

CAPE CORAL
WATER QUALITY
MONITORING SUMMARY
WY '06

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ENVIRONMENTAL RESOURCES DIVISION
PUBLIC WORKS DEPARTMENT
CITY OF CAPE CORAL

CAPE CORAL MONITORING SUMMARY
WY '06

EXECUTIVE SUMMARY

This summary is based on the fifteenth year of water quality data (WY-06) in the Environmental Resources Division's water quality monitoring program. 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 coliform bacteria, biological oxygen demand, dissolved oxygen, pH, chlorophyll a, total nitrogen, total phosphorous and total suspended solids. 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 '06

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, 2005 - September 30, 2006 (Water Year 2006). 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 ERD 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 ERD. 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, 2005 through September 30, 2006. For clarity in interpretation, data were separated into freshwater and saltwater.

Chlorophyll a numbers made up 37% of the Class II water quality standards outliers. Total suspended solids numbers made up 29% and dissolved oxygen 10% of these above standard numbers (Table 3).

Stations 242, 262, 310, 355 and 600 all had violations in seven areas. Station 600 had 57 violations, primarily in the total suspended solids and chlorophyll a categories. Station 310 had 54 in mainly the same areas. Stations 242 and 600 are in and near the Caloosahatchee River and heavily influenced by upstream sources. Stations 262, 310 and 355 are located in heavily populated freshwater systems.

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. ERD 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 42. 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 remained at about the same level as in previous years, which with the City's population growth is impressive (Table 4).

CITY OF CAPE CORAL Water Quality Sampling Stations

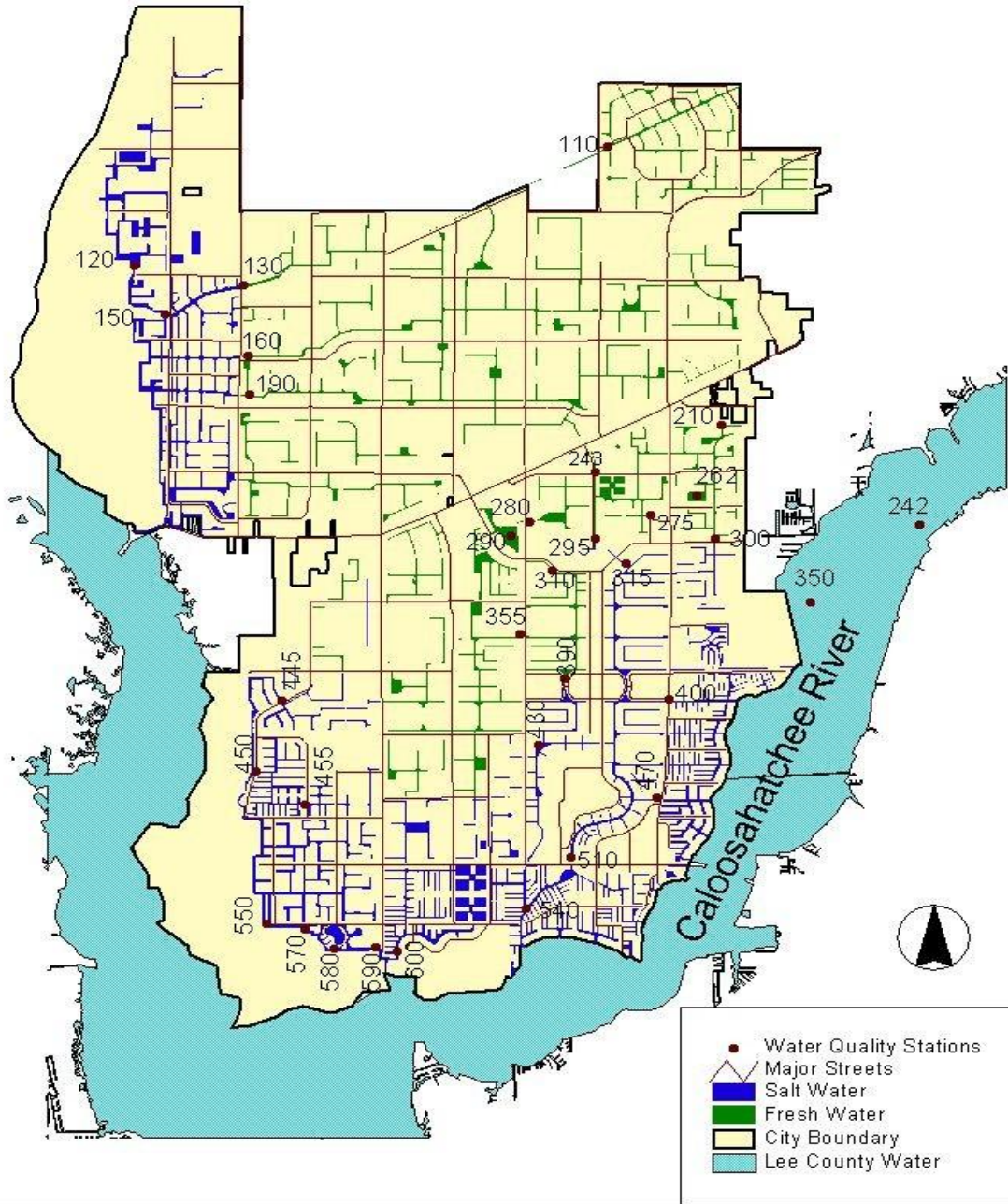


TABLE 1. MONITORING FACTORS

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 '2006

FACTOR	UNITS	MEAN	STD. DEV.	MIN.	MAX.	#
TEMPERATURE	DEG. C	25.15	4.66	14.51	32.37	462
DISSOLVED O2	MG/L	7.32	2.18	0.19	11.98	462
pH	STD. UNITS	7.75	0.39	6.66	8.83	422
CONDUCT.	MS/CM	0.483	0.0843825	0.305	0.773	462
TURBIDITY	NTU	5.75	14.18	0.05	218.00	425
SECCHI DEPTH	M	1.17	0.54	0.30	3.42	163
NITRATE N	MG/L	0.083	0.097	0.030	0.700	425
NITRITE N	MG/L	0.035	0.009	0.030	0.090	425
AMMONIA N	MG/L	0.050	0.000	0.050	0.050	425
KJEHDAHL N	MG/L	0.312	0.208	0.050	1.400	425
ORGANIC N	MG/L	0.262	0.208	0.000	1.350	425
TOTAL N	MG/L	0.373	0.240	0.030	1.480	425
TDS	MG/L	283.7	184.5	35	3943	425
TSS	MG/L	11.6	26.3	0.25	322	425
TOTAL P	MG/L	0.039	0.021	0.030	0.320	425
FECAL STREP	CFU'S/100 ML	24.4	32.8	1	216	168
FECAL COLIFORMS	CFU'S/100 ML	125.7	247.3	1	888	168
CHL A	uG/L	55.47	53.50	2.20	498.00	169
5 DAY BOD	MG/L	1.56	0.78	1.20	4.60	425

TABLE 2B: SALTWATER MONITORING DATA SUMMARY
 WY '2006

FACTOR	UNITS	MEAN	STD.DEV.	MIN.	MAX.	#
TEMPERATURE	DEG. C	25.66	4.15	16.26	35.75	583
DISSOLVED O2	MG/L	6.63	1.76	0.12	10.83	583
pH	STD. UNITS	7.58	0.43	6.19	8.38	497
CONDUCT.	MS/CM	10.003	10.241	0.037	42.9	583
TURBIDITY	NTU	5.69	13.65	0.13	172.00	312
SECCHI DEPTH	M	1.07	0.44	0.10	2.70	201
NITRATE N	MG/L	0.114	0.104	0.030	0.620	321
NITRITE N	MG/L	0.035	0.009	0.030	0.050	321
AMMONIA N	MG/L	0.050	0.000	0.050	0.050	321
KJELDAHL N	MG/L	0.406	0.240	0.050	2.200	321
ORGANIC N	MG/L	0.356	0.240	0.000	2.150	321
TOTAL N	MG/L	0.514	0.272	0.050	2.260	321
TDS	MG/L	7103.2	6908.2	7	28180	321
TSS	MG/L	26.9	24.2	0	221.5	321
TOTAL P	MG/L	0.053	0.070	0.010	0.800	311
FECAL STREP	CFU'S/100 ML	18.1	31.8	1	244	120
FECAL COLIFORMS	CFU'S/100 ML	118.7	271.7	1	1200	120
CHL A	uG/L	73.27	96.32	9.90	991.00	120
5 DAY BOD	MG/L	1.37	0.53	1.20	4.90	321

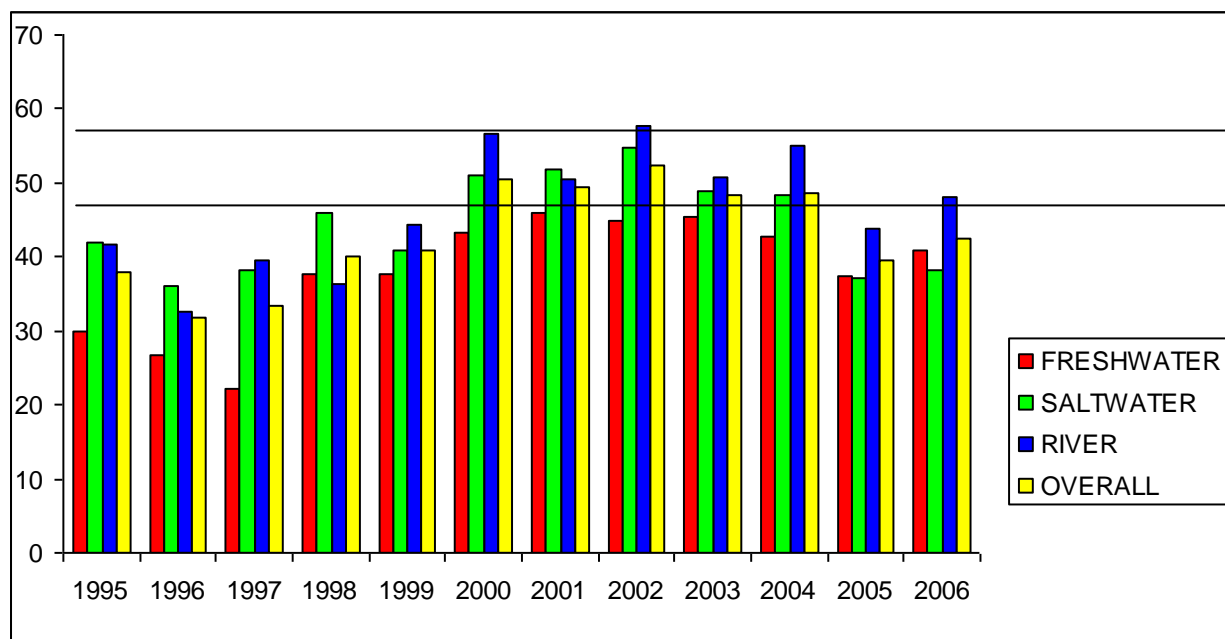
TABLE 3. DEVIATIONS FROM STATE STANDARDS			WY'2006	
AT FRESHWATER STATIONS			AT SALTWATER STATIONS	
FACTORS	FREQUENCY	STATIONS	FREQUENCY	STATIONS
TURBIDITY	25	160,190,210, 262,290,300, 310,355	18	242,315,350, 430,540,590, 600
TSS	44	160,190,210, 262,280,290, 295,300,310, 390	197	130,242,315, 350,400,430, 470,510,540, 550,590,600
BOD	20	110,262,310, 355,390	4	130,242,550
TN	NA		1	590
TP	NA		3	470,600
STREP	40	110,210,243, 262,275,280, 290,295,300, 310,355,390	23	242,315,350, 400,430,510, 540,550,600
COLI	24	110,160,190, 210,243,262, 275,280,290, 295,300,310, 355,390	23	130,242,315, 350,400,430, 470,510,540, 550,600
DO	37	110,160,190, 210,243,262, 275,280,295, 300,310,355	46	120,242,315, 430,445,455, 510,540,550, 570,580,590, 600
CHL A	161	110,160,190, 210,243,262, 275,280,290, 295,300,310, 355,390	143	130,242,315, 350,400,430, 470,510,540, 550,590,600
pH	11	160,190,275, 290,295,355	NA	

TABLE 4. WATER QUALITY INDICES FOR CAPE CORAL
WY '2006

SYSTEM TYPE	INDEX VALUE
FRESHWATER	40.9
SALTWATER	38.31
RIVER	48.02
OVERALL	42.41

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 33 locations in the vicinity of Cape Coral during Water Year 2006. 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
DECEMBER 1998**

STATION NUMBER	CODE	DESCRIPTION AND SYNONYMS
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.
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 Ft. Myers at Centennial Park east of bridge.
243	FACNE	Greene Canal at Hancock Bridge between SE 12th Ct and SE 13th Av; NE side of Bridge.
262	FALSE	Lake Manitoba center, 4th St and 18th Ave. = RMLM.
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 th 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 st 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
" W	WWEIR
" C	CANAL
" L	LAKE
" R	RIVER
" M	MISCELLANEOUS OTHER (e.g. wetland, marsh, swamp etc.)
2 A	ALL ROUTINE PARAMETERS MEASURED
" I	INSTRUMENT MEASUREMENTS ONLY MEASURED ROUTINELY
" E	EXCEPTIONAL - NOT A ROUTINE SAMPLING STATION
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