGE OF ISLANDS  
AND  
THE FLORIDA INTERNATIONAL UNIVERSITY BOARD OF TRUSTEES**

This Agreement entered into between Islamorada, Village of Islands, a Florida municipal corporation (hereinafter "Village"), and The Florida International University Board of Trustees (hereinafter "FIU"), to conduct the work related to the project entitled "Water Quality Monitoring Program for the Village of Islamorada, Florida Keys" (hereinafter, the "Project"). Village and FIU shall hereinafter be referred to collectively as the "Parties".

**WITNESSETH:**

WHEREAS, Village desires to engage and retain the services of FIU and FIU desires to accept such engagement.

NOW THEREFORE, in consideration of the foregoing and mutual promises, covenants and agreements herein contained, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree as follows:

**I. PERIOD OF PERFORMANCE**

This Agreement shall become effective on August 1, 2015 and shall terminate on September 30, 2015 ("Project Period"). Performance may be extended and/or renewed for additional periods by the mutual written agreement of the Parties.

**II. PROJECT ADMINISTRATOR**

All questions concerning administration of this Agreement should be addressed to:

**FOR FIU:**

Robert Gutierrez  
Assistant VP of Research  
Office of Research and Economic Development  
Florida International University

MMC/MARC 430  
11200 SW 8<sup>th</sup> St.  
Miami, Florida 33199  
Phone: (305) 348-2494  
Fax: (305) 348-4117

**FOR VILLAGE:**

Greg Tindle  
Wastewater Program Manager  
Islamorada, Village of Islands  
Village Administrative Center & Public  
Safety Headquarters  
86800 Overseas Highway  
Islamorada, Florida 33036

Phone: 305-664-6451  
Fax: 305-852-9523

All questions regarding the technical aspects of the project should be addressed to:

III. PROJECT DIRECTOR

FOR FIU:

Henry O. Briceño  
Southeast Environmental Research Center  
& Department of Earth and Environment  
Florida International University

11200 SW 8th St, OE-148  
Miami, FL 33199  
305 348 1269  
[bricenoh@fiu.edu](mailto:bricenoh@fiu.edu)  
<http://casgroup.fiu.edu/serc/>  
[www.henrybriceno.com](http://www.henrybriceno.com)

FOR VILLAGE:

Greg Tindle  
Wastewater Program Manager  
Islamorada, Village of Islands  
Village Administrative Center & Public  
Safety  
Headquarters  
86800 Overseas Highway  
Phone: 305-664-6451  
Fax: 305-852-9523  
[greg.tindle@islamorada.fl.us](mailto:greg.tindle@islamorada.fl.us)

IV. STATEMENT OF WORK

Specific Responsibilities of FIU will be found in the attached Statement of Work (Appendix A hereto).

V. COMPENSATION

Funds provided for FIU's involvement in this project shall be the fixed price amount of \$18,110.67 payable to FIU upon execution of this Agreement.

Payment shall be made by Village via wire (electronic funds) transfer to: Bank of America, ABA#063100277, Account# 001595614027.

Should Village fail to timely make any of the payments set forth above, FIU shall have no further obligation to continue performance of this Agreement.

VI. TECHNICAL REPORTS

FIU shall maintain clear and accurate records of the work conducted throughout the project period so that Village Project Director may readily evaluate the progress of the study at any time.

VII. INDEPENDENT CONTRACTOR

The officers, employees and agents of each party shall not be considered the officers, employees or agents of the other party for purposes of accomplishing the work to be performed under this Agreement or for any other purpose. Nothing in this Agreement shall create any

association, partnership or joint venture between the parties or any employer-employee relationships. Nothing in this agreement shall be deemed to affect the rights, privileges and immunities afforded by law to FIU, the Florida Board of Governors and the State of Florida and their respective trustees, officers, employees and agents.

### **VIII. INTELLECTUAL PROPERTY**

Inventions made solely by FIU faculty, students and staff under this Agreement will be solely owned by FIU. Inventions made jointly by FIU and VILLAGE will be owned jointly by VILLAGE and FIU, who agree to jointly determine patent filing and licensing subject to existing patent law. Inventions made solely by VILLAGE will be solely owned by VILLAGE. This understanding is subject to the rights of the U.S. Government, if any.

### **IX. PUBLICATION**

Nothing contained in this Agreement shall preclude FIU or its employees or students from publishing and copyrighting scholarly articles, abstracts, theses and similar documents or presentations concerning the work conducted under this Agreement.

### **X. TERMINATION**

#### **A. Termination at Will:**

This agreement may be terminated by either party hereto by written notice to the other party of such intent to terminate at least sixty (60) days prior to the effective date of such termination.

#### **B. Termination for Breach.**

Each Party by written notice to the other Party may terminate this Agreement for the other Party's breach of a material term of this Agreement. Termination shall be upon no less than twenty four (24) hours' written notice.

#### **C. Non-Waiver/Notices:**

Failure by either Party to insist upon strict performance of any of the provisions of this Agreement, or either Party's failure or delay in exercising any rights or remedies provided herein or by law, shall not be deemed a waiver of any rights of either Party to insist upon strict performance hereof or of any of either Party's rights or remedies under this contract or law, and shall not operate as a waiver of any of the provisions hereof or as a modification of the terms of the Agreement.

Any notice required by this Agreement shall be delivered by Certified Mail, return receipt requested, by facsimile transmission, overnight delivery service or in person.

#### **D. Termination Arrangements:**

After receipt of a notice of termination and except as otherwise directed by Village, FIU shall:

1. Stop work under the Agreement on the date, and to the extent specified in the notice of termination.
2. Place no further orders or Agreements for materials, services, or facilities, except as may be necessary for completion of such portion of work under the Agreement as is not terminated.
3. Terminate all orders and Agreements to the extent that they relate to the performance of work which was terminated.
4. Handle all Village property as directed by Village.
5. Prepare all necessary reports and documents required under the terms of the Agreement up to the date of termination.

Regardless of reasons for the termination, Village shall compensate FIU for actual costs incurred up to the time of termination including for all non-cancelable commitments entered into by FIU in furtherance of this Agreement up to the effective date of the termination.

#### **XI. MODIFICATION**

This Agreement may only be changed or modified by an amendment executed by the Parties in the same fashion as the original.

#### **XII. APPLICABLE LAW**

The Parties' rights, obligations and remedies under this Agreement shall be interpreted and governed in all respects by the laws of the State of Florida. The Parties consent to the sole and exclusive jurisdiction of the courts of the State of Florida in connection with any dispute arising out of this Agreement and agree to submit to the personal jurisdiction and venue of a court of subject matter jurisdiction located in Miami-Dade County, State of Florida.

#### **XIII. COMPLETE AGREEMENT**

This Agreement is intended as the complete and exclusive statement of the agreement between the Parties. Parole or extrinsic evidence shall not be used to vary or contradict the express terms of this Agreement, and recourse may not be had to alleged dealings, usage of trade, course of dealing, or course of performance to explain or supplement the express terms of this Agreement.

All appendices to this Agreement are incorporated as if set out fully herein. In the event of any inconsistency(ies) or conflict(s) between the language of this Agreement and the attachments hereto, the language of such attachments shall be controlling but only to the extent of such conflict(s) or inconsistency(ies).

IN WITNESS WHEREOF, the parties have caused this agreement to be executed by their respective duly authorized officers.

**The Florida International University  
Board of Trustees**

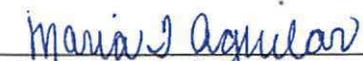


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Robert Gutierrez  
Assistant VP of Research, Pre-Award  
Office of Research and Economic  
Development  
Florida International University

Date: 8/21/15

Islamorada, Village of Islands



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Name: Maria T. Aguilar  
Title: Village Manager  
Islamorada, Village of Islands

Date: 8/20/2015

**Appendix A**

**STATEMENT OF WORK**



Water Quality Monitoring Program for Village of Islamorada,  
Florida Keys

Proposal submitted to:

Village of Islamorada: Water Quality Improvement

Citizens' Advisory Water Testing Sub-Committee

**Attention: Mr. Greg Tindle**

Wastewater Program Manager

Proposal submitted by:

**Henry Briceño, Ph.D.**

Florida International University, Southeast Environmental Research Center

June 22<sup>th</sup>, 2015

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# Water Quality Monitoring Program for Village of Islamorada.

## INTRODUCTION

Internal nutrient loading and freshwater runoff from the Florida Keys themselves has significant effects on the physical, chemical, and biological composition of waters within the Florida Keys National Marine Sanctuary, especially in canal and coastal waters at the mouth of canals. Kruczynski (1999) and Kruczynski and Fletcher (2011) reported elevated nutrient concentrations (dissolved and particulate), frequent hypoxia in canal systems, algal blooms, fish kills, macroalgal overgrowth of seagrasses and corals, and coral diseases.

Many canals in the Florida Keys do not meet the State's minimum water quality criteria and are a potential source of nutrients and other contaminants to near shore waters designated as Outstanding Florida Waters. Hence, the Village of Islamorada has approved moving forward incorporation of communities to central sewer systems to improve canal and coastal water quality. The Village has selected ten (5) canals to monitor the changes which would occur as consequence of the elimination of septic tanks and cesspits.

Previous investigations by Florida International University have documented relatively elevated nutrient concentrations of nitrogen, phosphorous and silica in waters close to shore along the Keys, and corresponding responses from the system, such as higher phytoplankton biomass (CHLA), turbidity and light attenuation ( $K_d$ ), as well as lower oxygenation (DO) and lower salinities of the water column (Briceño and Boyer, 2014). These waters are part of the so called Halo Zone (RAD 2011), a belt following the shoreline which extends up to 500 meters offshore, and whose water quality characteristics are closely related to those in canals and are affected by quick movement of infiltrated runoff and wastewaters (Kruczynski, 1999), tides and high water tables.

## MONITORING

### Objectives of WQ monitoring of canals

Some canals do not meet the State of Florida minimum water quality criteria and are potential sources of low quality water to near shore Outstanding Florida Waters. The Objective of the Village of Islamorada Monitoring Project is to create a Water Quality Monitoring Program and to gather baseline data from a series of canals, to detect changes in water quality as a function of remediation activities, especially remediation linked to the installation of wastewater collection systems. Most of these canals are lined with single-family residences that were constructed prior to 1970, which have/had inadequate sewage treatment systems with poorly functional septic systems or cesspits. The Village of Islamorada has selected five (5) canals (Table 1), to trace changes in water quality brought about by the incorporation of surrounding dwelling units to the sewer collection system. Monitoring water quality in those canals is proposed to be performed during a five year period.

Specific objectives are as follows:

- To provide data needed to make unbiased, statistically rigorous statements about the status and temporal trends of water quality parameters in the selected canals
- To inform management actions and policy development processes for improved water quality in the Village of Islamorada

The major tasks for this project include: logistical planning, field measurements, water sampling, laboratory analysis, data management, data analysis, interpretation and reporting.

## **REQUESTED MONITORING PROGRAM**

According to the Village of Islamorada request, the purpose of the Project is to create a Water Quality Monitoring Program and gather baseline data from five canals (Table 1) performed quarterly. Water samples and water column measurements will be taken at all five sites. The test will measure a series of physiochemical parameters attempting to detect the relative impacts of major pollution discharges and changes linked to remediation, especially the incorporation of dwelling units to the sewer collection system.

Reporting will include production of a geo-referenced station map, data reports and an interpretive report. The principal investigator will be responsible for ensuring the results are compiled and the complete data set is submitted to the Village in a timely fashion. Upon completion of the analysis of samples, the principal investigator will produce a statistical summary of the data in a logical format based on the station design. The statistical summary will include calculated averages, sample variances, ranges and number of samples. The principal investigator will submit a data and narrative report documenting the results of each quarterly survey. The data will be analyzed using appropriate statistical tests of significance to meet the specific objectives of the monitoring program.

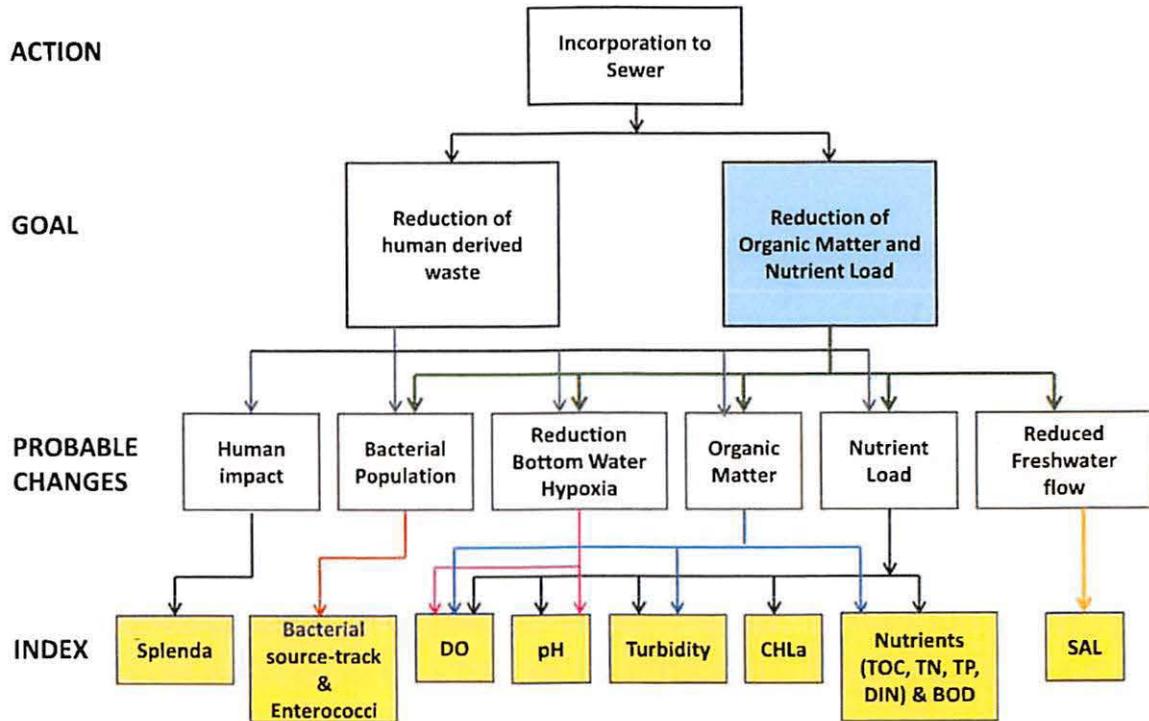
**Table 1:** Status of selected canals for monitoring, according to Monroe County Canal Inventory (AMEC 2013)

	PLANTATION KEY			LOWER MATECUMBE	
	CANAL 118	CANAL 120	CANAL 114	CANAL 145	CANAL 152
FID	153	410	147	447	440
Canal_Name	118 PLANTATION KEY	120 PLANTATION KEY	114 PLANTATION KEY	145 LOWER MATECUMBE KEY	152 LOWER MATECUMBE KEY
Mile_Marke	90	89	90	76	74
Bayside	X	X			X
Oceanside			X	X	
Weed_Gate		X		X	X
Culvert		X			X
Culvert_Ma					X
Backfill	X	X	X	X	
Organic_Re				X	
Pumping	X	X			X
Existing_T	Several Aerators	None	None	Several Aerators	Poorly maintained culvert
Area_ac	17.064489	12.909727	3.4214	2.364113	10.253825
Length_ft	5249.328	3838.567819	2001.3063	1771.6482	3116.785219
Num_of_Con	7	9	0.6	1	4
Num_of_Mou	2	1	1	1	1
Deg_of_Sta	2.213571	3.208968	0.26264	0.137764	2.221063
Min_El	-26.18	-19.1	-12.74	-18.88	-17.17
Max_El	-6.4	-6.36	-7.95	-6.76	-5.26
Ave_El	-13.33	-11.09	-10.16	-12.52	-8.03
Ave_Org_Th	0.55	0.67	0.47	0.77	0.63
Canal_Cate					
WQ_Summary	Fair	Poor	Fair	Poor	Fair
WQ_Ranking		86		87	
DO_mg_L	3.13	0.73	3.02	2.99	2.66
Turb_NTUs	0.23	2.89	0.88	2.23	0.58
Parcels	271		61	37	141
Tid_Ran_Ft	0.579999		2.14	1.879999	0.75

## CONCEPTUAL GUIDELINES TO MONITORING

In the present project, monitoring is defined as the continued observation of the selected canal waters to determine spatial and temporal variability in water quality. Monitoring involves systematic, long-term data collection and analysis to measure the status of water quality and to detect changes over time. Detecting and quantifying such changes at each specific canal (Table 1) can focus research on quantifying and qualifying those changes to evaluate the success of corrective actions. As shown in Figure 1, ACTIONS like elimination of septic tanks and incorporation to the sewer network is expected to lead to the achievement of those desired goals established as landmarks by the Village of Islamorada, namely, reduction of human derived waste, and decline in nutrients and organic matter entering the canal waters. Reaching or approaching these GOALS entails important consequences in the canal conditions, which may lead to a series of PROBABLE CHANGES occurring in the water column: human impact, bacterial population, incidence of hypoxia, organic matter, nutrient load and freshwater inflow should change after incorporation. Finally, if such changes were to occur, we could detect and quantify them with our analytical toolkit using INDEXES or indicators of environmental conditions (Doren et al 2009).

Let us use the **Reduction of Organic Matter and Nutrient Loads** goal (Figure 1) as example to lay down the scientific rationale behind the proposed monitoring strategy. If in fact this **Incorporation to Sewer** network lead towards the desired **GOAL of Reducing Organic Matter and Nutrient Loads**, then **Bacterial Population** would **CHANGE** and techniques of **Bacterial Source Track** or **Enterococci content** would detect such changes. Also, **Reduction of Bottom Waters Hypoxia** would be expected leading to detectable changes in **dissolved oxygen (DO)** and **acidity (pH)**. Similar analysis applies for different changes and useful indexes to measure such changes.



**Figure 1:** Conceptual framework for Monitoring Design

Enterococci are Gram-positive, catalase-negative, non-spore-forming, facultative anaerobic bacteria, which usually inhabit the alimentary tract of humans in addition to being isolated from environmental and animal sources. They are able to survive a range of stresses and hostile environments, including those of extreme temperature (5–65 °C), pH (4.5–10.0) and high NaCl concentration, enabling them to colonize a wide range of niches, and to be used as indicator of fecal matter in water and soil.

An important class of anthropogenic compounds which have been detected in wastewater, surface and ground water, and tap water are artificial sweeteners like acesulfame and sucralose (Splenda). Modern wastewater treatment plants are not geared up to remove these compounds, so they are emitted in the waste streams to the environment. Studies in North America (Mawhinney et al. 2011) have detected artificial sweeteners in marine and coastal waters, wastewater treatment plant effluents and groundwater. In particular, the consistent presence of sucralose has led to its proposal

as an indicator of the presence of wastewater in surface waters. We will use sucralose (Splenda) as indicator of human impact given its special properties: not present naturally, conservative behavior, relatively easy to measure at low concentrations down to 10 ng/L, not effectively metabolized, water soluble, long environmental half-life (1-2 years), low toxicity and non-reactive nature.

## PROPOSED MONITORING PROGRAM

The proposed monitoring project has been conceptually developed as a Before-After Impact Design experiment with multiple sites (Eberhardt, 1976; Stewart-Oaten et al., 1986) and includes an initial characterization followed by periodic monitoring:

**1. Preliminary characterization** of water quality at each canal will be performed with:

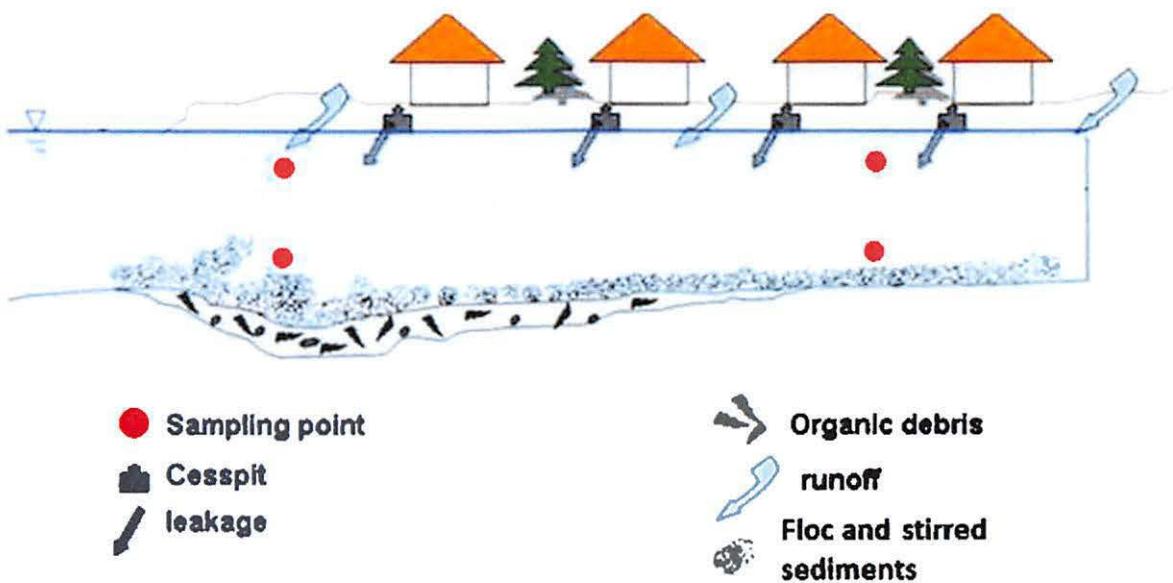
- a- Vertical profiles (casts). Several profiles will be measured only for this initial characterization (Figures 3 to 7) to define at least the two best sites to perform monitoring at each canal the rest of the program.
- b- Once the sites (stations) are selected, water sampling and analysis, as well as continuous 24-hour recording (diel) of physiochemical properties, will be performed

**2. Periodic monitoring** will consists of quarterly water sampling and analysis, as well as vertical cast measurements (profiles) and continuous 24-hour recording (diel) of physiochemical properties at the sites previously selected.

We will deploy multi-sensor, water quality monitoring instruments (YSI) to measure physiochemical parameters including depth (m), salinity (PSU), specific conductivity, temperature (°C), dissolved oxygen (DO; mg l<sup>-1</sup>), %DO Saturation, pH, and turbidity, from both, vertical profiles and diel measurements

Water samples will be collected quarterly in at least two stations for a minimum of 4 samples per canal. Samples will be collected at a depth of 1-3 ft below the water surface and 1-3 ft above bottom depth using a Niskin sampler (Fig 2). Sixty milliliters (60 ml) will be drawn with a syringe and filtered through a 25 mm Whatman GF/F filter with a nominal pore size of 0.8 µm. The filtrate will be collected in a 60 ml high density polyethylene (HDPE) bottle and the filter stored in a vial with 90% acetone for extraction and analysis of chlorophyll a (CHLA, µg l<sup>-1</sup>).

Filtered water samples will be analyzed for dissolved nutrients: ammonium ( $\text{NH}_4^+$ ), nitrate+nitrite ( $\text{NO}_x^-$ ), nitrite ( $\text{NO}_2^-$ ), soluble reactive phosphorus (SRP), and using standard NELAP Certified laboratory methods. An additional 120 ml sample will be collected directly from the Niskin bottle for analysis of total nitrogen (TN), total phosphorus (TP). Finally, two 100 ml water samples, one for Enterococci analysis (Enterolert method), one for analysis of Splenda content will be obtained (Table 2).



**Figure 2:** Canal sampling design

**Table 2: Water Quality Variables and Testing Parameters**

CHEMICAL VARIABLES	PARAMETERS
Chlorophyll a (CHLa)	Depth
Nitrite (NO <sub>2</sub> )	Salinity
Nitrate( NO <sub>3</sub> )*	Specific Conductivity
Ammonium (NH <sub>4</sub> )	Temperature
Nitrite+Nitrate (NO <sub>x</sub> )	Dissolved Oxygen
Dissolved Inorganic Nitrogen (DIN)	pH
Solubre Reactive Phosphate (SRP)	Turbidity
Total Nitrogen (TN)	% Dissolved Oxygen Saturation
Total Phosphorous (TP)	
Total Organic Nitrogen (TON)	
Splenda content	
Enterococci (Enterolert)	

### **Analytical Methods**

The following are the standard methods of analysis of the Southeast Environmental Research Center Water Quality Lab which will be used for the proposed monitoring program. NH<sub>4</sub><sup>+</sup> is analyzed by the indophenol method (Koroleff 1983). NO<sub>2</sub><sup>-</sup> is analyzed using the diazo method and NO<sub>x</sub><sup>-</sup> is measured as nitrite after cadmium reduction following the methodology of Grassoff (1983a, b). The ascorbic acid/molybdate method is used to determine SRP (Murphy and Riley 1962). High temperature combustion and hlg temperature dlgestlon are used to measure TN (Frankovich and Jones 1998; Walsh 1989) and TP (Solórzano and Sharp 1980), respectively. Samples are analyzed for CHLA content by spectrofluorometry of acetone extracts (Yentsch and Menzel 1963).

Protocols are presented in EPA (1993) and elsewhere as noted. All elemental ratios discussed are calculated on a molar basis. DO saturation in the water column (DO<sub>sat</sub> as %) is either calculated using the equations of Garcia and Gordon (1992) or directly read from the sondes. Some parameters are not measured directly but calculated by difference. Nitrate (NO<sub>3</sub><sup>-</sup>) is calculated as NO<sub>x</sub><sup>-</sup>-NO<sub>2</sub><sup>-</sup>; total dissolved inorganic nitrogen (DIN) as NO<sub>x</sub><sup>-</sup> + NH<sub>4</sub><sup>+</sup>., and total organic nitrogen (TON) as TN - DIN.

All variables are reported in ppm (mg l<sup>-1</sup>) unless otherwise noted. Sucralose will be analyzed using liquid chromatography tandem mass spectrometry (LC-MS/MS; Mawhinney et al. 2011; Batchu et al. 2013).

In accordance with EPA policy, this Islamorada water quality monitoring program adheres to existing rules and regulations governing QA and QC procedures as described in EPA guidance documents. The FIU-SERC Nutrient Laboratory will maintain NELAP certification during this project.

## **Data Management**

The principal investigator will develop and maintain protocols and procedures under a data management program for water quality monitoring to ensure that the data generated are accessible to potential users in a timely manner. All original and ancillary data produced under this project will be generated, processed, stored, and archived in a manner that provides detailed documentation of the procedures used at all stages of data collection, reduction, processing, analysis, and storage.

## **Results/Outputs and Deliverables**

### **Quarterly Progress Reports**

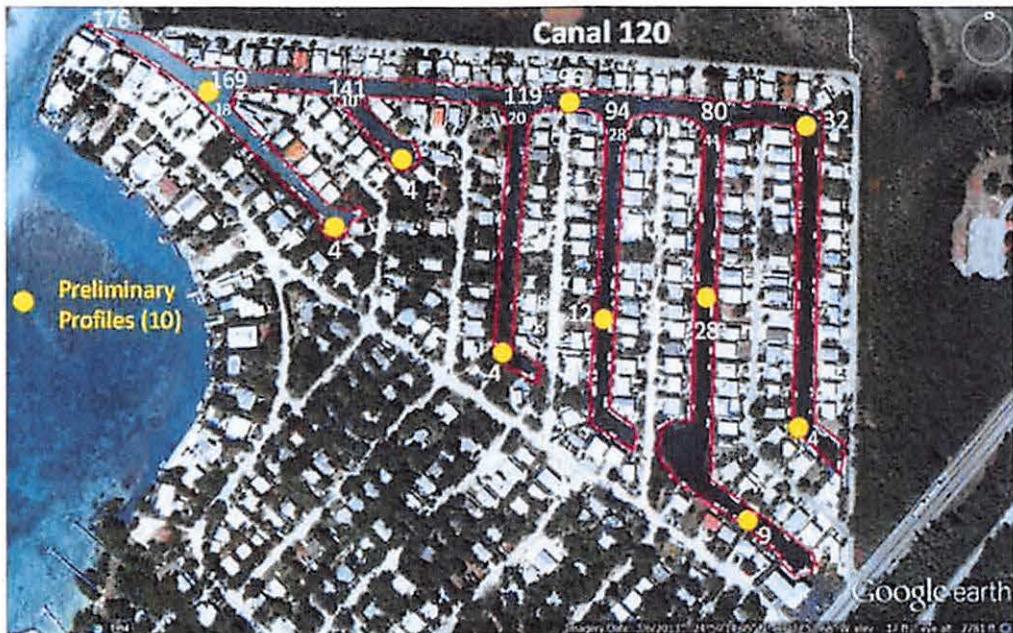
Upon completion of the data gathering and/or analysis of samples from each quarterly survey, the PI will produce a statistical summary of the data. The statistical summary will include calculated averages, sample variances, ranges, and number of samples. When appropriate, the PI will provide the summaries in a graphical format. The PI will submit a data and narrative report documenting the results of each quarterly survey. The data report will include the raw data and statistical summaries in hard copy and electronic format. The PI will evaluate the data in accordance with the data quality objectives developed in the Work/Quality Assurance Project Plan.



**Figure 3:** Canal located at Harbor Drive, Plantation Key (#114; AMEC 2013). Proposed preliminary characterization profiles (yellow dots). Numbers are cumulative Equivalent Dwelling Units



**Figure 4:** Canal located at Azalea St. Plantation (#118; AMEC 2013). Proposed preliminary characterization profiles (yellow dots). Numbers are cumulative Equivalent Dwelling Units



**Figure 5:** Canal located at Sioux St. Plantation Key (#120; AMEC 2013). Proposed preliminary characterization profiles (yellow dots). Numbers are cumulative Equivalent Dwelling Units



**Figure 6:** Canal located at Columbus Drive, Lower Matecumbe (#145; AMEC 2013). Proposed preliminary characterization profiles (yellow dots). Numbers are cumulative Equivalent Dwelling Units



**Figure 7:** Canal located at Venetian Drive, Lower Matecumbe (#152; AMEC 2013). Proposed preliminary characterization profiles (yellow dots) and potential sampling sites (blue circle). Numbers are cumulative Equivalent Dwelling Units

#### Annual Report

After completion of analysis of data from the first year of activities, the PI will produce statistical summaries of the data collected at each water quality monitoring station to be incorporated in an annual report. All data will be evaluated in relation to the data quality objectives developed in the Work/Quality Assurance Project Plan. The data will be analyzed using appropriate statistical tests of significance to meet the specific objectives of the monitoring program.

The draft annual report should summarize the objectives, methods, and results of water quality monitoring. The report should interpret the results in relation to the objectives of the canal monitoring program. The draft annual report will be reviewed by the Village of Islamorada and returned with comments. The PI will address the comments and submit the final annual report with revisions.

### Deliverable Items and Schedule

Quarterly reports will be submitted to the Village of Islamorada within 60 days of end of quarter. Annual reports will be submitted to the Village of Islamorada within 90 days of end of collection.

### **Project Management**

The Principal Investigator (PI) will be responsible for administration of all grant activities, financial budgeting, procurement of services, supplies, and equipment, compliance with QA/QC, and reporting.

### **SUMMARY BUDGET**

FLORIDA INTERNATIONAL UNIVERSITY PROPOSAL BUDGET SHEET						
Principal Investigator/Project Director:	Henry O. Briceno					
Agency:	City of Islamorada					
Level 4 Budgetary Account	Year 1	Year 2	Year 3	Year 4	Year 5	Total Year 1 - 5
P77100 - Salaries & Wages	17,456.88	17,980.59	18,520.01	20,005.08	20,605.23	\$ 94,567.79
P77156 - Fringe	5,972.39	6,151.56	6,336.11	6,903.00	7,110.09	\$ 32,473.17
P71121 - Domestic Travel	3,926.00	4,043.78	4,165.09	4,178.64	4,418.75	\$ 20,732.26
P77300 - Materials and Supplies	22,263.00	22,533.63	22,808.41	23,087.41	23,370.74	\$114,063.19
<b>Total Direct Costs By Year</b>	<b>49,618.27</b>	<b>50,709.56</b>	<b>51,829.62</b>	<b>54,174.14</b>	<b>55,504.81</b>	<b>261,836.41</b>
P75700 - Indirect Costs	22,824.41	23,326.40	23,841.62	24,920.10	25,532.21	\$120,444.75
<b>Total Direct &amp; Indirect Costs By Year</b>	<b>\$72,442.68</b>	<b>\$74,035.96</b>	<b>\$75,671.24</b>	<b>\$79,094.24</b>	<b>\$81,037.03</b>	<b>\$382,281.15</b>

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