3-16-2016

Water Quality Monitoring Program for Islamorada, Village of Islands, Florida Keys- Preliminary Report #1: Canal Water Characterization and Monitoring

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WATER QUALITY MONITORING PROGRAM FOR ISLAMORADA, VILLAGE OF ISLANDS, FLORIDA KEYS

Preliminary Report #1: Canal Water Characterization and Monitoring

March 16, 2016

Presented to:
City of Islamorada, Village of Islands Water Quality Improvement Citizens' Advisory Committee

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Objective

- To assess the improvements in water quality (WQ) derived from remediation activities, especially linked to the installation of wastewater collection systems

Conceptual model

- The project has been developed as a Before-and-After-Control-Impact scheme (BACI) with multiple sites and includes an initial characterization and periodic monitoring afterwards.

A priori classification

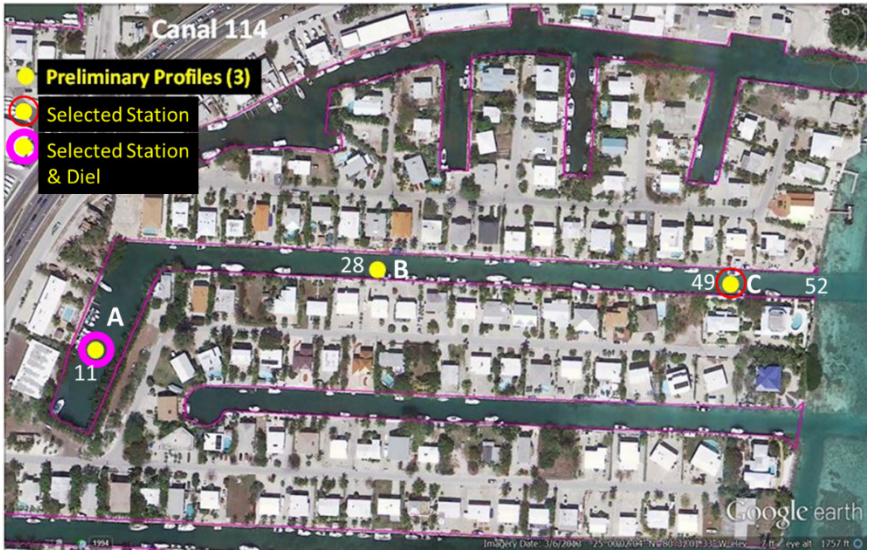
- The five selected canals have been subdivided in 3 classes (Class A, B, and C) based on the estimated % of properties connected to the wastewater network

Canal #118

Canal #120

FIU photos by A. Serna (Feb. 2016)

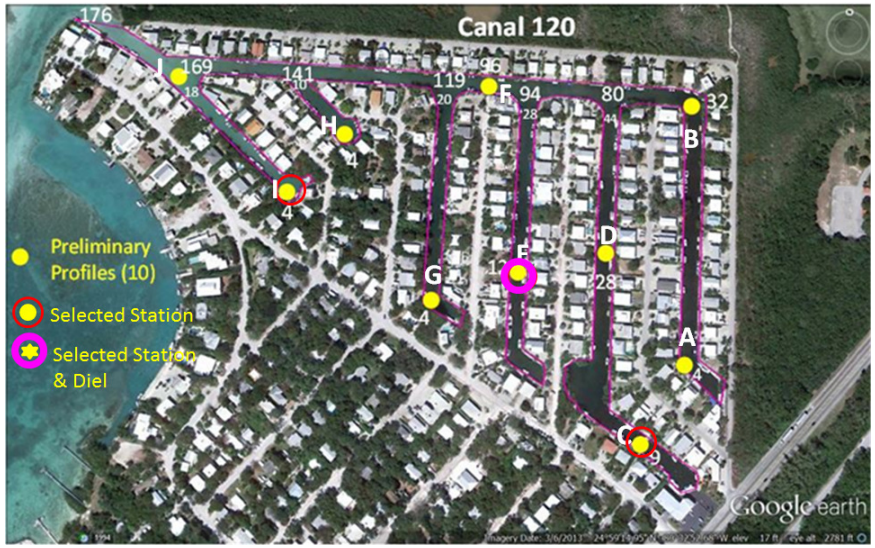
Class A: Estimate is 90 to 95 % of properties connected to sewer collection system to date by canal. Units connected to the system for many years



Canal #114 located at Harbor Drive, Plantation Key.

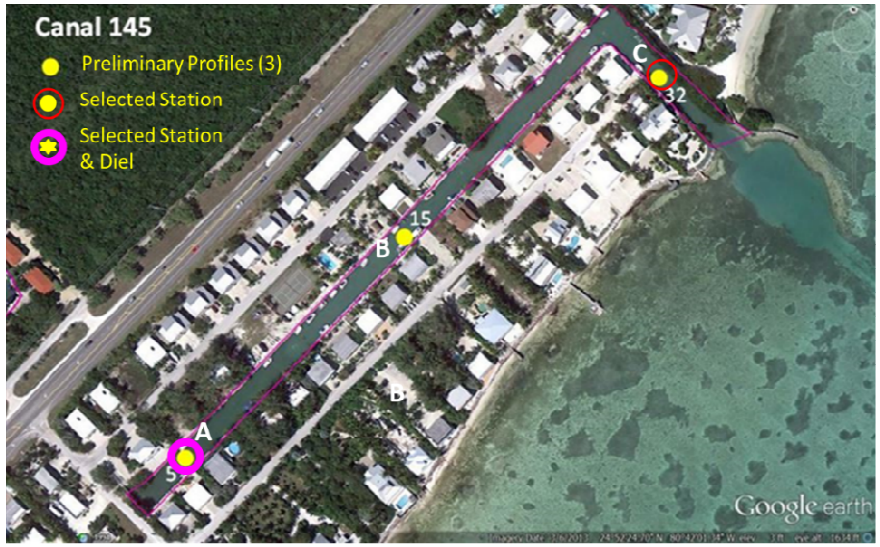
Canal #118 located at Azalea Street, Plantation Key

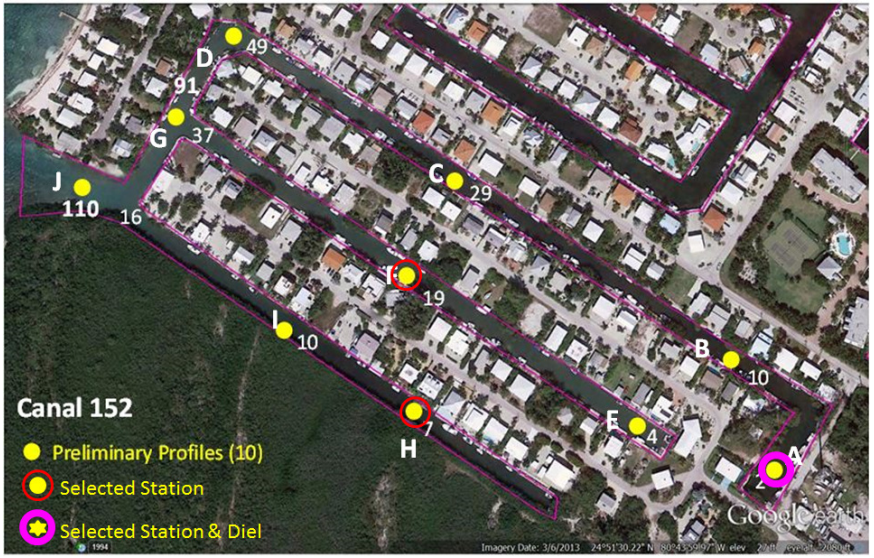
Class B: Estimate is 50 % of properties connected to sewer collection system to date by canal. Units connected to the system since March 2015



Canal #120 located at Sioux Street, Plantation Key.

Class C: No properties connected to sewer collection system to date





Canal #145 located at Columbus Drive, Lower Matecumbe

Canal #152 located at Venetian Drive, Lower Matecumbe

Water quality testing parameters

Water quality has been monitored using a framework of:

- Vertical profiles

- Continuous 24-hour recording (Diels) of physical-chemical data:

* Dissolved Oxygen (DO) * % DO saturation (%DO sat) * pH
* Temperature * Salinity * Specific conductivity * Turbidity

%DO sat exceedances are calculated as the daily average %DO sat below 42% saturation in a full day of diel data (Rule 62-302.533 of the Florida Administrative Code for Dissolved Oxygen).

- Water sampling and analysis for dissolved and total nutrients in Surface and Bottom waters.

Monitoring plan summary

- Initially, several stations were sampled at each canals to characterize the canals and then the best sites were selected for future work.
- Once the stations were selected quarterly monitoring followed, and will continue until completion of the project.

Characterization	
IC-00	**IC-01**
8/12/2015	10/21/2015
8/13/2015	10/22/2015
	10/23/2015

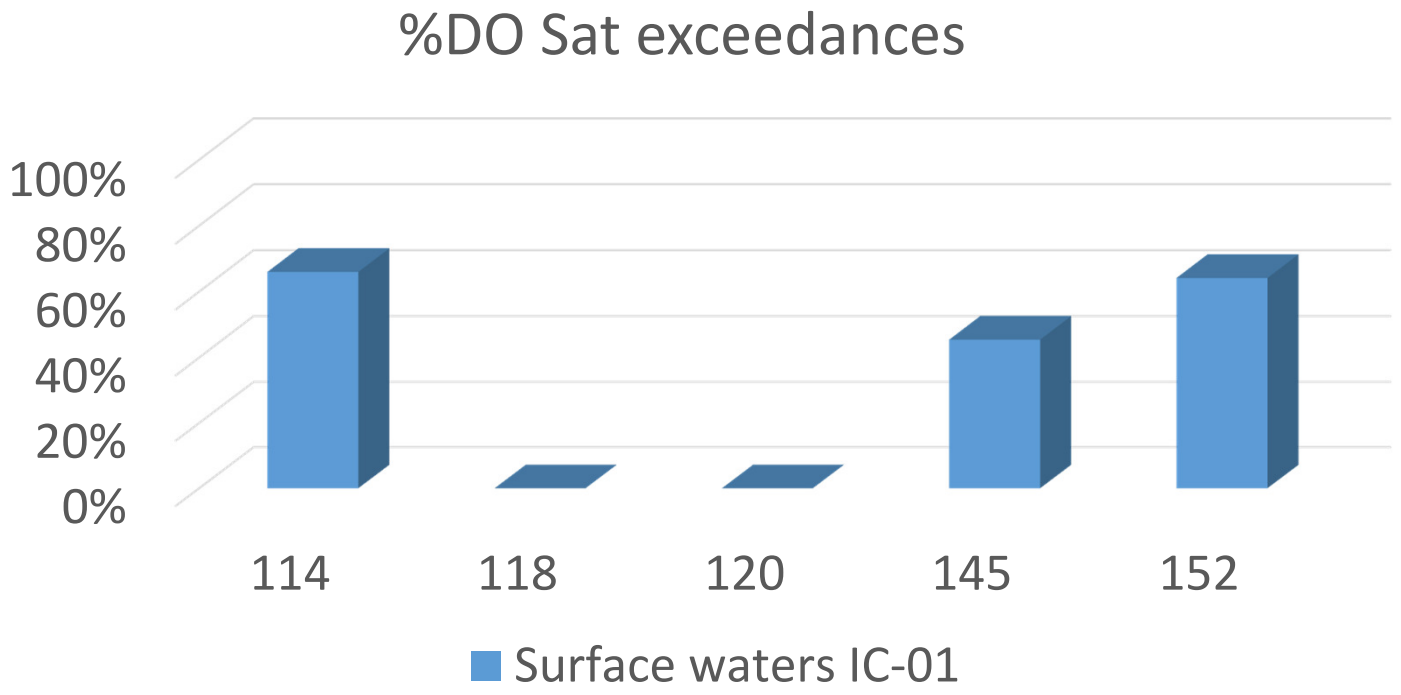
Quarterly monitoring
IC-02
2/4/2016
2/18/2016

Results of diel recording of physicochemical properties in Surface waters in the five selected canals.

	Canal:	114	118	120	145	152
Surface Temperature	ºC	27.83	28.13	27.75	28.38	29.25
Surface Specific Conductivity	mS/cm	53.38	54.98	54.42	52.81	55.09
Surface Salinity	ppt	35.15	36.34	35.94	34.72	36.39
Surface pH		7.54	7.72	7.80	7.40	7.54
Surface Turbidity	NTU	5.44	9.28	1.95	4.32	0.51
Surface DO Sat	%	31.00	73.91	84.40	48.15	39.03
Surface DO	mg/l	2.00	4.71	5.43	3.08	2.44
%DO Sat Exceedances	%	66%	0%	0%	45%	64%

Values are the average of measurements every 10 minutes during 24-h tests in Surface water in the five selected canals.

Surface waters of canals #118 and #120 are well oxygenated with all values above 42 %DO saturation (no %DO saturation exceedances)



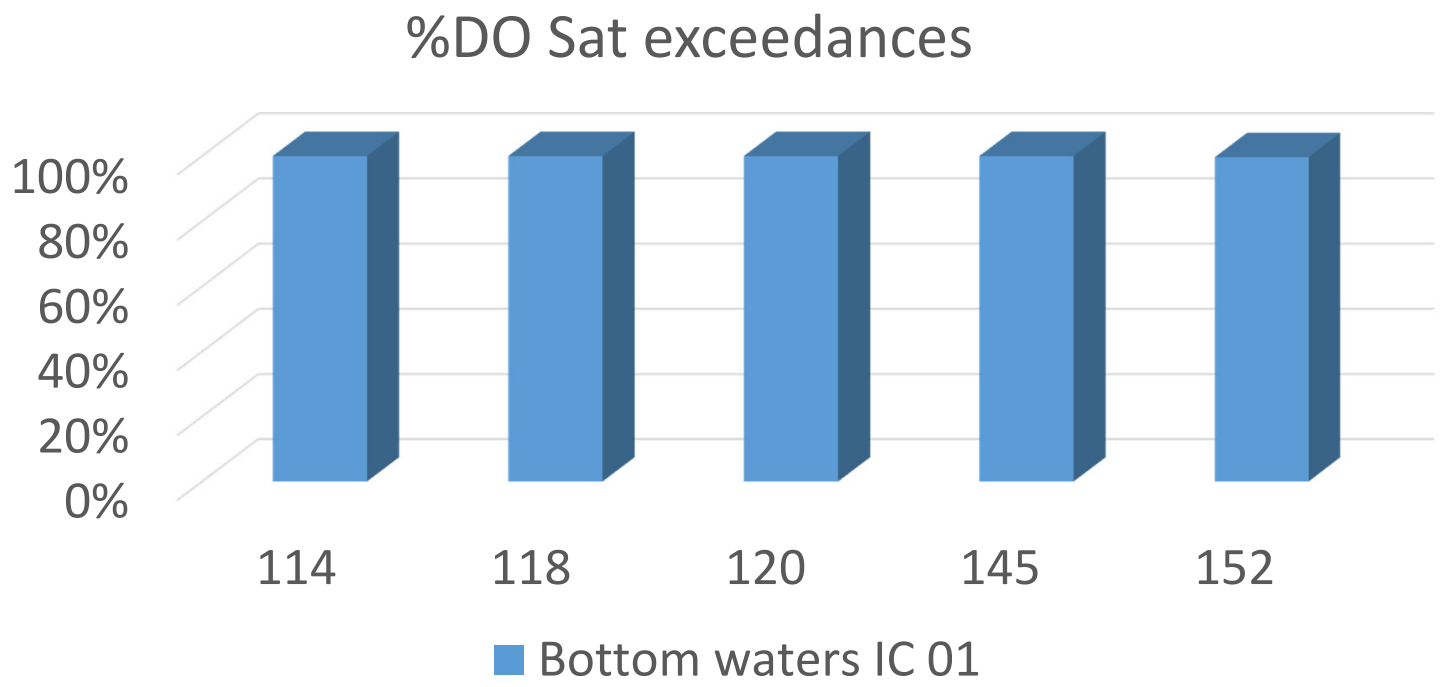
Values are the results from diel measurements during survey IC-01 conducted in October 2015

Results of diel recording of physicochemical properties in Bottom waters in the five selected canals.

	Canal:	114	118	120	145	152
Bottom Temperature	°C	27.22	27.80	27.89	26.40	28.91
Bottom Specific Conductivity	mS/cm	57.11	56.70	56.02	55.41	54.29
Bottom Salinity	ppt	37.96	37.63	37.13	36.71	35.80
Bottom pH		7.16	7.11	7.50	7.12	7.33
Bottom Turbidity	NTU	0.73	2.78	2.69	1.25	1.63
Bottom DO Sat	%	0.35	0.90	16.98	0.27	20.82
Bottom DO	mg/l	0.02	0.06	1.08	0.02	1.32
%DO Sat Exceedances	%	**100%**	**100%**	**100%**	**100%**	**100%**

Values are the average of measurements every 10 minutes during 24-h tests in Bottom water in the five selected canals.

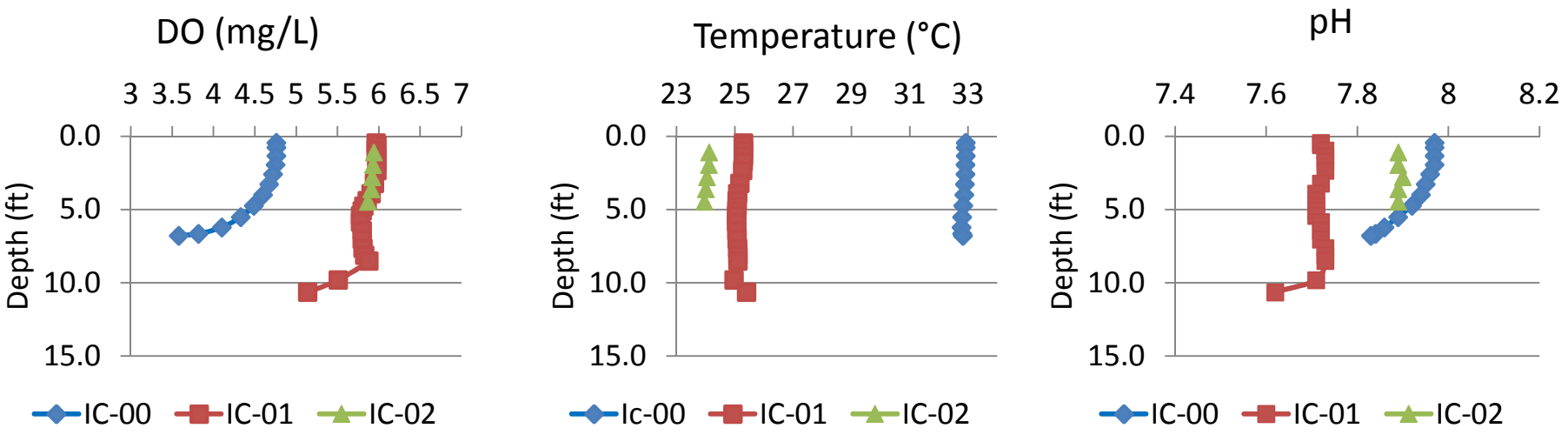
%DO saturation in Bottom waters of all canals exceed the regulation levels (all values below 42 %DO saturation)



Values are the results from diel measurements during survey IC-01 conducted in October 2015.

Results of vertical profiles

In this example: **Canal #114** located at Harbor Drive, Plantation Key.



Seasonal variability (dates of surveys) is clearly observed in the canals.

Tentative work schedule

Date		Description
Aug. 2015	✓	Survey IC-00 Characterization
Oct. 2015	✓	Survey IC-01 Characterization
Feb. 2016	✓	Survey IC-02 Quarterly monitoring
May 2016		Survey IC-03 Quarterly monitoring
Aug. 2016		Survey IC-04 Quarterly monitoring
Nov. 2016		Survey IC-05 Quarterly monitoring

Tentative deliverables schedule

Task	Due date following work execution	Deliverable
Characterization IC-00	8 weeks	Initial progress report
Characterization IC-01	8 weeks	Preliminary results Characterization Phase IC-00 and IC-01
Quarterly monitoring IC-02	12 weeks	Progress report
Quarterly monitoring IC-03	12 weeks	Progress report
Quarterly monitoring IC-04	12 weeks	Progress report
Quarterly monitoring IC-05	12 weeks	Annual report