

CAPE CORAL
WATER QUALITY
MONITORING SUMMARY
WY '10

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ENVIRONMENTAL RESOURCES SECTION
PUBLIC WORKS DEPARTMENT
CITY OF CAPE CORAL

**CAPE CORAL MONITORING SUMMARY
WY '10**

EXECUTIVE SUMMARY

This summary is based on the nineteenth year of water quality data (WY-10) in the Environmental Resources Section'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 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 '10

INTRODUCTION

The Environmental Resources Section (ERS) 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, 2009 - September 30, 2010 (Water Year 2010). Figure 1. shows the locations of the main regular sampling stations for which monthly sampling have 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 ERS 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, 2009 through September 30, 2010. For clarity in interpretation, data were separated into freshwater and saltwater.

Dissolved oxygen numbers made up 32% of the Class II water quality standards outliers. Biological oxygen demand (BOD) and chlorophyll a numbers made up 17% (Table 3).

Stations 110, 130, 262 and 300 all had violations in seven areas. The majority of these violations occurred in BOD, chlorophyll a and dissolved oxygen. Stations 110 and 130 are located in the northwestern part of the city, which takes stormwater runoff from outlying areas, including several trailer parks. Stations 262 and 300 are in freshwater areas that have been subject to algae 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 43. 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. (Table 4).

CITY OF CAPE CORAL Water Quality Sampling Stations

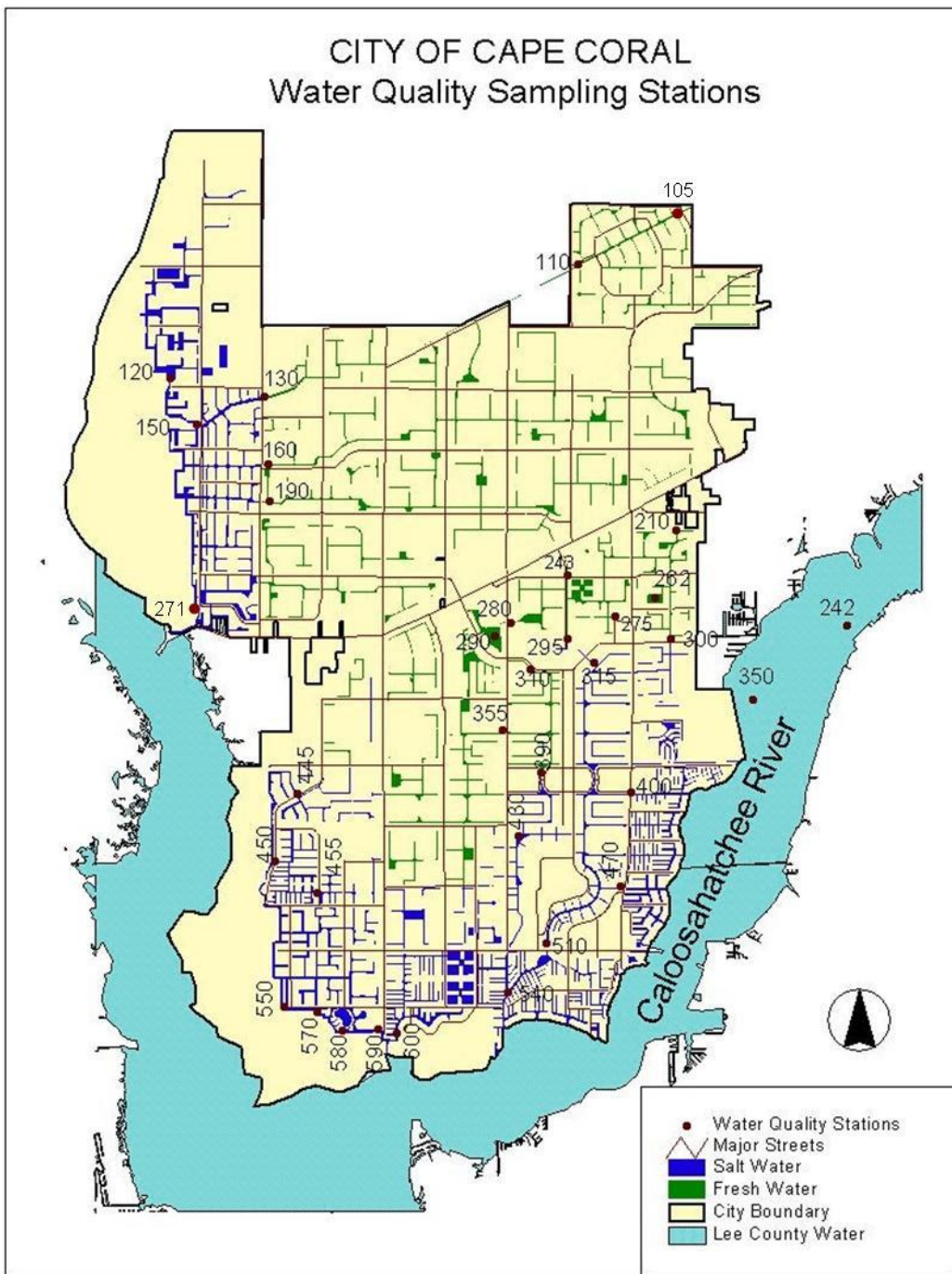


TABLE 1. MONITORING FACTORS

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 '2010

FACTOR	UNITS	MEAN	STD. DEV.	MIN.	MAX.	#
TEMPERATURE	DEG. C	24.72	5.94	10.29	32.16	546
DISSOLVED O2	MG/L	6.45	2.41	0.59	12.72	541
pH	STD. UNITS	7.66	0.34	6.61	8.40	546
CONDUCT.	MS/CM	0.627	0.148	0.262	1.079	546
TURBIDITY	NTU	2.81	3.38	0.01	27.39	401
SECCHI DEPTH	M	1.25	0.59	0.35	3.45	190
NITRATE N	MG/L	0.039	0.039	0.025	0.410	440
NITRITE N	MG/L	0.025	0.000	0.025	0.025	440
AMMONIA N	MG/L	0.055	0.026	0.050	0.300	440
KJEHDAHL N	MG/L	0.563	0.389	0.050	3.400	440
ORGANIC N	MG/L	0.508	0.386	0.000	3.350	440
TOTAL N	MG/L	0.581	0.392	0.050	3.450	440
TDS	MG/L	361.3	171.9	159	3532	433
TSS	MG/L	7.6	10.6	0.025	125	440
TOTAL P	MG/L	0.031	0.020	0.010	0.290	440
	CFU'S/100					
FECAL STREP	ML	22.7	70.0	1	888	192
FECAL	CFU'S/100					
COLIFORMS	ML	179.1	304.5	1	888	192
CHL A	uG/L	7.35	8.26	0.5	57.6	193
5 DAY BOD	MG/L	1.92	1.14	1	6	440

TABLE 2B: SALTWATER MONITORING DATA SUMMARY
 WY '2010

FACTOR	UNITS	MEAN	STD.DEV.	MIN.	MAX.	#
TEMPERATURE	DEG. C	25.14	5.58	10.55	33.06	618
DISSOLVED O2	MG/L	5.83	2.05	0.24	10.55	618
pH	STD. UNITS	7.67	0.27	6.79	8.39	618
CONDUCT.	MS/CM	14.032	11.515	0.36	54.8	618
TURBIDITY	NTU	2.59	7.28	0.01	127.00	358
SECCHI DEPTH	M	1.26	0.49	0.50	3.10	215
NITRATE N	MG/L	0.050	0.069	0.025	0.620	368
NITRITE N	MG/L	0.025	0.000	0.025	0.025	368
AMMONIA N	MG/L	0.084	0.176	0.050	2.000	368
KJELDAHL N	MG/L	0.761	0.401	0.100	4.400	368
ORGANIC N	MG/L	0.690	0.418	0.000	4.300	368
TOTAL N	MG/L	0.780	0.407	0.050	4.400	368
TDS	MG/L	9541.7	8189.7	218	82832	362
TSS	MG/L	9.1	11.3	0.25	144	368
TOTAL P	MG/L	0.059	0.038	0.010	0.220	368
FECAL STREP	CFU'S/100 ML	10.1	14.0	1	114	144
FECAL COLIFORMS	CFU'S/100 ML	120.6	252.6	1	888	144
CHL A	uG/L	7.15	5.65	0.5	29.0	144
5 DAY BOD	MG/L	1.42	0.62	1.0	5.4	368

TABLE 3. DEVIATIONS FROM STATE STANDARDS
WY '2010

AT FRESHWATER STATIONS			AT SALTWATER STATIONS	
FACTORS	FREQUENCY	STATIONS	FREQUENCY	STATIONS
TURBIDITY	3	262,300	8	130,262,300, 430
TSS	33	110,160,190, 210,262,300, 310,390	63	110,120,130, 160,190,210, 242,262,271, 300,310,350, 390,400,430, 510,540,590
BOD	66	110,210,262, 275,290,300, 310,355,390	76	110,120,210, 242,262,275, 290,300,310, 315,355,390, 430,470,510, 590,999
TN	2	110,300	3	110,130,300
STREP	27	105,110,129, 160,190,210, 262,275,295, 300,310,355, 390	37	105,110,120, 129,130,160, 190,210,242, 262,275,295, 300,310,315, 350,355,390, 470,510,540
COLI	34	105,110,129, 160,210,243, 262,275,280, 290,295,300, 310	57	105,110,120, 129,130,160, 210,242,243, 262,275,280, 290,295,300, 310,315,350, 400,430,470, 510,550,590, 999
DO	95	105,110,129, 160,190,210,	187	105,110,120, 129,130,150,

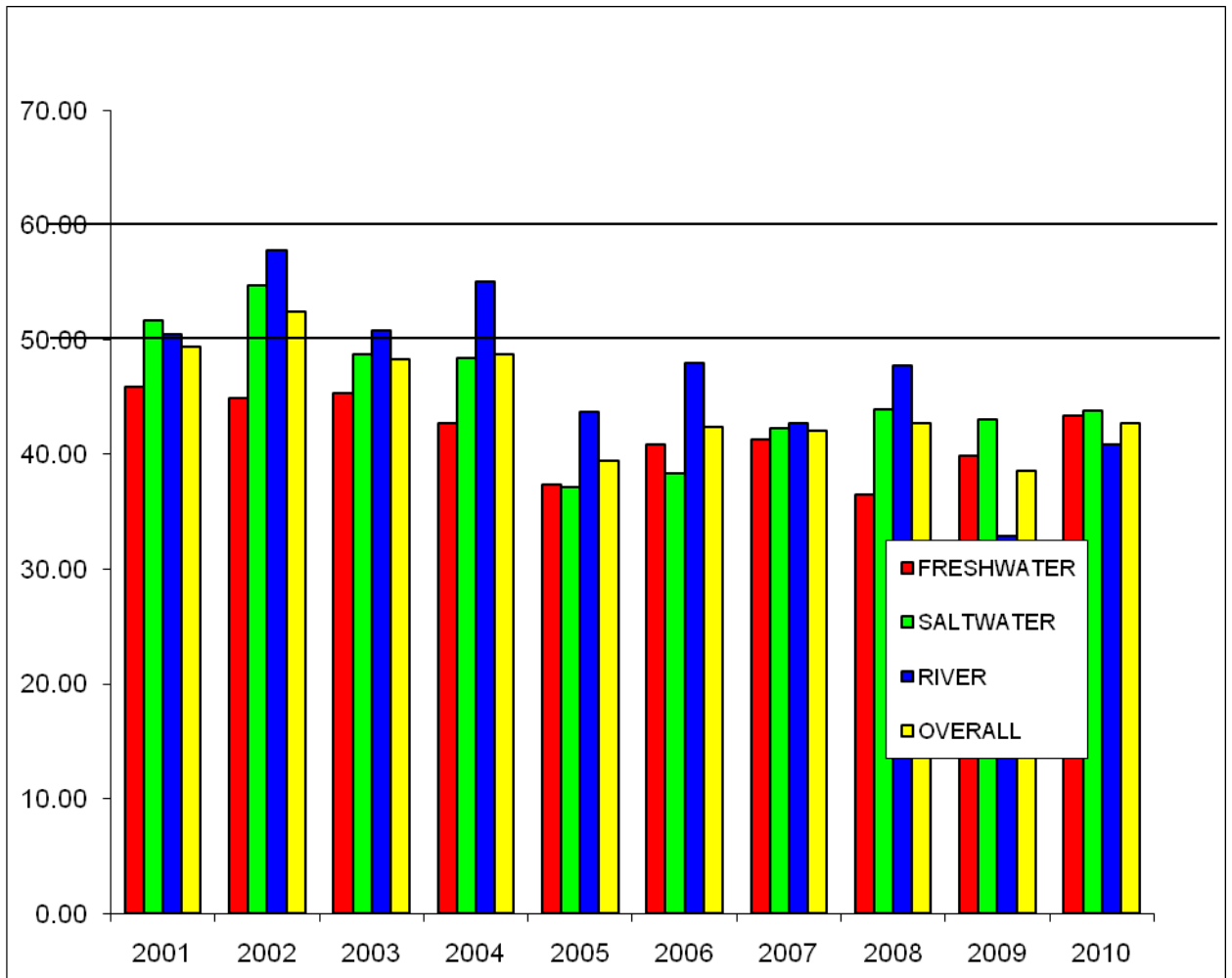
		243,262,275, 290,295,310, 355		160,190,210, 243,262,271, 275,290,295, 310,355,430, 445,450,455, 470,510,540, 570,580,590, 600
CHL A	53	105,110,210, 262,275,280, 290,300,310, 390	89	105,110,120, 130,210,242, 262,275,280, 290,300,310, 315,390,400, 430,470,510, 540,550,999

TABLE 4. WATER QUALITY INDICES FOR CAPE CORAL
WY '2010

SYSTEM TYPE	INDEX VALUE
FRESHWATER	43.41
SALTWATER	43.84
RIVER	40.82
OVERALL	42.69

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

Low values better than high.



SUMMARY AND CONCLUSIONS

ERS continued to monitor 22 water quality factors at 36 locations in the vicinity of Cape Coral during Water Year 2010. 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 remained about the same.

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**

<i>STA. #</i>	<i>CODE</i>	<i>DESCRIPTION AND SYNONYMS</i>
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 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
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