

CAPE CORAL  
WATER QUALITY  
MONITORING SUMMARY  
WY '11

RELEASED OCTOBER 2011

ENVIRONMENTAL RESOURCES DIVISION  
PUBLIC WORKS DEPARTMENT  
CITY OF CAPE CORAL

**CAPE CORAL MONITORING SUMMARY  
WY '11**

***EXECUTIVE SUMMARY***

This summary is based on the twentieth year of water quality data (WY-11) in the Environmental Resources Division's water quality monitoring program. Overall water quality in the city declined slightly during this sampling period as compared to the previous year. By comparison with state indices, water quality is good in all systems.

As in earlier reports, potential problems were noted in both fresh and salt water with turbidity, streptococcus and coli form bacteria, biological oxygen demand, dissolved oxygen, chlorophyll a, total nitrogen, total phosphorous, pH and total suspended solids (TSS). For the seawater canals, these problems are partially caused by runoff from the general river basin, which is the source of water to Cape Coral. Areas of high development and increased population within the city also affect both freshwater and saltwater canals.

## **CAPE CORAL MONITORING SUMMARY WY '11**

### ***INTRODUCTION***

The Environmental Resources Division (ERD) of the Public Works Department of the City of Cape Coral conducts routine monitoring of aquatic systems in the City. This report summarizes the findings from October 1, 2010 - September 30, 2011 (Water Year 2011). Figure 1. shows the locations of the main regular sampling stations for which monthly sampling has been conducted. Appendix Table 1. describes these sampling stations. The full set of data on which this report is based is on file at the office of the ERS in Cape Coral.

The water quality characteristics routinely measured at each station are listed in Table 1. along with the frequency and the applicable Florida water quality standards. Laboratory analyses were provided by the Chemistry Group of the Cape Coral Water Reclamation Plant and by staff of ERS. Staff members of ERD collected field instrument data. All methods followed APHA, 1989.

### ***RESULTS AND DISCUSSION***

Tables 2A and 2B summarize statistics for all regular water quality samples taken during the sampling period October 1, 2010 through September 30, 2011. For clarity in interpretation, data were separated into freshwater and saltwater.

Dissolved oxygen numbers made up 25% of the Class II water quality standards outliers. Biological oxygen demand (BOD) made up 21% and chlorophyll a numbers made up 20% (Table 3).

Stations 430 and 510 had violations in eight areas. Stations 242, 300 and 315 all had violations in seven areas. The majority of these violations occurred in BOD, TSS and dissolved oxygen. Stations 430 and 510 are located in populated areas in the southeastern part of the city. Stations 242 and 315 are located in the River and the end of a saltwater canal system. Station 300 is in a freshwater area that has been subject to algal blooms.

The State of Florida (Hand et al. 1988) developed a water quality index for streams based on water clarity, dissolved oxygen, oxygen demand, bacteria, nutrients and biological diversity. ERS calculated a similar index based on all of the 6 factors except biological diversity (for which information is presently inadequate). Because the State index is a simple arithmetic average, it is reasonable to compare the Cape Coral index with it. Table 4. gives the calculated indices for the main aquatic system types of Cape Coral.

The overall average for the Cape Coral systems was 48. According to this index, Cape Coral water quality is good. (The state range for "good" is 0 to 49; fair is 50-59; poor is 60-100). Overall water quality has declined slightly as compared to previous years. (Table 4).

# CITY OF CAPE CORAL Water Quality Sampling Stations

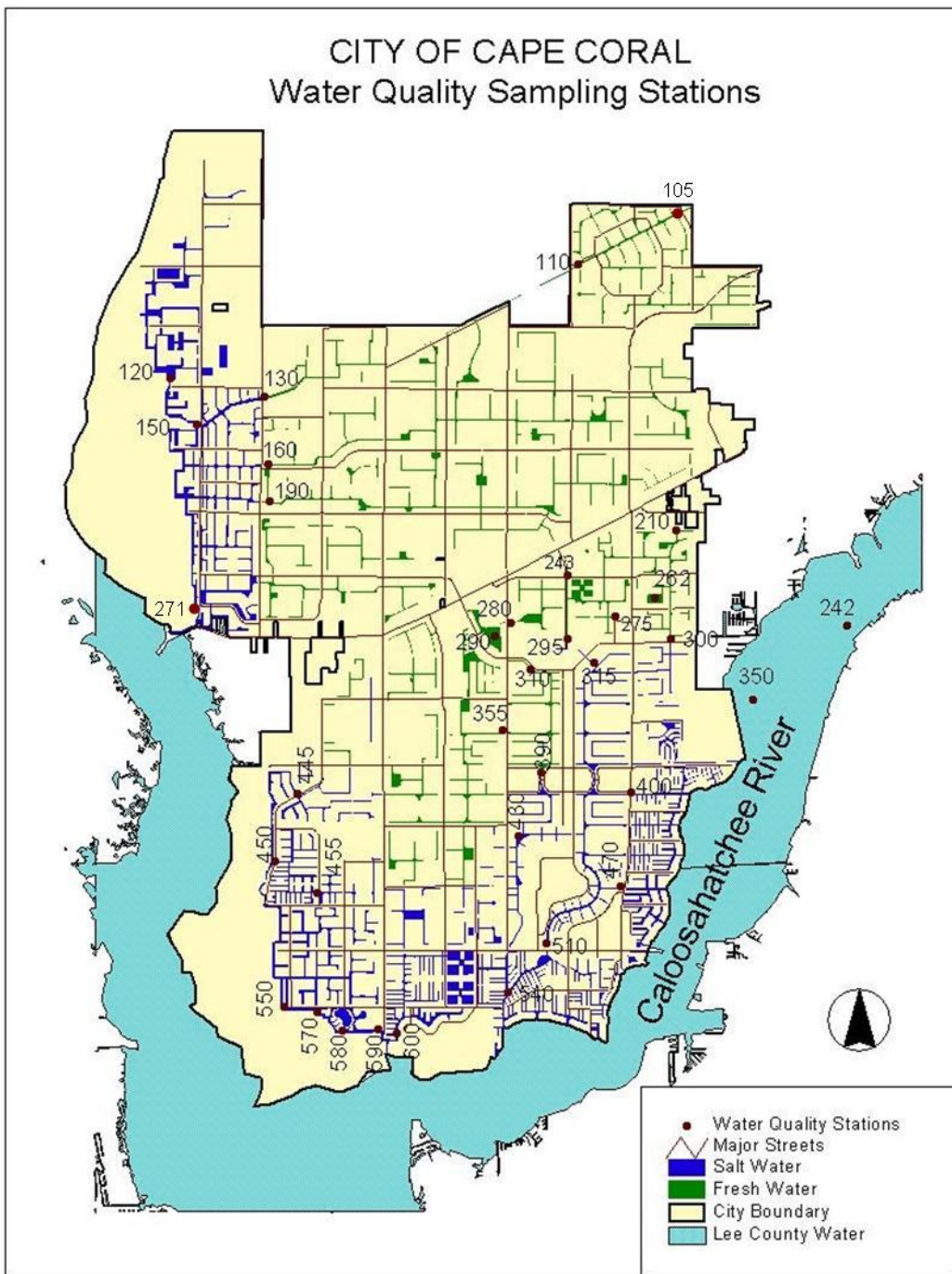


TABLE 1. MONITORING FACTORS

| FACTOR                    | SAMPLING FREQUENCY | FLORIDA STANDARD     |
|---------------------------|--------------------|----------------------|
| Dissolved oxygen          | Monthly            | >4 mg/l              |
| Temperature               | Monthly            | NA                   |
| pH                        | Monthly            | >6.0 <8.5            |
| Conductivity & Salinity   | Monthly            | <1275 or 50%         |
| Turbidity                 | Monthly            | >background          |
| Total Suspended Solids    | Monthly            | <29 NTU > background |
| Nitrate Nitrogen          | Monthly            | <18                  |
| Nitrite Nitrogen          | Monthly            | <10 mg/l             |
| Total Nitrogen            | Monthly            | <10 mg/l             |
| Ortho-phosphorous         | Monthly            | < 2.0 mg/l           |
| Total Phosphorous         | Monthly            | <0.1 mg/l            |
| Secchi Disk Depth         | Monthly            | < 0.46 mg/l          |
| Fecal Coliforms           | Monthly            | >0.6 M               |
| Fecal Streptococcus       | Monthly            | <200/100 ml          |
| Chlorophyll a             | Monthly            | <33/100 ml           |
| Biochemical Oxygen Demand | Monthly            | < 10 ug/l            |
|                           |                    | <3.3 mg/l            |

TABLE 2A: FRESHWATER MONITORING DATA  
SUMMARY  
WY '2011

| FACTOR       | UNITS      | MEAN   | STD.<br>DEV. | MIN.  | MAX.    | #   |
|--------------|------------|--------|--------------|-------|---------|-----|
| TEMPERATURE  | DEG. C     | 24.96  | 5.12         | 12.32 | 32.23   | 544 |
| DISSOLVED O2 | MG/L       | 6.38   | 1.98         | 0.25  | 11.58   | 544 |
| pH           | STD. UNITS | 7.77   | 0.50         | 6.25  | 10.03   | 509 |
| CONDUCT.     | MS/CM      | 0.618  | 0.124        | 0.227 | 0.913   | 544 |
| TURBIDITY    | NTU        | 4.80   | 26.99        | 0.06  | 563.00  | 433 |
| SECCHI DEPTH | M          | 1.13   | 0.54         | 0.40  | 3.50    | 188 |
| NITRATE N    | MG/L       | 0.032  | 0.023        | 0.025 | 0.340   | 436 |
| NITRITE N    | MG/L       | 0.025  | 0.000        | 0.025 | 0.025   | 436 |
| AMMONIA N    | MG/L       | 0.053  | 0.027        | 0.050 | 0.400   | 436 |
| KJEHDAHL N   | MG/L       | 0.758  | 0.576        | 0.200 | 10.200  | 436 |
| ORGANIC N    | MG/L       | 0.703  | 0.596        | 0.100 | 10.150  | 400 |
| TOTAL N      | MG/L       | 0.768  | 0.576        | 0.200 | 10.200  | 436 |
| TDS          | MG/L       | 503.74 | 2133.64      | 0.5   | 37197.0 | 436 |
| TSS          | MG/L       | 8.39   | 6.74         | 0.3   | 49.5    | 436 |
| TOTAL P      | MG/L       | 0.029  | 0.020        | 0.010 | 0.200   | 436 |
| FECAL STREP  | CFU'S/100  |        |              |       |         |     |
| FECAL        | ML         | 16.6   | 28.1         | 1     | 200     | 191 |
| COLIFORMS    | CFU'S/100  |        |              |       |         |     |
| CHL A        | ML         | 244.0  | 356.0        | 1     | 888     | 191 |
| 5 DAY BOD    | uG/L       | 10.06  | 7.22         | 0.5   | 37.1    | 192 |
|              | MG/L       | 2.23   | 1.27         | 1.2   | 7.0     | 436 |

TABLE 2B: SALTWATER MONITORING DATA SUMMARY  
 WY '2011

| FACTOR          | UNITS        | MEAN     | STD.DEV. | MIN.  | MAX.     | #   |
|-----------------|--------------|----------|----------|-------|----------|-----|
| TEMPERATURE     | DEG. C       | 25.55    | 5.22     | 11.98 | 33.88    | 616 |
| DISSOLVED O2    | MG/L         | 5.55     | 1.99     | 0.15  | 11.69    | 615 |
| pH              | STD. UNITS   | 7.74     | 0.41     | 6.28  | 9.84     | 572 |
| CONDUCT.        | MS/CM        | 20.784   | 13.250   | 0.460 | 52.630   | 616 |
| TURBIDITY       | NTU          | 2.657    | 2.890    | 0.03  | 45.5     | 360 |
| SECCHI DEPTH    | M            | 1.234    | 0.447    | 0.35  | 3.05     | 215 |
| NITRATE N       | MG/L         | 0.028    | 0.013    | 0.025 | 0.130    | 360 |
| NITRITE N       | MG/L         | 0.025    | 0.000    | 0.025 | 0.025    | 360 |
| AMMONIA N       | MG/L         | 0.054    | 0.024    | 0.050 | 0.200    | 360 |
| KJELDAHL N      | MG/L         | 0.600    | 0.291    | 0.050 | 2.600    | 360 |
| ORGANIC N       | MG/L         | 0.549    | 0.271    | 0.000 | 1.550    | 331 |
| TOTAL N         | MG/L         | 0.592    | 0.301    | 0.050 | 2.600    | 360 |
| TDS             | MG/L         | 14837.34 | 9518.18  | 245.0 | 101790.0 | 360 |
| TSS             | MG/L         | 9.76     | 14.63    | 0.3   | 214.0    | 360 |
| TOTAL P         | MG/L         | 0.054    | 0.045    | 0.010 | 0.600    | 360 |
| FECAL STREP     | CFU'S/100 ML | 8.2      | 15.0     | 1     | 130      | 143 |
| FECAL COLIFORMS | CFU'S/100 ML | 115.3    | 256.9    | 1     | 888      | 143 |
| CHL A           | uG/L         | 6.77     | 3.91     | 0.5   | 21.1     | 143 |
| 5 DAY BOD       | MG/L         | 1.69     | 1.17     | 1.2   | 8.6      | 360 |

TABLE 3. DEVIATIONS FROM STATE STANDARDS  
WY '2011

| AT FRESHWATER STATIONS |           |   | AT SALTWATER STATIONS |  |
|------------------------|-----------|---|-----------------------|--|
| FACTORS                | FREQUENCY | STATIONS  | FREQUENCY             | STATIONS   |
| TURBIDITY              | 2         | 262,300   | 8                     | 242,262,300,<br>350,430  |
| TSS                    | 22        | 110,210,290,<br>300,310,355,<br>390   | 76                    | 110,120,130,<br>210,242,271,<br>290,300,310,<br>315,350,355,<br>390,400,430,<br>510,540,590,<br>600                          |
| BOD                    | 96        | 105,110,160,<br>190,210,243,<br>262,280,290,<br>295,300,310,<br>355,390             | 124                   | 105,110,120,<br>130,160,190,<br>210,242,243,<br>262,271,280,<br>290,295,300,<br>310,315,350,<br>355,390,400,<br>430,470,510  |
| TN                     | 2         | 280,355   | 3                     | 280,355,510  |
| TP                     | NA        |   | 1                     | 430  |
| STREP                  | 23        | 105,190,210,<br>262,275,290,<br>295,310,355,<br>390                                 | 32                    | 105,130,190,<br>210,242,262,<br>275,290,295,<br>310,315,350,<br>355,390,510  |
| COLI                   | 52        | 105,110,129,<br>160,190,210,<br>243,262,275,<br>280,290,295,<br>300,310,355,<br>390 | 72                    | 105,110,120,<br>129,130,160,<br>190,210,242,<br>243,262,275,<br>280,290,295,<br>300,310,315,<br>355,390,430,<br>510,540,550, |



|       |    |   |     |   |
|-------|----|---|-----|---|
|       |    |   |     | 590   |
| DO    | 69 | 105,110,129,<br>160,190,243,<br>275,280,295,<br>300,355                 | 194 | 105,110,120,<br>129,130,150,<br>160,190,243,<br>271,275,280,<br>295,300,315,<br>350,355,400,<br>430,445,450,<br>455,470,510,<br>540,550,570,<br>580,590,600 |
| CHL A | 86 | 105,110,160,<br>210,243,262,<br>275,280,290,<br>295,300,310,<br>355,390 | 118 | 105,110,120,<br>130,160,210,<br>242,243,262,<br>271,275,280,<br>290,295,300,<br>310,315,350,<br>355,390,400,<br>430,470,510,<br>550,590,600                 |
| pH    | 24 | 129,160,243,<br>280,290,300,<br>310                                     | 36  | 129,160,242,<br>243,280,290,<br>300,310,315,<br>430,510,540,<br>550   |

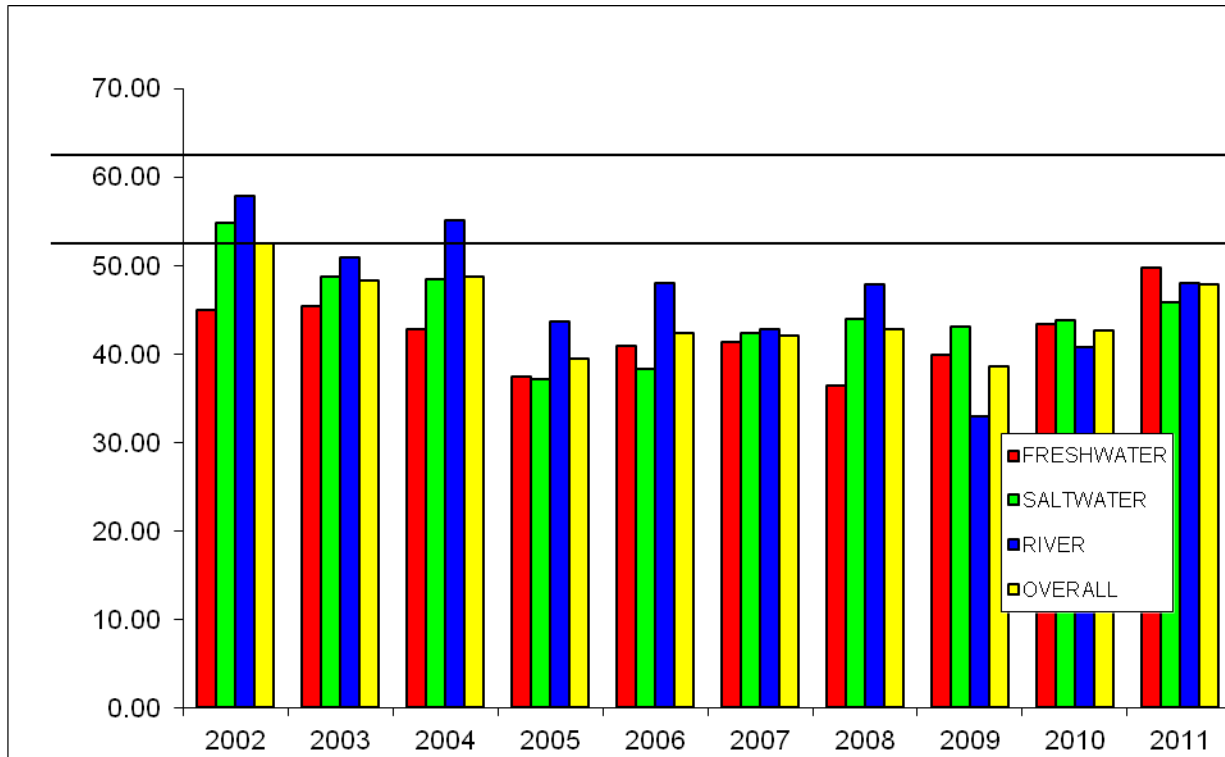
TABLE 4. WATER QUALITY INDICES FOR CAPE CORAL

WY '2011

| SYSTEM TYPE | INDEX VALUE |
|-------------|-------------|
| FRESHWATER  | 49.75       |
| SALTWATER   | 45.85       |
| RIVER       | 48.01       |
| OVERALL     | 47.87       |

Note: index based on Hand et al. (1988).

Low values better than high.



## **SUMMARY AND CONCLUSIONS**

ERD continued to monitor 22 water quality factors at 36 locations in the vicinity of Cape Coral during Water Year 2011. Based on these observations and comparisons with Florida water quality indices, the overall water quality of Cape Coral sampling stations was good, and in comparison to previous years had declined slightly.

The recommendations for improvement of these conditions continue to include the following:

- 1)** Lobby for drainage basin improvements in the Caloosahatchee River upstream of Cape Coral. The saltwater canals of Cape Coral cannot be much better than the water that they receive from adjacent and upstream areas.
- 2)** Proceed as rapidly as possible to connect the entire City of Cape Coral to sewers. Nutrients from septic drainage systems are fostering excessive growth of plants in the canals and may also be responsible for elevated bacterial counts in areas of higher population and development.
- 3)** Encourage the use of best management practices, BMP's, in all areas of the Cape. Emphasize BMP's dealing with fertilizing of lawns and gardens, pesticide applications, the installation of barrier strips of vegetation to intercept runoff along waterways and enforce and improve existing erosion control ordinances.
- 4)** In some of the deeper canals, dissolved oxygen violations are consistently occurring. Addition of hard substrate on the bottom would lead to increased mixing and could alleviate some of these violations.
- 5)** To improve flow conditions dead-end canals should be connected to other canals. This could also improve oxygen conditions and clarity.

---

### ***Literature Cited***

APHA, 1989.

Standard Methods for the Examination of Water and Wastewater 17th Edition. American Public Health Association, Washington, DC 20005.

Hand, J., V. Tauxe and M. Friedman, 1988.

1988 Florida Water Quality Assessment 305(b) Technical Appendix. Standards and Monitoring Section, Bureau of Surface Water Management, Division of Water Management, Florida Department of Environmental Regulation, Tallahassee, FL.

**APPENDIX TABLE 1.  
REGULAR SAMPLING STATION LIST  
AUGUST, 1999**

| STA. # | CODE  | DESCRIPTION AND SYNONYMS   |
|--------|-------|--|
| 105    | FACNE | Gator Slough at the city limits  |
| 110    | FAWNE | Gator Slough above Weir 19 at Andalusia - drains headlands of NE Cape Coral.                             |
| 120    | FICNW | North Spreader at junction with Laguna Lake N of Kismet. Drains NW corner of Cape. = MNS4.               |
| 129    | SAWNW | Gator Slough below Weir 11 at Burnt Store Rd.  |
| 130    | FAWNW | Gator Slough above Weir 11 at Burnt Store Rd. Drains mid section of slough. =MNGS.                       |
| 150    | FICNW | North Spreader W of Old Burnt Store Rd., N of NW 16th Terr. jct. with Gator Slough and Wray Canal =MNS6. |
| 160    | FAWNW | Horseshoe Canal at Burnt Store Rd. N of Diplomat above Weir 13.  |
| 190    | FAWNW | Hermosa Canal above Weir 14, Burnt Store Rd. at NW 9th St.   |
| 210    | FACNE | Head of Meade Canal at Cleveland Canal, S of 6th St., E of 19th CT. =RM3.                                |
| 242    | SARNE | Caloosahatchee River off Hancock Bridge at County Park east of bridge.                                   |
| 243    | FACNE | Greene Canal at Hancock Bridge between SE 12th Ct and SE 13th Ave; NE side of Bridge.                    |
| 262    | FALSE | Lake Manitoba center, 4th St and 18th Ave. = RMLM.   |
| 271    | SACNW | Old Site of Ceitus Lift  |
| 275    | FACSE | Rachel Canal at Dual Water Pumphouse 8, SE 6th St and SE 13th Ave.                                       |
| 280    | FACSE | Lake Saratoga outlet at SE First PL between SE 5th St and SE 6th St. =BF9.                               |
| 290    | FALSW | Lake Kennedy, center. =BL2 =SC8.   |
| 295    | FACSE | Mackinac Canal at n side of SE 9th St bridge between SE 8th PL and St. Jock Blvd.                        |
| 300    | FACSE | Meade Canal above Weir 3, Viscaya Pky between SE 20th CT. and SE 21st Ave. =BF7.                         |
| 310    | FACSE | Nicholas Canal, center of wide area between SE 3rd Ave and SE 4th Ave. =SC7.                             |
| 315    | SACSE | Industrial Park; jct. Rubicon & Honolulu Canals, SE 12th Terr at SE 13th AVE = BT1=RM6.                  |
| 350    | SARSW | Caloosahatchee River, 1/2 mile due E of Chantry Canal. =CR4.   |
| 355    | FACSW | Dual Water Pumphouse on Escapade Canal, 20th St SW.  |
| 390    | FAWSE | San Carlos Canal (or Retunda Canal N) above Weir 1. =SC6 =BF3.   |
| 400    | SACSE | Lido Canal at Del Prado Bridge S of Shelby Pky.  |
| 430    | SACSE | San Carlos Basin, SE First Ave at 34th Terr. =SC4.   |
| 445    | SICSW | Maxine Canal at Surfside Blvd. Bridge near SW 28 <sup>th</sup> Ave.                                      |
| 450    | SICSW | South Spreader, bridge at Hernando Canal, S of 36th Terr. = SP5  |
| 455    | SICSW | Rose Canal at Oasis Blvd. Bridge near SW 41 <sup>st</sup> St.  |
| 470    | SACSE | Plato Canal, just W of Del Prado, S of 40th St. =RM9.  |
| 510    | SACSE | Rubicon Canal, south end, between 5th Ave. and 6th Ave at 47th St. =RM8.                                 |
| 540    | SACSE | Bimini Canal jct. with San Carlos Canal; ca. 53rd Terr near Sarasota Ct. =SC1 =BL3.                      |

|     |       |   |
|-----|-------|---|
| 550 | SACSW | South Spreader, SW corner, W end of El Dorado Pky =SP4.             |
| 570 | SICSW | South Spreader at bend at Sagamore Pl. =SP3.                        |
| 580 | SICSW | South Spreader at bend W of Peelinore Ct. =SP2.                     |
| 590 | SACSW | South Spreader, W of Boat Lock. =SP1.                               |
| 600 | SACSW | Casaba Canal jct. with its southernmost branch along 58th Ln. =FB1. |

**DESCRIPTION CODES FOR SAMPLING SITES**

| DIGIT | SYMBOL | DESCRIPTION   |
|-------|--------|---|
| 1     | F      | FRESHWATER  |
| "     | S      | SALTWATER; SALINITY >0.1 PPT                          |
| 2     | A      | ALL ROUTINE PARAMETERS MEASURED                       |
| "     | I      | INSTRUMENT MEASUREMENTS ONLY MEASURED ROUTINELY       |
| "     | E      | EXCEPTIONAL - NOT A ROUTINE SAMPLING STATION          |
| 3     | W      | WEIR  |
| "     | C      | CANAL   |
| "     | L      | LAKE  |
| "     | R      | RIVER   |
| "     | M      | MISCELLANEOUS OTHER (e.g. wetland, marsh, swamp etc.) |
| 4&5   | NW     | NW OF EMBERS-HANCOCK, SANTA BARBARA-JUANITA LINES     |
| "     | NE     | NE OF EMBERS-HANCOCK, SANTA BARBARA LINES             |
| "     | SW     | SW OF EMBERS-HANCOCK, SANTA BARBARA LINES             |
| "     | SE     | SE OF EMBERS-HANCOCK, SANTA BARBARA LINES             |