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CLERK OF THE BOARD
OF COUNTY COMMISSIONERS
MIAMI-DADE COUNTY, FLORIDA

Memorandum

MIAMI-DADE COUNTY

Agenda Item No. 8(M)(1)

Date: June 3, 2014

To: Honorable Chairwoman Rebeca Sosa
and Members, Board of County Commissioners

From: Carlos A. Gimenez
Mayor

Subject: Resolution Authorizing Execution of a Collaborative Agreement with the United States Geological Survey for Biological Monitoring

Resolution No. R-522-14

Recommendation

It is recommended that the Board of County Commissioners (Board) approve the attached resolution authorizing execution of a Collaborative Agreement with the United States Geological Survey for biological monitoring in order to carry out the County's obligations pursuant to the Settlement Agreement between Miami-Dade County and Petitioners Dan Kipnis, Tropical Audubon Society, Inc. and Biscayne Bay Waterkeeper, Inc. ("the Petitioners") in association with the -50 Feet Miami Harbor Federal Navigation Project Phase III. The Settlement Agreement was approved by the Board on May 1, 2012 as Resolution No. R-422-12 and was fully executed on May 16, 2012.

Scope

Activities associated with this agreement will occur in Biscayne Bay within Commission Districts 3, 5, and 7 (Commissioners Edmonson, Barreiro, Suarez).

Fiscal Impact/Funding Source

Under the proposed Collaborative Agreement, Miami-Dade County will pay the United States Geological Survey $229,500 for Monitoring Project 2 activities as stated in the Settlement Agreement. The Settlement Agreement required fund transfers totaling $1,310,000 to be deposited into the Biscayne Bay Environmental Trust Fund by the Seaport Department. In accordance with the schedule of fund transfers in the Settlement Agreement, the initial amount of $665,000 has been transferred to the Biscayne Bay Environmental Enhancement Trust Fund and will provide the funding for Monitoring Project 2 activities.

Track Record / Monitor

The Restoration and Enhancement Section Chief, Stephen Blair, within the Department of Regulatory and Economic Resources, Division of Environmental Resources Management, will monitor the activities performed with these funds.

Background

In 2007, the US Congress authorized the Miami Harbor to be deepened to a controlling depth of 50 feet. In November 2011, the Petitioners sued the Florida Department of Environmental Protection to challenge the issuance of the required dredging permit to Miami-Dade County. To resolve the Petitioners' objections and concerns with environmental impacts from the dredging, and in order to allow the project to proceed, Miami-Dade County (as an intervener) entered into a Settlement Agreement with the Petitioners. The Settlement Agreement was approved by the Board on May 1, 2012 as Resolution No. R-422-12 and was executed on May 16, 2012. The Settlement Agreement is attached to Resolution No. R-422-12.

The Settlement Agreement specified a schedule of fund transfers to be deposited by the County

into the Biscayne Bay Environmental Enhancement Trust Fund to pay for the Biscayne Bay environmental enhancement and monitoring projects listed in Schedule A of the Settlement Agreement. The initial transfer was made on schedule by the Seaport Department. Of the Monitoring Projects listed in Schedule A, Monitoring Project 2 will assess the small fish and macro-invertebrates (crabs and shrimp) in the Rickenbacker Basin area bounded by the Port of Miami to the north, the mainland to the west, Fisher Island and Virginia Key to the east, and Rickenbacker Causeway to the south.

From 2005 to 2011, the United States Geological Survey conducted a monitoring program to assess the small fish and macro-invertebrates in various areas of Biscayne Bay, including the Rickenbacker Basin. The Settlement Agreement requires that this United States Geological Survey data be used as the baseline data for the Monitoring Project 2. Because the prior monitoring project was conducted by the United States Geological Survey, and to provide continuity of the methodology, the proposed Collaborative Agreement with the United States Geological Survey is recommended for approval.

Jack Osterholt, Deputy Mayor

MEMORANDUM
(Revised)

TO: Honorable Chairwoman Rebeca Sosa
and Members, Board of County Commissioners

DATE: June 3, 2014

FROM: R. A. Cuevas, Jr.
County Attorney

SUBJECT: Agenda Item No. 8(M)(1)

Please note any items checked.

_____ **"3-Day Rule" for committees applicable if raised**

_____ **6 weeks required between first reading and public hearing**

_____ **4 weeks notification to municipal officials required prior to public hearing**

_____ **Decreases revenues or increases expenditures without balancing budget**

_____ **Budget required**

_____ **Statement of fiscal impact required**

_____ **Ordinance creating a new board requires detailed County Mayor's report for public hearing**

✓ **No committee review**

_____ **Applicable legislation requires more than a majority vote (i.e., 2/3's ____, 3/5's ____, unanimous _____) to approve**

_____ **Current information regarding funding source, index code and available balance, and available capacity (if debt is contemplated) required**

Approved _____ Mayor
Veto _____
Override _____

Agenda Item No. 8(M)(1)
6-3-14

RESOLUTION NO. R-522-14

RESOLUTION AUTHORIZING THE COUNTY MAYOR OR COUNTY MAYOR'S DESIGNEE TO EXECUTE A COLLABORATIVE AGREEMENT WITH THE UNITED STATES GEOLOGICAL SURVEY FOR UP TO $229,500.00 TO CONDUCT BIOLOGICAL MONITORING PURSUANT TO SETTLEMENT AGREEMENT WITH PETITIONERS DAN KIPNIS, TROPICAL AUDUBON SOCIETY, INC. AND BISCAYNE BAY WATERKEEPER, INC. PREVIOUSLY APPROVED BY THIS BOARD; AUTHORIZING THE COUNTY MAYOR OR COUNTY MAYOR'S DESIGNEE TO EXECUTE NECESSARY AMENDMENTS TO THE COLLABORATIVE AGREEMENT; AND AUTHORIZING THE COUNTY MAYOR OR COUNTY MAYOR'S DESIGNEE TO EXERCISE THE PROVISIONS CONTAINED THEREIN

WHEREAS, this Board desires to accomplish the purposes outlined in the accompanying memorandum, a copy of which is incorporated herein by reference; and

WHEREAS, on May 1, 2012, the Board approved a Settlement Agreement between Miami-Dade County and Petitioners Dan Kipnis, Tropical Audubon Society, Inc. and Biscayne Bay Waterkeeper, Inc. regarding the -50 Feet Miami Harbor Federal Navigation Project Phase III ("the Port Dredging Project") as Resolution No. R-422-12, and said Settlement Agreement was executed on May 16, 2012; and

WHEREAS, the Settlement Agreement specifies a schedule of fund transfers to be deposited in the Biscayne Bay Environmental Enhancement Trust Fund to pay for the Biscayne Bay environmental enhancement projects listed in Schedule A of the Settlement Agreement; and

WHEREAS, the Settlement Agreement designates Miami-Dade County as the responsible entity for implementation and coordination of the projects identified in Schedule A; and

WHEREAS, of the required monitoring projects listed in Schedule A of the Settlement Agreement, Monitoring Project 2 will assess the small fish and macro-invertebrates in the Rickenbacker Basin area bounded by the Port of Miami to the north, the mainland to the west, Fisher Island and Virginia Key to the east, and Rickenbacker Causeway to the south; and

WHEREAS, the United States Geological Survey conducted tasks similar to Monitoring Project 2 from 2005 to 2011, which data is to be used as baseline data for continuing the assessment in accordance with the Settlement Agreement; and

WHEREAS, Miami-Dade County is desirous of obtaining such services from the United States Geological Survey,

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF MIAMI-DADE COUNTY, FLORIDA, that this Board authorizes the County Mayor or County Mayor's designee to execute a Collaborative Agreement, in substantially the form attached hereto and made a part hereof, with the United States Geological Survey to conduct biological monitoring in order to carry out the County's obligations pursuant to the above-referenced Settlement Agreement; authorizes the County Mayor or County Mayor's designee to execute amendments to this agreement, including extensions of time and changes to the scope of work, so long as such amendments do not require additional funding from the County; authorizes the County Mayor or County Mayor's designee to file and execute necessary amendments to this agreement; and authorizes the County Mayor or County Mayor's designee to exercise the provisions contained therein.

The foregoing resolution was offered by Commissioner **Lynda Bell**, who moved its adoption. The motion was seconded by Commissioner **José "Pepe" Diaz** and upon being put to a vote, the vote was as follows:

Rebeca Sosa, Chairwoman			**aye**
Lynda Bell, Vice Chair			**aye**
Bruno A. Barreiro	**absent**	Esteban L. Bovo, Jr.	**aye**
Jose "Pepe" Diaz	**aye**	Audrey M. Edmonson	**aye**
Sally A. Heyman	**aye**	Barbara J. Jordan	**aye**
Jean Monestime	**aye**	Dennis C. Moss	**absent**
Sen. Javier D. Souto	**aye**	Xavier L. Suarez	**aye**
Juan C. Zapata	**absent**		

The Chairperson thereupon declared the resolution duly passed and adopted this 3rd day of June, 2014. This resolution shall become effective ten (10) days after the date of its adoption unless vetoed by the Mayor, and if vetoed, shall become effective only upon an override by this Board.

MIAMI-DADE COUNTY, FLORIDA
BY ITS BOARD OF
COUNTY COMMISSIONERS

HARVEY RUVIN, CLERK

By: Christopher Agrippa
Deputy Clerk

Approved by County Attorney as
to form and legal sufficiency.

Abbie Schwaderer-Raurell

Collaborative Agreement

Agreement between U.S. Geological Survey, a Bureau of the Department of the Interior, through the offices of its **Southeast Ecological Science Center (SESC)** , located in **Gainesville, Florida,** hereinafter called "USGS"; and **Miami-Dade County**, located in **Miami, Florida**, hereinafter called "Collaborator."

Whereas, the USGS is authorized to perform collaborative work and prosecute projects in cooperation with other agencies, Federal, State or private, pursuant to 43 USC §36c [and to receive payments in arrears by 43 USC §50b]; and

Whereas, **this collaborative project supports the interests of both parties in the following way:**

Biscayne Bay, which includes Biscayne Bay Aquatic Preserve and Biscayne National Park, is one of the few tropical estuaries located within the continental U.S. The rich biodiversity and health of the Bay is threatened by widespread development. The Port of Miami located on the Bay is being improved in order to capitalize on the increase in trade expected with the expansion of the Panama Canal. Improvements include dredging to widen and deepen major channels within Miami Harbor (Fig. 1A). Dredging commenced in November 2013 and is scheduled to continue for eighteen months. The modifications to the Port have the potential to impact over 400 acres of benthic habitat within Biscayne Bay, and the adjacent coastal area including: seagrass, hard bottom reef, rock rubble, and unvegetated sediments. Channel deepening and widening activities will be conducted within the Rickenbacker Basin of the Biscayne Bay Aquatic Preserve. It is estimated that 0.2 acres of seagrass habitat within the existing channel and 7.7 acres of seagrass habitat outside of the existing channel will be impacted (USACE, 2011). Due to the sensitive nature of the benthic communities in this region, monitoring of those communities is warranted to determine what changes, if any, occur within the Basin, outside of the region of direct impact. The proposed project will assess changes in the monitored communicates, and to what extent, if any those changes are associated with the Port of Miami expansion activities. A long term dataset (2005-2011) collected in the region as part of the USGS South Florida Seagrass Fish and Invertebrate Assessment Network (FIAN) project, (http://sofia.usgs.gov/projects/scopesofwork03/assessnetwk.html) will provide pre-impact baseline information needed to evaluate the impacts of dredging.

Now therefore, the parties hereto agree as follows:

1. **Statement of Work: "See attached Statement of Work – Item A"**

2. **Principal Contacts:** The Principal Investigator assigned to this project from the USGS is:

Andre Daniels
Fish Biologist, Southeast Ecological Science Center, U.S. Geological Survey
3205 College Ave.
Davie, FL 33314
954-236-1263
andre_daniels@usgs.gov

3. **Term.** The collaborative effort provided by USGS and Collaborator will commence on the effective date of this agreement. The effective date of this agreement shall be the later date of (1) **April 1, 2014** or

(2) the date of the last signature by the parties. The expiration date of this agreement shall be **September 30, 2016**. This agreement is subject to renewal only by mutual written agreement of the parties.

4. **Funding**. Collaborator is providing funds to USGS with an estimated value of approximately **$ 229,500**. The billing cycle for this agreement will be quarterly as required by USGS policy for agreements over $25,000.

USGS shall render invoices quarterly to the Collaborator. Payments of bills are due within 60 days after the billing date. If not paid by the due date, interest will be charged at the current Treasury rate for each 30 day period, or portion thereof, that the payment is delayed beyond the due date (31 USC 3717; Comptroller General File B-212222, August 23, 1983).

TNC DUNS # _____

USGS is providing in-kind services valued at $ 84,000.

5. **Termination:** This Agreement may be terminated by either party on 30 days written notice to the other party. In the event of an early termination USGS shall be reimbursed for any completed work or work in progress at the time of termination of the agreement. This provision shall survive the termination of the agreement.

6. **Publications/Reports**: Each Party is free to publish the information and data developed by the study.

7. **Intellectual Property**: No intellectual property is expected to be developed under the research effort. A copy of the data and the reports provided for in the SOW will be delivered to Collaborator at the end of the project.

8. **Notices**: Any notice required to be given or which shall be given under this Agreement shall be in writing and delivered by first class mail to the parties as follows:

USGS:

Technical

Andre Daniels
Fish Biologist,
Southeast Ecological Science Center, USGS
3205 College Ave.
Davie, FL 33314
954-236-1263
andre_daniels@usgs.gov

Administrative
Brenda Turrentine, Administrative Specialist
SESC/USGS
7920 NW 71st Street
Gainesville, FL 32653
(352)264-3513
bturrentine@usgs.gov

Collaborator:

Technical

Steven Blair
Chief
Restoration & Enhancement Section
Environmental Resources Management (DERM)
Miami-Dade Department of Regulatory and
Economic Resources
701 NW 1st Court Suite 400
Miami, FL 33136
305-372-6853

9. **Independent Entity:** For purposes of this Agreement and all services to be provided hereunder, each party shall be, and shall be deemed to be, an independent party and not an agent or employee of the other party. Each party shall have exclusive control over its employees in the performance of the work. .

Neither party may use the name of the other in advertising or other form of publicity without the written permission of the other.

10. **Governing Law/Disclaimer:**

(a) The validity and interpretation of this Agreement are subject to interpretation under Federal Law. Each party agrees to be responsible for the activities, including the negligence, of their employees. As a federal agency, USGS liability is limited by the Federal Tort Claims Act, codified at 28 USC 2671 et seq. USGS warrants that it is self-insured for purposes of Worker's Compensation. 'Miami-Dade County's liability is limited by Section 768.28 of the Florida Statutes."

(b) **THE USGS AND COLLABORATOR MAKE NO EXPRESS OR IMPLIED WARRANTY AS TO THE CONDITIONS OF THE RESEARCH, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE RESEARCH, DATA OR RESULTING PRODUCT INCORPORATING DATA DEVELOPED AND EXCHANGED UNDER THE STATEMENT OF WORK. THESE PROVISIONS SHALL SURVIVE THE TERMINATION OF THE AGREEMENT.**

11. **Entire Agreement:** This Agreement contains all of the terms of the parties and supercedes all prior agreements and understandings related thereto. This Agreement can be changed or amended only by a written instrument signed by the parties.

12. **Disputes:** The signatories to this Agreement shall expend their best efforts to amicably resolve any dispute that may arise under this Agreement. Any dispute that the signatories are unable to resolve shall

be submitted to the Director of the USGS or his/her designee and the President/Chairman/ Sr. Manager of Collaborator or his/her designee for resolution.

13. **Miscellaneous Provisions:** Pursuant to the Anti-Deficiency Act, codified at 31 U.S.C. §1341 (a)(1), nothing herein contained shall be construed as binding the USGS to expend in any one fiscal year any sum in excess of its appropriations or funding in excess or what it has received for the collaborative work outlined in the Statement of Work.

IN WITNESS WHEREOF, the parties have caused this agreement to be executed the last date listed below.

U.S. GEOLOGICAL SURVEY	COLLABORATOR
By: Kenneth G Rice	By : _____
Name: Kenneth G Rice	Name: _____
Title: Director, SESC	Title: _____
Date: 3/11/14	Date: _____

STATEMENT OF WORK – ITEM A

Faunal Monitoring in Response to Harbor Dredging in Port of Miami

STATEMENT OF PROBLEM:

The Port of Miami is being improved in order to capitalize on the increase in trade expected with the expansion of the Panama Canal. Improvements include a tunnel to facilitate truck traffic and dredging to widen and deepen major channels within Miami Harbor (Fig. 1A). Dredging commenced in November 2013 and is scheduled to continue for eighteen months. The modifications to the Port have the potential to impact over 400 acres of benthic habitat including: seagrass, hard bottom reef, rock rubble, and unvegetated sediments. Impacts to manatees, sea turtles, and fish and invertebrate species may occur due to loss of this habitat. The proposed project will monitor the impacts of the Port of Miami expansion on benthic communities found within Miami Harbor. It is estimated that 0.2 acres of seagrass habitat within the existing channel and 7.7 acres of seagrass habitat outside of the existing channel will be impacted (USACE, 2011). Reference sites located outside the impact zone will also be monitored to support statistical inferences drawn from the field observations. A long term dataset (2005-2011) collected in the region as part of another project will provide pre-impact baseline information needed to evaluate the impacts of dredging.

The POM is situated in northern Biscayne Bay (Fig. 2). Biscayne Bay is home to many protected, threatened and endangered species including the Florida manatee, sea turtle species and bottlenose dolphins, in addition to recreational and commercial species. Terrestrial and marine habitats surrounding the Port include beaches, mangroves, seagrass beds and hardbottom and reef communities. Seagrass and reef habitats are considered essential fish habitat by the South Atlantic Fishery Management Council and National Marine Fisheries Service (NOAA, 2000; SAFMC, 1998).

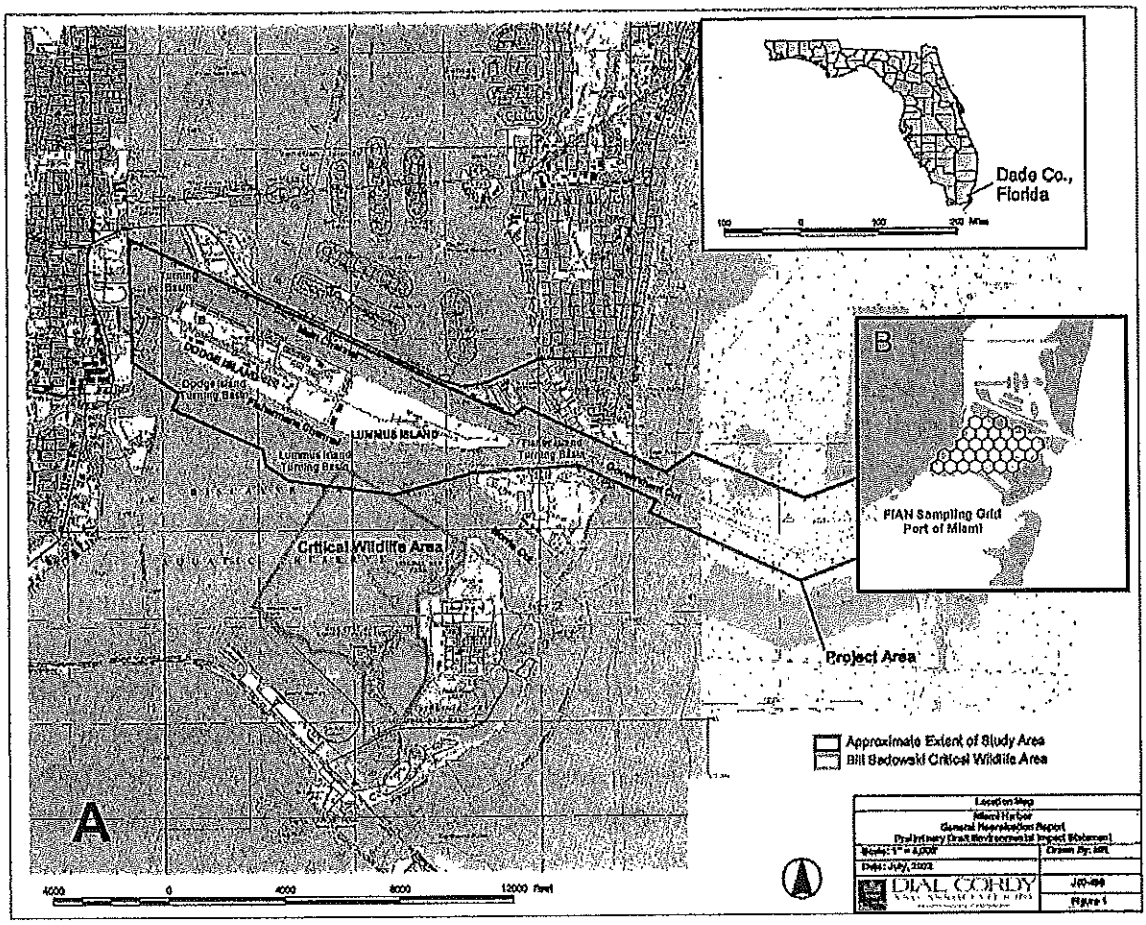

Figure 1. A. Port of Miami dredging project area outlined in red (after USACE 2004; page 127), Insert B. Proposed study area encompassed by FIAN Port of Miami sampling grid.

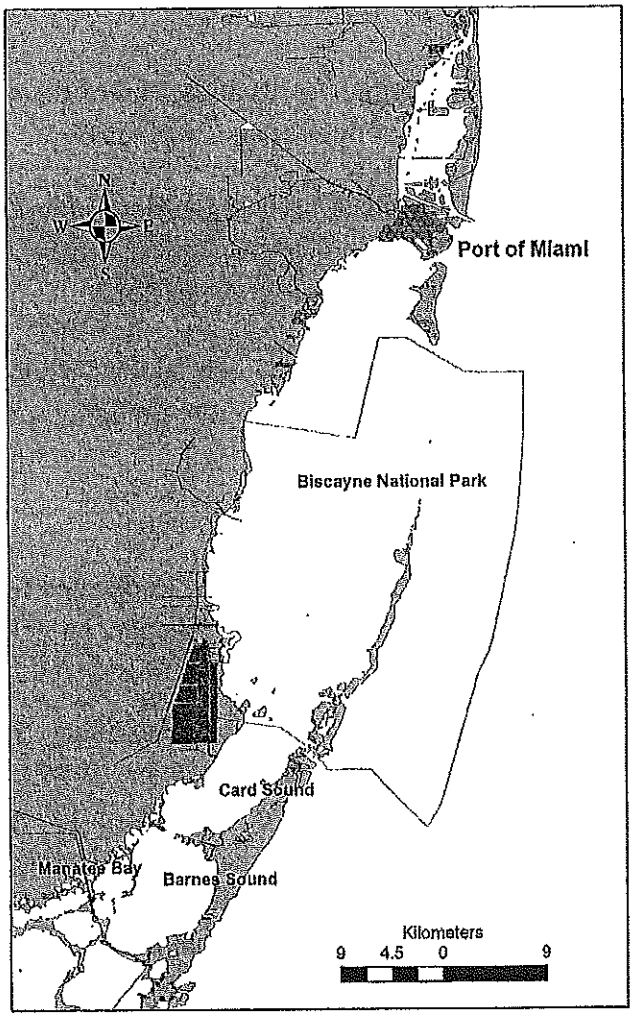

Figure 2. Proposed study area in Biscayne Bay between the Port of Miami complex and Fisher Island on the north and Rickenbacker Causeway on the south. The grid highlighted in green is the proposed study area and the FIAN grid sampled in both spring and fall from 2005 through 2011.

PURPOSE

The purpose of this project is to monitor fish, shrimp (carideans and penaeids), and crabs in relation to seagrass and bottom substrate in the vicinity of dredging operations in the Port of Miami for three years, 2014–2016. These results will be compared to a similar pre-dredging seven year baseline dataset, 2005–2011. Figure 1B indicates the 30-cell sampling grid that defines the project study area in Biscayne Bay between the POM complex and Fisher Island to the north and Rickenbacker Causeway to the south.

OBJECTIVES

1. To sample seagrass fauna in the spring (April) at the end of the dry season and in the fall (September) at the end of the wet season for three years, 2014–2016.

2. To duplicate the approach and methods used in the South Florida Fish and Invertebrate Assessment Network (FIAN), a monitoring project conducted between 2005 and 2011 prior to dredging operations in the study area (Robblee and Browder 2012).

3. To compare the seagrass community observed here in connection with the Port of Miami dredging project with the seven year, 2005–2011, pre-dredging project baseline seagrass community data record available from FIAN.

METHODOLOGY:

The sampling design previously used in FIAN will be duplicated in this project in order to evaluate the impact of dredging in the Port of Miami by comparison with the FIAN data set as a pre-Port of Miami dredging project baseline (Robblee and Browder 2012).

The South Florida Seagrass Fish and Invertebrate Assessment Network (FIAN) was an element of the Monitoring and Assessment Plan (MAP), a part of RECOVER, the Restoration, Coordination and Verification Program of the Comprehensive Everglades Restoration Plan (CERP) (RECOVER 2004). As an element of the Southern Coastal System module of MAP, FIAN quantified change and trend in epibenthic fish, shrimp, and crab communities in relation to benthic vegetation, substrate and environmental conditions in South Florida between 2005 and 2011 (Robblee and Browder 2012). The data developed in FIAN provides a seven-year pre-Port of Miami dredging project baseline. Key results from the FIAN project from the POM sites are summarized in Figures A1-A3 in Appendix A.

The grid of 30 equal-sized, tessellated, hexagonal grid-cells established in FIAN will be used to define the POM study area in this project. As in FIAN the grid will serve as the core of the sampling design (Fig. 1B). In FIAN the grid was positioned to encompass the observable or expected gradients of physical, environmental and vegetation conditions present.

Seagrass-associated fish, shrimp, and crabs will be collected twice annually in the Port of Miami study area as in FIAN, in April and September, approximating the end of the dry season and wet season in South Florida, respectively. Collections will be made in April and September for three years, 2014–2016.

Following the FIAN sampling design a single randomly located 1-m^2 throw-trap sample will be collected from within each grid-cell, with the resulting 30 throw-trap samples constituting a seasonal collection. The FIAN sampling design resulted in samples being doubly randomized (grid is randomly fitted to the study area and sample is randomly located with each grid-cell) and quasi-evenly distributed across the Port of Miami study area (Fig. 1B). The data obtained in this manner will be well suited for statistical analysis as well as mapping and spatial interpolation. In

this project the quantitative nature of the throw-trap and the sample size of 30 will provide a solid basis for evaluating the impacts of dredging in the Port of Miami.

Like FIAN, sampling will focus on seagrass/algae habitat which is widespread in the Port of Miami study area. Sampling will be limited to waters generally accessible to a shallow draft boat (≈10-12 inches). For each grid-cell, five random sample points (latitude and longitude) will be established prior to field work. In the field, using GPS, sampling points will be visited one at a time and inspected for the presence of bottom vegetation (either seagrass or algae) in its immediate vicinity. Sampling will occur at the first of the five alternate sampling-points where vegetation is observed. Once a sample has been collected, no further sample-points will be visited in that grid-cell. If, however, vegetation is not found after the five sample-points are examined, the fifth sample-point will be sampled and scored as not vegetated. By recording the number of non-vegetated sample-points visited in a grid-cell, an estimate of habitat patchiness will be obtained. Sampling the fifth sample-point, when vegetation was not found, provides information about non-vegetated bottom. During the FIAN project sampling in the Port of Miami study area did not occur in Fisherman's Channel along the northern boundary of the study area because the bottom habitat was disturbed and seagrasses and algae were absent. Rather sampling was conducted as near as possible to the designated sample point (Fig.1). As in FIAN, if a sample point falls within very shallow water that does not allow boat access, sampling will be conducted as near as possible to the designated sample point provided vegetation is present.

Faunal Sampling

The 1-m^2 throw-trap (Robblee et al 1991), as in FIAN, will be used to collect fauna. The throw-trap collects discrete, quantitative samples of epibenthic fish and invertebrates that are associated with benthic vegetation and substrate or that seek shelter in benthic vegetation or substrate when disturbed. The throw-trap is an open-ended 1-m^2 aluminum box, 45-centimeters (cm) deep, with two cover-nets of weighted nylon netting (1.6-millimeter [mm] square mesh DELTA netting) attached on parallel edges of the top of the trap (Fig. 4). Each cover-net is large enough to cover the open top of the throw-trap.

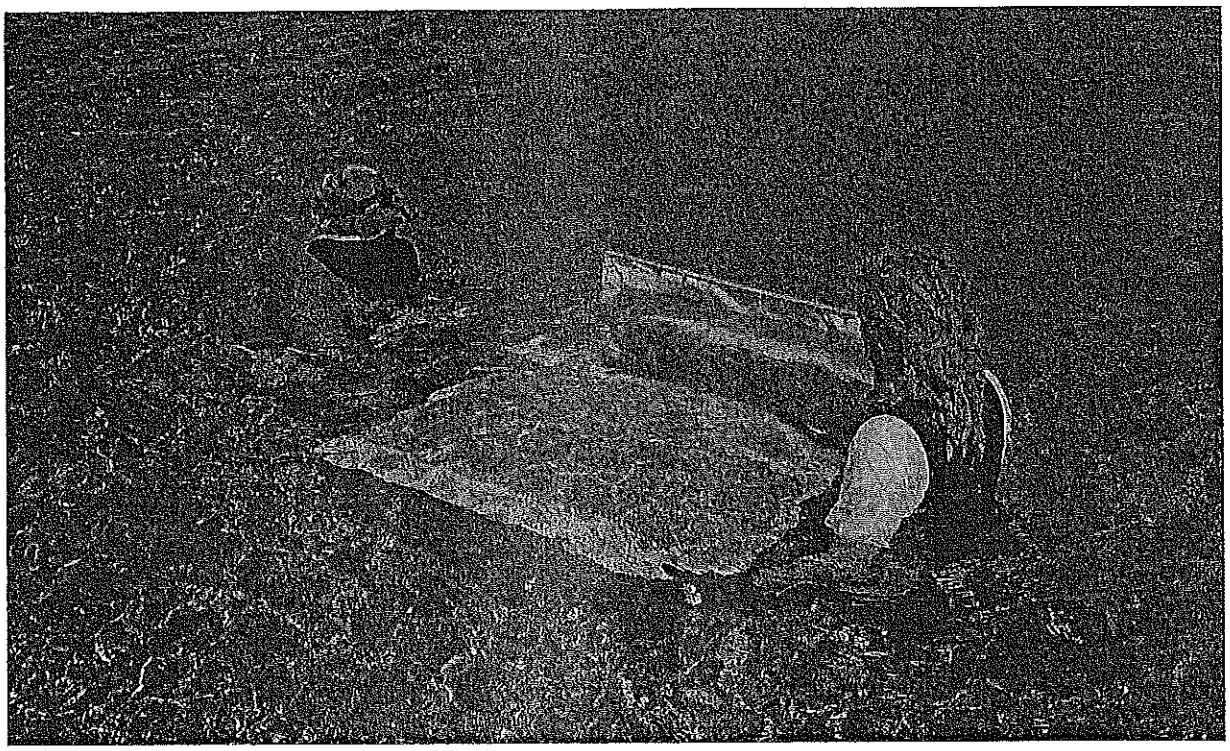

Figure 3. The 1-m^2 throw-trap being used in a shallow seagrass habitat in Biscayne Bay. The cover-net is shown located ahead of the open sweep-net. The second cover-net is located behind the sweep-net. After the hinged sweep-net has been passed across the throw-trap and sealed against the wall of the throw-trap, the second cover-net will be used to cover the open throw-trap behind the sweep-net.

Once the anchored boat has settled into the wind, the throw-trap will be thrown into undisturbed water at the stern of the boat. As the throw-trap settles to the bottom it will be covered by one of the two cover-nets when the trap is in water deeper than about 45 cm.

Once the trap is in place, it will be cleared of animals with five separate passes with a 1-m-wide framed sweep-net of mesh size similar to that of the cover-nets. The sweep-net is hinged, allowing it to enclose the sample purse-like for removal from the throw-trap and for return to the boat for processing. The throw-trap will be covered between alternating passes of the sweep-net (left to right, right to left) when under water. To minimize the possible loss of animals, the cover-net covering the throw-trap will be pushed forward of the sweep-net as it is dragged across the trap. The opposite cover-net will be pulled over the throw-trap as the closed sweep-net is removed. SCUBA equipment (surface-supplied hookah) will be used when the throw-trap is in water deeper than about 0.75 meter (m). The material collected in each pass of the sweep-net will be washed over a 1-mm sieve in the boat, labeled, and secured in a net bag with mesh size similar to that of the sweep-net. Each sample will be held on ice until preserved in 10% formalin at the dock. Washed material from each of the five passes of the sweep-net will be processed separately and numbered consecutively, with the result that a single throw-trap sample will consist of an ordered series of five subsamples.

Physical and Environmental Field Measurements

Along with date, time, and latitude and longitude, seven environmental parameters will be measured with each throw-trap sample: surface and bottom salinity, surface and bottom temperature, turbidity, water depth, and sediment depth (Tab. 1). Surface and bottom salinity and temperature will be measured using a hand-held WTW 330i Conductivity Field Meter (or equivalent, 315i). An ATAGO automatic temperature-compensating (10-30 °C) refractometer, model ATC-S/Mill-E, with a salinity range of 1 to 100 is a field backup to the conductivity meter for measuring salinity. A hand-held thermometer (graduated in 1-°C increments) is a field backup for measuring temperature. Turbidity will be estimated from a single grab sample collected from undisturbed water just under the surface. Samples are held on ice in the field and cooled in a refrigerator in the laboratory until turbidity is measured. An HF Scientific DRT-15CE portable turbidity meter measuring nephelometric turbidity units (ntu) over three selectable ranges, 0-10, 0-100, and 0-1,000 ntu, is used to measure turbidity. These measurements will be made within 24 hours of sample collection. Water depth at the time of collection will be estimated using a 3-m PVC pole graduated in 1-cm increments. Sediment depth at the throw-trap sample-point will be measured by probing with a 1.2-cm (½-inch) diameter 3-m-long rod graded in 1-cm increments. A Garmin GPSMAP492 global positioning system (GPS) will be used to locate the throw-trap sample.

Benthic Vegetation Measurement

Benthic vegetation (seagrass and algae) in the immediate vicinity of each throw-trap sample will be quantified using the Braun-Blanquet method. The Braun-Blanquet method involves visually quantifying the cover and abundance of seagrass and algae observed in a 0.25-m^2 quadrat (Tab.1). As in FIAN, six replicate quadrats will be sampled. Five quadrats will be located in a semi-circle around the throw-trap (from the right to the left side of the boat, ≈ 5-m radius), and a sixth quadrat (number 3 in the series) will be located outside and immediately adjacent to one side of the throw-trap. The Braun-Blanquet method requires relatively little time per replicate (10-15 minutes for six replicates). For each quadrat, the observer first lists all the species or plant groupings present. A cover/abundance score is then assigned for each taxa by using the following ordinal-scale index: 0.1 = individual, 0.5 = sparse, 1 = 0-5%, 2 = 5-25%, 3 = 25-50%, 4 = 50-75%, and 5 = 75-100%. The upper scale values (2, 3, 4, and 5) are measures of cover when taxa, especially seagrasses, are vertically oriented. The lower scale values (0.1, 0.5, and 1) are more nearly estimates of abundance, single or a few individuals, respectively. In addition to Braun-Blanquet cover/abundance, estimates of canopy height and a qualitative estimate of sediment texture based on feel and observation will be made within each quadrat (Tab. 1).Littler and others (1989) will be used to identify and standardize algal nomenclature. Green and Short (2003) is used to standardize seagrass nomenclature.

Table 1. Habitat and environmental measurements and methods associated with individual throw-trap collections in the field.

Habitat and Braun-Blanquet Methods

Parameter	Replicate	Method
Cover/abundance Estimate	6	% cover of seagrass and algae by species; plant groupings ($0.25m^2$ quadrat), Scores by species: .1 = individual, .5 = sparse, 1 = 0-5% 2 = 5-25%, 3 = 25-50%, 4 = 50-75%, 5 = 75-100%
Canopy Height	6	Maximum height (cm)
Sediment Texture	6	Estimate: M = mud, SM = sand/mud, MS = mud/sand, S = sand, CS = coarse shell, R = rubble, HH = halimeda hash, combinations of these, etc.

Physical Measurements and Methods

Parameter	Replicate	Method
Sediment Depth	1	Probe, sediment surface to bedrock (cm)
Water Depth	1	Depth when sampled (cm)

Environmental Measurements and Methods

Parameter	Replicate	Method
Surface Salinity	1	WTW 315i and 330i Conductivity Meters (psu)
Bottom Salinity	1	WTW 315i and 330i Conductivity Meters (psu)
Surface Temp.	1	WTW 315i and 330i Conductivity Meters (psu)
Bottom Temp.	1	WTW 315i and 330i Conductivity Meters (psu)
Water Turbidity	1	DRT 15C Turbidimeter (ntu)

Laboratory Processing of Fish and Invertebrates

Before processing in the laboratory, the sample will be separated from the 10% formalin preservative by decanting over a 1-mm sieve; retained sample material will be washed free of residual formalin with freshwater. Waste 10% formalin solution will be reused until diluted or discolored and then disposed of as required by law as a non-hazardous material. All fish, caridean and penaeid shrimp, and crabs will be separated from sediment and plant material in sweep-net sample manually in the laboratory. A 10% portion of the processed sample material

will be re-sorted as a quality check on sorting. The entire sample will be re-sorted if necessary. Fish, crabs, and penaeid shrimp will be sized by standard length (SL), carapace width (CW), and carapace length (CL), respectively. Gender will be determined for all pink shrimp. Caridean shrimp will not be sized, but the number with eggs (gravid) will be recorded, by species. A voucher collection of all species identified is maintained in the laboratory for reference.

Individuals will be identified to species when possible; otherwise, they will be identified to genera or higher taxonomic level. Identifying an individual to species is not always possible because animals collected in the throw-trap can be extremely small, especially fish and crabs. Additionally, crabs are particularly difficult to identify to species because legs and claws are very often separated from the carapace when preserved.

Fish nomenclature will be standardized per American Fisheries Society Special Publication 29, Common and Scientific Names of Fishes from the United States, Canada, and Mexico (Nelson and others 2004). Shrimp and crab nomenclature will be standardized per American Fisheries Society Special Publication 31, Common and Scientific Names of Aquatic Invertebrates from the United States and Canada (McLaughlin and others 2005).

Data Analysis

A Before-After Control Impact (BACI) analysis will be used for before and after dredging comparisons of animal and vegetation abundance, and environmental conditions, e.g. turbidity. Pre-impact conditions will be derived from 2005-2011 FIAN data. Multivariate statistics will be used to evaluate the relations of individual species or taxa and species groups or communities with environmental conditions and habitat. GIS will be used to evaluate changes in spatial distribution of fauna and community parameters; to assist with analysis of species relations with habitat, salinity, and other environmental data; and with QA/QC of the dataset.

Statistical analyses will be conducted using SPSS and/or SigmaStat. GIS analyses and mapping will be conducted using ArcGIS. SigmaPlot will be used for graphics. Primer will be used for some community analyses.

Project and Data Management

Field work will be directed by the USGS. All equipment, including vessels, SCUBA gear, and monitoring equipment to be used in the field will be supplied by USGS.

All field and laboratory data will be recorded by hand on data sheets. In the field, data sheets will be inspected for completeness and accuracy by the recorder as well as by a second individual. Project data will be transferred to Microsoft Excel spreadsheets and protected through redundant back-ups on USGS servers. A digital data management plan can be provided upon request. All data will be made available to DERM.

Data generated in this study will be archived in a USGS database. This database includes throw-trap-based data from earlier studies in South Florida, including FIAN.

Laboratory facilities supporting this study's field collections and sample processing are located at the Nova Southeastern University Oceanographic Center. Following sample processing, samples will be catalogued, stored in 70% ethyl alcohol, and secured at the USGS seagrass laboratory in Dania Beach, FL. This is the same facility, which FIAN samples were processed and stored.

Prior to the onset of sample collection in April 2014 a sampling permit will be acquired from the Florida Fish and Wildlife Conservation Commission.

WORK SCHEDULE

Spring and fall collections will occur during the first two weeks of April and September of each year 2014-2016, respectively.

DELIVERABLES

1. *Progress Updates.* One week following the completion of the spring season fieldwork a brief, written update will be provided summarizing field activities, samples collected and problems encountered if any.

2. *Annual Summaries for Years 1 and 2.* By December 31 in both 2014 and 2015 an annual summary will be provided that includes: the results from the spring and fall fieldwork, an initial comparison with the FIAN baseline data set, and a cumulative project data set CD complete through the fall collection each year in MS Excel spreadsheet.

4. *Final Project Report.* A final report that includes an annual summary of Year 3 findings along with discussion, due by December 31, 2016, will compare abundance of seagrass, algae, fish, shrimp, crabs and overall community composition with pre-dredging baseline conditions observed between 2005 and 2011. A complete data set will accompany the Final Project Report.

TIMELINE OF ACTIVITIES AND DELIVERABLES

	Spring '14	*Fall '14*	*Spring '15*	*Fall '15*	*Spring '16*	*Fall '16*
Field work	*X*	*X*	*X*	*X*	*X*	*X*
Progress updates	*X*		*X*		*X*	
Annual Summaries		*X*		*X*		
Final Report (Due Dec. 31st, 2016)						*X*

DELIVERABLE AND BILLING SCHEDULE

Date	Deliverable	Invoice amount
NTE May 1st 2014	Progress Update	$25,245
NTE Dec. 31st 2014	Annual Summary	$51,255
NTE May 1st 2015	Progress Update	$25,245
NTE Dec. 31st 2015	Annual Summary	$51,255
NTE May 1st 2016	Progress Update	$25,255
NTE Dec. 31st 2016	Final Report	$51,255 Total: $229,500

Note: USGS in-kind services including salaries for Investigators, vehicles and transportation support, and other expenses estimated at $28,000 per year. USGS will cover project expenses exceeding $229,500.

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APPENDIX A: Summary of 2005-2011 baseline data available from FIAN.

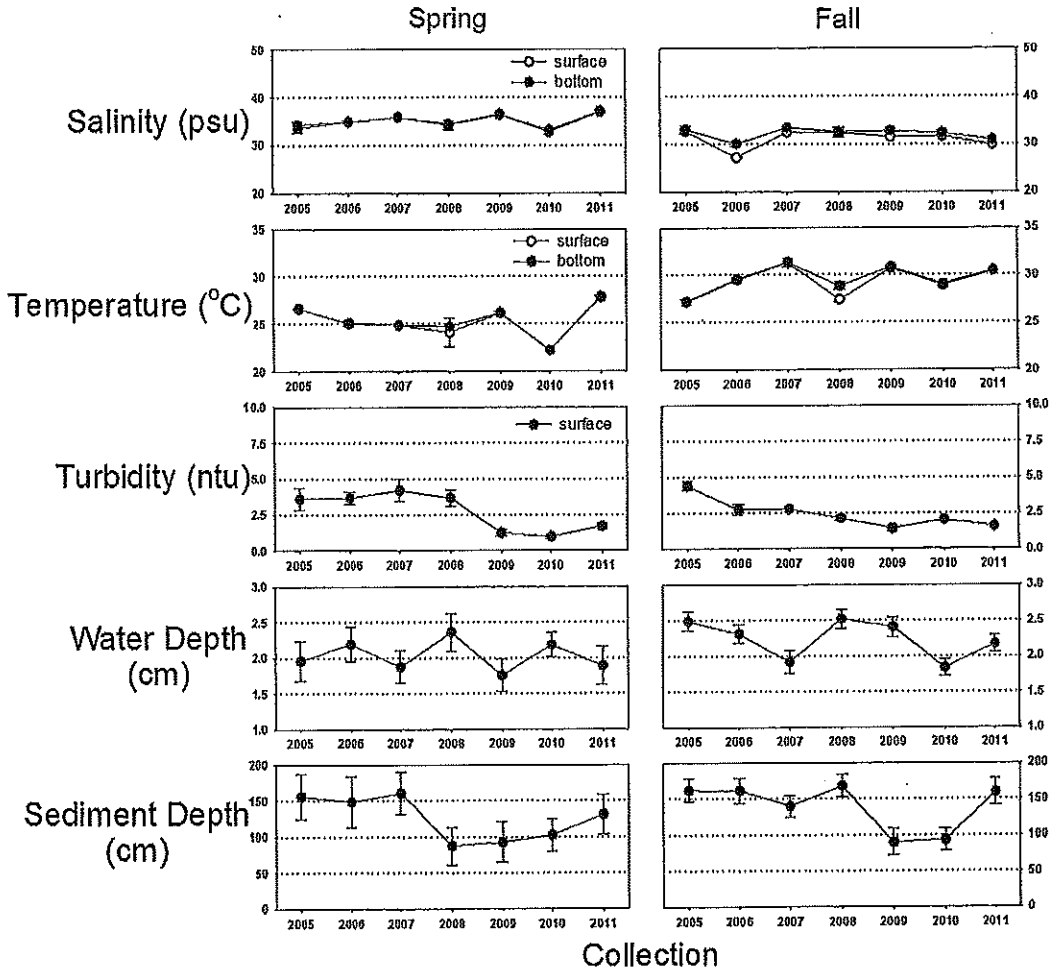

Figure A1. Environmental and physical conditions observed in the FIAN Port of Miami sampling grid from 2005 through 2011. Sample size in each season was 30 and the error bars are 95% confidence intervals.

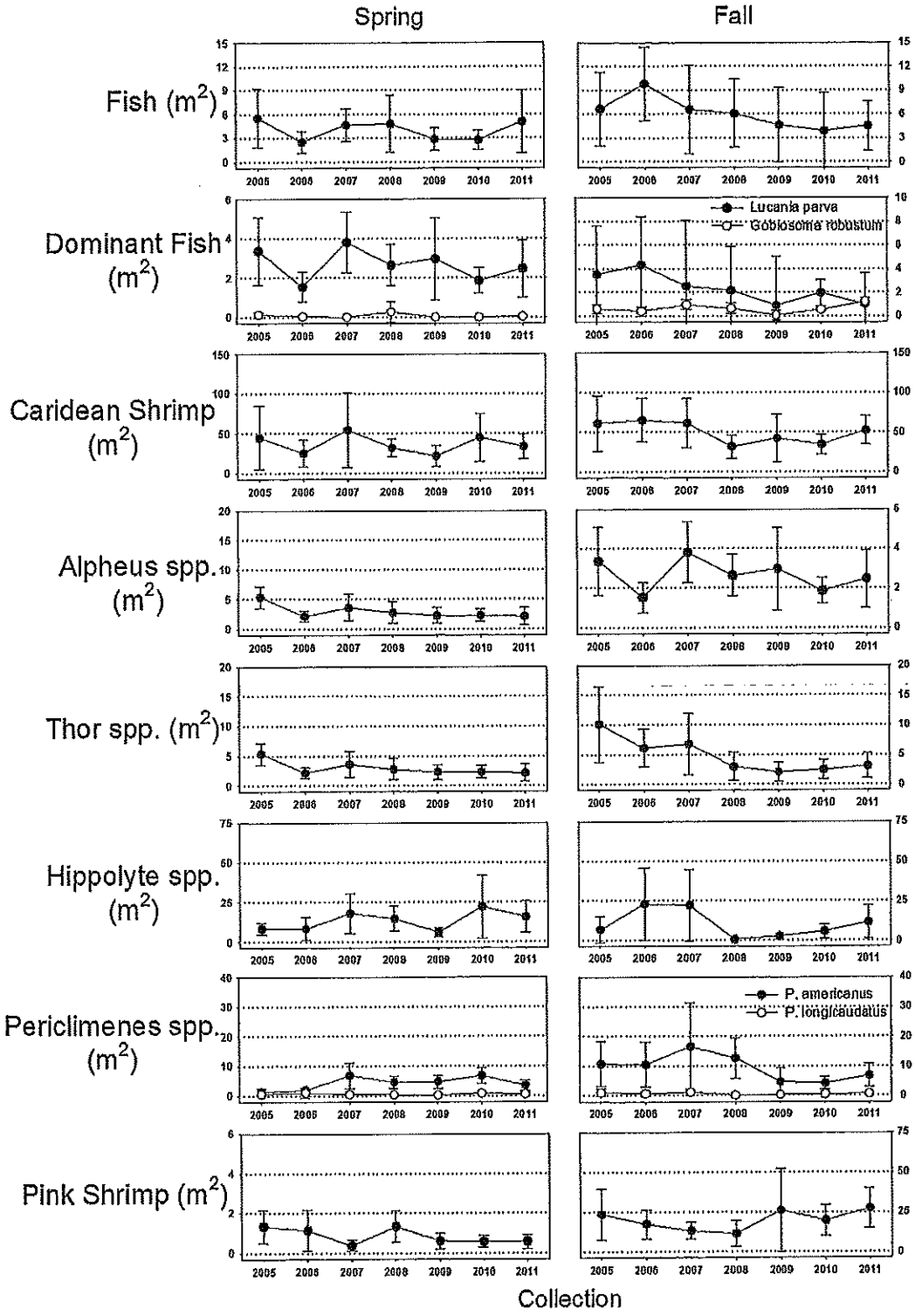

Figure A2. Densities of abundant fish, caridean shrimp and pink shrimp (*Farfantepenaeus duorarum*) observed in the FIAN Port of Miami sampling grid between 2005 and 2011. Sample size in each season was 30 and the error bars are 95% confidence intervals.

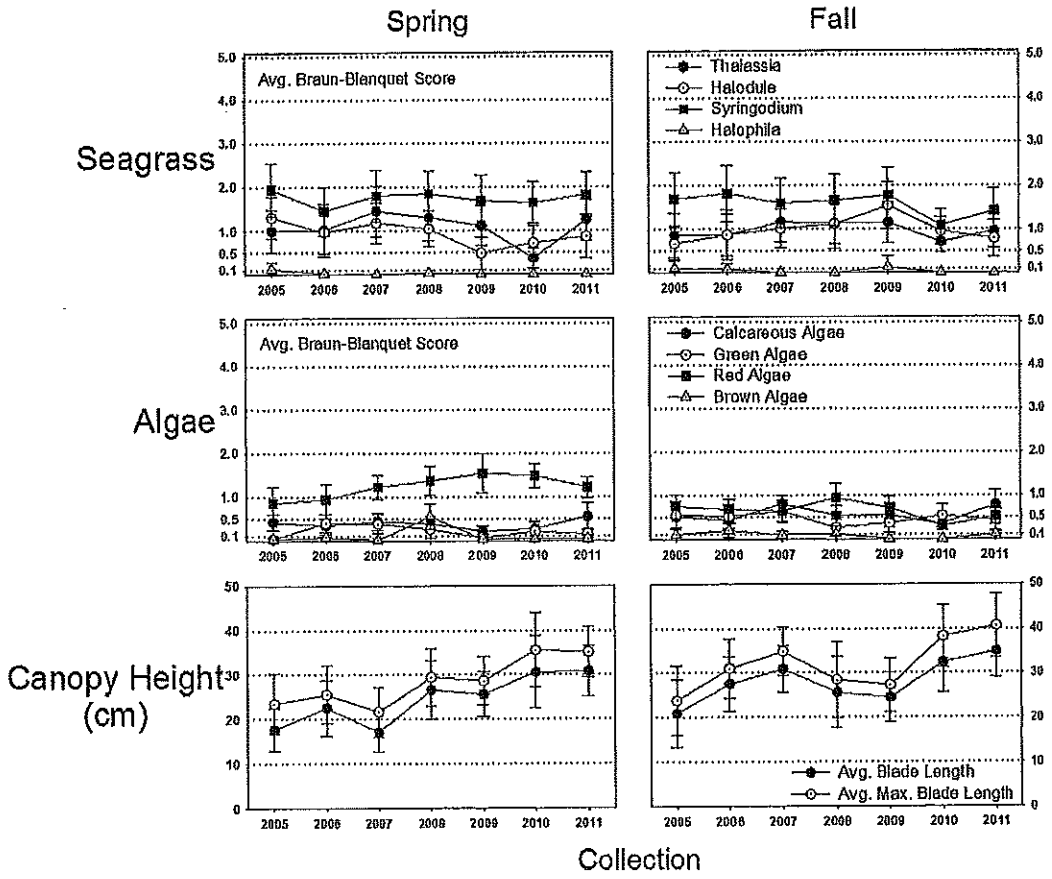

Figure A3. Braun-Blanquet cover-abundance and seagrass canopy height observed in the FIAN Port of Miami sampling grid from 2005 through 2011. Sample size in each season was 30 and the error bars are 95% confidence intervals.