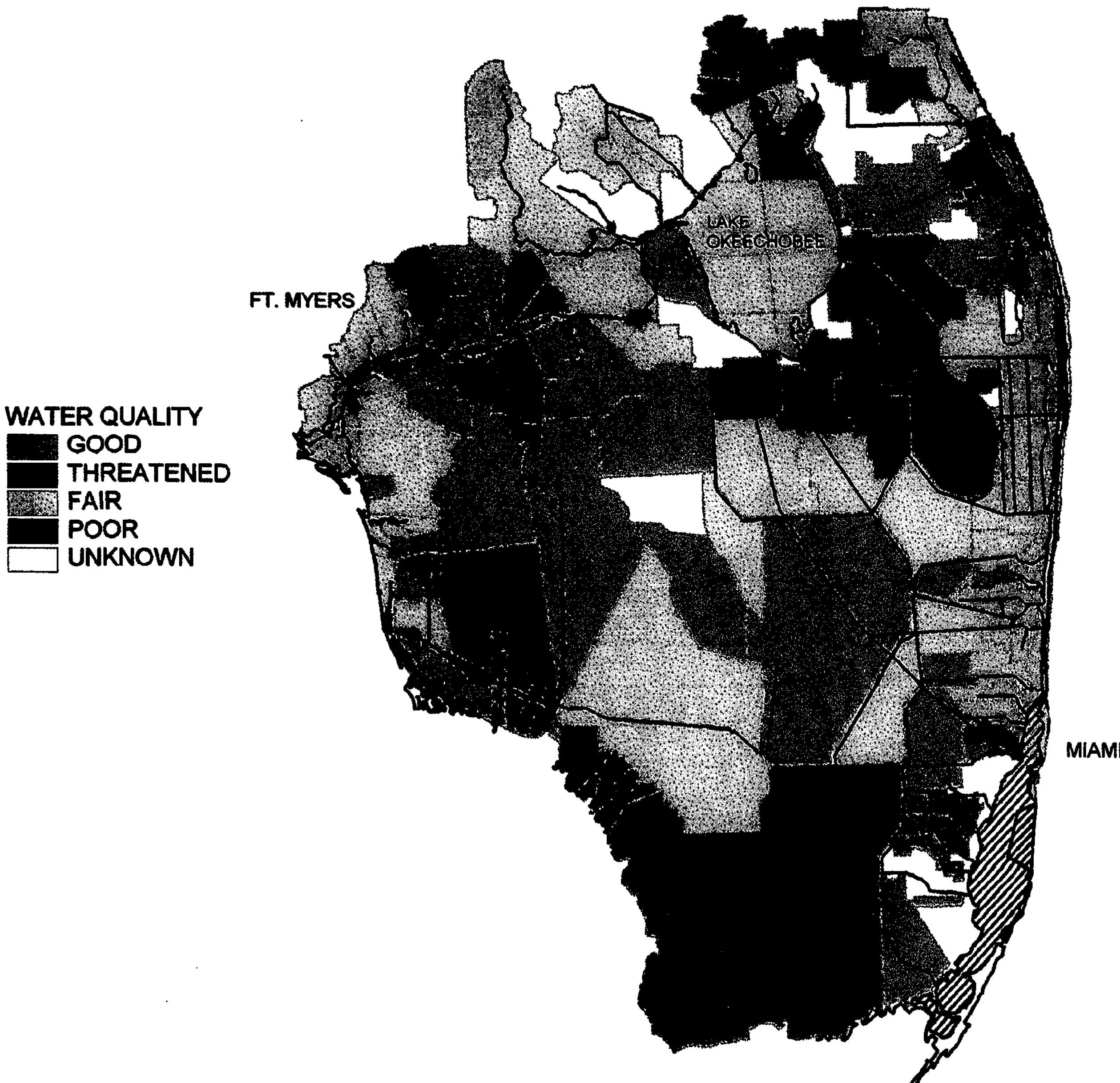
SOUTHEAST AND SOUTH FLORIDA DISTRICT WATER QUALITY ASSESSMENT 1994 305 (b) TECHNICAL APPENDIX

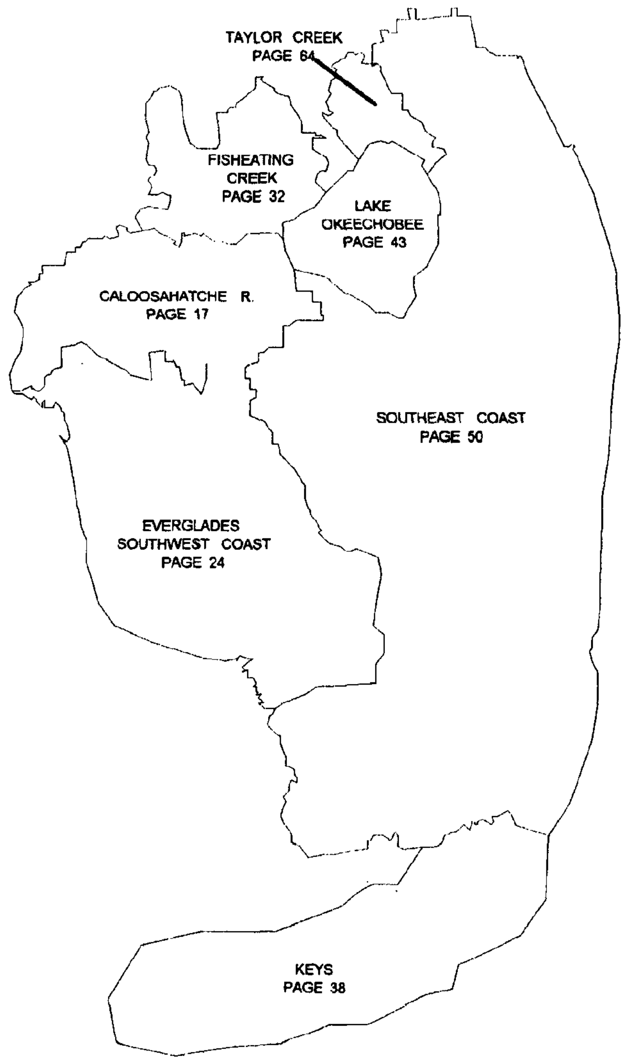


JOE HAND, JANA COL, AND ERIC GRIMISON
BUREAU OF SURFACE WATER MANAGEMENT
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

NOVEMBER, 1994

TASK 4.1

INDEX TO RIVER BASINS



1994 WATER QUALITY ASSESSMENT
FOR THE
STATE OF FLORIDA

TECHNICAL APPENDIX

Submitted in accordance with the
Federal Clean Water Act
Section 305(b)

November, 1994

Standards and Monitoring Section
Bureau of Surface Water Management
Division Of Water Facilities

PREFACE

This report is produced to inform Floridians and the EPA about surface water quality conditions and trends in Florida. Originally produced in 1978, this report has been updated every two years since, and has gone through many changes. The items listed below identify the major format changes which distinguish this report from its predecessor.

- **Regional Reports** - The large size of the statewide report (550 pages) necessitated its subdivision into 5 regional reports which correspond roughly with Department of Environmental Protection District Office boundaries (South and Southeast District Office reports are under one cover).
- **Watersheds versus Reaches** - In 1992 the State's rivers, lakes and estuaries were subdivided into 1600 'reaches' and the assessment was based on this reach structure, however much of the State's waters were not contained within the reaches. For 1994, the assessed area has been enlarged to cover the entire State by dividing the State into 4400 watersheds. The original 1600 reaches remain pretty much intact within the new watersheds, and the terminology now includes watershed and waterbody rather than reach.
- **ARC/INFO Water Quality Color Maps** - GIS techniques were used to produce color maps depicting water quality (designated use support) in each river basin. Watersheds were color coded based on good, threatened, fair or poor water quality designations.
- **New Nonpoint Source Qualitative Survey** - A nonpoint source qualitative survey was performed in 1988 and has been updated and included in this report for 1994. The survey used the same watersheds which were used to assess the water quality data and the qualitative results were integrated into this report to both supplement the quantitative information and to provide information when no quantitative information was available.
- **Current versus Historic Data** - Water quality data were examined for two time periods: current data from 1989-1993 and historic data from 1970-1988. Historic data were used to assess waterbodies only when there was no current data available.

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ACKNOWLEDGMENTS

We would like to express our gratitude to all of the professionals that supplied us with water quality data and reports, responded to surveys, and answered telephone inquiries concerning the status of waterbodies in their area. The quality of this report has been greatly enhanced by their efforts.

Many individuals in the District Offices reviewed the report on their sections of the State. These individuals include Rick Bradburn, Glenn Butts, Donald Ray, and Tone Touart-Rohlke in the Northwest District; Cathy Krestalude, Ernie Frey, Lee Banks, Angela Halfacre, and Jim Wright of the Northeast District ; Eric Pluchino and Dave Herbster of the Central District; Paul Wierzbicki, Herb Zebuth, and John Moulton of the Southeast District; Gordon Romeis of the South District, and Pat Fricano of the Southwest District . Sid Flannery of the Southwest Florida Water Management District also reviewed the report for his area.

The Nonpoint Source Stormwater Section put in a tremendous amount of work on the 1994 Nonpoint Source Assessment Survey . This team included Kent Cain, Ellen McCarron, and Mike Scheinkman. Don Foose, recently retired from the USGS , spent four years delineating and digitizing the new watersheds. Bernadette Howe, formerly with the St. Johns River Water Management District, provided much of the foundation work on GIS techniques for handling watersheds and water quality data and mapping the information.

Several of the DEP Tallahassee staff are to be thanked for their support and review of the final document including Don Axelrad, Vivian Garfein, Mark Latch and Richard Harvey, and Machelle Jarmon, who produced numerous draft copies of this text.

List of Abbreviations

AWT	advanced wastewater treatment
BAS	DEP basin water quality study
BMPs	best management practices
BOD	biochemical oxygen demand
cfs	cubic feet per second
DEP	Department of Environmental Protection
DO	dissolved oxygen
EAA	Everglades Agricultural Area
EPA	Environmental Protection Agency
FGFWFC	Florida Game and Fresh Water Fish Commission
MGD	millions of gallons per day
NPDES	National Pollutant Discharge Elimination System
NPS	nonpoint source
NWFWMD	Northwest Florida Water Management District
OFW	Outstanding Florida Waters
REACH	an EPA-designated waterbody or portion of a waterbody
SFWMD	South Florida Water Management District
SJRWMD	St. Johns River Water Management District
SRWMD	Suwannee River Water Management District
STORET	EPA's water quality data STOrage and RETrieval system
SWFWMD	Southwest Florida Water Management District
SWIM	Surface Water Improvement and Management
TKN	total Kjeldahl nitrogen (organic nitrogen and ammonia)
TSI	trophic state index
WLA	wasteload allocation
WMD	Water Management District
WQI	water quality index
WWTP	wastewater treatment plant

EXECUTIVE SUMMARY/OVERVIEW

The 305(b) Technical Report provides useful surface water quality related information in a format that is helpful to managers, planners, permit staff, and laymen, as well as water quality experts. For each of the 52 basins, a narrative summary, a map, and data tables identify the quality and trends of Florida's waterbodies, the causes of water quality problems, and the present regulatory activities conducted by DEP and EPA to improve the problem areas. It is the most widely circulated water quality assessment in the State, and also serves as the support document for the Surface Water Section of the 1994 305(b) Water Quality Assessment Main Report submitted to EPA.

The assessment required analysis of the available STORET water quality data for the 1970-1993 time period (STORET is EPA's computerized water quality database). Data from approximately 4,000 stations are assessed in this report, necessitating the extensive use of computerized assessment techniques. Water quality assessment techniques used to identify problem areas included: water quality indices, screening level exceedances, statistical trend analysis, information from special studies, and interviewing local experts. The 305(b) assessment also includes information from the 1994 DEP Nonpoint Source Assessment Survey (which is based on the responses of 50 Florida agencies).

Statewide Results From the Main Report

In the 1992 305(b) assessment report, Florida was subdivided into 1600 reaches which were based on EPA's RF2 (river reach file #2). A reach was defined as a 5 mile long section of river, or 5 square mile section of lake or estuary. Only major waterbodies were assessed in the 1992 report due to the resolution limitations imposed by the RF2 file. For 1994, Florida has been subdivided into 4400 watersheds based on EPA's RF3 and USGS watershed delineations. Many more miles of Florida waterbodies were assessed (50% more river miles, 30% more lake miles, and 20% more estuary miles) due to the increased number of watersheds available for assessment and due to efforts to collect more ambient data and store the data into STORET. Table 1 and Figure 1 show the mileages of Florida waters which were assessed in this year's report. A striking feature shown in Figure 1 is that 77% of river miles have unknown quality. This large percentage is due to the fact that EPA classified Florida's many ditches and canals as rivers, which were not assessed in this report.

A quantitative summary of the State's water quality was accomplished by determining the degree of designated use support for the different waterbody types. The vast majority of assessed Florida waterbodies meet or partially meet their designated use (92% of the river miles, 81% of the lake miles, and 96% of the estuary miles). Figure 2 shows that the river and estuary results are fairly similar, however the lake results show generally worse overall quality than the rivers and estuaries with fewer miles in the "meets use" category and more miles in the "does not meet use" category. Interestingly enough, this year's lake assessment brought in many more small lakes with good overall quality, however, Florida's largest lakes (Lake Okeechobee and Lake George) still overwhelm the State average with their large mileages of fair to poor quality.

It is very important to address both the sources of pollution and trends in water quality. In the past, the majority of identified water quality problems in the State were caused by point sources, including both domestic and industrial sources. Recently, however, nonpoint sources accounted for the majority of Florida's water quality problems. This is due to the fact that point source treatment processes have improved while there has been an increase in acreage of agricultural and urban developed land and their associated runoff.

Water quality trend analysis was performed on waterbodies which had sufficient data for analysis (467 out of 4400 waterbodies). The majority (70%) of these waterbodies (as seen in Figure 3) exhibited no significant trends. Five times as many waterbodies (24%) have improving water quality trends as have degrading trends. The improved water quality trends were generally the result of wastewater treatment plant upgrades or the additions of new regional WWTPs and nonpoint source controls in Tampa, Orlando and several other cities (as seen in Figure 4). Five percent of the waterbodies assessed for trends showed degrading trends; however, there are no regional patterns for degrading trends similar to the improving trends. The causes of degrading trends included point sources and nonpoint sources. Statewide trend detection is limited for the following reasons:

1. Only one-tenth of the waterbodies are assessed for trends.
2. The primary focus of our monitoring network is not trend assessment; most of our stations are frequently moved, and there are very few sites with long-term, monthly data.
3. Our trend assessment technique is tailored to the problem identified in #2, thus, it only identified relatively drastic changes in water quality. Subtle water quality changes due to population growth or nonpoint source treatment improvements are not picked up by this analysis.

Table 1. Mileages of Florida Waters Assessed

	Monitored 1.	Evaluated 2.	Unknown 3.	Total
River (miles)	7,025	4,855	39,978 2.	51,858
Lake (sq. miles)	1,541	400	124	2,064
Estuary (sq. miles)	2,417	1,290	347	4,054

1. Monitored data includes 1989-1993 STORET data.
2. Qualitative information or older STORET data (1970-1988)
3. This number includes 25,909 miles of ditches and canals which have not been assessed.

Table 2. Overall Designated Use Support Summary

RIVERS	(All size units in Miles)		
Degree of use support	Evaluated	Monitored	Total
Fully Supporting	1116	4378	5495
Supporting but Threatened	2259	0	2259
Partially Supporting	1139	2093	3232
Not Supporting	342	554	895
Total Size Assessed	4856	7025	11881

LAKES	(All size units in Square Miles)		
Degree of use support	Evaluated	Monitored	Total
Fully Supporting	213	494	707
Supporting but Threatened	100	0	100
Partially Supporting	53	714	766
Not Supporting	34	332	366
Total Size Assessed	400	1541	1940

ESTUARIES	(All size units in Square Miles)		
Degree of use support	Evaluated	Monitored	Total
Fully Supporting	501	1427	1928
Supporting but Threatened	402	0	402
Partially Supporting	358	851	1209
Not Supporting	28	139	167
Total Size Assessed	1290	2417	3707

Evaluated means qualitative information or older STORET data (1970-1988).
Monitored means recent STORET data (1989-1993).

FIGURE 1. MILES MONITORED, EVALUATED AND UNKNOWN

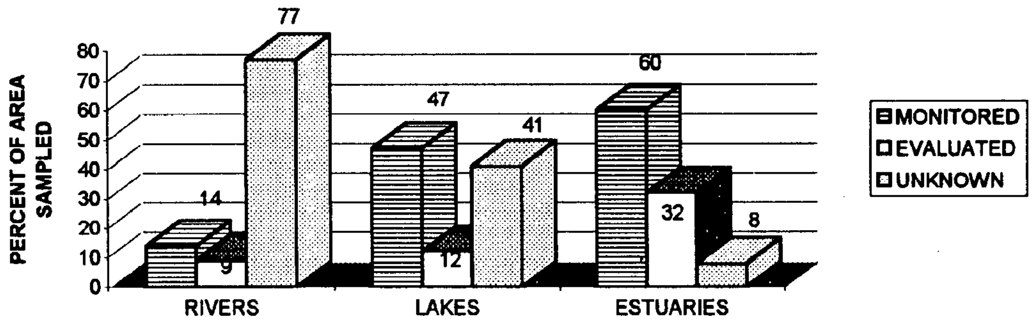


FIGURE 2. DESIGNATED USE SUPPORT IN FLORIDA WATERBODIES

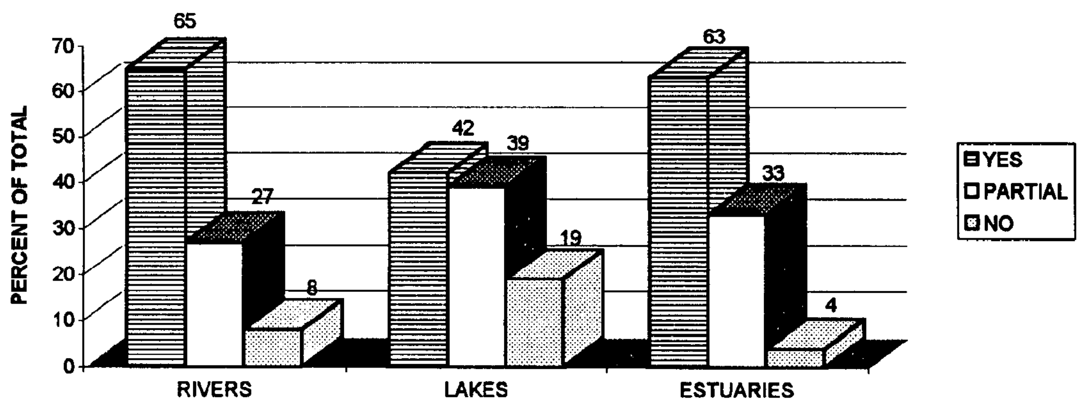
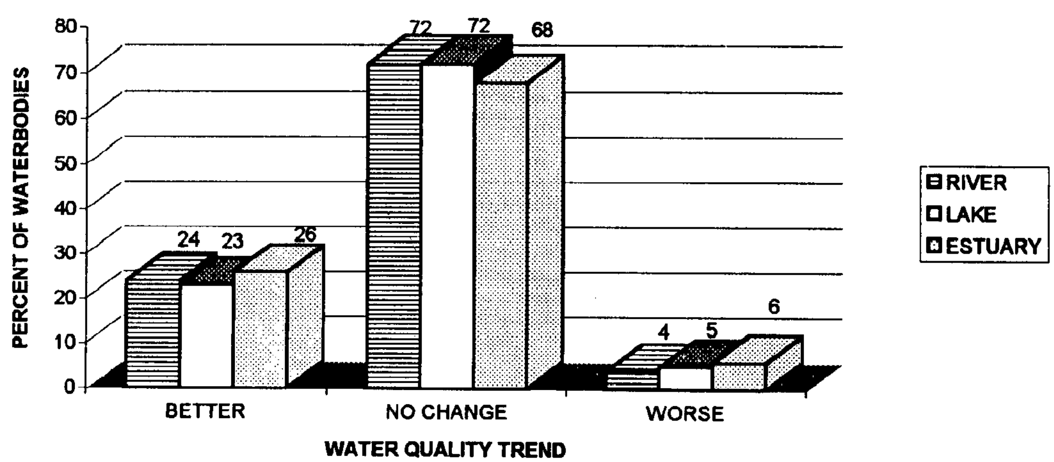
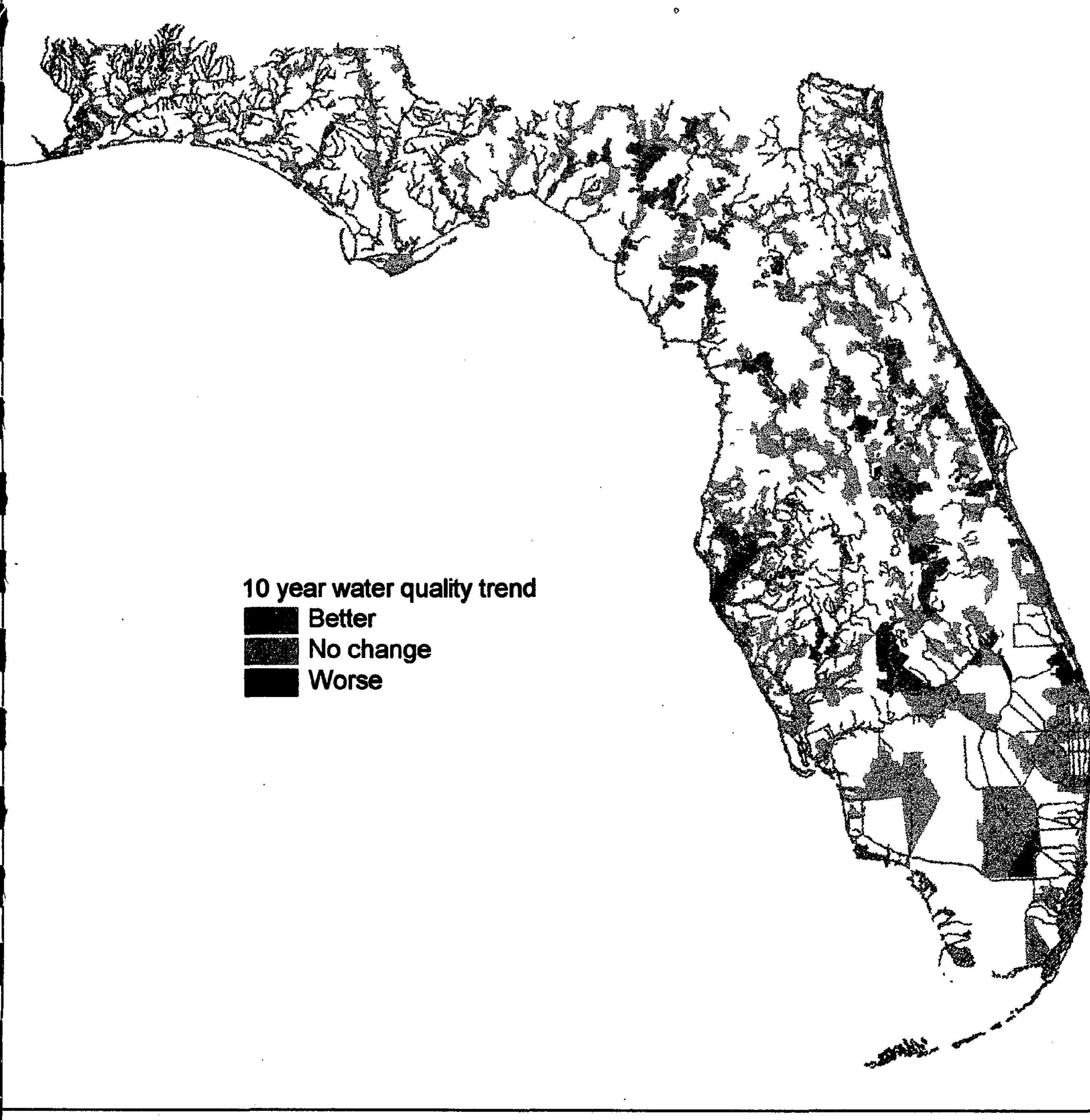


FIGURE 3. TEN YEAR WATER QUALITY TREND ANALYSIS FOR FLORIDA WATERBODIES (1984-1993)



Ten Year Florida Water Quality Trends (1984-1993)



Florida's surface water quality is displayed on the map on the cover of the main report. Two important conclusions can be drawn from this figure: first, the majority of Florida's surface water has good quality; and second, the majority of problems are found in Central and South Florida.

The sparsely populated northwest and west-central sections of the State have relatively better water quality than other areas. Water quality problem areas in the State are evident around the densely populated, major urban areas including: Jacksonville, Orlando, Tampa, Pensacola, the Cape Kennedy area and the southeastern Florida coast. Other areas of poor water quality, not associated with population, are found in basins with intense agricultural usage.

Pollution sources and problems in Florida are varied. The State does not have extensive industrialization, but rather localized concentrations of heavy industry centered mostly in urban areas. Many of the problems found in surface waters in urban areas can be attributed to industrial discharges. Silviculture, agriculture and various types of animal husbandry are a large part of Florida's current and historical economy. Furthermore, Florida has undergone rapid population growth over the past two decades and this continues. This has resulted in more pollution sources associated with residential development.

Florida's major surface water quality problems can be summarized into five general categories :

1. Urban Stormwater. Stormwater carries a wide variety of pollutants from nutrients to toxicants. Siltation and turbidity associated with construction activities can also be a major problem. Problem areas are concentrated around urban centers and mirror, quite well, the population map of the State. Current stormwater rules and growth management laws address this problem for new sources, but are difficult to monitor and enforce.

2. Agricultural Runoff. The major pollutants involved include nutrients, turbidity, BOD, bacteria and herbicides/pesticides. These pollutants generally do their worst damage in lakes and slow moving rivers and canals, and sometimes, the receiving estuary. Problems are concentrated in the central and southern portions of the State, and in several of the rivers entering the State from the north. Traditionally, agricultural operations have had far more lenient regulation than point sources; however, there is increasing recognition of the need for improved treatment of runoff water.

3. Domestic Wastewater. This is an area that has shown significant improvement in the last decade. Most of the waterbodies with improving water quality trends can be traced to wastewater treatment plant (WWTP) upgrades. Further advancements are being encouraged with design innovations such as wastewater discharge to wetlands, water reuse and advanced treatment. Still, a problem exists in the rural areas of the State where financial and technological resources are limited. Consequently, several of these poorly operating facilities are polluting some of Florida's relatively pristine natural waterbodies. Also, septic tank leachate contributes to the degradation of many of Florida's waterbodies.

4. Industrial Wastewater. Most notable among these are the pulp and paper mills. Because of the volume and nature of their discharge, all of the pulp and paper mills operating in the State seriously degrade their receiving waters. The phosphate and fertilizer industries are major pollution sources (both point and nonpoint) in several of Florida's surface water basins. In addition, the mining of phosphate causes surface water hydrological modifications and major land use disturbances.

5. Hydrological Modifications. This can take the form of damming running waters, channelizing slow moving waters, or dredging, draining and filling wetlands. Such modifications are not strictly pollution sources. However, in most cases where the natural hydrological regime was modified (mostly for water quantity purposes) water quality problems have ensued. Rating the effect of hydrologic modification is difficult. Dredge and fill activities result in a loss of habitat. Disruption of wetlands with a resultant net loss of area reduces the buffering and filtering capacities and biological potential of wetlands. This is a particularly important problem in estuaries. The loss of seagrasses and other marine habitats can seriously affect the maintenance of a viable fishery.

The assessment of public health and aquatic life impacts uncovered several areas of concern. Many of these problems are associated with estuaries and are of a persistent nature. Fish with Ulcerative Disease Syndrome are still present in the lower St. Johns River. This problem was first identified in the early to mid-80s. Second, major fish kills (as many as 1 million fish) occurred in the Pensacola Bay system over the past two years. The more massive of these kills occurred in Bayou Chico. Bacterial contamination in the water and contaminated sediments of the Miami River threaten Biscayne Bay. Many urban estuaries throughout the State have elevated levels of metals and organic contaminants in their sediments. Examples are Tampa Bay, St. Johns River Estuary and Pensacola Bay. The continued loss of fishery habitat from dredge and fill and construction activities is a threat to the maintenance of a viable fishery. The extensive die off of mangroves and seagrasses and algal blooms in Florida Bay are an important State concern. The probable cause is the extensive channelization and hydrological modification of the bay's watershed exacerbated in recent years by a lack of flushing from hurricanes, high water temperature and high salinity.

On the positive side, seagrasses have increased in area in Tampa Bay and there has been an improvement in water quality in Hillsborough Bay.

Three other problems exist which are also of a persistent nature, but largely impact fresh water systems. First, fish consumption advisories for largemouth bass continue to be issued because of elevated mercury concentrations in their tissue. Second, a no fish consumption advisory has been issued for the Fenholloway River. Elevated levels of dioxin were found in fish from this stream. This waterbody receives effluent from a pulp mill. The third problem is the coliform bacteria contamination of the Miami River. Sources of this contamination are illegal sewer connections to the stormwater pipe system, leaking or broken sewer lines, and direct discharges of raw sewage when pump stations have exceeded their capacity. During acute contamination events (direct discharge of sewage) coliform bacteria counts in the Miami River and adjoining waters of Biscayne Bay are hundreds of times higher than State criteria. Efforts are being made by the City of Miami and Dade County to correct these problems.

South Florida Region Basin-by-Basin Evaluation of Water Quality

The quality of Florida waters is graphically depicted on basin maps which follow each basin description. Areas of good, fair, and poor quality are readily discernible on these maps. The following is a summary of the status of the quality of waters in south Florida:

This part of the State has had extensive surface hydrologic modification. Large areas, that were once low-lying swamps, are now man-made canals designed for flood control and reclamation of land. Much of the once-inundated lands are used for intensive agriculture or urban development. Other significant portions of the marsh land are used for water storage and recharge or are preserved in State and federal holdings.

The Caloosahatchee River has mostly been channelized from Lake Okeechobee to the Gulf of Mexico. It receives agricultural runoff. Biological diversities are lower in the river than in its tributaries. The estuarine portion receives urban runoff and some wastewater discharge and exhibits water quality problems. The City of Cape Coral recently connected its first home to a dual use water system. That system allows treated effluent and canal water to be used for irrigation.

Several streams drain into Lake Okeechobee. The Fisheating Creek basin has no major pollution problems, although rangeland and agricultural runoff have resulted in some depressed DO concentrations. The five small streams that compose the Taylor Creek Basin (north of Lake Okeechobee) have some of the poorest water quality in the State. They are severely impacted by dairy-farm runoff.

Lake Okeechobee exhibits fair overall quality. The northern section of the lake receives excessive nutrient loads from Kissimmee River and from the streams in the Taylor Creek basin. The southern section of the lake receives nutrient loading from historic backpumping of agricultural lands (which still occasionally occurs). These lands are primarily planted in sugar cane and vegetables and are sprayed with various pesticides and/or fertilizers. Backpumping, which is now much reduced, occurs only during drought periods. There is a concerted effort by DEP and the

South Florida Water Management District to reverse the trend of worsening water quality in Lake Okeechobee. Lake Okeechobee serves as the hub of a flood control system that involves five major canals that run east and southeast of the lake through water conservation areas and the Everglades to the Atlantic Ocean. These major canals are greatly subdivided and dammed for flood control purposes. The canals, along with the residential finger-canal systems which are located along the Intracoastal Waterway and the Biscayne Bay area, make up most of the water systems of the Southeast Coast basin. The canals are characterized by high nutrient levels, low DO concentrations and poor flushing. Fish kills occur periodically as a result of the low DO. Water quality in the western reaches of these canals near the lake is poor due to agricultural runoff. The water quality of the canals in the eastern section of the basin depends on the degree of urbanization surrounding them and domestic point sources. Areas of relatively good water quality in the Southeast Coast basin are the Savannas near Ft. Pierce, portions of the St. Lucie and Loxahatchee Rivers and their estuaries, portions of Lake Worth, and the more open areas of Biscayne Bay. The marshes constituting the water conservation areas and most of the Everglades National Park are also included in this basin and have good water quality but are threatened by nutrient loading from agricultural areas. Largemouth bass in the Savannas Marsh, Everglades, and Conservation Areas 2 and 3 had high enough tissue concentrations of mercury to warrant no consumption advisories.

A three year lawsuit against DEP and the SFWMD filed by the U.S. Department of Justice for water quality violations in the Everglades and Loxahatchee National Wildlife Refuge has been settled. Nutrient enrichment has caused or contributed to four violations of Florida's Class III water quality criteria. These include imbalances of flora or fauna, dominance of nuisance species, biological integrity, and dissolved oxygen.

Waterbodies in portions of southern Florida that are heavily urbanized have a different set of problems than those in agricultural areas. Urban runoff and historic wastewater discharges have created serious problems for these waterbodies. Of particular concern are the New River in Broward County and the Miami River in Dade County. The New River receives discharges from improperly functioning septic tanks, vessels, industrial activities, and runoff. Metals enrichment of sediments has been found at marina sites.

The Miami River has serious problems with high coliform counts and contaminated sediments. Overload of the sewer system during periods of high inflow of stormwater or groundwater results in discharges of sewage. A more chronic problem of high coliform counts exists because of illegal connections of sewer lines to the stormwater system, leaking pipes and joints, and broken pipes. Sediments are contaminated with heavy metals, pesticides, and organic pollutants; sources of these pollutants includes stormwater runoff, domestic and industrial waste discharges, and biocides used on vessels.

The Florida Keys have good water quality except for problems in some of the manmade canals, in the marina areas, and in the port at Key West. There are also localized problems around some of the wastewater discharges. Biological problems have become evident with the die-off of seagrasses and mangroves. High temperature, high salinity and lack of flushing from hurricanes have been implicated as causes of the seagrass die-off.

INTRODUCTION AND METHODS

This section describes the water quality assessment procedures used by the Bureau of Surface Water Management to prepare the 1994 Florida Water Quality Inventory [305(b)]. The procedures are:

1. Divide State into Assessment Watersheds.
2. Inventory STORET data.
3. Calculate Stream Water Quality Index (WQI).
4. Calculate Lake/Estuary Trophic State Index (TSI).
5. Apply Screening Levels.
6. Conduct Trend Analysis.
7. Conduct Toxic Pollutant Assessment.
8. Conduct Nonpoint Source Assessment.

Florida's 52 major river basins were subdivided into 4400 watersheds of approximately five square miles each. The predominate waterbody within each watershed was identified and classified as a lake, stream, or estuary. Each watershed and its waterbody formed an assessment unit and all water quality stations within the watershed were aggregated as if they were from the same site (the stations were screened for unwanted sites, such as, point source discharge sites). A water quality inventory was performed on EPA's STORET database. The inventory included the years 1970 through 1993 and was classified as recent (1989-1993) or historic (1970-1988). Tables of water quality data were prepared for each of Florida's 52 basins. Three procedures were then used to assess the water quality data. A Water Quality Index was calculated to determine the overall quality of Florida streams and rivers. The Water Quality Index summarizes information from six categories including water clarity (turbidity and total suspended solids), dissolved oxygen, oxygen demanding substances (biochemical oxygen demand, chemical oxygen demand, and total organic carbon), nutrients (total nitrogen and total phosphorus), bacteria (total coliform and fecal coliform), and macroinvertebrate diversity index (based on natural substrate samples, artificial substrate samples and Beck's Biotic Index). The water quality of lakes and estuaries is described by the Trophic State Index which is a measure of the potential for algal or aquatic weed growth. The components which make up the Trophic State Index include total nitrogen, total phosphorus, chlorophyll and Secchi depth. Screening levels for 19 water quality parameters were also used to determine the quality of Florida lakes, estuaries and streams.

The water quality indices and screening levels have all been tailored to Florida's water quality by using the actual distribution of Florida data to determine the water quality criteria used by the procedures. Specific information on each of the procedures is described in the following sections.

Watershed as the Assessment Unit

In the 1992 305(b) assessment report, Florida was subdivided into 1600 reaches which were based on EPA's RF2 (river reach file #2). A reach was defined as a 5 mile long section of river, or 5 square mile section of lake or estuary. Only major waterbodies were assessed in the 1992 report due to the resolution limitations imposed by the RF2 file. For 1994, Florida has been subdivided into 4400 watersheds based on EPA's RF3 and USGS watershed delineations. The original 1600 reach delineations have been kept intact, however, many additional watersheds have been added due to the increased resolution of RF3 and the USGS watersheds which cover the entire State. USGS was contracted to develop useable, small watersheds (approximately 5 square miles) using watershed boundaries identified on USGS topological maps and ARC/INFO GIS techniques. USGS completed 75% of the State, but unfortunately they did not delineate watersheds in south Florida (USGS subregion 0309). Watersheds for South Florida were adapted from a much coarser delineation developed by the South Florida Water Management District. The resulting watersheds in this area are about 50 square miles each, ten times larger than those for the rest of the State.

The major waterbody within each watershed was identified and named. Usually each watershed encompassed one major or one minor named waterbody (similar to the 1992 reach structure). The length of each stream waterbody and the area of lake and estuary waterbodies is essential information. The length of stream waterbodies was determined by GIS measurements of the RF3 trace (or assigned a length of 5 miles if no RF3 trace was available). The area of lake and estuary waterbodies was determined with crude GIS aerial measurement techniques (if estuary waterbodies had no RF3 traces, their area was set to 5 square miles and unknown lake waterbodies were assigned an area of 1 square mile). The water quality within each waterbody is assumed to be homogenous (if data prove this assumption to be wrong, then the waterbody was subdivided). GIS techniques were used to assign STORET sites to their respective watersheds and the location of each site was visually inspected on a GIS map. If more than one named waterbody showed up in a watershed (based on the STORET data within a watershed), then the watershed was subdivided.

Inventory of STORET Data

An inventory of data was retrieved from STORET for the 1970-1993 time period. If data within a watershed were available for the current time period (defined as 1989-1993), then historical data was not examined, except for trend analysis. If no current data were found, then historic data (defined as 1970-1988) were used for the assessment. Fifty STORET parameter codes representing 21 different water quality parameters were inventoried (Table 3). There are about 8000 Florida stations in STORET which were sampled in 1970-1993. These stations are located in 1500 of the 4400 watersheds. Annual average (median) water quality was calculated for each of these stations and the data were stored on a local IBM Personal computer. In order for an annual average to be calculated for a station, the station had to be sampled at least twice within each year. STORET remark

Table 3. Storet Water Quality Assessment Parameters.

Category	Storet Parameter	Name	Storet Parameter Code
Coliform	Fecal Coli	MPN-FCBR/100ml	31616
Coliform	Fecal Coli	MPNECMED/100ml	31615
Coliform	Total Coli	MGIMENDO/100ml	31501
Coliform	Total Coli	MPN CONG/100ml	31505
Conductivity	Conductivity	at 25c micromho	95
Conductivity	Conductivity	Field micromho	94
Dissolved Oxygen	Dissolved Oxygen	% saturation	301
Dissolved Oxygen	Dissolved Oxygen	mg/l	300
Dissolved Oxygen	Dissolved Oxygen	Probe mg/l	299
Diversity Index	Biotic Index	BI	82256
Diversity Index	Diversity Index	Artificial substrate	82251
Diversity Index	Diversity Index	Natural substrate	82246
Flow	Stream Flow	cfs	60
Flow	Stream Flow	inst.-cfs	61
Oxygen Demand	BOD 5 day	mg/l	310
Oxygen Demand	COD Hi Level	mg/l	340
Oxygen Demand	Tot Organic Carbon	C mg/l	680
pH-Alkalinity	pH SU		400
pH-Alkalinity	pH SU	lab	403
pH-Alkalinity	Total Alkalinity	CaCO3 mg/l	410
Temperature	Temperature Water	cent	10
Trophic Status	Chlorophyll A	mg/l	32230
Trophic Status	Chlorophyll A	mg/l	32217
Trophic Status	Chlorophyll A	mg/l	32210
Trophic Status	Chlorophyll A	mg/l corrected	32211
Trophic Status	Chlorophyll Total	mg/l	32234
Trophic Status	Chlorophyll	total ug/l	32216
Trophic Status	Nitrogen ammonia	Diss-NO2 mg/l	71846
Trophic Status	Nitrogen NH3+NH4-	N Diss mg/l	608
Trophic Status	Nitrogen NH3_NH4-	N total mg/l	610
Trophic Status	Nitrogen Nitrate	Diss-NO3 mg/l	71851
Trophic Status	Nitrogen Nitrate	Tot-NO3 mg/l	71850
Trophic Status	Nitrogen NO2&NO3	N-Diss mg/l	631
Trophic Status	Nitrogen NO2&NO3	N-Total mg/l	630
Trophic Status	Nitrogen NO3-N	Diss mg/l	618
Trophic Status	Nitrogen NO3-N	Total mg/l	620
Trophic Status	Nitrogen Org N	N mg/l	605
Trophic Status	Nitrogen Tot Kjel	N mg/l	625
Trophic Status	Nitrogen Total N	As NO3 mg/l	71887
Trophic Status	Nitrogen Total N	N mg/l	600
Trophic Status	Phosphorus	OrthoPO4 mg/l	660
Trophic Status	Phosphorus Total	As PO4 mg/l	71886

Table 3. Storet Water Quality Assessment Parameters (continued).

Category	Storet Parameter	Name	Storet Parameter Code
Trophic Status	Phosphorus Total	mg/l P	665
Trophic Status	Transparency	Secchi Inches	77
Trophic Status	Transparency	Secchi Meters	78
Water Clarity	Color	PT-CO Units	80
Water Clarity	Color-AP	Pt-CO Units	81
Water Clarity	Residue Tot NFLT	mg/l	530
Water Clarity	Turbidity	JKSN JTU	70
Water Clarity	Turbidity	TRBIDMTR HACH FTU	76

codes also present a problem in data analysis when a data value is recorded as "less than" the actual value reported. In these cases the reported value was multiplied by 0.5 to adjust for the "less than" condition. Data with STORET remark codes indicating that the reported value was "greater than" the actual value were dropped from further analysis. A Water Quality Index value was calculated for each stream/river annual median and a Trophic State Index value was calculated for each lake/estuary annual median.

Florida Stream Water Quality Index Procedure

To assess Florida stream water quality, a Florida stream Water Quality Index (WQI) was developed and first used in the 1988 305(b) report. The WQI is based on the quality of water as measured by six water quality categories (water clarity, dissolved oxygen, oxygen demanding substances, bacteria, nutrients and biological diversity). Each category may have more than one parameter as shown in Table 4. Raw (annual average) data are converted into index values which range from 0 to 99 for the six categories. Index values correspond to the percentile distribution of stream water quality data in Florida (Table 4). [The percentile distribution of STORET water quality data were determined in 1987 for 2,000 ambient, stream STORET locations in Florida.] For example, Table 4 shows the BOD concentrations ranged from 0.8 mg/l (10 percentile) to 5.1 mg/ (90 percentile) with a median value of 1.5 mg/l (50 percentile). A BOD concentration of 0 to less than 0.8 mg/l is assigned an index value of 0 to 9, etc.

The overall WQI is the arithmetic average of the six water quality index categories. The index for each category is determined by averaging its component parameter index values. Missing water quality parameters and missing water quality categories are ignored in the final calculation. Therefore, the final WQI is based on an average of anywhere from 1 to 6 water quality index categories. Table 5 shows an example calculation of the WQI. The WQI can be calculated from just one index category; however, it becomes more reliable as more categories are used in its calculation.

In order to determine the range of values of the WQI which correspond to good, fair and poor quality, the WQI was correlated with the EPA National Profiles Water Quality Index for Florida data. (The EPA WQI was used in the 1986 305(b)). Based on this correlation, the cutoff values for the WQI were determined as follows: 0 to less than 45 represents good quality, 45 to less than 60 represents fair quality, and 60 to 99 represents poor quality.

The Florida stream Water Quality Index has several advantages over indices used previously. First, the index is tailored to Florida water quality data, since it is based on the percentile distribution of Florida stream data. Second, it uses the water quality categories which are felt to be the most important measures of water quality in Florida: water clarity, dissolved oxygen, oxygen demanding substances, nutrients, bacteria and biological diversity. Third, it is simple to understand and calculate and does not require a mainframe computer or any complex data transformations or averaging schemes. Finally, the index

Table 4. Florida Stream Water Quality Index Criteria.
Percentile Distribution of STORET Data.

Parameter	Unit	Best Quality 10%	20%	30%	40%	Median Value 50%	60%	70%	80%	Worst Quality 90%
** Category: Water Clarity										
Turbidity	JTU	1.50	3.00	4.00	4.50	5.20	8.80	12.20	16.50	21.00
Total Suspended Soldis	mg/l	2.00	3.00	4.00	5.50	6.50	9.50	12.50	18.00	26.50
** Category: Dissolved Oxygen										
Dissolved Oxygen	mg/l	8.00	7.30	6.70	6.30	5.80	5.30	4.80	4.00	3.10
** Category: Oxygen Demand										
Biochemical Oxygen Demand	mg/l	0.80	1.00	1.10	1.30	1.50	1.90	2.30	3.30	5.10
Chemical Oxygen Demand	mg/l	16.00	24.00	32.00	38.00	46.00	58.00	72.00	102.00	146.00
Total Organic Carbon	mg/l	5.00	7.00	9.50	12.00	14.00	17.50	21.00	27.50	37.00
** Category: Nutrients										
Total Nitrogen	mg/l as N	0.55	0.75	0.90	1.00	1.20	1.40	1.60	2.00	2.70
Total Phosphorus	mg/l as P	0.02	0.03	0.05	0.07	0.09	0.16	0.24	0.46	0.89
** Category: Bacteria										
Total Coliform	#/100 ml	100.00	150.00	250.00	425.00	600.00	1100.00	1600.00	3700.00	7600.00
Fecal Coliform	#/100 ml	10.00	20.00	35.00	55.00	75.00	135.00	190.00	470.00	960.00
** Category: Biological Diversity										
Diversity Index Nat. Substrate	Index	3.50	3.10	2.80	2.60	2.40	2.15	1.95	1.50	1.20
Diversity Index Art. Substrate	Index	3.55	3.35	3.20	3.05	2.90	2.65	2.40	1.95	1.35
Beck's Biotic Index	Index	32.00	28.00	23.00	18.50	14.00	11.00	8.00	5.50	3.50

Table 5. An Example Calculation of the Florida Stream Water Quality Index (WQI).

Water Quality Category[1]	Water Quality Parameter[2]	Value[3]	Parameter Index Value[4]	Index Average[5]
Water Clarity	Turbidity	3.9 mg/l	29	40
Water Clarity	Total Suspended Solids	7.0 mg/l	52	
Dissolved Oxygen	Dissolved Oxygen	5.4 mg/l	58	58
Oxygen Demanding Substances	BOD	2.8 mg/l	75	
Oxygen Demanding Substances	COD	31.0 mg/l	29	52
Oxygen Demanding Substances	TOC	.	--	
Nutrients	Total Nitrogen	1.87 mg/l	77	79
Nutrients	Total Phosphorus	0.56 mg/l	82	
Bacteria	Total Coliform	1800 MPN/100 ml	71	70
Bacteria	Fecal Coliform	1900 MPN/100 ml	70	
Macroinvertebrate Diversity	Natural Substrate	1.7	76	
Macroinvertebrate Diversity	Artificial Substrate	2.3	72	69
Macroinvertebrate Diversity	Beck's Biotic Index	11.0	60	
				WQI = 61[6]

1 - These are the 6 water quality categories.
2 - These are the 13 water quality parameters which make up the 6 categories.
3 - These are the actual data values ('.' indicates no measurement was taken for this parameter).
4 - The index value is based on the percentile distribution values shown in Table 4.
5 - The category average is based on an average of each of the water quality parameter values.
6 - The WQI is an average of the category index values, i.e., WQI = (40+58+52+79+70+69)/6=61.

works; it nicely identifies areas of good, fair, and poor water quality that correspond to professional and public opinion.

A toxic pollutants category would be a valuable addition to the index; however, toxic pollutants were not included in the index since there is relatively little data in Florida (compared to the amount of data for conventional pollutants). Toxic pollutants were assessed separately as discussed later in this section of the report.

Trophic State Index Procedure

The Trophic State Index procedure provides an effective method of classifying lakes based on the lake's chlorophyll, Secchi depth, nitrogen and phosphorus concentrations. The index was developed in 1982 in response to the EPA Clean Lakes Program and is documented in the Classification of Florida Lakes Report by the University of Florida, Department of Environmental Engineering Sciences. This index remains unchanged from the 1988 305(b) report.

The index is based on a trophic classification scheme developed in 1977 by R.E. Carlson. It relies on three trophic indicators to describe the trophic status of a lake. The goal was to have each indicator relate to algal biomass such that a 10 unit change in the index would represent a doubling or halving of algal biomass. Carlson developed indices based on Secchi disc transparency, chlorophyll concentration and total phosphorus concentration. The Florida Trophic State Index (TSI) is based on the same rationale, but also includes total nitrogen concentration as a fourth index. Criteria were developed for Florida lakes from a regression analysis of data on 313 Florida lakes. The desirable upper limit for the index is set at 20 ug/l chlorophyll which corresponds to an index of 60. Doubling the chlorophyll concentration to 40 ug/l results in an index increase to 70 which is the cutoff for undesirable (or poor) lake quality. Index values from 60 to 69 represent 'fair' water quality. The criteria for chlorophyll, Secchi depth, total phosphorus and total nitrogen concentrations are shown in Table 6.

A nutrient index is also calculated based on phosphorus and nitrogen concentrations and the limiting nutrient concept. The limiting nutrient concept identifies a lake as phosphorus limited if the nitrogen to phosphorus concentration ratio is greater than 30, as nitrogen limited if the ratio is less than 10, and balanced (depending on both nitrogen and phosphorus) if the ratio is 10-30. Thus, the nutrient TSI is based solely on phosphorus if the ratio is greater than 30, solely on nitrogen if less than 10, or based on both nitrogen and phosphorus if the ratio is between 10 and 30. An overall index (TSI) is calculated based on the average of the chlorophyll TSI, the Secchi depth TSI and the nutrient TSI. For this index to be calculated, both nitrogen and phosphorus measurements are required for the sample. The lake trophic state index was also applied to Florida estuaries to describe estuarine water quality. The criteria for the estuary quality ratings is 10 less than the lake ratings (i.e., good estuarine water quality is a TSI value of 0-49, fair quality is 50-59, and poor quality is a value of 60-100). Table 7 shows an example TSI calculation.

Table 6. Trophic State Index (TSI) for Lakes and Estuaries.

For Lakes: 0-59 is good, 60-69 is fair, 70-100 is poor
For Estuaries: 0-49 is good, 50-59 is fair, 60-100 is poor

Trophic State Index TSI	Chlorophyll CHLA (ug/l)	Secchi Depth SD (m)	Total Phosphorus TP (mgP/l)	Total Nitrogen TN (mgN/l)
0	0.3	7.4	0.003	0.06
10	0.6	5.3	0.005	0.10
20	1.3	3.8	0.009	0.16
30	2.5	2.7	0.01	0.27
40	5.0	2.0	0.02	0.45
50	10.0	1.4	0.04	0.70
60	20.0	1.0	0.07	1.2
70	40	0.7	0.12	2.0
80	80	0.5	0.20	3.4
90	160	0.4	0.34	5.6
100	320	0.3	0.58	9.3

TSI equations which generate the above criteria:

$CHLA_{TSI} = 16.8 + [14.4 \times LN\ (CHLA)]$ (use Natural Log)

$SD_{TSI} = 60 - [30 \times LN\ (SD)]$

$TN_{TSI} = 56 + [19.8 \times LN\ (TN)]$

$TP_{TSI} = [18.6 \times LN\ (TP \times 1000)] - 18.4$

$TSI = (CHLA_{TSI} + SD_{TSI} + NUTR_{TSI*}) / 3$

* Limiting Nutrient considerations for Calculating $NUTR_{TSI}$:

If $TN/TP > 30$ then $NUTR_{TSI} = TP_{TSI}$

If $TN/TP < 10$ then $NUTR_{TSI} = TN_{TSI}$

If $10 < TN/TP < 30$ then $NUTR_{TSI} = (TP_{TSI} + TN_{TSI}) / 2$

Table 7. An Example Calculation of the Trophic State Index (TSI) (See Table 6 for Formulas).

	Annual Average	TSI Calculation	Average TSI
Chlorophyll	6.0 ug/l	42.6[1.]	42.1
Secchi Depth	1.8 meters	42.3[2.]	42.3
Phosphorus*	0.04 mg P/l	50.2[3.]	
Nitrogen*	0.67 mg N/l	48.1[4.]	49.2[5.]
			45.0[6.]

1. CHLA = 16.8 + [14.4 x LN (6.0)] = 42.1 (use Natural Log)

2. SD = 60 - [30 x LN (1.9)] = 42.3

3. TP = [18.6 x LN (0.04 x 1000)] - 18.4 = 50.2

4. TN = 56 + [19.8 x LN (0.67)] = 48.1

5. TN/TP Ratio = 0.67/0.04 = 16.7 therefore, TSI NUTR = an average of TSI Phosphorus and TSI Nitrogen = (50.2 + 48.1)/2 = 49.2

6. (42.6 + 42.3 + 49.2)/3 = 45

* Note: If either phosphorus or nitrogen sampling information are missing, then the index is not calculated. Chlorophyll and/or Secchi Depth may be missing and the index will be calculated.

Screening Levels

Screening levels were used to determine water quality problems caused by each of nineteen water quality parameters (Table 8). Screening levels were based on either Florida criteria or on criteria established by professional judgment when quantitative Florida criteria are absent. Different screening levels were developed for streams, lakes and estuaries to take into account the natural differences among these waterbodies. The criteria which were established by professional judgment were based on the percentile distribution of Florida data.

The eightieth percentile was chosen as the cutoff between acceptable and unacceptable water quality. This means that 80% of Florida's water quality data will have acceptable levels. Table 8 identifies the screening levels used, the typical values measured and the Florida criteria for streams, lakes and estuaries. Screening level exceedances are noted in the data tables for each watershed in each basin.

Trend Analysis

Water quality trend analysis was performed on 12 water quality parameters (plus the overall stream water quality index and the trophic state index) for 460 watersheds. The time frame for the analysis is from 1984-1993. The analysis was quite simple; a non-parametric correlation analysis (Spearman's Ranked Correlation) was used to analyze the ten-year trend of the annual STORET station medians for each watershed. There may have been only one station analyzed within a watershed resulting in a maximum of ten years of data, or there may have been many stations sampled within the watershed resulting in the analysis of many more yearly station medians and a more meaningful trend analysis.

A separate trend assessment technique was used to analyze stream, lake, and estuary waterbodies. Stream trend analysis utilized the trend information from eight water quality parameters (bacteria, turbidity, total suspended solids, BOD, dissolved oxygen, Secchi depth, nitrogen and phosphorus) plus the overall water quality index. Lake and estuary trend analysis focused on four trophic state parameters (chlorophyll, Secchi depth, nitrogen and phosphorus) plus the trophic state index.

The overall trend of each waterbody was determined by comparing the number of improved water quality parameters to the number of degraded water quality parameters. Some waterbodies showed quite strong trends. If a waterbody showed no trends, or just one parameter showed a trend (or the number of improved trends minus the number of degraded trends is zero or one), then the trend is classified as "no change". This trend analysis must be considered preliminary due to the simplicity of the technique.

Table 8. Water Quality Assessment Parameters For Florida Streams, Lakes and Estuaries, Screening Levels-Typical Values-Florida Criteria.

Parameter	Units	Screening Level	Typical Values 10%	(Median)	90%	Florida Criteria (17-302) Class III
** Water Body Type: Stream						
Alkalinity	$CaCO_3$ mg/l		13	(75)	150	20.0 mg/l min.
Beck's Biotic Index	Index #	<5.5	4	(14)	32	
BOD 5 Day	mg/l	>3.3	0.8	(1.5)	5.1	Not cause DO<5 mg/l
Chlorophyll	ug/l		1	(6)	30	
COD	mg/l	>102	16	(46)	146	
Coliform-Fecal	#/100 ml	>470	10	(75)	960	200/100 ml
Coliform-total	#/100 ml	>3700	100	(600)	7600	1000/100 ml
Color	Platinum-Color Units		21	(71)	235	No nuisance conditions
Conductivity	micromho	>1275	100	(335)	1300	1275 or 50% abv background
Dissolved Oxygen	mg/l	<4.0	3.1	(5.8)	8.0	5.0 mg/l
Diversity Artificial Sub	index	<1.95	1.4	(2.9)	3.6	min. 75% of DI
Diversity Natural Substr	index	<1.50	1.2	(2.4)	3.5	min. 75% of DI (marine)
DO % Saturation	%		36	(68)	90	
Fecal Strep	#/100 ml		20	(15)	1700	
Fluoride	mg/l		0.1	(0.2)	0.8	10.0 mg/l
Nitrogen-total	mg/l as N	>2.0	0.5	(1.2)	2.7	Not cause imbalance
pH	standard units		6.1	(7.1)	7.9	<6.0 >8.5
Phosphorus-total	mg/l as P	>0.46	0.02	(0.09)	0.89	Not cause imbalance
Secchi Disc Depth	meters		0.4	(0.8)	1.7	min. 90% background
Temperature	centigrade		19	(23)	28	No nuisance conditions
Total Organic Carbon	mg/l	>27.5	5	(14)	37	
Total Suspended Solids	mg/l	>18.0	2	(7)	26	
Turbidity	JTU FTU	>16.5	1.5	(5)	21	29 NTUs above background
** Waterbody Type: Lake						
Alkalinity	$CaCO_3$ mg/l	>20.	2	(28)	116	20.0 mg/l min.
Chlorophyll	ug/l	>40.	1	(12)	70	
Nitrogen-total	mg/l as N	>2.0	0.4	(1.1)	2.5	Not cause imbalance
Phosphorus-total	mg/l as P	>0.12	0.01	(0.05)	0.29	Not cause imbalance
Secchi Disc Depth	meters	<0.7	0.4	(0.9)	2.7	Min. 90% background
** Waterbody Type: Estuary						
Chlorophyll	ug/l	>40	1	(9)	36	
Nitrogen-total	mg/l as N	>2.0	0.3	(0.8)	1.6	Not cause imbalance
Phosphorus-total	mg/l as P	>0.12	0.01	(0.07)	0.20	Not cause imbalance
Secchi Disc Depth	meters	<0.7	0.6	(1.1)	3.0	Min. 90% background

Toxic Pollutant Assessment

The assessment of toxic pollutants in Florida's waters was accomplished by an inventory of 9 STORET toxic metal parameters for 1991-93 (Table 9). The Florida surface water quality standards (Chapter 17-302, Florida Administrative Code) were used to assess whether the toxic pollutant was found at an elevated level. Several standards are based on hardness levels, however, since hardness levels were not available in all cases, a hardness value of 100 mg/l as calcium carbonate was assumed. An elevated level was defined as any exceedance of the standard for any of the nine metals. Generally, each waterbody was sampled two or three times for several of the metals during the last three years.

Nonpoint Source Assessment

An extensive assessment of nonpoint source impacts on Florida's waters was conducted in 1988 through the use of a questionnaire sent to all major State agencies (Water Management Districts, Division of Forestry, Game and Fresh Water Fish Commission), city and county offices, U.S. Soil Conservation Service, U.S. Forestry Service, Regional Planning Councils, local Soil and Water Conservation Districts, citizen environmental groups (Sierra Clubs, Audubon Society and others) and professional outdoor guides. The respondents (approximately 150 agencies and 350-400 participants) to the questionnaire identified nonpoint sources of pollution, environmental pollution symptoms (fish kills, algal blooms, etc.) pollutants and miscellaneous comments. The assessment has been updated in 1994. The 1994 nonpoint source assessment was performed more efficiently than the 1988 version due largely to the use of GIS technology for compiling and displaying the data, and also advancements in the questionnaire methodology. Scannable forms were used eliminating the need to key punch data and integration with the 305b report was much improved.

Florida's 1994 nonpoint source assessment was performed using a qualitative, best professional judgment approach. Unlike point source pollution analysis and its readily available STORET ambient data, there is rarely any convenient database of water quality monitoring data that has been designed for analyzing impacts of nonpoint source pollution on surface waters. Therefore, the assessment procedure was designed to make use of the knowledge of experienced field personnel who had information about individual waterbodies. The 1994 survey was sent to essentially the same group of professionals as the 1988 report and approximately fifty respondents identified nonpoint sources of pollution, environmental symptoms of pollution (fish kills, algal blooms, etc.), degree of impairment (rating) of a waterbody and miscellaneous comments. A total of 1720 watersheds or about 40 % of the total watersheds were qualitatively assessed by the respondents. Data tables summarizing the 1994 NPS survey are presented for each basin in this report. The remainder of this section describes the information presented in these tables.

Table 9. Toxic Metals in the Water Column.

Metal	Storet Parameter Number	Number of Waterbodies Sampled	Florida Criteria (ppb)	% of Waterbodies With Exceedances
Arsenic	1002	162	50	0%
Cadmium	1027	211	1.1	17%
Chromium	1034	155	207*	0%
Copper	1042	330	12*	10%
Iron	1045	378	1000	22%
Lead	1051	240	3.2*	30%
Mercury	71900	129	0.012	47%
Nickel	1067	130	158*	0%
Zinc	1092	253	106	10%

* actual criteria is dependent on water hardness which was assumed to be 100 mg/l as calcium carbonate since hardness was not available in all waterbodies

The impairment rating of a waterbody was defined as status of waters within a watershed as determined by support or nonsupport of designated use. The status of a watershed was dependent on making a determination of designated use support that applied to all surface waters within the aerial extent of that watershed. Designated use refers to the classification or standards and criteria applied to all Florida waters.

Impairment rating categories used were as follows:

1. Good (meets designated use). All surface waters in the watershed are supporting their use classification with no evidence of nonpoint source problems.
2. Threatened (meets designated use). All surface waters in the watershed are attaining their use classification, but in the absence of any future management activities, it is suspected that within five years at least some of the surface waters in the watershed will not support their designated use.
3. Fair (partially meets designated use). Some, but not all, surface waters in the watershed are not supporting their designated use.
4. Poor (does not meet use). All surface waters in the watershed are not supporting their designated use.

Nonpoint source pollution is generally associated with land use activities which do not have a well-defined point of discharge, such as discharge from a pipe or smoke stack. Nonpoint contaminants are carried to waterbodies by direct runoff or percolation through the soil to groundwater. There are many different potential source areas. Some of the common activities and sources which were considered in the nonpoint source assessment include:

1. Construction site runoff. This type of source can provide sediment, chemicals and debris to surface waters.
2. Urban stormwater. Runoff from buildings, streets and parking lots carries with it oil, grease, metals, fertilizers and other pollutants.
3. Land disposal. Leachate from septic tanks and landfills may pollute groundwater or local surface waters. Contamination of surface waters can be by either by direct runoff or discharge from groundwater.
4. Agricultural runoff. Runoff from fields and pastures carries with it sediments, pesticides and animal wastes (which can be a source of bacteria and viruses and nutrients).
5. Silvaculture operations. Logging activities which erode forest soils add turbidity and suspended solids to local surface waters.
6. Mining. This type of activity can cause siltation in nearby waterbodies, release of radioactive materials to groundwater, discharge of acid mine drainage and depletion of water supplies in aquifers.

7. Hydrologic modification. Dams, canals, channelization and other alternations to the flow of a waterbody result in habitat destruction and in general water quality deterioration.

Abbreviations were used for the nonpoint source categories in the NPS data tables which are found in each basin write-up on the following pages. Those abbreviations correspond to the sources as described below:

AG	=	Agricultural runoff
RE	=	Resource extraction or mining
SL	=	Silvaculture or for operations
LD	=	Land disposal
UR	=	Urban runoff
CN	=	Construction site runoff
HM	=	Hydrologic Modification
OT	=	Other nonpoint source
IND	=	Industrial site runoff
STP	=	Sewage treatment plant

Data for the last two point source categories were not obtained from the 1994 NPS assessment survey, but rather they come from the 1992 305(b) Report.

Respondents were provided with 15 choices of pollutants and 9 choices of symptoms for use in characterizing the status of a watershed. Pollutant choices or categories and their descriptions are provided below:

1. Nutrients. An imbalance of nitrogen and or phosphorus which resulted in algal blooms or nuisance aquatic plant growth. Standards for Class III waterbodies are based on this criteria.
2. Bacteria. This refers to the presence of high levels of coliform, strep and enteric fecal organisms which cause the closure of waters to swimming and shellfishing.
3. Sediments. Soil erosion which results in high levels of turbidity.
4. Oil and Grease. Hydrocarbon pollution resulting from highway runoff, marina, and industrial areas. Their presence is evidenced as a sheen on the water surface.
5. Pesticides. These class of chemicals can be found in runoff from agricultural lands and some urban areas.
6. Other Chemicals. General category for other chemicals besides pesticides and oil and grease, typically associated with landfills, industrial land uses and hazardous waste sites.

7. Debris. This category includes trash ranging from Styrofoam plates and cups to yard clippings and dead animals.
8. Oxygen Depletion. Low levels of dissolved oxygen in the water column resulting in odor problems (anoxic waters) and fish kills.
9. Salinity. Changes in salinity caused by too much or too little freshwater inflows. Typical results are declines in the fishery and changes in species composition.
10. pH. Change in the acidity of surface waters with resultant declines in fisheries and other changes to flora and fauna, such as reductions in diversity or abundance.
11. Metals. Anthropogenically enriched levels of trace metals commonly associated with urbanized watersheds and marinas.
12. Habitat Alteration. Landuse activities which adversely affect the resident flora and fauna. Included with habitat alteration is habitat loss.
13. Flow Alteration. Landuse activities which influence the flow characteristics of a watershed resulting in adverse affects upon flora and fauna.
14. Thermal Pollution. Activity which changes local temperature of receiving water relative to ambient temperature.
15. Other Pollutants. General category used to describe activities and impacts not described in the other 14 categories.

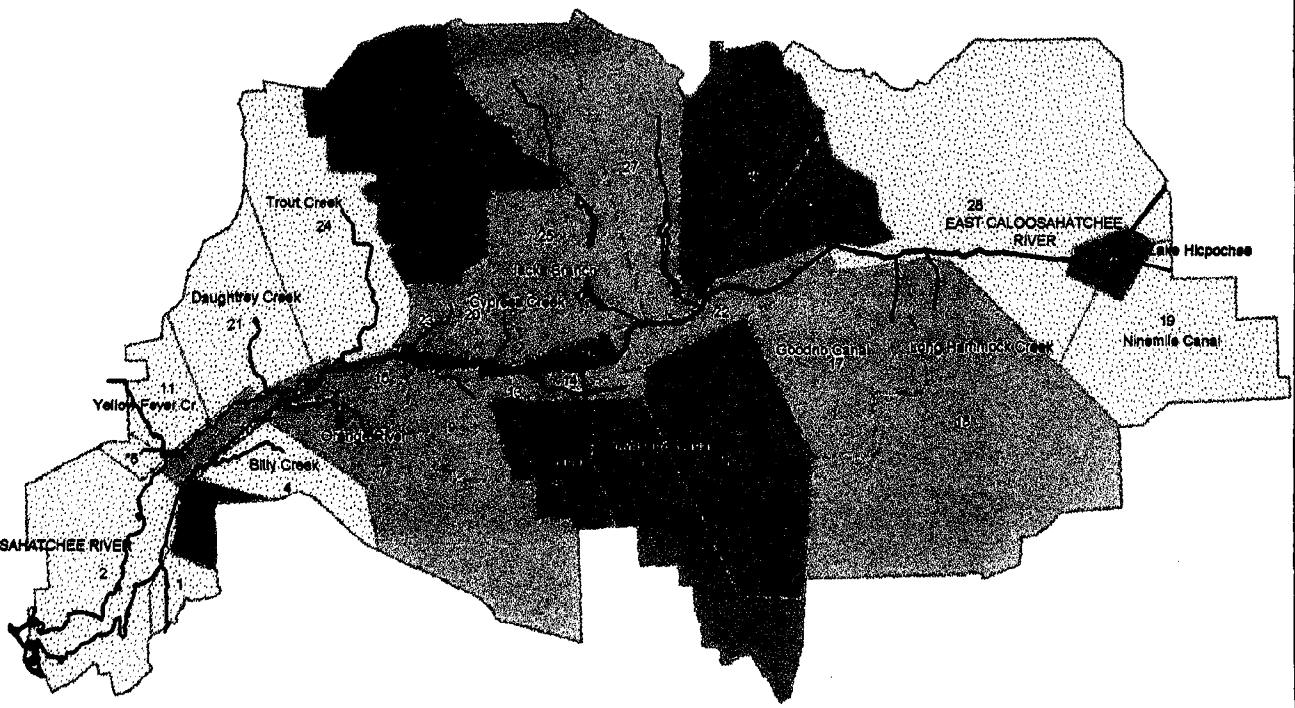
Responses of waterbodies to the above listed sources of pollutants were defined as symptoms. The nine symptoms used for categorization are defined as follows:

1. Fish Kills. Dead and dying fish caused by designated source of pollution.
2. Algal Blooms. Excessive growth of algae resulting from nutrient enrichment.
3. Aquatic Plants. Density of exotic and nuisance plants such that impairment of the waterbody occurs. Nutrient enrichment is usually the cause.
4. Turbidity. High suspended sediment loads in water column resulting from soil erosion. Effects on the waterbody include smothering of benthos and reduced light penetration with resultant loss of plant and algal productivity.
5. Odor. Unpleasant smells resulting from low dissolved oxygen conditions (anoxia) and or fish kills.
6. Declining Fisheries. Reduction in landings of or increases in catch per unit effort to catch game and commercial species indicating loss of productive fishery.
7. No Swimming. Closure of recreational swimming areas due to public health risks, usually caused by high coliform bacteria counts.
8. No Fishing. Closure of recreational or commercial fishing areas because of threats to human health from elevated bacteria counts or levels of contaminants.

9. Other Symptoms. General category used for information that cannot be placed in any other category.

Making Use Support Determinations

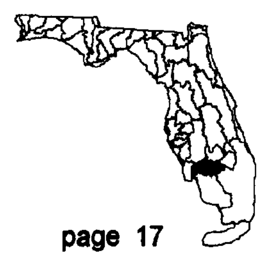
EPA has revised its criteria for determining the status of waters as documented in Appendix B of the Guidelines for the Preparation of the 1994 State Water Quality Assessments (305(b) Report). Often, a variety of assessment techniques were available for each watershed (e.g., chemical data, biological data and NPS survey results) and in this case a use decision was made based on integrating all the information. If quantitative data were available on the water quality of a waterbody (through the Trophic State Index or Water Quality Index) then the designated use of the waterbody was determined from the quantitative information, and if no quantitative data were available, then the qualitative NPS survey results were used to estimate designated use of the waterbody. Current data was available for assessment of about 1100 watersheds, historic data was used in 400 watersheds, and qualitative data was used in 1000 watersheds. The NPS survey provided all the information on sources of pollution (e.g. urban or construction runoff) and part of the information on causes and symptoms of pollution. Integrating the information from the quantitative (STORET) analysis and the qualitative NPS survey was not easy, but many additional watersheds were assessed based on the results of the integration. In the future, the two techniques should blend together much better through increased coordination of efforts.



CALOOSAHATCHEE RIVER BASIN
03090205

AVERAGE WATER QUALITY
1984-1993 STORET DATA
WATERSHED ID NUMBERS LINK MAP TO TABLES
* INDICATES QUALITATIVE ASSESSMENT

WATER QUALITY
- GOOD
- THREATENED
- FAIR
- POOR
- UNKNOWN



CALOOSAHATCHEE RIVER BASIN

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Basic Facts

Drainage Area: 1,327 square miles
Major Land Uses: rangeland, agriculture, wetlands, urban development
Population Density: low, except high at mouth (Ft. Myers, Cape Coral)
Major Pollution Sources: hydrologic modification, agriculture, urban
Best Water Quality Areas: non-channelized tributaries
Worst Water Quality Areas: urban tributaries, parts of estuary, agricultural areas
Water Quality Trends: stable quality at four sites
OFW Waterbodies: Caloosahatchee River State Recreation Area
SWIM Waterbodies: none
Reference Reports:
Caloosahatchee River BAS, DEP (Punta Gorda), 1988
Florida Nonpoint Source Assessment, DEP (Tallahassee), 1988
Basin Water Quality Experts:
Ford Walton, DEP (Punta Gorda), 813/639-4967
David Heil, DEP (Tallahassee), 904/488-5471
David Ceilley, Lee County Lab, 813/939-7908
Tom Fontaine, Ken Todd, Anthony Waterhouse, SFWMD, 407/686-8800

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In the News

* The EPA has indicated it is considering suing the City of Cape Coral because the city is dumping too much wastewater into the Caloosahatchee River.

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Ecological Characterization

The Caloosahatchee River is basically a channelized flood control waterway that runs from Lake Okeechobee to the lower Charlotte Harbor Basin at San Carlos Bay. It travels approximately 45 miles from the Moore Haven locks on western Lake Okeechobee to the Franklin Locks near the Town of Olga, Florida. There is a third set of locks in between, near Ortona. The Caloosahatchee is the only flood control outlet leading west from Lake Okeechobee. It is part of the Okeechobee Waterway that is the only navigable passage between the Gulf of Mexico and the Atlantic Ocean. From Olga to the Gulf, approximately 30 miles, the river broadens into a tidally influenced estuarine system.

The river drains low, flat muck lands and is blackwater in nature. It also receives overflow from the lake. The river's flow is controlled by the lock system, but averages 1,300 cfs at Franklin Lock. West of these locks, which act to prevent saltwater intrusion, the river progressively becomes wider, saltier, and tidally influenced.

Land use in the Caloosahatchee basin is dominated by rangeland and agriculture, particularly in the upper portion. Tributaries are generally drainage canals. The lower river, below Ortona Locks, still has portions of the old meanders and natural tributaries. Some of these tributaries receive flow from saline artesian wells. There is more citrus and fern farming here, and some large residential developments. Wetlands also constitute a major land use category in the basin. Large urban centers are not present in the upper basin; however, the Cities of Fort Myers, North Fort Myers and Cape Coral are located along both banks of the estuarine portion of the Caloosahatchee River. These cities are among the fastest growing "boom" towns in the State.

The river has a long history of use by man and has some of southern Florida's oldest settlements. It was used as a trade route for the Indians before the Seminole Wars in the early 1800s. Later the river became more important as a steamboat waterway, especially as it was dredged and channelized in the early to mid-1900s.

Anthropogenic Impacts

The South District of DEP conducted an assessment of the river in 1988-1989. The upper portions near Lake Okeechobee had frequent violations in dissolved oxygen and also high conductivity and nutrient values. These problems are a result of low flows and drainage from agricultural fields (mostly sugar cane). Nine Mile Canal drains agriculture fields and has very poor water quality. Biological samples were dominated by pollution tolerant species. No algal blooms were seen during the sample period but have been reported in the past.

Water quality improves down river near Alva. Land use is less intensive (mostly orchards) and the river has more natural tributaries and old channels. Several of the tributaries have good water quality and biological community measurements. The river's biological community measures are somewhat poorer than the tributaries, probably because of the flow and habitat reduction in the channel. The City of Ft. Myers uses the Caloosahatchee River above Franklin Locks as its potable water source.

Below Franklin Locks, the river widens and becomes estuarine. Fort Myers is on one bank and Cape Coral on the other. The latter is a massive residential area developed largely before there was strict regulation of dredging and filling. Miles of networked canals provide the fill and drainage for the roads and homesites. The community has been sparsely populated, but is now growing rapidly. As the population continues to grow and more lots are converted to lawn, there will be greater impact on the water quality in the canals and on the limited underground drinking water source. In March 1992, the City of Cape Coral officially connected its first home to a dual-water system. That system allows the use of treated effluent and canal water for irrigation. The two Ft. Myers WWTPs that discharge to the river are required to meet advanced treatment. The City of Ft. Myers is giving consideration to implementing its own dual-water system.

However, at present, the more serious impact to the estuary is the high nutrient waters from the river and tributaries and the stormwater runoff from the cities. Nutrient and chlorophyll values are high and small algal blooms occur regularly.

The Orange River, a tributary that discharges below the Locks, is a favored wintering place for manatees. A power plant that discharges warm water is located nearby. A fish kill and die-off of clams occurred in 1990 and have been determined to be the result of high temperature water discharge and low DO.

** USGS HYDROLOGIC UNIT: 03090205 CALOOSAHATCHEE RIVER

SURFACE WATER QUALITY DATA FOR 1970-1993
MEDIAN VALUES FOR EACH WATERSHED
CURRENT PERIOD OF RECORD (1989-1993) USED WHERE AVAILABLE
PERIOD PRIOR TO 1989 IS EVALUATED AS HISTORICAL INFORMATION

INDEX	GOOD	FAIR	POOR
WQI-RIVER	0-44	45-59	60-90
TSI-ESTUARY	0-49	50-59	60-100
TSI-LAKE	0-59	60-69	70-100

WATERSHED ID	NAME	WATERSHED DATA RECORD				WATER CLARITY				DISSOLVED OXYGEN		OXYGEN DEMAND			PH ALKALINITY		TROPHIC STATUS			COLIFORM		BIOLOGICAL SPECIES DIVERSITY			COND	FLOW	WATER QUALITY INDICES	
		MAX #OBS	BEG YR	END YR	DATA PERIOD	TURB	SD	COLOR	TSS	DO	DOSAT	BOD	COD	TOC	PH	ALK	NITRO	PHOS	CHLA	TOTAL	FECL	NAT	ART	BECK	COND	FLOW	WQI	TSI
* WATER BODY TYPE: ESTUARY																												
2	TIDAL CALOOSAHATCHEE	38	89	93	Current	2.9	2.3	35	11	6.5	76	2.3	.	.	7.8	.	1.06	0.11	8	48	4	.	.	.	29500	.	.	53
* WATER BODY TYPE: STREAM																												
1	WHISKY CREEK	8	73	75	Historical	5.0	.	66	.	5.9	68	1.3	41	16	7.6	186	1.34	0.33	.	55	35	.	.	.	2060	.	46	.
3	Manuel Branch	3	92	92	Current	6.3	.	80	10	3.7	40	1.6	.	.	7.0	.	1.10	0.22	11	.	2195	.	.	.	11900	.	68	.
4	Billy Creek	2	92	92	Current	5.0	.	90	5	7.5	90	3.0	.	.	8.0	.	1.31	0.19	57	.	1839	.	.	.	6995	.	57	.
7	Orange River	4	92	93	Current	3.0	.	63	.	6.0	67	1.6	.	.	7.0	.	0.82	0.02	2	270	127	.	.	.	522	.	36	.
9	Hickey Creek	50	73	79	Historical	2.0	2.4	30	.	6.4	74	1.1	.	9	7.7	186	0.58	0.04	.	.	.	.	.	.	748	7	28	.
10	TIDAL CALOOSAHATCHEE	4	91	91	Current	3.5	.	110	.	6.6	78	2.8	.	.	7.5	.	1.64	0.10	10	.	13	.	.	.	6235	.	41	.
11	Yellow Fever Cr.	9	73	75	Historical	3.0	.	63	.	3.5	41	1.3	42	15	7.5	108	1.45	0.23	.	.	.	.	.	.	5025	.	51	.
13	Bedman Creek	81	73	88	Historical	2.0	1.8	50	.	6.7	77	0.9	.	10	7.6	201	0.86	0.01	1	.	124	.	.	.	720	35	23	.
14	TOWNSEND CANAL	80	73	80	Historical	1.6	1.5	79	.	6.3	72	0.6	.	17	7.5	139	1.90	0.10	.	.	.	.	.	.	619	.	37	.
15	TIDAL CALOOSAHATCHEE	65	89	93	Current	2.1	1.1	60	3	7.0	81	1.6	.	.	7.5	155	1.42	0.11	5	70	48	.	.	.	750	.	39	.
17	Goodno Canal	2	92	92	Current	1.6	.	90	2	8.3	96	2.0	.	.	7.8	132	1.21	0.03	12	.	290	.	.	.	460	.	38	.
18	Long Hammock Creek	2	92	92	Current	6.2	.	110	6	7.7	90	3.0	.	.	7.7	212	1.23	0.04	21	220	80	.	.	.	620	.	44	.
19	Ninemile Canal	2	75	75	Historical	1.0	.	150	.	0.6	7	2.3	.	.	6.8	.	1.80	0.05	.	170	10	.	.	.	580	.	49	.
20	Cypress Creek	89	73	88	Historical	1.9	1.3	62	.	4.8	54	2.0	22	9	7.2	150	0.97	0.03	2	.	185	.	.	.	694	11	37	.
21	Daughtrey Creek	11	73	73	Historical	2.0	.	130	.	4.3	51	1.7	.	.	7.5	51	1.96	0.50	.	.	.	.	.	.	.	.	56	.
22	WEST CALOOSAHATCHEE	4	91	91	Current	1.5	.	80	.	7.1	85	1.2	.	.	7.1	.	1.92	0.14	8	.	14	.	.	.	700	.	30	.
23	Telegraph Creek	3	93	93	Current	7.7	.	130	4	5.7	61	1.0	.	.	6.9	244	0.71	0.02	.	1100	204	.	.	.	385	.	39	.
24	Trout Creek	17	73	88	Historical	2.5	.	52	.	3.5	54	1.6	79	14	7.5	122	0.93	0.09	1	.	265	.	.	.	1465	.	55	.
25	Jacks Branch	90	73	80	Historical	0.9	1.0	55	.	5.3	60	1.1	.	18	7.1	98	1.17	0.02	.	.	.	.	.	.	593	2	38	.
27	Bee Branch	25	76	79	Historical	2.0	0.5	50	.	5.4	57	.	.	30	7.2	22	0.81	0.05	.	.	.	.	.	.	948	2	37	.
28	EAST CALOOSAHATCHEE	67	89	91	Current	3.6	.	82	4	6.4	76	2.6	.	.	7.6	.	1.69	0.14	25	.	71	.	.	.	582	.	47	.

LEGEND:
ALK-ALKALINITY MG/L
ART-ARTIFICIAL SUBSTRATE DI
BEG YR-BEGINNING SAMPLING YEAR
BECK-BECK'S BIOTIC INDEX
BOD-BIOCHEMICAL OXYGEN DEMAND MG/L
CHLA-CHLOROPHYLL UG/L
COD-CHEMICAL OXYGEN DEMAND MG/L
COLOR-COLOR PCU
COND-CONDUCTIVITY UMHOS
DO-DISSOLVED OXYGEN MG/L
DOSAT-DO % SATURATION
END YR-ENDING YEAR
FECL-FECAL COLIFORM MPN/100ML
FLOW-FLOW CFS
MAX #OBS-MAXIMUM NUMBER OF SAMPLES
NAT-NATURAL SUBSTRATE DIVERSITY
NITRO-TOTAL NITROGEN MG/L
PH-PH STANDARD UNITS
PHOS-TOTAL PHOSPHORUS MG/L
SD-SECCHI DISC METERS
TOC-TOTAL ORGANIC CARBON MG/L
TOTAL-TOTAL COLIFORM MPN/100ML
TSI-TROPHIC STATE INDEX
TSS-TOTAL SUSPENDED SOLIDS MG/L
TURB-TURBIDITY MG/L
WQI-WATER QUALITY INDEX

SURFACE WATER QUALITY DATA SCREENING REPORT
MEDIAN VALUES FOR EACH WATERSHED SCREENED

** USGS HYDROLOGIC UNIT: 03090205 CALOOSAHATCHEE RIVER

'x'=EXCEEDS SCREENING CRITERIA
'0'=WITHIN SCREENING CRITERIA
'.'=MISSING DATA

SCREENING VARIABLES AND CRITERIA

WATERSHED ID	NAME	RANK WQI OR TSI	DATA RECORD CURRENT OR HISTORICAL	TN	STREAM TP	LAKE TP	PH	ALK	TURB & TSS	COND	OXYGEN DEMAND	DO	COLIFORM BACTI	BIOL DIV	CHLA	SECCHI DISC
				TN>2.0	TP>.46	TP>.12	PH>8.8 PH<5.2	ALK<20	TURB>16.5 TSS>18	COND>1275	BOD>3.3 COD>102 TOC>27.5	DO<4	TOT>3700 FECAL>470	DIART<1.95 DINAT<1.5 BECK<5.5	CHLA>40	SD<.7
* WATER BODY TYPE: ESTUARY																
2	TIDAL CALOOSAHATCHEE	FAIR	Current	0	.	0	0	.	0	x	0	0	0	.	0	0
* WATER BODY TYPE: STREAM																
1	WHISKY CREEK	FAIR	Historical	0	0	.	0	0	0	x	0	0	0	.	.	.
3	Manuel Branch	POOR	Current	0	0	.	0	.	0	x	0	x	x	.	0	.
4	Billy Creek	FAIR	Current	0	0	.	0	.	0	x	0	0	x	.	x	.
7	Orange River	GOOD	Current	0	0	.	0	.	0	.	0	0	0	.	0	.
9	Hickey Creek	GOOD	Historical	0	0	.	0	0	0	.	0	0	.	.	.	0
10	TIDAL CALOOSAHATCHEE	GOOD	Current	0	0	.	0	.	0	x	0	0	0	.	0	.
11	Yellow Fever Cr.	FAIR	Historical	0	0	.	0	0	0	x	0	x	.	.	.	.
13	Bedman Creek	GOOD	Historical	0	0	.	0	0	0	.	0	0	0	.	0	0
14	TOWNSEND CANAL	GOOD	Historical	0	0	.	0	0	0	.	0	0	.	.	.	0
15	TIDAL CALOOSAHATCHEE	GOOD	Current	0	0	.	0	0	0	.	0	0	0	.	0	0
17	Goodno Canal	GOOD	Current	0	0	.	0	0	0	.	0	0	0	.	0	.
18	Long Hammock Creek	GOOD	Current	0	0	.	0	0	0	.	0	0	0	.	0	.
19	Ninemile Canal	FAIR	Historical	0	0	.	0	.	0	.	0	x	0	.	.	.
20	Cypress Creek	GOOD	Historical	0	0	.	0	0	0	.	0	0	0	.	0	0
21	Daughtrey Creek	FAIR	Historical	0	x	.	0	0	0	.	0	0	.	.	.	.
22	WEST CALOOSAHATCHEE	GOOD	Current	0	0	.	0	.	0	.	0	0	0	.	0	.
23	Telegraph Creek	GOOD	Current	0	0	.	0	0	0	.	0	0	0	.	.	.
24	Trout Creek	FAIR	Historical	0	0	.	0	0	0	x	0	x	0	.	0	.
25	Jacks Branch	GOOD	Historical	0	0	.	0	0	0	.	0	0	.	.	.	0
27	Bee Branch	GOOD	Historical	0	0	.	0	0	0	.	x	0	.	.	.	x
28	EAST CALOOSAHATCHEE	FAIR	Current	0	0	.	0	.	0	.	0	0	0	.	0	.

LEGEND:
ALK-ALKALINITY
BECK-BECK'S BIOTIC INDEX
BIOL DIV-BIOLOGICAL DIVERSITY
CHLA-CHLOROPHYLL
COND-CONDUCTIVITY
DO-DISSOLVED OXYGEN
CURRENT-1989 TO 1993
DIART-ARTIFICIAL SUBSTRATE DIVERSITY
DINAT-NATURAL SUBSTRATE DIVERSITY
FECAL-FECAL COLIFORM BACTERIA
HISTORICAL-1970 TO 1988
OXYGEN DEMAND-BOD,COD,TOC
PH-PH
TN-NITROGEN
TP-PHOSPHORUS
TOT-TOTAL COLIFORM BACTERIA
TSS-TOTAL SUSPENDED SOLIDS
TURB-TURBIDITY
SD-SECCHI DISC METERS
WQI OR TSI-WATER QUALITY INDEX RATING WHICH INDEX USED, WQI OR TSI, IS BASED ON WATERBODY TYPE

SURFACE WATER QUALITY ASSESSMENT REPORT
TRENDS-SOURCES-CLEANUP

** USGS HYDROLOGIC UNIT: 03090205 CALOOSAHATCHEE RIVER

'x'=DEGRADING TREND
'0'=STABLE TREND
'+'=IMPROVING TREND
'.'=MISSING DATA

1984 - 1993 TRENDS <--- PLEASE READ THESE COLUMNS VERTICALLY

WATERSHED ID	NAME	QUALITY RANK: MEETS USE ?	QUALITY RANK: WQI OR TSI	OVER-ALL TREND	WQI or TSI	TN	TP	CHLA	SD	PH	ALK	TURB	TSS	BOD	TOC	DO	DOSAT	TCOLI	FCOLI	TEMP	FLOW	DEGRADATION SOURCES, PRESENT CONDITIONS AND CLEANUP EFFORTS
* WATER BODY TYPE: ESTUARY																						
2	TIDAL CALOOSAHATCHEE	PARTIAL	FAIR	0	0	0	0	0	+	x	.	0	.	.	.	0	0	x	0	0	.	
* WATER BODY TYPE: STREAM																						
1	WHISKY CREEK	PARTIAL	FAIR																			
3	Manuel Branch	NO	POOR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
4	Billy Creek	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
7	Orange River	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
9	Hickey Creek	YES	GOOD																			
10	TIDAL CALOOSAHATCHEE	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
11	Yellow Fever Cr.	PARTIAL	FAIR																			
13	Bedman Creek	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
14	TOWNSEND CANAL	YES	GOOD																			
15	TIDAL CALOOSAHATCHEE	YES	GOOD	0	0	0	0	+	0	0	0	0	.	0	0	0	0	+	0	0	.	
17	Goodno Canal	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
18	Long Hammock Creek	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
19	Ninemile Canal	PARTIAL	FAIR																			
20	Cypress Creek	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
21	Daughtrey Creek	PARTIAL	FAIR																			
22	WEST CALOOSAHATCHEE	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
23	Telegraph Creek	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
24	Trout Creek	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
25	Jacks Branch	YES	GOOD																			
27	Bee Branch	YES	GOOD																			
28	EAST CALOOSAHATCHEE	PARTIAL	FAIR	0	0	0	0	.	0	0	.	0	0	.	.	0	0	.	0	x	.	

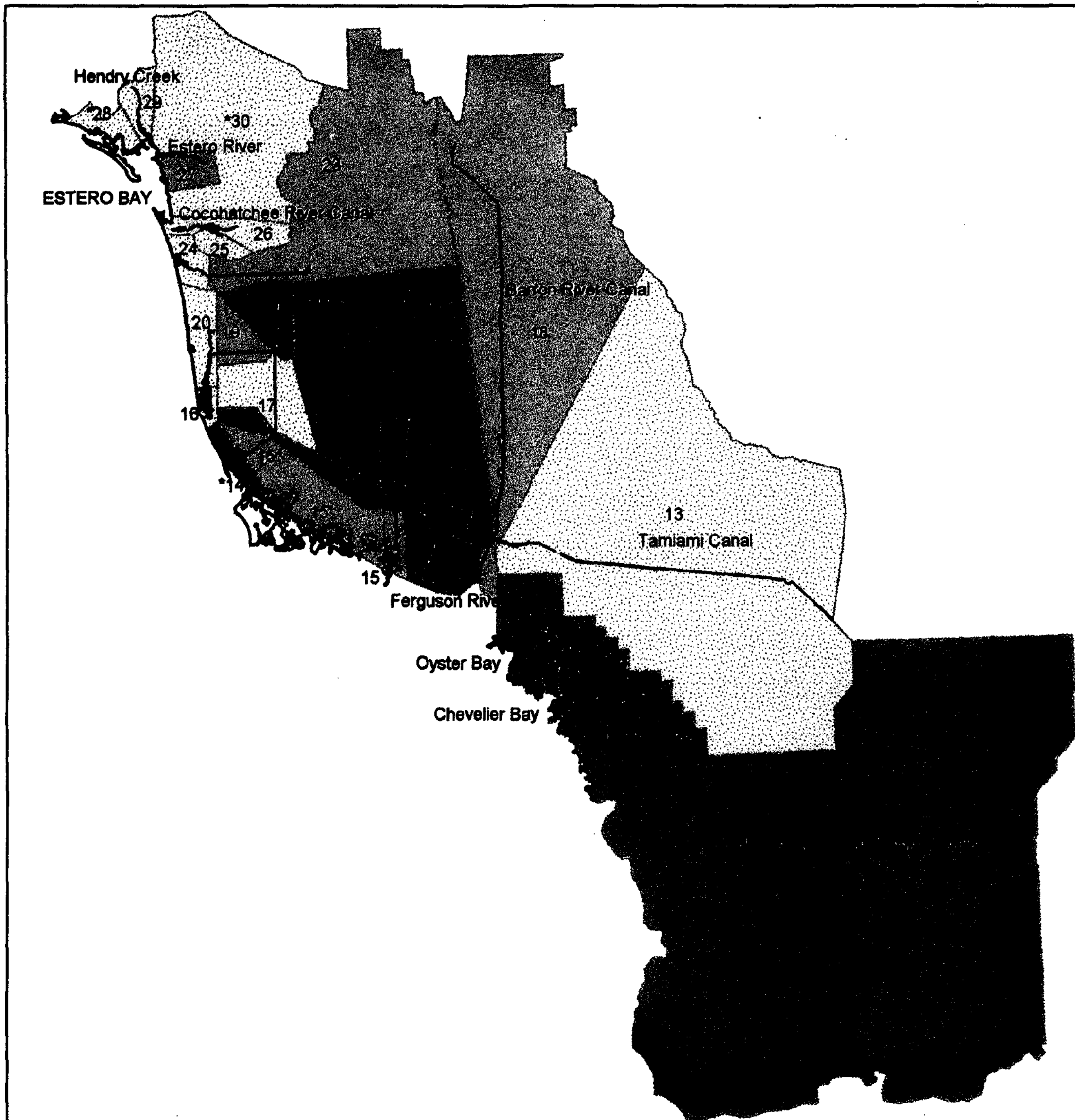
LEGEND:

ALK-ALKALINITY
BOD-BIOCHEM. OXYGEN DEMAND
CHLA-CHLOROPHYLL
DO-DISSOLVED OXYGEN
DOSAT-DO SATURATION
FCOLI-FECAL COLIFORM
FLOW-FLOW
MEETS USE-MEETS DESIGNATED USE
PH-PH
SD-SECCHI DISC METERS
TCOLI-TOTAL COLIFORM
TEMP-TEMPERATURE
TN-NITROGEN
TOC-T.ORGANIC CARBON
TP-PHOSPHORUS
TSS-TOTAL SUSPENDED SOLIDS
TURB-TURBIDITY
TSI-TROPHIC STATE INDEX FOR LAKES AND ESTUARIES
WQI-WATER QULAITY INDEX FOR STREAMS AND SPRINGS

NPS QUALITATIVE SURVEY RESULTS
AN "X" INDICATES A PROBLEM WITH POLLUTANT OR SOURCE
THE * ON MAPID INDICATES NO STORET INFORMATION AVAILABLE FOR THIS WATERSHED
-SEE PAGE 11 FOR LEGEND FOR THIS TABLE-

CATNAME=CALOOSAHATCHEE RIVER HUC=03090205

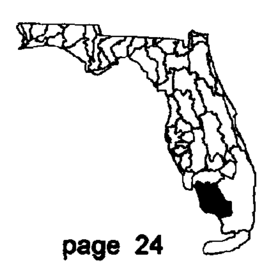
MAPID	WBID	BASIN	WQ305	WQNPS	NUTRIENT	BACTERIA	SEDIMENT	OIL	PESTICID	OTHERCHE	DEBRIS	OXYGEN	SALINITY	PH	METAL	HABITAT	FLOW	THERMAL	OTHERPOL	FISHKILL	ALGAL	WEED	TURBIDIT	ODOR	FISHDCL	NOSWIM	NOFISH	OTHERSYM	IND	STP	AG	RE	SL	LD	UR	CN	HM	OT
1	3240H	WHISKY CREEK	FAIR	FAIR	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X	X	X
2	3240A	TIDAL CALOOSAHATCHEE	FAIR	FAIR	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X	X	X
3	3240I	Manuel Branch	POOR	FAIR	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X		X			X	X		X	X	X	X	X
4	3240J	Billy Creek	FAIR	FAIR	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X		X			X	X		X	X	X	X	X
5*	3235L	Townsend Canal		THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X		X			X	X		X	X	X	X	X
6*	3240D	Hancock Creek		FAIR	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X		X			X	X		X	X	X	X	X
7	3240K	Orange River	GOOD	FAIR	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X		X			X	X		X	X	X	X	X
8*	3235J	Dog Canal		THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X		X			X	X		X	X	X	X	X
9	3235H	Hickey Creek	GOOD	THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X		X			X	X		X	X	X	X	X
10	3240B	TIDAL CALOOSAHATCHEE	GOOD	FAIR	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X		X			X	X		X	X	X	X	X
11	3240E	Yellow Fever Cr.	FAIR	FAIR	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X	X	X
12*	3235N	Roberts Canal		THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X		X			X	X		X	X	X	X	X
13	3235I	Bedman Creek	GOOD	THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X		X			X	X		X	X	X	X	X
14	3235K	TOWNSEND CANAL	GOOD	THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X		X			X	X		X	X	X	X	X
15	3240C	TIDAL CALOOSAHATCHEE	GOOD	FAIR	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X		X			X	X		X	X	X	X	X
16*	3235A	WEST CALOOSAHATCHEE		THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X		X			X	X		X	X	X	X	X
17	3235M	Goodno Canal	GOOD	THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X		X			X	X		X	X	X	X	X
18	3237B	Long Hammock Creek	GOOD	THREAT	X	X	X	X	X	X	X	X	X			X	X		X	X	X	X	X	X	X	X	X				X	X		X	X	X	X	X
19	3237D	Ninemile Canal	FAIR	THREAT	X	X	X	X	X	X	X	X	X			X	X		X	X	X	X	X	X	X	X	X				X	X		X	X	X	X	X
20	3235C	Cypress Creek	GOOD	THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X		X			X	X		X	X	X	X	X
21	3240F	Daughtrey Creek	FAIR	FAIR	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X		X			X	X		X	X	X	X	X
22	3235B	WEST CALOOSAHATCHEE	GOOD	THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X		X			X	X		X	X	X	X	X
23	3236A	Telegraph Creek	GOOD	THREAT	X	X	X		X	X						X															X			X	X	X	X	X
24	3240G	Trout Creek	FAIR	FAIR	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X		X			X	X		X	X	X	X	X
25	3235D	Jacks Branch	GOOD	THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X		X			X	X		X	X	X	X	X
26*	3237C	Lake Hicpochee		THREAT	X	X	X	X	X	X	X	X	X			X	X		X	X	X	X	X	X	X	X	X				X	X		X	X	X	X	X
27	3235E	Bee Branch	GOOD	THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X		X			X	X		X	X	X	X	X
28	3237A	EAST CALOOSAHATCHEE	FAIR	THREAT	X	X	X	X	X	X	X	X	X			X	X		X	X	X	X	X	X	X	X	X				X	X		X	X	X	X	X
29*	3235G	Cypress Branch		THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X		X			X	X		X	X	X	X	X
30*	3235F	Pollywog Creek		THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X		X			X	X		X	X	X	X	X
31*	3236	TELEGRAPH SWAMP		THREAT	X	X	X		X	X						X															X			X	X	X	X	X



EVERGLADES-WEST COAST BASIN
03090204

AVERAGE WATER QUALITY
1984-1993 STORET DATA
WATERSHED ID NUMBERS LINK MAP TO TABLES
* INDICATES QUALITATIVE ASSESSMENT

WATER QUALITY
- GOOD
- THREATENED
- FAIR
- POOR
- UNKNOWN



EVERGLADES WEST COAST BASIN

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Basic Facts

Drainage Area: 2,657 square miles
Major Land Uses: wetland, agriculture, rangeland, urban development
Population Density: low, except coastal population centers (Naples, Marco Island)
Major Pollution Sources: hydrologic modification, agriculture
Best Water Quality Areas: Gulf waters adjacent to Everglades
Worst Water Quality Areas: Gordon River, Cocohatchee River
Water Quality Trends: stable quality at 6 sites, declining trend at Henderson Creek Canal
OFW Waterbodies:
- Everglades National Park
- Fakahatchee Strand State Preserve
- Cape Romano State Aquatic Preserve
- Rookery Bay State Aquatic Preserve and National Estuarine Research Reserve
- Big Cypress National Preserve

SWIM Waterbodies: Everglades National Park/Florida Bay
Reference Reports:
- West Coast Basin Assessment, DEP (Punta Gorda), 1990
- Florida Nonpoint Source Assessment, DEP (Tallahassee), 1988

Basin Water Quality Experts;
- Sid Flannery, SWFWMD, 904/796-7211
- Ford Walton, DEP (Punta Gorda), 813/639-4967
- Tom Fontaine, Ken Todd, Anthony Waterhouse, SFWMD, 407/686-8800

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In the News

* See Southeastern Basin
* This area has been undergoing a severe drought in recent years, with water use restrictions and wildlife impacts.
* The coastal area around Naples is among the fastest growing areas in the nation.
* Interstate Highway 75 is being constructed across this basin. There many drainage culverts and wildlife corridors (underpasses) built into the design of the highway.
* Health advisories recommending no consumption and limited consumption of largemouth bass have been issued for portions of Everglades National Park due to high mercury content.

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Ecological Characterization

This basin consists of 2657 square miles of land south and east of the City of Ft. Myers. In can be characterized as land with very little topographic relief with primarily wetland in the southeastern portion of the basin and mixed dry and wetland areas in the northwestern portion of the area. Much of this "dry" area is periodically wet, and it is commonly drained by a network of ditches. The predominant vegetation in the wetlands is sawgrass with patches of cypress or hardwoods. Inches of difference of elevations account for vast differences in vegetation.

The southern coast is a thick forest of mangroves extending inland five or more miles. This coastal area below Naples, known as the Land of Ten Thousand Islands, is a rich estuary where the freshwater sloughs and rivers mix with the bays and tidal creeks of the Gulf of Mexico. Most of the basin east of the Barron River Canal is part of the Big Cypress Swamp or Everglades National Park, which, with Ten Thousand Islands Aquatic Preserve, contains most of the coastal wetlands.

In the northwestern portion of the basin, a considerable amount of farming, including cattle ranching and vegetable growing, is done in the quadrangle formed by the Cities of Naples, Sunniland, Immokalee and Ft. Myers. There is pressure from the citrus and ranching industries to extend this area southward. There is already some ranching in the privately owned areas in the southwest, especially near the major drainage canals. A large area about 175 square miles east of Naples was "developed" into lots in the 1960s. This involved extensive ditching and draining through a network of 183 miles of canals and an associated 813 miles of roads. Although the project, Golden Gate Estates, was somewhat of a "boondoggle" and few of the lots were ever inhabited, the canals and roads remain, and the site has never recovered. Part of the southern area of Golden Gate Estates is being acquired by DEP. Further west, along the coast, urbanization is occurring very rapidly as a series of cities and communities from Ft. Myers to Naples. This development is also associated with canal and road building. The canals join with natural drainage channels which lead in a west to southwesterly direction to the Gulf of Mexico. Also, Marco Island, south of Naples, is almost completely developed. It is a winter resort.

Water flows very sluggishly in this area because of the small difference between land and sea elevations. The waters in these manmade canals and natural streams are typically low in dissolved oxygen and are often below State criteria. Although these low values are considered a natural condition in many southern Florida waters, care must be taken to prevent further lowering of dissolved oxygen through nonpoint source or point source discharges.

<u>Anthropogenic Impacts</u>

Because it is so large and remote, this basin has very limited STORET water quality data. It is also somewhat difficult to assess water quality due to the naturally low DO conditions and the fact that most of the "streams" are actually manmade canals. However, given these background conditions, it is possible to note and compare some impacts to the canals. The Nonpoint Assessment notes that most of the canals run through agricultural lands. The western half of the Tamiami Canal is threatened or moderately impaired due to nutrients, algal and weed growth and pesticides. Canals draining urban areas are also affected by urban runoff and septic tank leachate. The receiving bay waters are threatened or moderately impaired (Naples Bay and parts of Estero Bay). Lake Trafford, near Immokalee, is rated as severely impaired due to agriculture, urbanization and septic tank runoff. It experiences algal blooms, weed growth, and occasional fish kills.

Probably the most disturbing and ecologically destructive problem in the area is the severe alteration of fresh water flow by the drainage canals. Excess fresh water drains into the estuaries in the wet season while saltwater intrusion is greater in the dry season. The drainage comes from canals which have inadequate control structures or none at all. Furthermore, there are proposals to expand the existing canals and/or create new ones to alleviate flooding in developed and developing areas. The unnatural oscillations of salinity are suspected of damaging seagrasses and lowering the productivity and fish yields in the estuary. Those bays at the mouth of the main canals are the most threatened.

Finally, the drought conditions in the last few years has caused severe stress to the flora and fauna of the region. The potential for widespread, disastrous fires is great. Additionally, water use restrictions have been implemented throughout much of the basin.

** USGS HYDROLOGIC UNIT: 03090204 EVERGLADES-WEST COAST

INDEX	GOOD	FAIR	POOR
WQI-RIVER	0-44	45-59	60-90
TSI-ESTUARY	0-49	50-59	60-100
TSI-LAKE	0-59	60-69	70-100

SURFACE WATER QUALITY DATA FOR 1970-1993
MEDIAN VALUES FOR EACH WATERSHED
CURRENT PERIOD OF RECORD (1989-1993) USED WHERE AVAILABLE
PERIOD PRIOR TO 1989 IS EVALUATED AS HISTORICAL INFORMATION

WATERSHED ID	NAME	WATERSHED DATA RECORD MAX #OBS	BEG YR	END YR	DATA PERIOD	WATER CLARITY TURB	SD	COLOR	TSS	DISSOLVED OXYGEN DO	DOSAT	OXYGEN DEMAND BOD	COD	TOC	PH ALKALINITY PH	ALK	TROPHIC STATUS NITRO	PHOS	CHLA	COLIFORM TOTAL	FECL	BIOLOGICAL SPECIES DIVERSITY NAT	ART	BECK	COND COND	FLOW FLOW	WATER QUALITY INDICES WQI	TSI
* WATER BODY TYPE: ESTUARY																												
16	Naples Bay	19	89	89	Current	4.3	1.0	50	.	5.4	64	1.5	.	.	7.4	.	0.98	0.07	9	.	56	.	.	.	20300	.	.	52
20	Gordon River	7	89	89	Current	2.0	.	80	.	1.6	20	1.6	.	.	7.1	.	1.06	0.10	5	.	329	.	.	.	1610	.	.	51
24	Cocohatchee River	10	89	92	Current	3.0	.	68	2	5.1	58	1.8	.	.	7.2	.	1.13	0.64	9	230	136	.	.	.	8963	.	.	50
* WATER BODY TYPE: STREAM																												
13	Tamiami Canal	3	91	91	Current	2.0	.	120	.	3.4	40	2.2	.	.	7.0	.	1.42	0.57	9	.	74	.	.	.	31500	.	58	.
15	Henderson Creek Canal	10	89	91	Current	0.8	.	20	.	8.4	103	1.2	.	.	7.7	.	0.55	0.09	2	.	6	.	.	.	753	.	17	.
17	Henderson Creek Canal	5	89	89	Current	4.8	0.7	70	.	3.5	44	2.8	.	.	7.7	.	0.93	0.03	40	.	3	.	.	.	2678	.	46	.
18	Barron River Canal	8	89	91	Current	2.4	.	58	.	4.3	52	2.0	.	.	7.1	.	0.89	0.05	8	.	18	.	.	.	13033	.	39	.
19	Gordon River	8	89	91	Current	3.3	1.1	80	.	6.1	78	2.0	.	.	7.4	.	0.95	0.03	13	.	45	.	.	.	725	.	38	.
23	Cocohatchee River Cana	161	71	88	Historical	4.2	0.3	69	2	6.5	123	.	.	14	7.5	238	1.08	0.03	.	.	.	.	.	.	575	4	29	.
25	Oak Creek	12	75	75	Historical	2.0	.	50	.	4.8	56	1.6	.	.	7.6	.	0.89	0.09	.	.	331	.	.	.	13648	.	48	.
26	Imperial River	14	89	93	Current	2.7	1.7	60	9	5.6	67	2.0	.	.	7.2	.	0.86	0.05	12	40	111	.	.	.	23250	.	46	.
27	Estero River	18	92	93	Current	2.0	.	46	5	5.1	58	1.2	.	.	7.2	.	0.78	0.04	2	108	230	.	.	.	15355	.	42	.
29	Hendry Creek	10	92	93	Current	5.4	0.8	75	17	5.0	59	1.6	.	.	7.4	.	0.94	0.12	7	36	41	.	.	.	20875	.	48	.

LEGEND:
ALK-ALKALINITY MG/L
ART-ARTIFICIAL SUBSTRATE DI
BEG YR-BEGINNING SAMPLING YEAR
BECK-BECK'S BIOTIC INDEX
BOD-BIOCHEMICAL OXYGEN DEMAND MG/L
CHLA-CHLOROPHYLL UG/L
COD-CHEMICAL OXYGEN DEMAND MG/L
COLOR-COLOR PCU
COND-CONDUCTIVITY UMHOS
DO-DISSOLVED OXYGEN MG/L
DOSAT-DO % SATURATION
END YR-ENDING YEAR
FECL-FECAL COLIFORM MPN/100ML
FLOW-FLOW CFS
MAX #OBS-MAXIMUM NUMBER OF SAMPLES
NAT-NATURAL SUBSTRATE DIVERSITY
NITRO-TOTAL NITROGEN MG/L
PH-PH STANDARD UNITS
PHOS-TOTAL PHOSPHORUS MG/L
SD-SECCHI DISC METERS
TOC-TOTAL ORGANIC CARBON MG/L
TOTAL-TOTAL COLIFORM MPN/100ML
TSI-TROPHIC STATE INDEX
TSS-TOTAL SUSPENDED SOLIDS MG/L
TURB-TURBIDITY MG/L
WQI-WATER QUALITY INDEX

SURFACE WATER QUALITY DATA SCREENING REPORT
MEDIAN VALUES FOR EACH WATERSHED SCREENED

** USGS HYDROLOGIC UNIT: 03090204 EVERGLADES-WEST COAST

'x'=EXCEEDS SCREENING CRITERIA
'0'=WITHIN SCREENING CRITERIA
'.'=MISSING DATA

SCREENING VARIABLES AND CRITERIA

WATERSHED ID	NAME	RANK WQI OR TSI	DATA RECORD CURRENT OR HISTORICAL	TN	STREAM TP	LAKE TP	PH	ALK	TURB & TSS	COND	OXYGEN DEMAND	DO	COLIFORM BACTI	BIOL DIV	CHLA	SECCHI DISC
				TN>2.0	TP>.46	TP>.12	PH>8.8 PH<5.2	ALK<20	TURB>16.5 TSS>18	COND>1275	BOD>3.3 COD>102 TOC>27.5	DO<4	TOT>3700 FECAL>470	DIART<1.95 DINAT<1.5 BECK<5.5	CHLA>40	SD<.7
* WATER BODY TYPE: ESTUARY																
16	Naples Bay	FAIR	Current	0	.	0	0	.	0	x	0	0	0	.	0	0
20	Gordon River	FAIR	Current	0	.	0	0	.	0	x	0	x	0	.	0	.
24	Cocohatchee River	FAIR	Current	0	.	x	0	.	0	x	0	0	0	.	0	.
* WATER BODY TYPE: STREAM																
13	Tamiami Canal	FAIR	Current	0	x	.	0	.	0	x	0	x	0	.	0	.
15	Henderson Creek Canal	GOOD	Current	0	0	.	0	.	0	.	0	0	0	.	0	.
17	Henderson Creek Canal	FAIR	Current	0	0	.	0	.	0	x	0	x	0	.	0	0
18	Barron River Canal	GOOD	Current	0	0	.	0	.	0	x	0	0	0	.	0	.
19	Gordon River	GOOD	Current	0	0	.	0	.	0	.	0	0	0	.	0	0
23	Cocohatchee River Cana	GOOD	Historical	0	0	.	0	0	0	.	0	0	.	.	.	x
25	Oak Creek	FAIR	Historical	0	0	.	0	.	0	x	0	0	0	.	.	.
26	Imperial River	FAIR	Current	0	0	.	0	.	0	x	0	0	0	.	0	0
27	Estero River	GOOD	Current	0	0	.	0	.	0	x	0	0	0	.	0	.
29	Hendry Creek	FAIR	Current	0	0	.	0	.	0	x	0	0	0	.	0	0

LEGEND:
ALK-ALKALINITY
BECK-BECK'S BIOTIC INDEX
BIOL DIV-BIOLOGICAL DIVERSITY
CHLA-CHLOROPHYLL
COND-CONDUCTIVITY
DO-DISSOLVED OXYGEN
CURRENT-1989 TO 1993
DIART-ARTIFICIAL SUBSTRATE DIVERSITY
DINAT-NATURAL SUBSTRATE DIVERSITY
FECAL-FECAL COLIFORM BACTERIA
HISTORICAL-1970 TO 1988
OXYGEN DEMAND-BOD,COD,TOC
PH-PH
TN-NITROGEN
TP-PHOSPHORUS
TOT-TOTAL COLIFORM BACTERIA
TSS-TOTAL SUSPENDED SOLIDS
TURB-TURBIDITY
SD-SECCHI DISC METERS
WQI OR TSI-WATER QUALITY INDEX RATING WHICH INDEX USED, WQI OR TSI, IS BASED ON WATERBODY TYPE

SURFACE WATER QUALITY ASSESSMENT REPORT
TRENDS-SOURCES-CLEANUP

** USGS HYDROLOGIC UNIT: 03090204 EVERGLADES-WEST COAST

'x'=DEGRADING TREND
'0'=STABLE TREND
'+'=IMPROVING TREND
'.'=MISSING DATA

1984 - 1993 TRENDS (<--- PLEASE READ THESE COLUMNS VERTICALLY)

WATERSHED ID	NAME	QUALITY RANK: MEETS USE ?	QUALITY RANK: WQI OR TSI	OVER-ALL TREND	WQI or TSI	TN	TP	CHLA	SD	PH	ALK	TURB	TSS	BOD	TOC	DO	DOSAT	TCOLI	FCOLI	TEMP	FLOW	DEGRADATION SOURCES, PRESENT CONDITIONS AND CLEANUP EFFORTS
* WATER BODY TYPE: ESTUARY																						
16	Naples Bay	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
20	Gordon River	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
24	Cocohatchee River	PARTIAL	FAIR	0	+	0	0	.	.	0	.	0	0	.	.	+	.	.	.	.	.	
* WATER BODY TYPE: STREAM																						
13	Tamiami Canal	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
15	Henderson Creek Canal	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
17	Henderson Creek Canal	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
18	Barron River Canal	YES	GOOD	0	0	0	0	.	.	0	.	0	0	.	.	0	.	.	.	.	.	
19	Gordon River	YES	GOOD	0	0	0	0	.	.	0	.	0	+	.	.	0	.	.	.	.	.	
23	Cocohatchee River Cana	YES	GOOD	0	0	0	0	.	.	.	.	0	0	.	.	.	.	.	.	.	.	
25	Oak Creek	PARTIAL	FAIR																			
26	Imperial River	PARTIAL	FAIR	0	0	0	0	.	.	0	.	.	.	.	.	0	0	.	.	0	.	
27	Estero River	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
29	Hendry Creek	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	

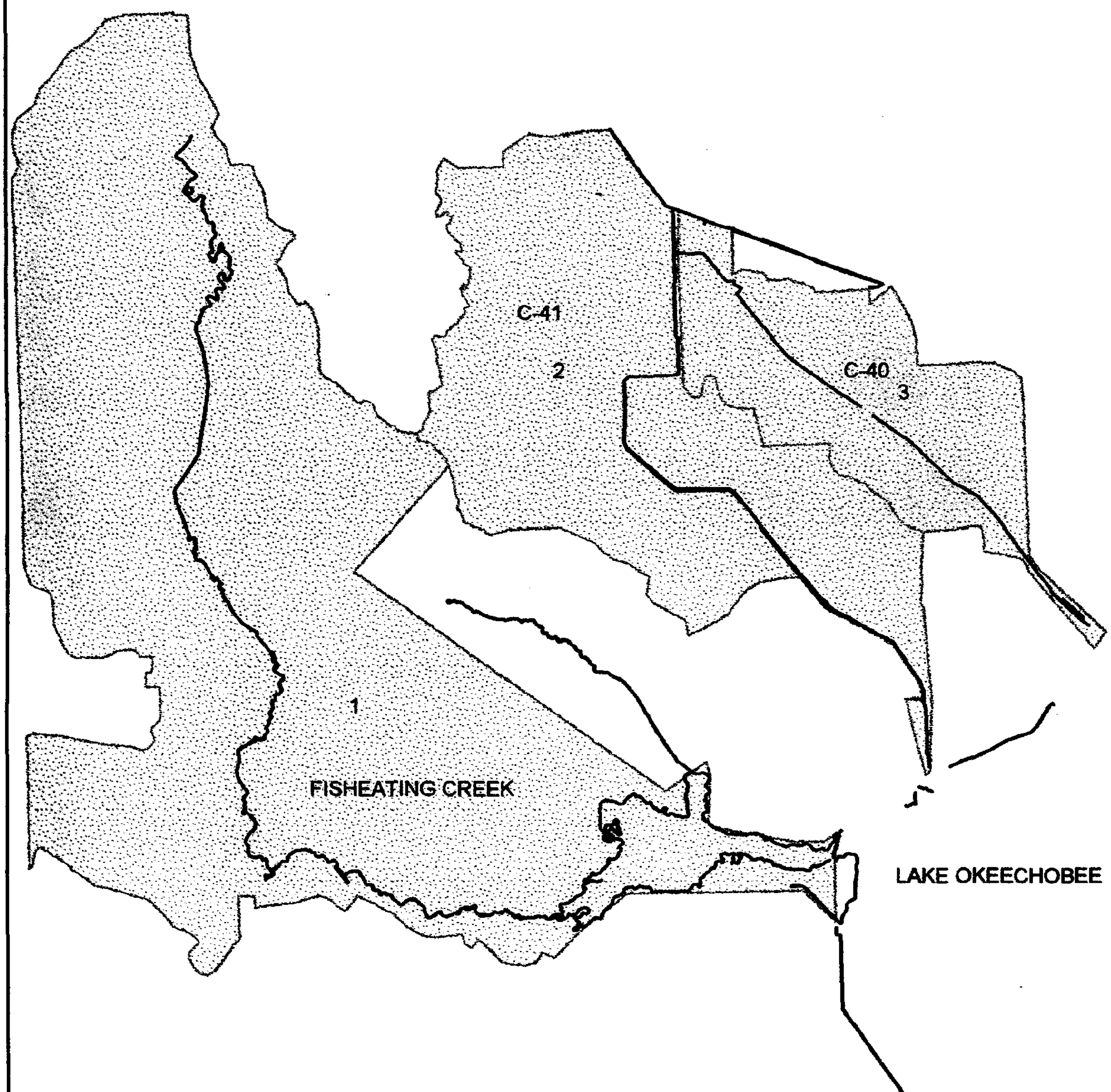
LEGEND:

ALK-ALKALINITY
BOD-BIOCHEM. OXYGEN DEMAND
CHLA-CHLOROPHYLL
DO-DISSOLVED OXYGEN
DOSAT-DO SATURATION
FCOLI-FECAL COLIFORM
FLOW-FLOW
MEETS USE-MEETS DESIGNATED USE
PH-PH
SD-SECCHI DISC METERS
TCOLI-TOTAL COLIFORM
TEMP-TEMPERATURE
TN-NITROGEN
TOC-T.ORGANIC CARBON
TP-PHOSPHORUS
TSS-TOTAL SUSPENDED SOLIDS
TURB-TURBIDITY
TSI-TROPHIC STATE INDEX FOR LAKES AND ESTUARIES
WQI-WATER QULAITY INDEX FOR STREAMS AND SPRINGS

NPS QUALITATIVE SURVEY RESULTS
AN "X" INDICATES A PROBLEM WITH POLLUTANT OR SOURCE
THE * ON MAPID INDICATES NO STORET INFORMATION AVAILABLE FOR THIS WATERSHED
-SEE PAGE 11 FOR LEGEND FOR THIS TABLE-

---------- CATNAME=EVERGLADES-WEST COAST HUC=03090204 ----------

MAP ID	WBID	BASIN	WQ305	WQNPS	NUTRIENT	BACTERIA	SEDIMENT	OIL	PESTICID	OTHERCHE	DEBRIS	OXYGEN	SALINITY	PH	METAL	HABITAT	FLOW	THERMAL	OTHERPOL	FISHKILL	ALGAL	WEED	TURBIDIT	ODOR	FISHDECL	NOSWIM	NOFISH	OTHERSYM	IND	STP	AG	RE	SL	LD	UR	CN	HM	OT
1*	3289	EVERGLADES NATIONAL PA		THREAT	X		X	X	X		X				X	X					X	X	X								X			X	X	X	X	X
2*	3289F	Charley Creek		THREAT	X		X	X	X		X				X	X					X	X	X								X			X	X	X	X	X
3*	3289G	Cannon Bay		THREAT	X		X	X	X		X				X	X					X	X	X								X			X	X	X	X	X
4*	3289D	Chevelier Bay		THREAT	X		X	X	X		X				X	X					X	X	X								X			X	X	X	X	X
5*	3289B	Huston River		THREAT	X		X	X	X		X				X	X					X	X	X								X			X	X	X	X	X
6*	3289E	Chevelier Bay		THREAT	X		X	X	X		X				X	X					X	X	X								X			X	X	X	X	X
7*	3289C	Last Huston Bay		THREAT	X		X	X	X		X				X	X					X	X	X								X			X	X	X	X	X
8*	3289A	Oyster Bay		THREAT	X		X	X	X		X				X	X					X	X	X								X			X	X	X	X	X
9*	3259S	Runoff to gulf		THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X
10*	3259P	Ferguson River		THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X
11*	3259R	Runoff to gulf		THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X
12*	3259I	WEST COLLIER		THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X
13	3261B	Tamiami Canal	FAIR	FAIR	X	X	X	X	X		X	X	X		X	X	X			X	X	X	X	X							X	X	X	X	X	X	X	X
14*	3259J	Rookery Bay		THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X
15	3259K	Henderson Creek Canal	GOOD	THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X
16	3259G	Naples Bay	FAIR	THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X
17	3259H	Henderson Creek Canal	FAIR	THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X
18	3261A	Barron River Canal	GOOD	FAIR	X	X	X	X	X		X	X	X		X	X	X			X	X	X	X	X							X	X	X	X	X	X	X	X
19	3259D	Gordon River	GOOD	THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X
20	3259C	Gordon River	FAIR	THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X
21*	3259E	Henderson Creek Canal		THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X
22*	3259F	Golden Gate Canal		THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X
23	3259B	Cocohatchee River Cana	GOOD	THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X
24	3259A	Cocohatchee River	FAIR	THREAT	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X
25	3258F	Oak Creek	FAIR	FAIR	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X
26	3258E	Imperial River	FAIR	FAIR	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X
27	3258D	Estero River	GOOD	FAIR	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X
28*	3258A	ESTERO BAY		FAIR	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X
29	3258B	Hendry Creek	FAIR	FAIR	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X
30*	3258C	ESTERO BAY		FAIR	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X



FISHEATING CREEK BASIN
03090103

AVERAGE WATER QUALITY
1984-1993 STORET DATA
WATERSHED ID NUMBERS LINK MAP TO TABLES
* INDICATES QUALITATIVE ASSESSMENT

WATER QUALITY
- GOOD
- THREATENED
- FAIR
- POOR
- UNKNOWN

FISHEATING CREEK BASIN

Basic Facts

Drainage Area: 918 square miles
Major Land Uses: rangeland, agriculture
Population Density: low, no population centers
Major Pollution Sources: agricultural runoff
Best Water Quality Areas: Fisheating Creek
Worst Water Quality Areas: Indian Prairie Canal, Harney Pond Canal
Water Quality Trends: stable quality at 2 sites
OFW Waterbodies: none
SWIM Waterbodies: none
Reference Reports:
Lake Okeechobee Drainage Basin Assessment, DEP (Punta Gorda), 1987
Florida Rivers Assessment, DEP/FREAC/NPS, 1989
Florida Nonpoint Source Assessment, DEP (Tallahassee), 1988
Basin Water Quality Experts:
Sid Flannery, SWFWMD, 904/796-7211
Homer Royals, FGFWFC, 904/357-6631
Ford Walton, DEP (Punta Gorda) 813/639-4967
Tom Fontaine, Ken Todd, Anthony Waterhouse, SFWMD, 407/686-8800

In the News

* Lykes Brothers, Inc., illegally dug 22 miles of ditches and canals and subsequently has restored these areas. The monitoring reports which have been submitted indicate a very high success rate for the restored wetlands.

Ecological Characterization

The Fisheating Creek basin forms part of the northwest drainage basin of Lake Okeechobee. The creek itself is a meandering blackwater stream that flows through rangeland in Highlands and Glades Counties, eventually emptying into Gator Slough, which then flows into Lake Okeechobee. It is mostly lined by cypress swamps. The river has the reputation of being an excellent place to observe wildlife. In drier years, many of Lake Okeechobee's wading birds seek refuge in the swamp and sloughs surrounding the creek.

The basin drains 918 square miles and is primarily improved rangeland with some agriculture. Fisheating Creek is unique in that the entire river corridor is (except the river itself) in private ownership by Lykes

Brothers Company. It has an average flow of 260 cfs 16 miles above its mouth at Lake Okeechobee. Other waterways in the basin include several major canals connected to a network of smaller canals designed to drain land for more intensive grazing and some agricultural areas. The basin is very sparsely populated and has no major urban areas. The Brighton Indian Reservation is in this basin.

Anthropogenic Impacts

Fisheating Creek and Gator Slough have generally good water quality with several remote segments used for recreational canoeing and swimming. The canals, however, are impaired from rangeland and agricultural runoff. Habitat and flow alteration and nutrient enrichment have lead to low biotic indices and declining fisheries. The canals also experience odor problems and weed growth. Stream areas which have low flow velocities, such as the upper part of Fisheating Creek and the canals, usually have low dissolved oxygen levels. This basin is one of the many sources of nutrient loading to Lake Okeechobee.

** USGS HYDROLOGIC UNIT: 03090103 FISHEATING CREEK

SURFACE WATER QUALITY DATA FOR 1970-1993
MEDIAN VALUES FOR EACH WATERSHED
CURRENT PERIOD OF RECORD (1989-1993) USED WHERE AVAILABLE
PERIOD PRIOR TO 1989 IS EVALUATED AS HISTORICAL INFORMATION

INDEX	GOOD	FAIR	POOR
WQI-RIVER	0-44	45-59	60-90
TSI-ESTUARY	0-49	50-59	60-100
TSI-LAKE	0-59	60-69	70-100

WATERSHED ID	NAME	WATERSHED DATA RECORD MAX #OBS	BEG YR	END YR	DATA PERIOD	WATER CLARITY TURB	SD	COLOR	TSS	DISSOLVED OXYGEN DO	DOSAT	OXYGEN DEMAND BOD	COD	TOC	PH ALKALINITY PH	ALK	TROPHIC STATUS NITRO	PHOS	CHLA	COLIFORM TOTAL	FECL	BIOLOGICAL SPECIES DIVERSITY NAT	ART	BECK	COND	FLOW	WATER QUALITY INDICES WQI	TSI
* WATER BODY TYPE: STREAM																												
1	FISHEATING CREEK	66	89	92	Current	2.0	.	218	2	4.7	56	1.0	.	.	6.6	26	1.43	0.14	.	400	289	.	.	.	188	51	45	.
2	HARNEY POND CANAL	65	89	91	Current	2.3	.	116	2	5.5	64	.	.	.	6.8	.	1.54	0.14	.	.	.	.	.	.	303	.	45	.
3	INDIAN PRAIRIE CANAL	84	89	92	Current	2.3	.	115	2	5.3	61	1.6	.	.	6.9	.	1.46	0.11	.	.	2694	.	.	.	334	.	46	.

LEGEND:
ALK-ALKALINITY MG/L
ART-ARTIFICIAL SUBSTRATE DI
BEG YR-BEGINNING SAMPLING YEAR
BECK-BECK'S BIOTIC INDEX
BOD-BIOCHEMICAL OXYGEN DEMAND MG/L
CHLA-CHLOROPHYLL UG/L
COD-CHEMICAL OXYGEN DEMAND MG/L
COLOR-COLOR PCU
COND-CONDUCTIVITY UMHOS
DO-DISSOLVED OXYGEN MG/L
DOSAT-DO % SATURATION
END YR-ENDING YEAR
FECL-FECAL COLIFORM MPN/100ML
FLOW-FLOW CFS
MAX #OBS-MAXIMUM NUMBER OF SAMPLES
NAT-NATURAL SUBSTRATE DIVERSITY
NITRO-TOTAL NITROGEN MG/L
PH-PH STANDARD UNITS
PHOS-TOTAL PHOSPHORUS MG/L
SD-SECCHI DISC METERS
TOC-TOTAL ORGANIC CARBON MG/L
TOTAL-TOTAL COLIFORM MPN/100ML
TSI-TROPHIC STATE INDEX
TSS-TOTAL SUSPENDED SOLIDS MG/L
TURB-TURBIDITY MG/L
WQI-WATER QUALITY INDEX

SURFACE WATER QUALITY DATA SCREENING REPORT ** USGS HYDROLOGIC UNIT: 03090103 FISHEATING CREEK
MEDIAN VALUES FOR EACH WATERSHED SCREENED

'x'=EXCEEDS SCREENING CRITERIA
'0'=WITHIN SCREENING CRITERIA
'.'=MISSING DATA

SCREENING VARIABLES AND CRITERIA

WATERSHED ID	NAME	RANK WQI OR TSI	DATA RECORD CURRENT OR HISTORICAL	TN	STREAM TP	LAKE TP	PH	ALK	TURB & TSS	COND	OXYGEN DEMAND	DO	COLIFORM BACTI	BIOL DIV	CHLA	SECCHI DISC
				TN>2.0	TP>.46	TP>.12	PH>8.8 PH<5.2	ALK<20	TURB>16.5 TSS>18	COND>1275	BOD>3.3 COD>102 TOC>27.5	DO<4	TOT>3700 FECAL>470	DIART<1.95 DINAT<1.5 BECK<5.5	CHLA>40	SD<.7
* WATER BODY TYPE: STREAM																
1	FISHEATING CREEK	FAIR	Current	0	0	.	0	0	0	.	0	0	0	.	.	.
2	HARNEY POND CANAL	FAIR	Current	0	0	.	0	.	0	.	.	0	.	.	.	.
3	INDIAN PRAIRIE CANAL	FAIR	Current	0	0	.	0	.	0	.	0	0	x	.	.	.

LEGEND:
ALK-ALKALINITY
BECK-BECK'S BIOTIC INDEX
BIOL DIV-BIOLOGICAL DIVERSITY
CHLA-CHLOROPHYLL
COND-CONDUCTIVITY
DO-DISSOLVED OXYGEN
CURRENT-1989 TO 1993
DIART-ARTIFICIAL SUBSTRATE DIVERSITY
DINAT-NATURAL SUBSTRATE DIVERSITY
FECAL-FECAL COLIFORM BACTERIA
HISTORICAL-1970 TO 1988
OXYGEN DEMAND-BOD,COD,TOC
PH-PH
TN-NITROGEN
TP-PHOSPHORUS
TOT-TOTAL COLIFORM BACTERIA
TSS-TOTAL SUSPENDED SOLIDS
TURB-TURBIDITY
SD-SECCHI DISC METERS
WQI OR TSI-WATER QUALITY INDEX RATING WHICH INDEX USED, WQI OR TSI, IS BASED ON WATERBODY TYPE

SURFACE WATER QUALITY ASSESSMENT REPORT
TRENDS-SOURCES-CLEANUP

** USGS HYDROLOGIC UNIT: 03090103 FISHEATING CREEK

'x'=DEGRADING TREND
'0'=STABLE TREND
'+'=IMPROVING TREND
'.'=MISSING DATA

1984 - 1993 TRENDS <--- PLEASE READ THESE COLUMNS VERTICALLY

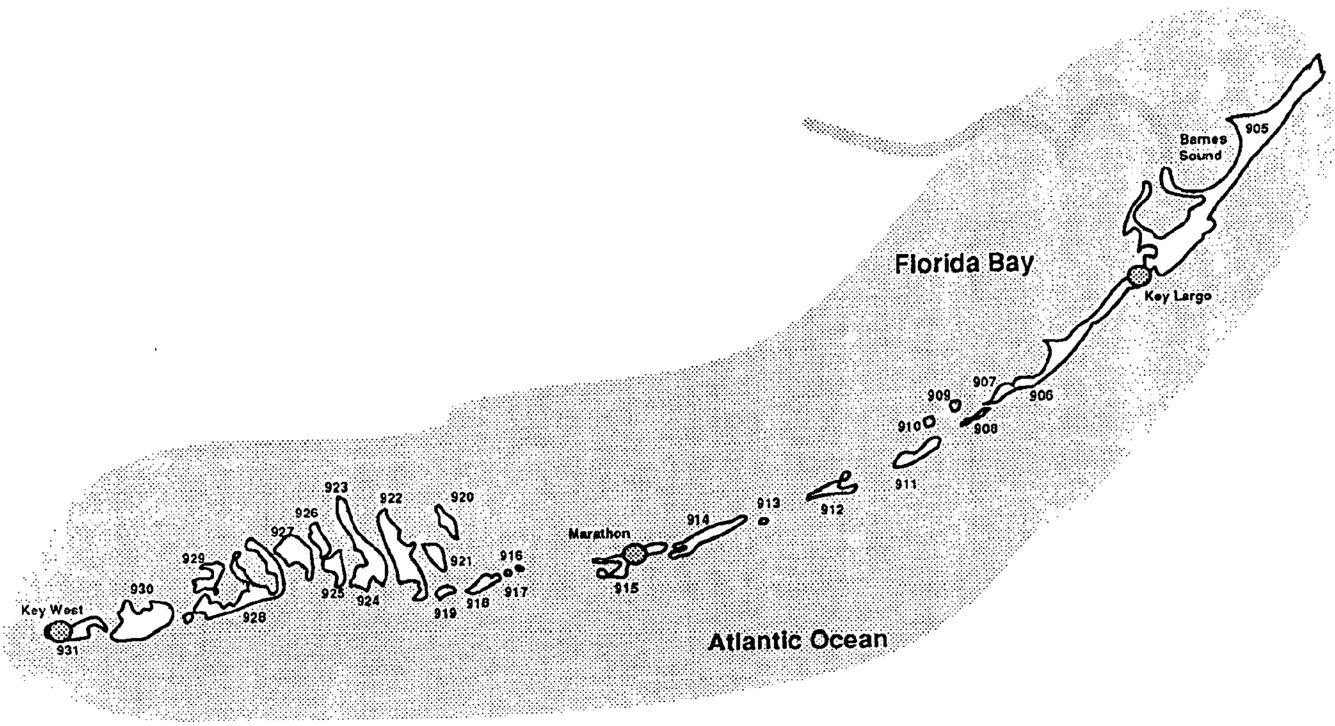
WATERSHED ID	NAME	QUALITY RANK: MEETS USE ?	QUALITY RANK: WQI OR TSI	OVER-ALL TREND	WQI or TSI	TN	TP	CHLA	SD	PH	ALK	TURB	TSS	BOD	TOC	DO	DOSAT	TCOLI	FCOLI	TEMP	FLOW	DEGRADATION SOURCES, PRESENT CONDITIONS AND CLEANUP EFFORTS
* WATER BODY TYPE: STREAM																						
1	FISHEATING CREEK	PARTIAL	FAIR	+	0	+	+	.	.	+	0	0	0	.	.	0	0	.	.	0	0	
2	HARNEY POND CANAL	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
3	INDIAN PRAIRIE CANAL	PARTIAL	FAIR	0	0	0	0	.	.	0	.	0	0	.	.	0	0	.	.	+	.	

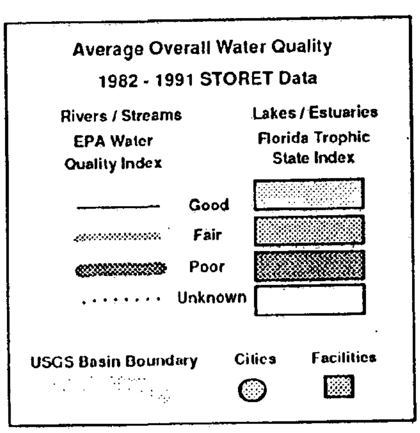
LEGEND:

ALK-ALKALINITY
BOD-BIOCHEM. OXYGEN DEMAND
CHLA-CHLOROPHYLL
DO-DISSOLVED OXYGEN
DOSAT-DO SATURATION
FCOLI-FECAL COLIFORM
FLOW-FLOW
MEETS USE-MEETS DESIGNATED USE
PH-PH
SD-SECCHI DISC METERS
TCOLI-TOTAL COLIFORM
TEMP-TEMPERATURE
TN-NITROGEN
TOC-T.ORGANIC CARBON
TP-PHOSPHORUS
TSS-TOTAL SUSPENDED SOLIDS
TURB-TURBIDITY
TSI-TROPHIC STATE INDEX FOR LAKES AND ESTUARIES
WQI-WATER QULAITY INDEX FOR STREAMS AND SPRINGS

Florida Keys Basin

03090203





FLORIDA KEYS BASIN

Basic Facts

Drainage Area: 918 square miles
Major Land Uses: urban development, recreation, sportfishing
Population Density: moderately high (Key West, Marathon, Key Largo)
Major Pollution Sources: construction, septic tanks, marinas, live aboards, stormwater runoff
Best Water Quality Areas: open ocean and bay waters
Worst Water Quality Areas: urban canals and marinas
Water Quality Trends: stable trend at one site, very limited trend sampling
OFW Waterbodies:
- Florida Keys
- Great White Heron National Wildlife Refuge
- Key West National Wildlife Refuge
- Crocodile Lake National Wildlife Refuge
- Key Largo Coral Reel National Marine Sanctuary
- John Pennekamp Coral Reef State Park
- Looe Key National Marine Sanctuary Aquatic Preserve

SWIM Waterbodies: none
Reference Reports:
- Fate and Pathways of Injection Well Effluent in the Florida Keys (draft) USGS 1994
- Florida Keys Monitoring Study, DEP (Marathon), 1987
- Florida Nonpoint Source Assessment, DEP (Tallahassee), 1988
- Interim Report: Ambient Water Quality Assessment in the Middle and Lower Florida Keys During 1989, Lapoint and Clark, 1990, Florida Keys Land and Sea Trust
- Boot Key Harbor Study (Draft), DEP (Marathon), 1990
- Florida Keys as Outstanding Florida Waters, 1985
- Florida Keys National Marine Sanctuary Assessment Reports, 1991-1992

Basin Water Quality Experts:
- Gus Rios, DEP (Marathon), 305/743-5955

In the News

* Key West WWTP increased the treatment level of their discharge and wen on-line in 1989. A new DEP permit issued in November 1991 requires monitoring of the effluent for nutrients, DO, conductivity, pH, salinity and biological monitoring of the sediment in the vicinity of the outfall.
* In order to better protect the fragile Key reefs and the Everglades, the State has launched a unified effort to block offshore oil drilling and to move shipping channels further offshore.
* Florida Keys National Marine Sanctuary and Protection Act was signed into law on November 16, 1990. A Management Plan is now being developed.

* An issue of heated debate is whether treated sewage pumped into the ground via deepwell injection may be reemerging through an ocean sinkhole to provide nutrients to fuel algal blooms.
* The Monroe County Commission has proposed a moratorium on new hotel/motel construction and the restriction of home building permits to 250 per year.
* A recent USGS Report (DRAFT, 1994, prepared for the DEP and EPA) that monitored the onshore and offshore ground water to study the fate of injection-well effluent, determined that the source of nutrients observed at some offshore reef locations could not be directly linked to onshore injection wells. The final report is expected later this year.

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Ecological Characterization

The Florida Keys located south of Miami consist of a 100 mile string of islands which extend in a west-southwesterly direction. To the north and west, the Keys are open to Florida Bay and the Gulf of Mexico; to the south and east is the Atlantic Ocean. The islands form many lagoons, predominantly on the Gulf side. Due to the rapid flushing of the lagoons, water chemistry is generally similar to open sea water. The islands sit on the edge of an elevated shelf so the waters, particularly on the Gulf side, are shallow and support lush growths of seagrasses. Along the east coast, as the shelf drops off into deeper water, there is the only stretch of living coral reef in the continental United States. There are no reaches of freshwater on the islands. The three main urban areas, Key Largo, Marathon and Key West are connected by one highway, U.S. 1, and a chain of small municipalities.

Anthropogenic Impacts

The island waters open to the Atlantic Ocean or Gulf of Mexico have good water quality and are designated as Outstanding Florida Waters, and as such are afforded legal protection against any significant change in water quality. On November 16, 1990, the Florida Keys National Marine Sanctuary and Protection Act was signed into law. This act is an expansion of the National Marine Sanctuary Program already in place in Key Largo and Looe Key. The act prohibits oil and gas development and hard mineral mining; and restrict commercial vessel traffic (750m length) within designated "area to be avoided". The Comprehensive Management Plan is due out this fall. The Water Quality Protection Program is in place and the research and monitoring program is in the first phase of implementation.

Many of the manmade canals and marinas exhibit some water quality problems which are exacerbated by decreased flushing. A 1986 205(j) study in the Keys indicated that the major sources of pollution were: 1. WWTPs and "package plants" discharging to poorly flushed manmade waterways; 2. thousands of septic tanks and cesspools; 3. marinas with no pump out facilities; 4. fish processors; and 5. stormwater runoff, especially into the canals. A more recent study by the Florida Keys Land and Sea Trust confirmed this report emphasizing eutrophication of canals by septic tank leachate. They found several violations of dissolved oxygen standards in the canals.

Both of these reports confirmed the importance of superior water quality to the coral reefs and other resources of the Keys, and warned against treating pollution with dilution. Even minute changes in nutrient, turbidity or toxics concentrations can have a severe impact on the highly fragile coral reef communities. The 205(j) report questioned the validity of using only water quality standards and criteria to assess the need for treatment facilities in this special area.

Additionally, the 205(j) report suggested that the need for wastewater treatment facilities and collection systems be based on population density, and that the facilities should discharge to the unconsolidated, non-potable aquifer that underlies the Keys. Most of the existing WWTPs have already shifted from surface water discharge to underground injection. However, there is potential for seepage of underground wastes into nearby surface waters. A study by the DEP Marathon office is being conducted on the Blue Water RV Park package plant to determine the extent of seepage problems. Baseline data was collected in late 1989, prior to discharge. Monitoring of surface waters and groundwater at this site is in progress. Another major pollution source is associated with sewage disposal in the urbanized areas, particularly Key Largo and Key West. For years, the City of Key West discharged raw sewage directly to the ocean. The DEP and EPA issued a Consent Order to the City requiring that a treatment facility be built. It finally went on-line early in 1989 and appears to be operating well. There are also localized problems (high fecal coliform counts, sediment contamination with metals, oils, etc.) in some of the marinas and the port at Key West. A marina related study was completed on Boot Key Harbor near Marathon in 1990. That study indicated that live aboard vessels were contributing to the degradation of surface waters.

Recently, there has been a mass die-off of the seagrasses in Florida Bay (particularly Barnes Bay) and consequent declining fisheries. Disruptions in the quantity and quality of freshwater inflow into the bay due to channelization on the mainland is suspected as one cause of the die-off. A study was conducted by the DEP district staff on the effect of discharge water from the C-111 canal. The SFWMD has taken over that project. Other suspected causes are the lack of hurricanes to flush sediments out of the bay and very warm water temperatures.

The coral reefs on the ocean side have suffered from careless divers, boat anchors, and several commercial ship grindings and/or spills. In 1989 there were two groundings of large ships that caused severe damage to the reef.

INDEX	GOOD	FAIR	POOR
WQI-RIVER	0-44	45-59	60-90
TSI-ESTUARY	0-49	50-59	60-100
TSI-LAKE	0-59	60-69	70-100

WATER QUALITY DATA FOR 1982-1991
(MEDIAN VALUES FOR EACH REACH)

REACH	REACH NAME	SAMPLE RECORD MAX #OBS	BEG YR	END YR	WATER CLARITY TURB	SD	COLOR	TSS	DISSOLVED OXYGEN DO	DOSAT	OXYGEN DEMAND BOD	COD	TOC	PH ALKALINITY PH	ALK	TROPHIC STATUS NITRO	PHOS	CHLA	COLIFORM TOTAL	FECL	BIOLOGICAL SPECIES DIVERSITY NAT	ART	BECK	COND	FLOW	WATER QUALITY INDICES WQI	TSI
	* WATER BODY TYPE: COASTAL																										
905	KEY LARGO ab FLORIDA BAY	78	85	85	.	2.1	.	.	6.8	73	.	.	.	7.8	.	0.53	0.02	.	.	1	.	.	.	54300	.	17	35
906	PLANTATION KEY ab FLORIDA BAY	3	85	85	.	0.9	.	.	9.3	98	.	.	.	8.0	.	0.45	0.02	.	.	1	.	.	.	55000	.	6	50
907	WINDLEY KEY ab FLORIDA BAY	3	85	85	.	1.5	.	.	8.0	74	.	.	.	7.8	.	.	.	.	.	.	.	.	.	57500	.	10	.
908	UPPER MATECUMBE KEY ab FLORIDA BAY	6	85	85	.	1.6	.	.	8.1	75	.	.	.	7.8	.	0.30	0.01	.	.	.	.	.	.	58450	.	8	38
909	SHELL KEY ab FLORIDA BAY	0	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
910	LIGNUMVITAE KEY ab FLORIDA BAY	0	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
911	LOWER MATECUMBE KEY ab FLORIDA KEY	4	85	85	.	1.2	.	.	.	.	.	.	.	7.9	.	0.38	0.02	.	.	.	.	.	.	51500	.	7	45
912	LONG KEY ab FLORIDA BAY	3	85	85	.	2.7	.	.	.	.	.	.	.	7.7	.	0.40	0.02	.	.	.	.	.	.	47500	.	8	33
913	DUCK KEY ab FLORIDA BAY	0	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
914	GRASSY KEY/MARATHON SHORES ab FLORIDA BAY	372	84	85	.	2.0	.	5	6.2	72	0.9	.	.	7.7	.	0.48	0.03	3	5	13	.	.	.	55275	.	22	38
915	MARATHON KEY/VACA KEY ab FLORIDA BAY	13	85	85	.	3.0	.	.	6.9	75	.	.	.	7.8	.	0.29	0.01	.	.	2	.	.	.	54000	.	17	27
916	PACET KEY ab FLORIDA BAY	0	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
917	OHIO KEY ab FLORIDA BAY	0	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
918	BAHIA HONDA KEY ab FLORIDA BAY	31	82	88	.	6.3	.	.	6.1	74	.	.	2	7.6	.	0.40	0.03	.	.	.	4.0	.	.	55750	.	30	32
919	SPANISH HARBOR KEYS ab FLORIDA BAY	0	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
920	LITTLE PINE KEY ab GULF OF MEXICO	0	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
921	NONAME KEY ab GULF OF MEXICO	0	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
922	BIG PINE KEY ab GULF OF MEXICO	10	85	85	.	2.0	.	.	7.5	77	.	.	.	7.7	.	0.37	0.02	.	.	.	.	.	.	56500	.	12	37
923	TORCH KEYS(BIG,MIDDLE,LITTLE) ab GULF OF MEXICO	127	82	90	2.0	2.0	2	4	6.3	72	.	.	3	7.8	.	0.59	0.02	0	76	1	5.5	.	.	54700	.	21	38
924	SUMMERLAND KEY COVE ab GULF OF MEXICO	0	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
925	SUMMERLAND KEY ab GULF OF MEXICO	3	85	85	.	1.6	.	.	7.3	79	.	.	.	7.9	.	0.21	0.00	.	.	.	.	.	.	57100	.	11	27
926	KNOCKEMDOWN KEYS ab GULF OF MEXICO	0	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
927	CUDJOE KEY ab GULF OF MEXICO	6	85	85	.	2.0	.	.	7.2	75	.	.	.	7.8	.	0.37	0.01	.	.	.	.	.	.	57050	.	14	33
928	SUGARLOAF KEY ab GULF OF MEXICO	8	85	85	.	1.3	.	.	8.0	87	.	.	.	7.8	.	0.33	0.01	.	.	.	.	.	.	59450	.	10	43
929	SADDLEBUNCH KEY ab GULF OF MEXICO	0	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
930	BOCA CHICA KEY ab GULF OF MEXICO	0	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
931	KEY WEST ab GULF OF MEXICO	38	83	85	.	3.1	.	.	6.7	75	.	.	.	7.1	.	0.24	0.01	.	.	98	5.2	.	.	53700	.	27	20

LEGEND:
ALK-ALKALINITY MG/L
ART-ARTIFICIAL SUBSTRATE DI
BEG YR-BEGINNING SAMPLING YEAR
BECK-BECK'S BIOTIC INDEX
BOD-BIOCHEMICAL OXYGEN DEMAND MG/L
CHLA-CHLOROPHYLL UG/L
COD-CHEMICAL OXYGEN DEMAND MG/L
COLOR-COLOR PCU
COND-CONDUCTIVITY UMHOS
DO-DISSOLVED OXYGEN MG/L
DOSAT-DO % SATURATION
END YR-ENDING YEAR
FECL-FECAL COLIFORM MPN/100ML
FLOW-FLOW CFS
MAX #OBS-MAXIMUM NUMBER OF SAMPLES
NAT-NATURAL SUBSTRATE DIVERSITY
NITRO-TOTAL NITROGEN MG/L
PH-PH STANDARD UNITS
PHOS-TOTAL PHOSPHORUS MG/L
SD-SECCHI DISC METERS
TOC-TOTAL ORGANIC CARBON MG/L
TOTAL-TOTAL COLIFORM MPN/100ML
TSI-TROPHIC STATE INDEX
TSS-TOTAL SUSPENDED SOLIDS MG/L
TURB-TURBIDITY MG/L
WQI-WATER QUALITY INDEX

WATER QUALITY ASSESSMENT REPORT
SCREENING LEVEL PROBLEMS-TRENDS-SOURCES-CLEANUP

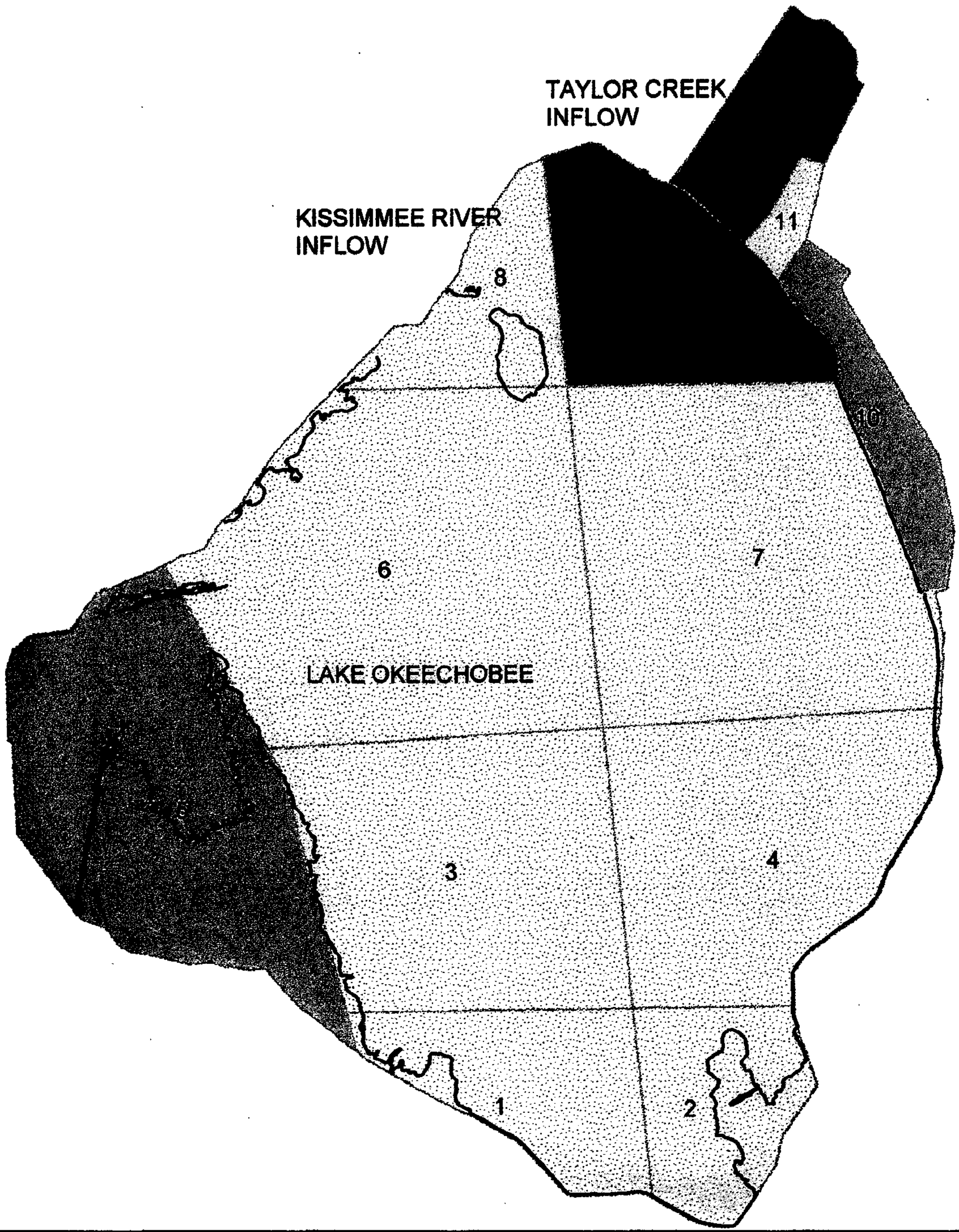
** USGS HYDROLOGIC UNIT: 03090203 FLORIDA KEYS -

'*'=PROBLEM OR DEGRADING TREND
'0'=NO PROBLEM OR STABLE TREND
'+'=IMPROVING TREND
'.'=NO DATA

<--- PLEASE READ THESE COLUMNS VERTICALLY

REACH	REACH NAME	MEETS USE ?	WQI RANK 1992 WQI TSI	WQI RANK 1990 WQI TSI	SCREENING PROBLEM (TPSC|BDBB|CSTT|MO / NHIO|OOAI|HDNP|ER / T LN|D CO|L |TG / P TD| TL|A |AA / O| |LN / G| |SI / Y| | C)	1982-1991 TRENDS (O|TFTT|BDDT|CSTT|WT|TF|PA / V|CCUS|OOOO|HDNP|QS|EL|HL / E|OORS|D SC|L |II|MO| K / R|LLB | A |A | |PW| / A|II | T / L / L)	SOURCES (IS|ASCU|MDHS / NT|GIOR|IUYE / DP|RLNB|NMDP / |IVSA|IPRT / |ITN|N OI / |R|G C)	PRESENT CONDITIONS AND CLEANUP EFFORTS
* WATER BODY TYPE: COASTAL								
905	KEY LARGO ab FLORIDA BAY	YES	GOOD	GOOD	00.*|.00.|.000|..	.|....|....|....|..|..|..	..|...*|...*	LARGE MARINA AND CANAL SYSTEM.
906	PLANTATION KEY ab FLORID	YES	FAIR	FAIR	00.*|.00.|.000|..	.|....|....|....|..|..|..	..|....|...*	
907	WINDLEY KEY ab FLORIDA B	YES	UNKN	UNKN	.0.*|.0..|.0..|..	.|....|....|....|..|..|..	..|...*|....	ASSESSMENT BASED ON NPS DATA AND PROFESSIONAL JUDGEMENT.
908	UPPER MATECUMBE KEY ab F	YES	GOOD	GOOD	00.*|.0..|.000|..	.|....|....|....|..|..|..	..|....|....	
909	SHELL KEY ab FLORIDA BAY	UNKNOWN	UNKN	UNKN	....|....|....|..	.|....|....|....|..|..|..	..|....|....	ASSESSMENT BASED ON PROFESSIONAL JUDGEMENT.
910	LIGNUMVITAE KEY ab FLORI	YES	UNKN	UNKN	....|....|....|..	.|....|....|....|..|..|..	..|....|....	ASSESSMENT BASED ON PROFESSIONAL JUDGEMENT.
911	LOWER MATECUMBE KEY ab F	YES	GOOD	GOOD	00.*|....|.000|..	.|....|....|....|..|..|..	..|....|....	
912	LONG KEY ab FLORIDA BAY	YES	GOOD	GOOD	00.*|....|.000|..	.|....|....|....|..|..|..	..|....|.*..	LANDFILL VERY CLOSE TO WATER.
913	DUCK KEY ab FLORIDA BAY	UNKNOWN	UNKN	UNKN	....|....|....|..	.|....|....|....|..|..|..	..|....|....	ASSESSMENT BASED ON PROFESSIONAL JUDGEMENT.
914	GRASSY KEY/MARATHON SHORE	YES	GOOD	GOOD	000*|000.|0000|..	.|....|....|....|..|..|..	..|....|....	
915	MARATHON KEY/VACA KEY ab	YES	GOOD	GOOD	00.*|.00.|.000|..	.|....|....|....|..|..|..	..|...*|...*	MULTIPLE SOURCES DISCHARGING INTO CANAL SYSTEMS.
916	PACET KEY ab FLORIDA BAY	UNKNOWN	UNKN	UNKN	....|....|....|..	.|....|....|....|..|..|..	..|....|....	ASSESSMENT BASED ON PROFESSIONAL JUDGEMENT.
917	OHIO KEY ab FLORIDA BAY	UNKNOWN	UNKN	UNKN	....|....|....|..	.|....|....|....|..|..|..	..|....|....	ASSESSMENT BASED ON PROFESSIONAL JUDGEMENT.
918	BAHIA HONDA KEY ab FLORI	YES	GOOD	GOOD	00.*|00.0|.000|..	.|....|....|....|..|..|..	..|....|....	
919	SPANISH HARBOR KEYS ab F	UNKNOWN	UNKN	UNKN	....|....|....|..	.|....|....|....|..|..|..	..|....|....	ASSESSMENT BASED ON PROFESSIONAL JUDGEMENT.
920	LITTLE PINE KEY ab GULF	UNKNOWN	UNKN	UNKN	....|....|....|..	.|....|....|....|..|..|..	..|....|....	ASSESSMENT BASED ON PROFESSIONAL JUDGEMENT.
921	NONAME KEY ab GULF OF ME	UNKNOWN	UNKN	UNKN	....|....|....|..	.|....|....|....|..|..|..	..|....|....	ASSESSMENT BASED ON PROFESSIONAL JUDGEMENT.
922	BIG PINE KEY ab GULF OF	YES	GOOD	GOOD	00.*|.0..|.000|..	.|....|....|....|..|..|..	..|....|....	
923	TORCH KEYS(BIG,MIDDLE,LIT	YES	GOOD	GOOD	000*|0000|0000|*.	0|..+0|.00.|.0.*|0.|0.|*.	..|....|....	STABLE 10 YEAR TREND.
924	SUMMERLAND KEY COVE ab G	UNKNOWN	UNKN	UNKN	....|....|....|..	.|....|....|....|..|..|..	..|....|....	ASSESSMENT BASED ON PROFESSIONAL JUDGEMENT.
925	SUMMERLAND KEY ab GULF O	YES	GOOD	GOOD	00.*|.0..|.000|..	.|....|....|....|..|..|..	..|....|....	
926	KNOCKEMDOWN KEYS ab GULF	UNKNOWN	UNKN	UNKN	....|....|....|..	.|....|....|....|..|..|..	..|....|....	ASSESSMENT BASED ON PROFESSIONAL JUDGEMENT.
927	CUDJOE KEY ab GULF OF ME	YES	GOOD	GOOD	00.*|.0..|.000|..	.|....|....|....|..|..|..	..|....|....	
928	SUGARLOAF KEY ab GULF OF	YES	GOOD	GOOD	00.*|.0..|.000|..	.|....|....|....|..|..|..	..|....|....	
929	SADDLEBUNCH KEY ab GULF	UNKNOWN	UNKN	UNKN	....|....|....|..	.|....|....|....|..|..|..	..|....|....	ASSESSMENT BASED ON PROFESSIONAL JUDGEMENT.
930	BOCA CHICA KEY ab GULF O	YES	UNKN	UNKN	....|....|....|..	.|....|....|....|..|..|..	..|....|....	ASSESSMENT BASED ON HISTORICAL DATA.
931	KEY WEST ab GULF OF MEXI	YES	GOOD	GOOD	00.*|.000|.000|..	.|....|....|....|..|..|..	..|...*|.***	VERY URBANIZED. POLLUTION FROM LIVEABOARD BOATS IN LARGE BOAT BASIN.

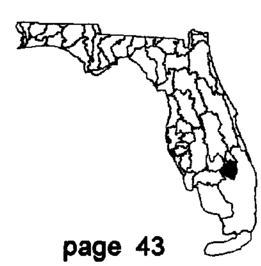
LEGEND:
AGRI-AGRICULTURE
ALK-ALKALINITY
BACT-BACTERIA
BIOLOGY-DIVERSITY
BOD-BIOCHEM. OXYGEN DEMAND
CHLA-CHLOROPHYLL
COND-CONDUCTIVITY
CONSTR-CONSTRUCTION
DO-DISSOLVED OXYGEN
DOSAT-DO SATURATION
DUMP-LANDFILL
FCOLI-FECAL COLIFORM
FLOW-FLOW
HYDRO-HYDROLOGIC MODIFICATION
IND-INDUSTRIAL POINT SOURCE
MEETS USE-MEETS DESIGNATED USE
METALS-TOXIC METALS
MINING-MINING
NPS SURVEY-1988 NONPOINT SOURCE
ORGANIC-ORGANIC TOXICS
OVERALL-OVERALL TREND
PH-PH
SD-SECCHI DISC
SEPTIC-SEPTIC TANKS
SILT-SILTATION
SILVI-SILVICULTURE
STP-WASTEWATER PLANT
TCOLI-TOTAL COLIFORM
TEMP-TEMPERATURE
TN-NITROGEN
TNTP-NUTRIENTS
TOC-T.ORGANIC CARBON
TP-PHOSPHORUS
TSI-TROPHIC STATE INDEX
TSS-TOTAL SUSPENDED SOLIDS
TURB-TURBIDITY
URBAN-URBAN
WQI-WATER QULAITY INDEX
WQI OR TSI-INDEX QUALITY OF WATER DEPENDS ON WATERBODY TYPE



LAKE OKEECHOBEE BASIN
03090201

AVERAGE WATER QUALITY
1984-1993 STORET DATA
WATERSHED ID NUMBERS LINK MAP TO TABLES
* INDICATES QUALITATIVE ASSESSMENT

WATER QUALITY
GOOD
THREATENED
FAIR
POOR
UNKNOWN



LAKE OKEECHOBEE BASIN

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Basic Facts

Drainage Area: 700 square miles surface area for lake, 4600 square miles for entire basin
Major Land Uses: agriculture, wetlands, improved pastime
Population Density: low (Moore Haven, Clewiston, Pahokee, Okeechobee, Belle Glade and South Bay)
Major Pollution Sources: dairies, agriculture
Best Water Quality Areas: west near wetlands and Fisheating Creek inflow
Worst Water Quality Areas: south by agricultural area, northeast by Taylor Creek/Nubbin Slough, St. Lucie Canal
Water Quality Trends: stable quality at 3 sites, slight phosphorus reduction in south Lake Okeechobee
OFW Waterbodies: none
SWIM Waterbodies: Lake Okeechobee/Kissimmee River
Reference Reports:
Macroinvertebrate Study; FL Game and Fish - Gary Warren, 1993
Lake Okeechobee Ecosystem - SFWMD and Unv. of FL. - (Nick Auman 404-687-6716)
SWIM Plan Document, SFWMD, 1989
DEP Macroinvertebrate Study, DEP, 1990
Basin Water Quality Experts:
Homer Royals, FGFWFC, 904/357-6631
Greg Graves, Terry Davis, DEP (Port St. Lucie), 407/871-7662
Harvey Rudolph, Palm Beach County, 407/355-4011
Tom Fontaine, Ken Todd, Anthony Waterhouse, SFWMD, 407/686-8800

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In the News

* Lake Okeechobee has been associated with several important developments in the Kissimmee-Okeechobee-Everglades drainage area (covered in the Southeast Florida Basin) and the Kissimmee Restoration (in Kissimmee River Basin).
* As part of the SWIM plan, some dairies have been removed from the lake's drainage basins.
* The Florida Steel Superfund Site is located 2 miles northwest on Indiantown in Martin County and consists of a 150 acre former steel mill that operated from 1970 to 1982, when it closed for economic reasons. Approximately 75,000 cubic yards of emission control dust were deposited on the southern portion of the site in waste piles. EPA has identified heavy metals including arsenic, cadmium and lead in the EC dust and ground water. In addition polychlorinated biphenyls (PCB's) were found at various

locations on the site. Approximately 4,800 people live within a two mile radius of the site. The Indiantown public water supply comes from a group of shallow wells located within three miles of the site. Wetlands located adjacent to the site are threatened by contamination migrating from the site. The site is being addressed in two stages: immediate actions and a long-term remedial phase focusing on cleanup of the entire site.

*Adjacent to Caulkins Indiantown Citrus is the Indiantown cogeneration plant, currently under construction by Bechtel. The plant will be coal fired and will consist of coal storage, water and wastewater basins.

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Ecological Characterization

Lake Okeechobee covers 700 square miles, depending on lake level, making it the largest lake in Florida and second largest lake within the boarders of the United States. The Kissimmee River is the largest basin draining into the lake followed by Fisheating Creek, the Indian Prairie Canal and Taylor Creek/Nubbin Slough. Land use in the surrounding basins is predominantly dairy farming (Kissimmee and Taylor Creek), improved posture, rangeland and wetlands (Fisheating Creek). The natural drainage from the lake, basically a spillage into the extensive wetland system south of the lake, has been diked and dredged into six major exiting canals: the westward flowing Caloosahatchee and the eastward St. Lucie, West Palm Beach, Hillsboro, North New River, and Miami Canals. These modifications and numerous other drainage canals allowed the claiming of hundreds of square miles of non-flooded land for agricultural usage. This area covering about 1200 square miles, known as the Everglades Agricultural Area (EAA), is planted mostly in sugar cane, but also has significant amounts of row crop and sod farming.

Lake Okeechobee is part of the larger system known as the Kissimmee, Okeechobee, Everglades drainage that is unique in the world. Historically, the sluggish, meandering river system emptied into a high, shallow lake that slowly released water to a 50 mile wide, 125 mile long "River of Grass" to a mangrove swamp and the Florida Bay estuary.

The hydrology of the Kissimmee Basin and the Everglades/Southeast Florida Basins has been greatly modified for flood control and to produce farmland. Lake Okeechobee still serves as a reservoir for the system, but both inflow to and outflow from the lake is, to a great extent, managed by man through a system of canals, pumps and control structures. All inflows and outflows to the lake (except Fisheating Creek) are controlled. The price of managing water quantity so heavily has been a marked lowering of water quality.

Anthropogenic Impacts

Major sources of pollution to the lake include runoff from ranch and dairy operations in the northern drainage and from historic back-pumping of runoff from row crops and sugar cane in the southern drainage. Water quality problems in the north end of the lake include elevated phosphorus and coliform concentrations and a continuous algal bloom. In the south part of the lake, problems of nutrient and pesticide loadings are caused by back-pumping. The back-pumping practice has mostly ceased, but still occurs when water levels in the EAA primary canal reach an elevations of 13 feet NGVD (flood control). Consequently, at different locations and different seasons of rainfall or drought, the lake receives varying amounts of nutrient, BOD, bacteria and toxic materials. Other pollutants entering the lake include high levels of total dissolved solids, unionized ammonia, chlorides, color and dissolved organics (THM precursors), water low in dissolved oxygen and high in specific conductance. The total phosphorus levels in the lake have doubled in the last decade. Considering the lake's volume, this increase represents a tremendous loading.

A basin assessment of the lake in 1985 revealed variable conditions in the lake from highly eutrophic (high pH and chlorophyll values) to relatively good values. Nutrient values were mostly high. Biological sampling also indicated variability in the lake, but is generally indicative of eutrophic conditions. In recent years there have been several wide-spread algal blooms (one covered about 100 square miles) and at least one major fish kill. These widely publicized events launched the environmental community and governmental agencies into a period of intense investigation and analysis. The Lake Okeechobee Technical Advisory Committee (LOTAC) was formed to assess the situation and make recommendations. LOTAC determined that phosphorus loading from dairy and agricultural sources was a major cause of water quality conditions conducive to noxious algal blooms and that phosphorus loading should be reduced by 40% (as stated in a 1981 SFWMD Technical publication TP81-2). A few others contend that the secondary cause of increased phosphorus levels are the hundreds of acres of perimeter wetlands which have become flooded after a late 1970s, decision by the Water Management District to raise the water level in the lake. Also, the higher lake levels reduced valuable fish spawning grounds and waterfowl feeding and nesting areas.

The South Florida Water Management District has initiated several biological, chemical and ecological research projects. The lake is a priority SWIM waterbody and plans are being submitted to attenuate pollution flowing to the lake. DEP has adopted a "dairy rule" requiring certain BMPs for dairy operation. That rule required BMP plan development and permit acquisition from DEP by June, 1989, and implementation by April, 1991 for all 52 dairies in the Lake Okeechobee drainage basin. Dairies are offered the option of selling and removing the cattle (through water management district and state funding) or coming into compliance with the rule. Additionally, DEP is regulating back pumping operations. The Dairy Rule does not seem to be uniformly accomplishing the desired result stated in the SWIM Plan of a dairy off-site phosphorus discharge concentration of no more than 2.1 mg/1.

Concerning the recent federal lawsuit on the Everglades, Lake Okeechobee was <u>not</u> included in the lawsuit. Unlike the Loxahatchee Wildlife Refuge (WCA-1) and Everglades National Park, no direct affect on federal interests could be shown for Lake Okeechobee (or WCA-2 or WCA-3). As part of the preliminary mediated settlement agreement and included in the Everglades Forever Act, some EAA agricultural drainage was diverted away from the lake and south to the regional storm water treatment areas (STAs). A primary reason for the diversion was to provide make-up water to the Everglades for the water that would be lost to evapotranspiration in the STAs. Lake Okeechobee also received a major benefit through the annual diversion of about 20 tons of phosphorus, 500 tons of nitrogen and a number of other pollutants.

Phosphorus loading limits established for the lake by the legislature in Ch. 373, FS and effective July 1992 have still not been met.

Results of recently completed research sponsored by the SFWMD indicate that because of internal recycling of lake phosphorus and the vast reservoir of phosphorus stored in the drainage basin in ground water and wetland and canal sediments, the lake water phosphorus concentration may not be lowered to acceptable levels for many decades or even a century. To shorten this time, new actions to reduce phosphorus at the points its tributaries enter the lake will be necessary.

Adoption of a new regulation schedule (the current experimental schedule, Run 25) for Lake Okeechobee is being proposed by the Corps of Engineers. It doesn't meet the need for a lower fluctuating water level in the lake's extensive marsh or adequately protect the St. Lucie and Caloosahatchee Estuaries from excessive fresh water discharges. It does provide for a greater agricultural water supply than the lower, environmentally friendly alternative (Run 22AZE).

** USGS HYDROLOGIC UNIT: 03090201 LAKE OKEECHOBEE

SURFACE WATER QUALITY DATA FOR 1970-1993
MEDIAN VALUES FOR EACH WATERSHED
CURRENT PERIOD OF RECORD (1989-1993) USED WHERE AVAILABLE
PERIOD PRIOR TO 1989 IS EVALUATED AS HISTORICAL INFORMATION

INDEX	GOOD	FAIR	POOR
WQI-RIVER	0-44	45-59	60-90
TSI-ESTUARY	0-49	50-59	60-100
TSI-LAKE	0-59	60-69	70-100

WATERSHED ID	NAME	WATERSHED DATA RECORD				WATER CLARITY				DISSOLVED OXYGEN		OXYGEN DEMAND			PH ALKALINITY		TROPHIC STATUS			COLIFORM		BIOLOGICAL SPECIES DIVERSITY			COND	FLOW	WATER QUALITY INDICES	
		MAX #OBS	BEG YR	END YR	DATA PERIOD	TURB	SD	COLOR	TSS	DO	DOSAT	BOD	COD	TOC	PH	ALK	NITRO	PHOS	CHLA	TOTAL	FECL	NAT	ART	BECK	COND	FLOW	WQI	TSI
* WATER BODY TYPE: LAKE																												
1	LAKE OKEECHOBEE	151	89	92	Current	8.8	0.6	35	9	8.6	95	.	.	.	8.1	.	1.34	0.05	16	.	.	.	.	.	609	.	.	60
2	LAKE OKEECHOBEE	161	89	92	Current	7.3	0.7	39	7	8.6	84	.	.	.	8.1	.	1.48	0.05	18	460	17	.	.	.	625	.	.	63
3	LAKE OKEECHOBEE	272	89	93	Current	11.0	0.6	31	11	8.3	96	.	.	.	8.1	.	1.33	0.05	22	.	.	.	.	.	604	.	.	66
4	LAKE OKEECHOBEE	70	90	90	Current	14.7	0.8	33	.	7.7	97	.	.	.	8.7	.	1.56	0.05	.	210	15	.	.	.	707	.	.	61
5	LAKE OKEECHOBEE	31	89	93	Current	1.6	1.1	60	1	4.5	35	.	.	.	6.9	.	1.31	0.03	23	.	.	.	.	.	541	.	.	49
6	LAKE OKEECHOBEE	32	89	91	Current	5.7	0.5	85	5	8.9	99	.	.	.	8.2	.	1.42	0.07	99	.	.	.	.	.	454	.	.	71
7	LAKE OKEECHOBEE	52	90	91	Current	20.0	0.6	30	.	7.2	89	.	.	.	8.7	.	1.54	0.10	.	.	.	.	.	.	721	.	.	68
8	LAKE OKEECHOBEE	228	89	93	Current	5.4	0.6	55	7	8.3	94	.	.	.	8.0	.	1.27	0.07	25	.	.	.	.	.	420	.	.	66
9	LAKE OKEECHOBEE	64	89	93	Current	16.2	0.6	80	.	8.5	97	.	.	.	8.3	104	1.51	0.09	44	172	19	.	.	.	523	.	.	71
* WATER BODY TYPE: STREAM																												
10	S-135	57	89	93	Current	4.8	.	52	6	6.8	75	.	.	.	7.6	.	1.40	0.07	.	.	.	.	.	.	753	.	38	.
11	Lettuce Creek	128	89	93	Current	2.6	0.9	150	.	4.1	43	.	.	.	6.7	.	1.57	0.29	.	.	110	.	.	.	377	.	58	.
12	S-135	60	92	93	Current	.	.	.	.	3.0	33	.	.	.	6.9	.	1.60	0.97	.	.	.	.	.	.	536	.	82	.

LEGEND:
ALK-ALKALINITY MG/L
ART-ARTIFICIAL SUBSTRATE DI
BEG YR-BEGINNING SAMPLING YEAR
BECK-BECK'S BIOTIC INDEX
BOD-BIOCHEMICAL OXYGEN DEMAND MG/L
CHLA-CHLOROPHYLL UG/L
COD-CHEMICAL OXYGEN DEMAND MG/L
COLOR-COLOR PCU
COND-CONDUCTIVITY UMHOS
DO-DISSOLVED OXYGEN MG/L
DOSAT-DO % SATURATION
END YR-ENDING YEAR
FECL-FECAL COLIFORM MPN/100ML
FLOW-FLOW CFS
MAX #OBS-MAXIMUM NUMBER OF SAMPLES
NAT-NATURAL SUBSTRATE DIVERSITY
NITRO-TOTAL NITROGEN MG/L
PH-PH STANDARD UNITS
PHOS-TOTAL PHOSPHORUS MG/L
SD-SECCHI DISC METERS
TOC-TOTAL ORGANIC CARBON MG/L
TOTAL-TOTAL COLIFORM MPN/100ML
TSI-TROPHIC STATE INDEX
TSS-TOTAL SUSPENDED SOLIDS MG/L
TURB-TURBIDITY MG/L
WQI-WATER QUALITY INDEX

SURFACE WATER QUALITY DATA SCREENING REPORT
MEDIAN VALUES FOR EACH WATERSHED SCREENED

** USGS HYDROLOGIC UNIT: 03090201 LAKE OKEECHOBEE

'x'=EXCEEDS SCREENING CRITERIA
'0'=WITHIN SCREENING CRITERIA
'.'=MISSING DATA

WATERSHED ID	NAME	RANK WQI OR TSI	DATA RECORD CURRENT OR HISTORICAL	TN	STREAM TP	LAKE TP	PH	ALK	TURB & TSS	COND	OXYGEN DEMAND	DO	COLIFORM BACTI	BIOL DIV	CHLA	SECCHI DISC
				TN>2.0	TP>.46	TP>.12	PH>8.8 PH<5.2	ALK<20	TURB>16.5 TSS>18	COND>1275	BOD>3.3 COD>102 TOC>27.5	DO<4	TOT>3700 FECAL>470	DIART<1.95 DINAT<1.5 BECK<5.5	CHLA>40	SD<.7
* WATER BODY TYPE: LAKE																
1	LAKE OKEECHOBEE	FAIR	Current	0	.	0	0	.	0	.	.	0	.	.	0	x
2	LAKE OKEECHOBEE	FAIR	Current	0	.	0	0	.	0	0	.	0	0	.	0	x
3	LAKE OKEECHOBEE	FAIR	Current	0	.	0	0	.	0	.	.	0	.	.	0	x
4	LAKE OKEECHOBEE	FAIR	Current	0	.	0	0	.	0	0	.	0	0	.	.	0
5	LAKE OKEECHOBEE	GOOD	Current	0	.	0	0	.	0	.	.	0	.	.	0	0
6	LAKE OKEECHOBEE	FAIR	Current	0	.	0	0	.	0	.	.	0	.	.	x	x
7	LAKE OKEECHOBEE	FAIR	Current	0	.	0	0	.	x	.	.	0	.	.	.	x
8	LAKE OKEECHOBEE	FAIR	Current	0	.	0	0	.	0	.	.	0	.	.	0	x
9	LAKE OKEECHOBEE	POOR	Current	0	.	0	0	0	0	.	.	0	0	.	x	x
* WATER BODY TYPE: STREAM																
10	S-135	GOOD	Current	0	0	.	0	.	0	.	.	0	.	.	.	.
11	Lettuce Creek	FAIR	Current	0	0	.	0	.	0	.	.	0	0	.	.	0
12	S-135	POOR	Current	0	x	.	0	.	.	.	.	x	.	.	.	.

LEGEND:
ALK-ALKALINITY
BECK-BECK'S BIOTIC INDEX
BIOL DIV-BIOLOGICAL DIVERSITY
CHLA-CHLOROPHYLL
COND-CONDUCTIVITY
DO-DISSOLVED OXYGEN
CURRENT-1989 TO 1993
DIART-ARTIFICIAL SUBSTRATE DIVERSITY
DINAT-NATURAL SUBSTRATE DIVERSITY
FECAL-FECAL COLIFORM BACTERIA
HISTORICAL-1970 TO 1988
OXYGEN DEMAND-BOD,COD,TOC
PH-PH
TN-NITROGEN
TP-PHOSPHORUS
TOT-TOTAL COLIFORM BACTERIA
TSS-TOTAL SUSPENDED SOLIDS
TURB-TURBIDITY
SD-SECCHI DISC METERS
WQI OR TSI-WATER QUALITY INDEX RATING WHICH INDEX USED, WQI OR TSI, IS BASED ON WATERBODY TYPE

SURFACE WATER QUALITY ASSESSMENT REPORT
TRENDS-SOURCES-CLEANUP

** USGS HYDROLOGIC UNIT: 03090201 LAKE OKEECHOBEE

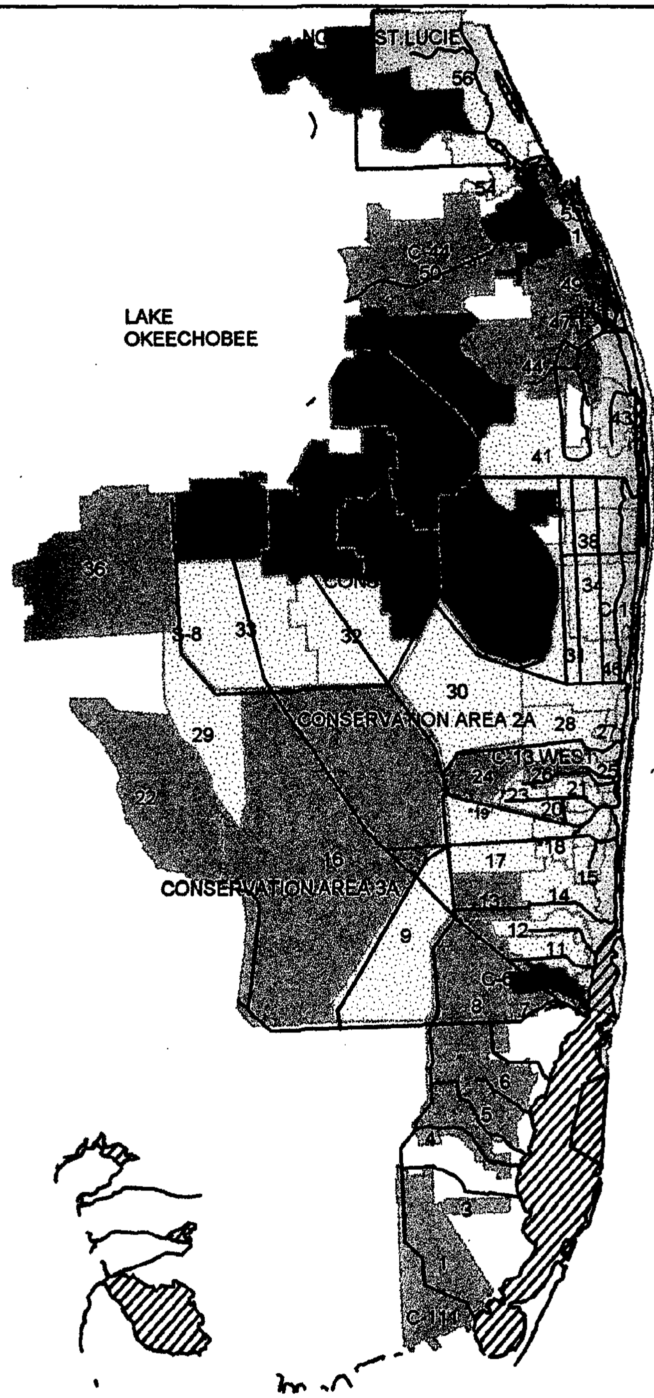
'x'=DEGRADING TREND
'0'=STABLE TREND
'+'=IMPROVING TREND
'.'=MISSING DATA

1984 - 1993 TRENDS (<--- PLEASE READ THESE COLUMNS VERTICALLY)

WATERSHED ID	NAME	QUALITY RANK: MEETS USE ?	QUALITY RANK: WQI OR TSI	OVER-ALL TREND	WQI or TSI	TN	TP	CHLA	SD	PH	ALK	TURB	TSS	BOD	TOC	DO	DOSAT	TCOLI	FCOLI	TEMP	FLOW	DEGRADATION SOURCES, PRESENT CONDITIONS AND CLEANUP EFFORTS
* WATER BODY TYPE: LAKE																						
1	LAKE OKEECHOBEE	PARTIAL	FAIR	0	0	0	0	0	0	0	.	0	x	.	.	0	0	.	.	0	.	
2	LAKE OKEECHOBEE	PARTIAL	FAIR	0	0	0	0	0	x	0	.	0	x	.	.	0	0	.	.	0	.	
3	LAKE OKEECHOBEE	PARTIAL	FAIR	0	0	0	0	0	0	+	.	0	0	.	.	0	0	.	.	0	.	
4	LAKE OKEECHOBEE	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
5	LAKE OKEECHOBEE	YES	GOOD	0	0	+	0	0	0	x	.	0	.	.	.	0	.	.	.	.	.	
6	LAKE OKEECHOBEE	NO	FAIR	x	x	0	x	.	0	0	.	0	.	.	.	0	.	.	.	.	.	
7	LAKE OKEECHOBEE	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
8	LAKE OKEECHOBEE	PARTIAL	FAIR	+	0	+	+	+	x	0	.	0	+	.	.	0	0	.	.	0	.	
9	LAKE OKEECHOBEE	NO	POOR	0	0	0	0	0	0	0	0	0	.	.	.	0	0	x	x	0	.	
* WATER BODY TYPE: STREAM																						
10	S-135	YES	GOOD	x	x	+	0	.	.	x	.	x	0	.	.	x	.	.	.	.	.	
11	Lettuce Creek	PARTIAL	FAIR	0	0	0	0	.	.	0	.	.	.	.	.	0	0	.	.	0	.	
12	S-135	NO	POOR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	

LEGEND:

ALK-ALKALINITY
BOD-BIOCHEM. OXYGEN DEMAND
CHLA-CHLOROPHYLL
DO-DISSOLVED OXYGEN
DOSAT-DO SATURATION
FCOLI-FECAL COLIFORM
FLOW-FLOW
MEETS USE-MEETS DESIGNATED USE
PH-PH
SD-SECCHI DISC METERS
TCOLI-TOTAL COLIFORM
TEMP-TEMPERATURE
TN-NITROGEN
TOC-T.ORGANIC CARBON
TP-PHOSPHORUS
TSS-TOTAL SUSPENDED SOLIDS
TURB-TURBIDITY
TSI-TROPHIC STATE INDEX FOR LAKES AND ESTUARIES
WQI-WATER QULAITY INDEX FOR STREAMS AND SPRINGS



SOUTHEAST FLORIDA BASIN
03090202

AVERAGE WATER QUALITY
1984-1993 STORET DATA
WATERSHED ID NUMBERS LINK MAP TO TABLES
* INDICATES QUALITATIVE ASSESSMENT

WATER QUALITY
GOOD
THREATENED
FAIR
POOR
UNKNOWN

SOUTHEASTERN FLORIDA BASIN

Basic Facts

Drainage Area: 8,000 square miles
Major Land Uses: wetlands, agriculture, urban development
Population Density: high in coastal areas (Miami, Ft. Lauderdale, West Palm Beach, Stuart, Homestead)
Major Pollution Sources: urban runoff, agriculture, boat dischargers, sewage overflows
Best Water Quality Areas: Biscayne Bay, Card Sound
Worst Water Quality Areas: canals from Everglades Agricultural Area, N. Fork Middle River, New River, Miami River
Water Quality Trends: stable quality at 23 sites, improvements at fifteen coastal canals, degradation in the Savannas
OFW Waterbodies:
- Everglades National Park
- Biscayne National Park
- Big Cypress National Preserve
- Biscayne Bay State Aquatic Preserve
- Loxahatchee National Wildlife Refuge
- Loxahatchee River State Aquatic Preserve
- Rotenberger Tract (CARL Project)
- Savannas State Reserve
- Northwest Fork of the Loxahatchee River

SWIM Waterbodies:
- Lake Okeechobee
- Everglades National Park/Florida Bay
- Everglades Water Conservation Areas
- Biscayne Bay
- Savannas State Reserve

Reference Reports:
- Bessey Creek and the Greater St. Lucie River, Estuary, DEP (PSL), 1993
- Broward County Annual Report, Broward County, 1986
- Benthic Macroinvertebrates in Lake Worth, Deis, Walesky, and Rudolph, 1983
- Manatee Pocket and Willoughby Creek Survey, DEP (Port St. Lucie), 1988
- Savannas BAS, DEP (Southeast), 1985
- An Assessment of Water Quality and Sources of Pollution in the New River Basin, Broward County, 1991, 1992
- A Macroinvertebrate and Water Quality Study of the Freshwater Portion of the Northwest Fork of the Loxahatchee River in Palm Beach and Martin Counties, DEP (Port St. Lucie), 1990

Macroinvertebrates Associated with Macrophytes in Lake Okeechobee, Florida, Biological Basin Assessment Survey, DEP (Port St. Lucie), 1990
Savannas Study, Biological Sampling Results, DEP (Port St. Lucie), 1989
North Fork of the St. Lucie River Macroinvertebrate Survey in February and August 1986, with a Comparison to Previous Macroinvertebrate Surveys, a Biological Basin Assessment Survey, DEP (Port St. Lucie),

1990
Basin Water Quality Experts:
Joe King, Broward County, 305/765-4900
Tom Fontaine, Ken Todd, Anthony Waterhouse, SFWMD, 407/686-8800
Greg Graves (PSL) 407-871-7662
Susan Markley, Dade DERM, 305/375-3376
Dorian Valdeo, Dade DERM, 305/372-6888

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In the News

* A federal judge signed a settlement agreement on the cleanup of Everglades pollution, signaling the end of a 3 1/2 year old lawsuit. Requirements of a preliminary mediated settlement agreement included in the Everglades Forever Act have replaced the federal settlement agreement which ended the federal lawsuit. Algal blooms occurring in Florida Bay and the continuing environmental deterioration of the bay are major current concerns. The Everglades Forever Act requires the SFWMD to develop and implement an emergency interim plan to deliver up to 800 cfs of fresh water to Florida Bay.
* A proposal by the EPA and Corps of Engineers which designates 24 square miles of Broward County as unsuitable for development goes to public hearing.
* Health advisories recommending no consumption of largemouth bass due to mercury content have been issued for Water Conservation Areas 2a, 3a portions of Everglades National Park, and the Savannas and for limited consumption in Water Conservation Area 1, and portions of Everglades National Park.
* An illegal dump containing tires, corroded batteries and diesel fuel was uncovered near the Everglades Park boundary near Interstate Highway 75 and U.S. Highway 27. A construction company under contract with DOT is being investigated and officials fear they may uncover more illegal dump sites.
* Studies by Broward County's Office of Natural Resource Protection found unusually high levels of metals in muck and high bacteria counts in waters from the New River.
* Twenty EPA listed Superfund Sites are located within the area identified. Approximately 50 more hazardous waste sites are subject to assessment and remediation with the State of Florida as the lead agency. The sites consist of heavy metal, solvent, pesticide/herbicide contamination. These sites will mostly affect groundwater, however, all have the potential to affect surface waters. In addition, approximately 5150 petroleum contaminated sites are located in Dade, Broward, Palm Beach, Okeechobee and St. Lucie Counties. Approximately 10,000 regulated petroleum facilities are located in the counties identified.
* In Dade, Broward and Palm Beach Counties, ten major public wellfields have shown contamination in public/private drinking water supply wells, including the City of Riviera Beach, the City of Delray Beach, the City of Hallandale, the Peele-Dixie Wellfield-City of Fort Lauderdale, the City of Dania, the City of Deerfield Beach, the City of North Miami Beach, the Miami Springs/Preston Wellfields, and the Fort Lauderdale Executive Airport Wellfield.
* Major petroleum assessments/cleanups are in progress at Port Everglades, Miami

International Airport and Homestead Air Force Base, among others.

* Miami International Airport has been a recent focus for the Southeast District. Contamination related to fuel handing (pipelines, storage tanks and stormwater), aircraft maintenance and former Department of Defense facilities are all under review. A Consent Order is in preparation. between DEP, the Metropolitan Dade County Environmental Resources Management and the Dade County Aviation Department.
* Several major Class I Solid Waste Disposal Facilities are located along major canal systems, including the North Dade Landfill, the South Dade Landfill, Lantana Landfill, Resources Recovery of Dade, Munisport Landfill, Martin County Landfill, and Glades Road Landfill. All have the potential to affect surface waters.

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Ecological Characterization

This basin covers 8,000 square miles, an area twice as large as the next smaller basin, the Upper St. Johns River basin. It includes the southeastern coast of Florida, from Ft. Pierce to south of Homestead, the Lake Okeechobee drainage canals (those which drain to the Atlantic Ocean), water conservation areas, and a portion of the Everglades including Cape Sable on the southwestern tip of Florida. This basin area is so large because, in its natural state, the drainage was a vast continuous wetland with a slow sheet flow of water from Lake Okeechobee south to Florida Bay. The net elevational change over the 130 miles north to south is only about 15 feet, an average of about 1 inch per mile. Throughout this basin any small changes in elevation can result in vast differences in vegetation and habitat. The native, predominantly sawgrass plain is dotted with cypress domes and hardwood hammocks, depending on elevation.

The basin has been extensively modified from its natural state. Southeastern Florida is criss-crossed by literally thousands of miles of canals and levees used to control and manage water resources, all of which have been constructed in the last century. Controls are centered around Lake Okeechobee, often referred to as the hub of this water management system. The remainder of the system includes five major canals that radiate out from Lake Okeechobee to the Atlantic, and one major waterway, the Caloosahatchee River, to the Gulf. The southeastern canals are the Miami Canal, North New River Canal, Hillsboro Canal, West Palm Beach Canal and St. Lucie Canal. A sixth major canal, the Tamiami Canal stretching across the middle of the basin, serves as the primary drainage for the Everglades and the lower southeastern coast. Control structures at all the major junctions of these canals allow water quantity management throughout the system. Water quantity is managed for flood control and water supply for agricultural activities, aquifer recharge, drinking water, and delivery to Everglades National Park.

Land use can be broken into four major categories. The eastern ridge from Ft. Pierce to Homestead is a more or less solid band of urban development from 5 to 15 miles inland. This band is bordered on the west by a thin band of agricultural and/or citrus operations (the northernmost coast is more citrus than urban). This urban/citrus band covers about one-fourth of the basin. An area south and east of Lake Okeechobee, about an eighth of the basin, is known as the Everglades Agricultural Area (EAA) where intensive cultivation of mostly sugar cane and row crops occur. Another sizable row cropping operation occurs near Homestead. Another area, roughly the size of the EAA in this basin is the Everglades National Park, a vast sawgrass wetland. In between the EAA and the Park and making up most of the rest of the basin (about 1/3-1/2) are the Water Conservation Areas. These sawgrass and cattail wetlands are maintained as a water quantity buffer for all the various needs within the basin, and as a water quality buffer for the Park.

This basin has several waterbodies with special designations, including the only two recommended Outstanding National Resource Waters: Everglades National Park and Biscayne National Park. These are pending legislative ratification.

Anthropogenic Impacts

This basin is extremely difficult to analyze in the same manner as the other Florida basins for several reasons. First is its size. Second, most of the reaches are manmade canals with controlled flow regimes. Third, some of the reaches in this basin are too large (up to 60 miles), resulting in the loss of information on local water quality problems. The result is that this basin assessment relies more heavily on the professional judgment offered in reports and by DEP district and county agency personnel than on the calculated water quality index values.

Before giving an area-by-area description of water quality, some basin-wide generalizations can be made. The eastern coast area is heavily urbanized and the major pollution source in these urban areas is stormwater. Most WWTPs either use deep well injection or ocean outfalls, but where they do discharge to surface waters, there are usually water quality problems. The western portions of the basin, particularly south of Lake Okeechobee, are affected by intensive agricultural development. In the southern portion of the basin, between the agricultural areas and the urban areas, are vast diked wetlands which are Water Conservation Areas for aquifer recharge. Although the Conservation Areas absorb some of the nutrient load, the canals' water quality depends heavily on water quantity (inverse relationship).

The extensive channelization that has occurred has exacerbated water quality problems. A frequent problem is low DO with resultant fish kills. There has been a great deal of controversy about the impact of agricultural activities on the water quality in Lake Okeechobee, the canals, the Conservation Areas and the Everglades National Park. The native sawgrass community in these wetlands of the conservation areas and the park is beginning to be replaced by cattails. This shift in the predominant vegetation and its threat to the Everglades National Park has caused real concern. A federal lawsuit was filed against state and regional environmental agencies for allowing poor quality water to enter federally protected waters. A settlement was reached in that lawsuit in February, 1992. To date, DEP has identified four major violations of Class III criteria caused by nutrient enrichment. These include imbalances of aquatic flora and fauna, dominance of nuisance species, biological integrity, and dissolved oxygen.

The water quality in the northeastern portion of the basin is relatively good. The major problems are near Port St. Lucie. Fivemile and Tenmile Creeks, which receive runoff from citrus groves, exhibit poor water quality with high levels of pesticides. These pesticides are suspected to adversely impact the North Fork and St. Lucie estuary. DEP plans to conduct an investigative study. The North Fork of the St. Lucie River improves downstream of the confluence of Fivemile and Tenmile creeks, but is still affected along with the main stem by runoff from construction sites and urban development along the river in Port St. Lucie. Manatee Pocket, a small port area on the St. Lucie River estuary, has very poor water quality and a severely depressed biological community in its southern reaches, but improves near the inlet where circulation is better. The Savannas State Preserve, a 15 mile long area of fresh water marsh located between Ft. Pierce and Stuart, has fairly good water quality, but has other environmental problems. Concentrations of mercury in fish tissue were high enough to warrant a no consumption advisory for largemouth bass. Also, uncontrolled stormwater runoff may be adversely affecting water quality, plant communities and biota. A study is underway to assess the extent of the problem.

The Loxahatchee basin was evaluated in a district basin assessment. Good to fair water quality was generally found throughout the area. Problem areas included a small section of the North Fork of the

Loxahatchee River which has low DO concentrations and waters in Jonathon Dickinson State Park which had high coliform counts. The estuarine portion of the Loxahatchee River has had a dramatic decline in seagrass beds in the last decade. Jupiter Sound has good water quality and a healthy biological community.

The L-8, West Palm Beach, Hillsboro, North New River and Miami Canals from Lake Okeechobee to the L4-L7 canals, which roughly delimit the EAA, exhibit poor water quality with extremely high nutrients and low DO values. Pesticides, BOD, bacteria and suspended solids have also been identified as problems. Agricultural runoff and the overflow or seepage from sugar mill retention ponds provide the pollutant loading to these canals. In addition, between the L-8 and West Palm Beach Canals, sludge spreading operations may further impact these waterways. The West Palm Beach canal periodically exhibited a toxicity problem with fish kills occurring after heavy rains drain from the Chemair Spray hazardous waste site. Canals bordering conservation areas generally have very low DO concentrations typical of marsh waters. Nutrient levels at the perimeter of the marsh are somewhat elevated, probably due to detritus breakdown as well as the agricultural drainage.

Further to the east the North New River Canal joins the South Fork of the New River near Ft. Lauderdale and the Miami Canal joins the Miami River near Miami. Both rivers are located in heavily urbanized areas and have been channelized and bulkheaded.

The New River receives discharges from improperly functioning septic tanks, vessels, industrial activities and stormwater runoff. A preliminary assessment by Broward County's Office of Natural Resource Assessment identified two sections of the river that show nutrient enrichment and potentially high coliform bacteria counts from septic tank discharges. Areas of the river which have vessel sewage discharges have been linked to high fecal coliform counts. Metal enrichment in sediment has been found for tin, copper, zinc, and chromium at all marina sites.

The most serious problems confronting the Miami River are chronic and acute coliform bacteria contamination and enrichment of sediments with heavy metals and organic pollutants. Median levels of total coliform bacteria during the past five years exceeded 1500/100 ml at eight stations on the river. Sampling of stormwater sewers during dry season frequently gave counts of over 100,000 coliform bacteria/100 ml. Acute contamination is the result of raw sewage discharge from either emergency overflows or manholes when flow conditions exceed pump station capacity. This occurs as a consequence of mechanical failure or inflow of large quantities of stormwater or ground water into the sewer system. The chronic contamination that has been occurring is the result of illegal sewer connections to stormwater pipes, leaking pipes and joints, and broken pipes.

The bacteria problems of the Miami River and its impact on Biscayne Bay have been a concern since the 1940's. One additional problem that has plagued the river has been a lack of coordinated authority. As many as 30 agencies exercise some degree of authority over the river or activities that affect the quality of the river. In response to this problem, in 1984 then-Governor Bob Graham established the Miami River Management Committee. The mission of this committee was to develop a coordinated plan for improving the river. Through the efforts of this committee and its successor, the Miami River Coordinating Committee, local governments, and the Florida Legislature in 1986 provided funding specifically for the restoration of the river. These funds were used by state agencies and Metro-Dade Department of Environmental Resources Management (DERM) for the following projects: stormwater outfall improvement project, establishment of a state-local pollution control enforcement program, pollution control enforcement and monitoring, and ranking of drainage basins for retrofitting. DERM has recently been involved in surface water monitoring, dye studies, and televising selected storm and sewer pipes to locate sources of bacterial contamination. An additional problem that DERM faces is the heavy use of the river by ship traffic. City and county ordinances prohibit discharge of untreated waste from vessels, but enforcement is very difficult. The second problem facing the Miami River is heavy metal, pesticides, and organic pollutant enrichment of sediments. Metals enrichment is among the highest in Florida. Sources of contaminants are urban stormwater runoff, domestic and industrial waste discharges, and bioacid used on vessels.

A controversial issue involving the Miami River is the proposed dredging of sediments by the U.S. Army Corps of Engineers. The purpose for dredging would be to improve navigation. At the heart of the issue is the location of a disposal site. Originally, spoil was to dumped at an ocean disposal site 3.6 miles offshore. Recent data indicates the sediments are not suitable for ocean disposal. Between West Palm Beach and Ft. Lauderdale, the four parallel north-south canals, E-1, E-2, E-3, and E-4 are all of fair quality except the westernmost which is poor from agricultural runoff. The other three are more directly affected by urban stormwater. The Earman River (or C-17) has historically been degraded by WWTP discharge; however, the discharge has been reduced and should be eliminated soon, and nitrogen levels in the canal are improving. Lake Worth, which is really a coastal estuarine lagoon, has good water quality near the inlet and is mostly good north of the inlet; however, water quality degrades south of the inlet especially where the West Palm Beach canal enters. Water quality improves again at the South Lake Worth inlet and near Boca Raton inlet.

The Ft. Lauderdale area seems to be particularly plagued with water quality problems due to urban runoff and from historical WWTP discharge. Frequently the westernmost stations on the canals have the worst water quality, again from agricultural sources. Canals throughout the area are frequently choked with weeds and require mechanical removal or herbicide treatment. A DEP study of major Dade County canals in 1985 showed poor water quality conditions, low biological diversity and many exotic plants and animals.

Biscayne Bay is affected by canal discharge and port activity but has fairly good water quality because of flushing from the Atlantic Ocean, especially south of Key Biscayne. A potentially threatening problem is increased turbidity caused by resuspension of spoil from the bay bottom. Much of the bay is blanketed with seagrasses which are associated with high biological quality. Boat traffic and shoreline development and pollutants from the Miami River threaten the bay.

Some areas in Florida Bay have experienced a massive seagrass and mangrove die-off. Researchers estimate 9,880 acres of grass have died and another 66,690 acres have been impacted to a lesser extent. Three years of investigation has all but ruled out direct anthropogenic impacts. The most probable reasons are lack of flushing from hurricanes, high water temperature, and high water salinity. Diversion of water into canals has reduced freshwater inflow. Salinity of bay water has been recorded as high as 70 ppt. Mercury contamination in seatrout collected from Florida Bay may indicate a need for concern.

Following the 1992 federal lawsuit settlement, agricultural interests filed legal challenges to the SWIM Plan and State permits intended to implement the settlement. After failure of mediation attempts to achieve a new settlement which included the agricultural interests, the Florida Legislature passed the Everglades Forever Act which included the latest preliminary mediated plan. Very high nitrogen concentrations have been measured in some of the canals which flow into Biscayne Bay from the agricultural area of southeast Dade County.

** USGS HYDROLOGIC UNIT: 03090202 SOUTHEAST FLORIDA COAST

SURFACE WATER QUALITY DATA FOR 1970-1993
MEDIAN VALUES FOR EACH WATERSHED
CURRENT PERIOD OF RECORD (1989-1993) USED WHERE AVAILABLE
PERIOD PRIOR TO 1989 IS EVALUATED AS HISTORICAL INFORMATION

INDEX	GOOD	FAIR	POOR
WQI-RIVER	0-44	45-59	60-90
TSI-ESTUARY	0-49	50-59	60-100
TSI-LAKE	0-59	60-69	70-100

WATERSHED ID	WATERSHED NAME	WATERSHED DATA RECORD MAX #OBS	BEG YR	END YR	DATA PERIOD	WATER CLARITY TURB	SD	COLOR	TSS	DISSOLVED OXYGEN DO	DOSAT	OXYGEN DEMAND BOD	COD	TOC	PH ALKALINITY PH	ALK	TROPHIC STATUS NITRO	PHOS	CHLA	COLIFORM TOTAL	FECL	BIOLOGICAL SPECIES DIVERSITY NAT	ART	BECK	COND	FLOW	WATER QUALITY INDICES WQI	TSI
* WATER BODY TYPE: ESTUARY																												
46	INTERCOASTAL	0	89	93	Current	2.2	1.6	23	8	6.4	74	0.9	.	.	7.6	118	0.55	0.04	2	20	13	.	.	.	45525	.	.	42
47	SOUTH INDIAN RIVER	0	89	94	Current	1.2	1.6	43	2	4.6	52	0.8	.	.	7.2	157	0.89	0.04	6	626	60	.	.	.	606	.	.	49
52	TIDAL ST.LUCIE	0	89	93	Current	4.2	0.9	60	7	6.2	63	4.6	.	.	7.4	143	1.03	0.14	4	780	100	.	.	.	1220	.	.	61
53	SOUTH COASTAL	0	89	92	Current	4.2	7.4	21	31	5.9	68	6.0	.	.	7.6	.	0.47	0.07	5	.	.	.	.	.	48150	.	.	39
* WATER BODY TYPE: STREAM																												
1	C-111	0	89	93	Current	1.8	1.3	27	1	4.9	57	.	.	.	7.1	.	0.96	0.01	.	.	.	.	.	.	593	.	33	.
2	BISCAYNE BAY	0	0	0	Current								.	.								.	.	.			24	.
3	FLORIDA CITY	0	89	92	Current	2.3	.	63	2	3.7	50	.	.	.	7.0	.	1.46	0.02	.	.	.	.	.	.	754	.	44	.
4	C-102	0	89	90	Current	1.8	2.5	4	.	6.0	69	.	.	.	7.0	.	3.61	0.00	.	255	101	.	.	.	664	.	33	.
5	C-1	0	89	93	Current	1.5	3.0	.	.	5.3	62	.	.	.	7.3	196	0.43	0.02	3	.	.	.	.	.	511	.	24	.
6	C-100	0	89	93	Current	2.0	3.0	.	.	7.7	91	.	.	.	7.3	195	0.42	0.02	3	.	.	.	.	.	1371	.	12	.
7	TAMIAMI EAST	0	89	90	Current	2.0	1.7	28	.	5.0	59	.	.	.	7.4	.	0.94	0.02	.	.	144	.	.	.	582	.	33	.
8	AREA B	0	89	90	Current	2.0	1.5	53	.	2.8	33	.	.	.	7.0	.	1.23	0.02	.	.	33	.	.	.	729	.	39	.
9	CONSERVATION AREA 3B	0	89	93	Current	2.0	.	65	2	3.2	39	.	.	.	7.0	.	1.65	0.02	.	.	.	.	.	.	747	.	46	.
10	C-6	0	89	90	Current	51.7	1.0	41	.	1.8	22	.	.	.	7.2	.	1.73	0.07	.	.	143	.	.	.	606	.	61	.
11	C-7	0	89	90	Current	1.6	1.9	50	.	2.7	31	.	.	.	7.1	.	1.57	0.04	.	.	285	.	.	.	673	.	54	.
12	C-8	0	89	90	Current	1.1	2.0	50	.	6.1	70	.	.	.	7.4	.	1.25	0.03	.	.	90	.	.	.	526	.	34	.
13	C-9 WEST	0	89	92	Current	1.6	2.1	63	.	1.8	21	.	.	.	7.0	.	1.67	0.02	.	160	14	.	.	.	792	.	40	.
14	C-9 EAST	0	89	90	Current	1.6	2.3	43	.	5.8	68	.	.	.	7.3	.	1.33	0.02	.	.	615	.	.	.	630	.	34	.
15	C-10	0	89	89	Current	3.0	1.5	30	.	4.0	51	.	.	.	7.1	.	0.68	0.05	.	.	190	.	.	.	23600	.	48	.
16	CONSERVATION AREA 3A	0	89	93	Current	1.5	.	65	2	4.1	43	.	.	.	7.0	.	1.44	0.02	.	.	.	.	.	.	553	.	43	.
17	C-11 WEST	0	89	89	Current	3.3	1.5	60	.	4.0	49	.	.	.	7.2	.	1.50	0.03	.	.	60	.	.	.	745	.	50	.
20	NORTH NEW RIVER	0	89	90	Current	3.2	1.2	51	.	4.5	54	.	.	.	7.4	.	1.37	0.04	.	213	38	.	.	.	8647	.	40	.
21	C-12	0	89	89	Current	2.9	0.7	50	.	4.7	58	.	.	.	7.1	.	1.23	0.09	.	.	95	.	.	.	2661	.	46	.
22	L-28 GAP	0	89	92	Current	2.2	.	80	3	5.6	54	.	.	.	7.2	.	1.11	0.06	.	.	.	.	.	.	575	.	37	.
24	CONSERVATION AREA 2B	0	89	92	Current	2.4	1.4	60	4	4.1	44	.	.	.	7.2	.	1.65	0.03	.	.	30	.	.	.	870	.	43	.
25	C-13 EAST	0	89	89	Current	2.9	1.7	15	.	4.5	57	.	.	.	7.4	.	0.45	0.06	.	.	80	.	.	.	39500	.	42	.
26	C-13 WEST	0	89	89	Current	3.7	1.1	50	.	4.0	50	.	.	.	7.2	.	1.30	0.02	.	.	5	.	.	.	700	.	36	.
27	POMPANO CANAL	0	89	89	Current	4.1	1.2	50	.	5.3	63	.	.	.	7.6	.	1.02	0.27	.	.	290	.	.	.	650	.	55	.
28	C-14	0	89	91	Current	2.5	1.4	43	1	5.7	67	.	.	.	7.2	.	1.30	0.03	.	3279	43	.	.	.	633	.	30	.
29	L-28 INTERCEPTOR	0	89	92	Current	3.3	.	80	5	5.3	52	.	.	.	7.2	.	1.43	0.06	.	.	.	.	.	.	529	.	46	.
30	CONSERVATION AREA 2A	0	89	92	Current	2.2	.	106	5	3.3	38	.	.	.	7.0	.	2.09	0.04	.	678	51	.	.	.	840	.	52	.
31	HILLSBORO CANAL	0	89	93	Current	3.0	1.4	68	.	5.1	61	1.6	.	.	7.3	199	1.44	0.09	.	300	40	.	.	.	571	.	40	.
32	S-7	0	89	92	Current	4.9	.	95	.	2.5	.	.	.	.	6.7	.	2.40	0.03	.	.	.	.	.	.	1077	.	55	.
33	S-8	0	89	92	Current	2.3	.	100	2	5.8	65	.	.	.	7.0	.	2.55	0.03	.	.	.	.	.	.	604	.	54	.
34	C-15	0	89	92	Current	2.6	1.1	78	10	6.1	72	2.0	.	.	7.2	192	1.37	0.10	.	555	66	.	.	.	452	.	43	.
35	CONSERVATION AREA 1	0	89	93	Current	5.7	0.6	161	7	2.7	29	.	.	.	6.8	.	3.58	0.15	.	.	.	.	.	.	1025	.	76	.
36	C-139	0	92	92	Current	8.5	0.6	38	10	8.9	103	.	.	.	8.3	.	1.28	0.07	30	.	.	.	.	.	495	.	39	.
37	S-6	0	89	93	Current	4.8	.	118	4	4.0	36	.	.	.	6.9	.	2.82	0.08	.	.	.	.	.	.	1183	.	69	.

LEGEND:
ALK-ALKALINITY MG/L
ART-ARTIFICIAL SUBSTRATE DI
BEG YR-BEGINNING SAMPLING YEAR
BECK-BECK'S BIOTIC INDEX
BOD-BIOCHEMICAL OXYGEN DEMAND MG/L
CHLA-CHLOROPHYLL UG/L
COD-CHEMICAL OXYGEN DEMAND MG/L
COLOR-COLOR PCU
COND-CONDUCTIVITY UMHOS
DO-DISSOLVED OXYGEN MG/L
DOSAT-DO % SATURATION
END YR-ENDING YEAR
FECL-FECAL COLIFORM MPN/100ML
FLOW-FLOW CFS
MAX #OBS-MAXIMUM NUMBER OF SAMPLES
NAT-NATURAL SUBSTRATE DIVERSITY
NITRO-TOTAL NITROGEN MG/L
PH-PH STANDARD UNITS
PHOS-TOTAL PHOSPHORUS MG/L
SD-SECCHI DISC METERS
TOC-TOTAL ORGANIC CARBON MG/L
TOTAL-TOTAL COLIFORM MPN/100ML
TSI-TROPHIC STATE INDEX
TSS-TOTAL SUSPENDED SOLIDS MG/L
TURB-TURBIDITY MG/L
WQI-WATER QUALITY INDEX

** USGS HYDROLOGIC UNIT: 03090202 SOUTHEAST FLORIDA COAST

SURFACE WATER QUALITY DATA FOR 1970-1993
MEDIAN VALUES FOR EACH WATERSHED
CURRENT PERIOD OF RECORD (1989-1993) USED WHERE AVAILABLE
PERIOD PRIOR TO 1989 IS EVALUATED AS HISTORICAL INFORMATION

INDEX	GOOD	FAIR	POOR
WQI-RIVER	0-44	45-59	60-90
TSI-ESTUARY	0-49	50-59	60-100
TSI-LAKE	0-59	60-69	70-100

WATERSHED		WATERSHED DATA RECORD				WATER CLARITY				DISSOLVED OXYGEN		OXYGEN DEMAND			PH ALKALINITY		TROPHIC STATUS			COLIFORM		BIOLOGICAL SPECIES DIVERSITY			COND	FLOW	WATER QUALITY INDICES	
ID	NAME	MAX #OBS	BEG YR	END YR	DATA PERIOD	TURB	SD	COLOR	TSS	DO	DOSAT	BOD	COD	TOC	PH	ALK	NITRO	PHOS	CHLA	TOTAL	FECL	NAT	ART	BECK	COND	FLOW	WQI	TSI
38	C-16	0	89	92	Current	3.6	1.1	74	3	6.8	82	2.1	.	.	7.2	142	1.52	0.14	.	585	65	.	.	.	487	.	41	.
39	S-2	0	89	92	Current	4.2	0.8	136	.	3.2	52	.	.	.	6.9	.	3.22	0.13	.	176	13	.	.	.	1238	.	67	.
40	S-3	0	91	91	Current	.	.	.	.	2.9	.	.	.	.	6.9	.	.	0.14	.	.	.	.	.	.	1010	.	75	.
41	C-51	0	89	93	Current	3.7	1.2	95	4	5.3	67	1.8	.	.	7.2	135	1.73	0.06	3	560	105	.	.	.	600	.	42	.
42	S-5A	0	89	92	Current	13.5	.	295	.	3.1	54	.	.	.	6.7	.	11.05	0.23	.	39	10	.	.	.	1509	.	78	.
43	C-17	0	89	92	Current	3.9	.	49	5	6.6	78	1.8	.	.	6.9	146	1.59	0.07	.	295	68	.	.	.	449	.	41	.
44	C-18	0	89	93	Current	1.6	1.6	54	2	5.6	59	1.2	.	.	7.2	.	0.83	0.03	7	330	60	.	.	.	448	.	32	.
45	L-8	0	91	91	Current	.	.	.	.	3.6	.	.	.	.	7.0	.	.	0.16	.	.	.	.	.	.	1623	.	74	.
49	JONATHAN DICKINSON	0	89	94	Current	2.5	1.0	273	4	5.3	61	1.2	.	.	7.6	19	0.82	0.05	.	67	75	.	.	.	9190	.	35	.
50	C-44	0	89	90	Current	4.6	0.9	49	4	6.3	74	.	.	.	7.2	.	1.03	0.08	.	.	.	.	.	.	863	.	36	.
51	BASIN 2	0	92	92	Current	4.4	1.2	30	40	5.7	68	6.4	.	.	7.6	.	0.43	0.02	3	.	.	.	.	.	51500	.	54	.
54	BASIN 4	0	92	92	Current	5.2	0.9	150	4	3.5	42	7.2	.	.	7.1	.	0.70	0.07	6	.	80	.	.	.	530	.	58	.
55	C-24	0	89	92	Current	3.3	0.9	100	29	2.7	33	8.4	.	.	7.0	.	1.20	0.17	23	.	43	.	.	.	1709	.	63	.
56	NORTH ST.LUCIE	0	89	93	Current	4.3	1.1	69	24	6.0	68	7.0	.	.	7.0	58	1.00	0.14	12	99	44	.	.	.	5981	.	47	.

LEGEND:
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TOC-TOTAL ORGANIC CARBON MG/L
TOTAL-TOTAL COLIFORM MPN/100ML
TSI-TROPHIC STATE INDEX
TSS-TOTAL SUSPENDED SOLIDS MG/L
TURB-TURBIDITY MG/L
WQI-WATER QUALITY INDEX

SURFACE WATER QUALITY DATA SCREENING REPORT
MEDIAN VALUES FOR EACH WATERSHED SCREENED

** USGS HYDROLOGIC UNIT: 03090202 SOUTHEAST FLORIDA COAST

'x'=EXCEEDS SCREENING CRITERIA
'0'=WITHIN SCREENING CRITERIA
'.'=MISSING DATA

SCREENING VARIABLES AND CRITERIA

WATERSHED ID	NAME	RANK WQI OR TSI	DATA RECORD CURRENT OR HISTORICAL	TN	STREAM TP	LAKE TP	PH	ALK	TURB & TSS	COND	OXYGEN DEMAND	DO	COLIFORM BACTI	BIOL DIV	CHLA	SECCHI DISC
				TN>2.0	TP>.46	TP>.12	PH>8.8 PH<5.2	ALK<20	TURB>16.5 TSS>18	COND>1275	BOD>3.3 COD>102 TOC>27.5	DO<4	TOT>3700 FECAL>470	DIART<1.95 DINAT<1.5 BECK<5.5	CHLA>40	SD<.7
* WATER BODY TYPE: ESTUARY																
46	INTERCOASTAL	GOOD	Current	0	.	0	0	0	0	x	0	0	0	.	0	0
47	SOUTH INDIAN RIVER	GOOD	Current	0	.	0	0	0	0	0	0	0	0	.	0	0
52	TIDAL ST.LUCIE	POOR	Current	0	.	x	0	0	0	0	x	0	0	.	0	0
53	SOUTH COASTAL	GOOD	Current	0	.	0	0	.	x	x	x	0	.	.	0	0
* WATER BODY TYPE: STREAM																
1	C-111	GOOD	Current	0	0	.	0	.	0	.	.	0	.	.	.	0
2	BISCAYNE BAY	GOOD	Current	0		.		0		.	.		.	.	0	0
3	FLORIDA CITY	GOOD	Current	0	0	.	0	.	0	.	.	x	.	.	.	.
4	C-102	GOOD	Current	x	0	.	0	.	0	.	.	0	0	.	.	0
5	C-1	GOOD	Current	0	0	.	0	0	0	.	.	0	.	.	0	0
6	C-100	GOOD	Current	0	0	.	0	0	0	x	.	0	.	.	0	0
7	TAMIAMI EAST	GOOD	Current	0	0	.	0	.	0	.	.	0	0	.	.	0
8	AREA B	GOOD	Current	0	0	.	0	.	0	.	.	x	0	.	.	0
9	CONSERVATION AREA 3B	FAIR	Current	0	0	.	0	.	0	.	.	x	.	.	.	.
10	C-6	POOR	Current	0	0	.	0	.	x	.	.	x	0	.	.	0
11	C-7	FAIR	Current	0	0	.	0	.	0	.	.	x	0	.	.	0
12	C-8	GOOD	Current	0	0	.	0	.	0	.	.	0	0	.	.	0
13	C-9 WEST	GOOD	Current	0	0	.	0	.	0	.	.	x	0	.	.	0
14	C-9 EAST	GOOD	Current	0	0	.	0	.	0	.	.	0	x	.	.	0
15	C-10	FAIR	Current	0	0	.	0	.	0	x	.	0	0	.	.	0
16	CONSERVATION AREA 3A	GOOD	Current	0	0	.	0	.	0	.	.	0	.	.	.	.
17	C-11 WEST	FAIR	Current	0	0	.	0	.	0	.	.	0	0	.	.	0
20	NORTH NEW RIVER	GOOD	Current	0	0	.	0	.	0	x	.	0	0	.	.	0
21	C-12	FAIR	Current	0	0	.	0	.	0	x	.	0	0	.	.	0
22	L-28 GAP	GOOD	Current	0	0	.	0	.	0	.	.	0	.	.	.	.
24	CONSERVATION AREA 2B	FAIR	Current	0	0	.	0	.	0	.	.	0	0	.	.	0
25	C-13 EAST	GOOD	Current	0	0	.	0	.	0	x	.	0	0	.	.	0
26	C-13 WEST	GOOD	Current	0	0	.	0	.	0	.	.	0	0	.	.	0
27	POMPANO CANAL	FAIR	Current	0	0	.	0	.	0	.	.	0	0	.	.	0
28	C-14	FAIR	Current	0	0	.	0	.	0	.	.	0	0	.	.	0
29	L-28 INTERCEPTOR	FAIR	Current	0	0	.	0	.	0	.	.	0	.	.	.	.
30	CONSERVATION AREA 2A	FAIR	Current	x	0	.	0	.	0	0	.	x	0	.	.	.
31	HILLSBORO CANAL	GOOD	Current	0	0	.	0	0	0	0	0	0	0	.	.	0
32	S-7	FAIR	Current	x	0	.	0	.	0	.	.	x	.	.	.	.
33	S-8	FAIR	Current	x	0	.	0	.	0	.	.	0	.	.	.	.
34	C-15	GOOD	Current	0	0	.	0	0	0	0	0	0	0	.	.	0
35	CONSERVATION AREA 1	POOR	Current	x	0	.	0	.	0	.	.	x	.	.	.	x
36	C-139	GOOD	Current	0	0	.	0	.	0	.	.	0	.	.	0	x
37	S-6	POOR	Current	x	0	.	0	.	0	.	.	0	.	.	.	.

LEGEND:
ALK-ALKALINITY
BECK-BECK'S BIOTIC INDEX
BIOL DIV-BIOLOGICAL DIVERSITY
CHLA-CHLOROPHYLL
COND-CONDUCTIVITY
DO-DISSOLVED OXYGEN
CURRENT-1989 TO 1993
DIART-ARTIFICIAL SUBSTRATE DIVERSITY
DINAT-NATURAL SUBSTRATE DIVERSITY
FECAL-FECAL COLIFORM BACTERIA
HISTORICAL-1970 TO 1988
OXYGEN DEMAND-BOD,COD,TOC
PH-PH
TN-NITROGEN
TP-PHOSPHORUS
TOT-TOTAL COLIFORM BACTERIA
TSS-TOTAL SUSPENDED SOLIDS
TURB-TURBIDITY
SD-SECCHI DISC METERS
WQI OR TSI-WATER QUALITY INDEX RATING WHICH INDEX USED, WQI OR TSI, IS BASED ON WATERBODY TYPE

SURFACE WATER QUALITY DATA SCREENING REPORT ** USGS HYDROLOGIC UNIT: 03090202 SOUTHEAST FLORIDA COAST
MEDIAN VALUES FOR EACH WATERSHED SCREENED

'x'=EXCEEDS SCREENING CRITERIA
'0'=WITHIN SCREENING CRITERIA
'.'=MISSING DATA

				SCREENING VARIABLES AND CRITERIA												
WATERSHED ID	NAME	RANK (WQI OR TSI)	DATA RECORD (CURRENT OR HISTORICAL)	TN	STREAM TP	LAKE TP	PH	ALK	TURB & TSS	COND	OXYGEN DEMAND	DO	COLIFORM BACTI	BIOL DIV	CHLA	SECCHI DISC
				TN>2.0	TP>.46	TP>.12	PH>8.8 PH<5.2	ALK<20	TURB>16.5 TSS>18	COND>1275	BOD>3.3 COD>102 TOC>27.5	DO<4	TOT>3700 FECAL>470	DIART<1.95 DINAT<1.5 BECK<5.5	CHLA>40	SD<.7
38	C-16	GOOD	Current	0	0	.	0	0	0	0	0	0	0	.	.	0
39	S-2	POOR	Current	x	0	.	0	.	0	0	.	x	0	.	.	0
40	S-3	POOR	Current	.	0	.	0	.	.	.	.	x	.	.	.	.
41	C-51	GOOD	Current	0	0	.	0	0	0	0	0	0	0	.	0	0
42	S-5A	POOR	Current	x	0	.	0	.	0	x	.	x	0	.	.	.
43	C-17	GOOD	Current	0	0	.	0	0	0	0	0	0	0	.	.	.
44	C-18	GOOD	Current	0	0	.	0	.	0	0	0	0	0	.	0	0
45	L-8	POOR	Current	.	0	.	0	.	.	x	.	x	.	.	.	.
49	JONATHAN DICKINSON	GOOD	Current	0	0	.	0	x	0	x	0	0	0	.	.	0
50	C-44	GOOD	Current	0	0	.	0	.	0	.	.	0	.	.	.	0
51	BASIN 2	FAIR	Current	0	0	.	0	.	x	x	x	0	.	.	0	0
54	BASIN 4	FAIR	Current	0	0	.	0	.	0	.	x	x	0	.	0	0
55	C-24	POOR	Current	0	0	.	0	.	x	x	x	x	0	.	0	0
56	NORTH ST.LUCIE	FAIR	Current	0	0	.	0	0	x	x	x	0	0	.	0	0

LEGEND:
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FECAL-FECAL COLIFORM BACTERIA
HISTORICAL-1970 TO 1988
OXYGEN DEMAND-BOD,COD,TOC
PH-PH
TN-NITROGEN
TP-PHOSPHORUS
TOT-TOTAL COLIFORM BACTERIA
TSS-TOTAL SUSPENDED SOLIDS
TURB-TURBIDITY
SD-SECCHI DISC METERS
WQI OR TSI-WATER QUALITY INDEX RATING WHICH INDEX USED, WQI OR TSI, IS BASED ON WATERBODY TYPE

SURFACE WATER QUALITY ASSESSMENT REPORT
TRENDS-SOURCES-CLEANUP

** USGS HYDROLOGIC UNIT: 03090202 SOUTHEAST FLORIDA COAST

'x'=DEGRADING TREND
'0'=STABLE TREND
'+'=IMPROVING TREND
'.'=MISSING DATA

1984 - 1993 TRENDS (<--- PLEASE READ THESE COLUMNS VERTICALLY)

WATERSHED ID	NAME	QUALITY RANK: MEETS USE ?	QUALITY RANK: WQI OR TSI	OVER-ALL TREND	WQI or TSI	TN	TP	CHLA	SD	PH	ALK	TURB	TSS	BOD	TOC	DO	DOSAT	TCOLI	FCOLI	TEMP	FLOW	DEGRADATION SOURCES, PRESENT CONDITIONS AND CLEANUP EFFORTS
* WATER BODY TYPE: ESTUARY																						
46	INTERCOASTAL	YES	GOOD	0	0	0	0	.	x	0	.	0	.	.	.	0	0	0	0	x	.	
47	SOUTH INDIAN RIVER	YES	GOOD	0	0	0	x	.	.	0	.	+	.	.	.	0	0	.	0	x	.	
52	TIDAL ST.LUCIE	NO	POOR	+	+	+	0	.	0	x	.	0	0	.	.	0	.	.	.	.	.	
53	SOUTH COASTAL	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
* WATER BODY TYPE: STREAM																						
1	C-111	YES	GOOD	0	0	+	0	.	.	0	.	0	0	.	.	0	.	.	.	.	.	
2	BISCAYNE BAY	YES	GOOD		0								.	.	.			.	.		.	
3	FLORIDA CITY	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
4	C-102	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
5	C-1	YES	GOOD	0	0	0	0	0	+	+	0	0	.	.	.	0	0	.	.	0	.	
6	C-100	YES	GOOD	0	0	0	0	0	.	0	0	0	.	.	.	0	0	.	.	0	.	
7	TAMIAMI EAST	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
8	AREA B	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
9	CONSERVATION AREA 3B	PARTIAL	FAIR	+	+	0	+	.	.	0	.	+	.	.	.	0	.	.	.	.	.	
10	C-6	NO	POOR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
11	C-7	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
12	C-8	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
13	C-9 WEST	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
14	C-9 EAST	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
15	C-10	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
16	CONSERVATION AREA 3A	YES	GOOD	0	0	0	+	.	.	0	.	0	0	.	.	0	.	.	.	.	.	
17	C-11 WEST	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
20	NORTH NEW RIVER	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
21	C-12	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
22	L-28 GAP	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
24	CONSERVATION AREA 2B	YES	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
25	C-13 EAST	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
26	C-13 WEST	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
27	POMPANO CANAL	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
28	C-14	YES	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
29	L-28 INTERCEPTOR	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
30	CONSERVATION AREA 2A	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
31	HILLSBORO CANAL	YES	GOOD	0	0	0	0	.	.	x	0	0	.	.	.	0	0	0	0	0	.	
32	S-7	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
33	S-8	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
34	C-15	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
35	CONSERVATION AREA 1	NO	POOR	0	0	0	0	.	.	0	.	0	0	.	.	x	.	.	.	.	.	
36	C-139	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	

LEGEND:

ALK-ALKALINITY
BOD-BIOCHEM. OXYGEN DEMAND
CHLA-CHLOROPHYLL
DO-DISSOLVED OXYGEN
DOSAT-DO SATURATION
FCOLI-FECAL COLIFORM
FLOW-FLOW
MEETS USE-MEETS DESIGNATED USE
PH-PH
SD-SECCHI DISC METERS
TCOLI-TOTAL COLIFORM
TEMP-TEMPERATURE
TN-NITROGEN
TOC-T.ORGANIC CARBON
TP-PHOSPHORUS
TSS-TOTAL SUSPENDED SOLIDS
TURB-TURBIDITY
TSI-TROPHIC STATE INDEX FOR LAKES AND ESTUARIES
WQI-WATER QULAITY INDEX FOR STREAMS AND SPRINGS

SURFACE WATER QUALITY ASSESSMENT REPORT
TRENDS-SOURCES-CLEANUP

** USGS HYDROLOGIC UNIT: 03090202 SOUTHEAST FLORIDA COAST

'x'=DEGRADING TREND
'0'=STABLE TREND
'+'=IMPROVING TREND
'.'=MISSING DATA

1984 - 1993 TRENDS (<--- PLEASE READ THESE COLUMNS VERTICALLY)

WATERSHED ID	NAME	QUALITY RANK: MEETS USE ?	QUALITY RANK: WQI OR TSI	OVER-ALL TREND	WQI or TSI	TN	TP	CHLA	SD	PH	ALK	TURB	TSS	BOD	TOC	DO	DOSAT	TCOLI	FCOLI	TEMP	FLOW	DEGRADATION SOURCES, PRESENT CONDITIONS AND CLEANUP EFFORTS
37	S-6	NO	POOR	0	0	0	0	.	.	0	.	0	.	.	.	0	.	.	.	.	.	
38	C-16	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
39	S-2	NO	POOR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
40	S-3	NO	POOR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
41	C-51	YES	GOOD	0	0	0	0	0	.	0	0	0	.	.	.	0	0	.	.	x	.	
42	S-5A	NO	POOR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
43	C-17	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
44	C-18	YES	GOOD	0	x	0	0	.	.	0	.	0	.	0	.	0	0	.	0	0	.	
45	L-8	NO	POOR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
49	JONATHAN DICKINSON	YES	GOOD	+	0	0	+	.	.	0	.	+	.	0	.	0	0	.	0	+	.	
50	C-44	YES	GOOD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
51	BASIN 2	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
54	BASIN 4	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
55	C-24	NO	POOR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
56	NORTH ST.LUCIE	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	

LEGEND:

ALK-ALKALINITY
BOD-BIOCHEM. OXYGEN DEMAND
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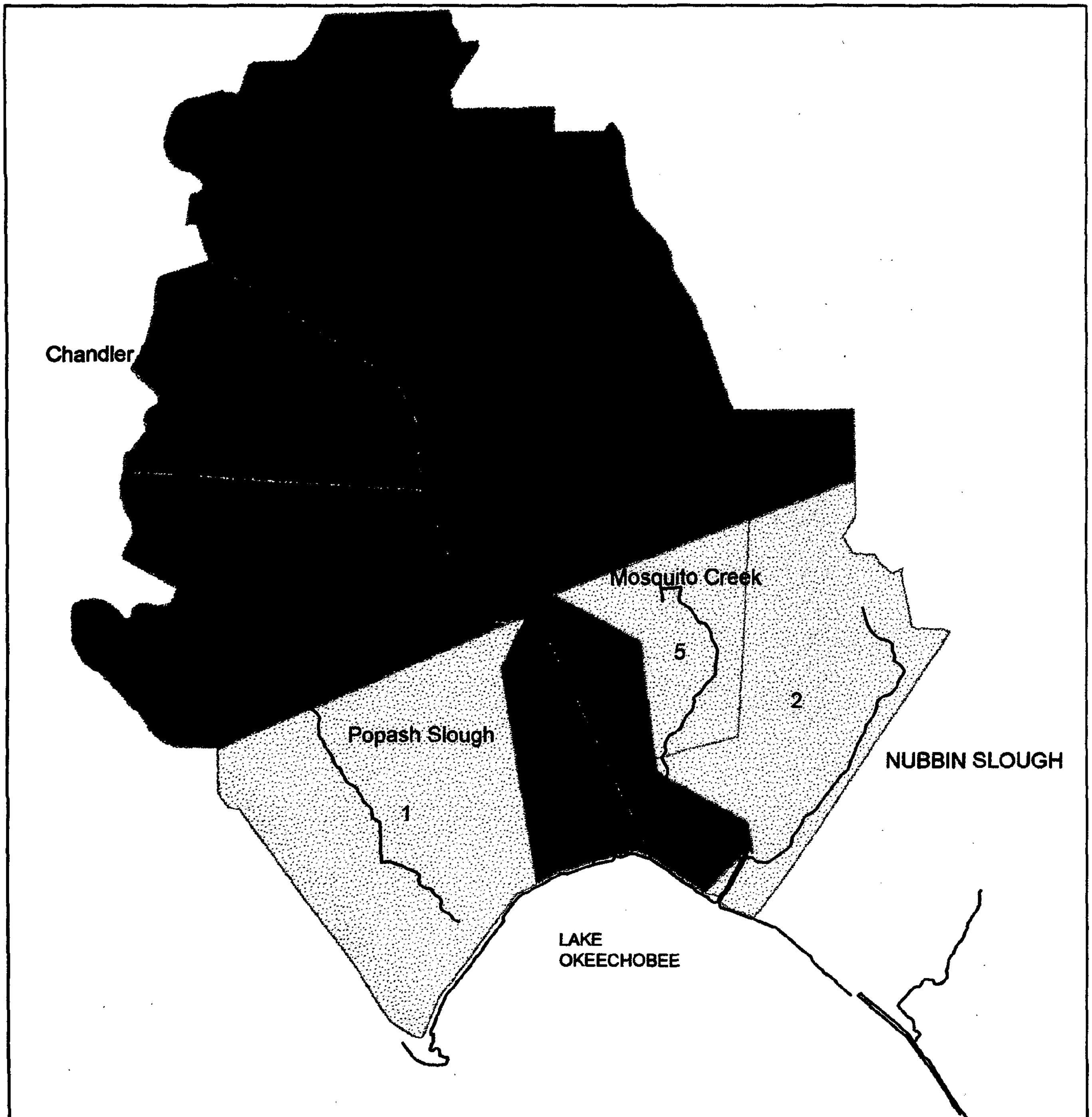
NPS QUALITATIVE SURVEY RESULTS
AN "X" INDICATES A PROBLEM WITH POLLUTANT OR SOURCE
THE * ON MAPID INDICATES NO STORET INFORMATION AVAILABLE FOR THIS WATERSHED
-SEE PAGE 11 FOR LEGEND FOR THIS TABLE-

CATNAME=SOUTHEAST FLORIDA COAST HUC=03090202

MAP_ID	WBID	BASIN	WQ305	WQNPS	NUTRIENT	BACTERIA	SEDIMENT	OIL	PESTICID	OTHERCHS	DEBRIS	OXYGEN	SALINITY	PH	METAL	HABITAT	FLOW	THERMAL	OTHERPOL	FISHKILL	ALGAL	WEED	TURBIDIT	ODOR	FISHDECL	NOSWIM	NOFISH	OTHERSYM	IND	STP	AG	RE	SL	LD	UR	CN	HM	OT
13	3284	C-9 WEST	GOOD	FAIR	X							X	X								X	X												X	X			
14	3283	C-9 EAST	GOOD	FAIR	X							X	X								X	X												X	X			
15	3282	C-10	FAIR	FAIR	X							X	X								X	X												X	X			
16	3268	CONSERVATION AREA 3A	GOOD	THREAT	X		X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X	X				X				X			
17	3279	C-11 WEST	FAIR	THREAT	X	X	X		X			X	X			X				X	X	X	X	X							X			X	X			
18*	3281	C-11 EAST		FAIR	X	X	X		X			X	X			X				X	X	X	X	X							X			X	X			
19*	3280	NORTH NEW RIVER		FAIR	X		X	X	X		X	X	X							X	X	X	X		X	X	X				X							
20	3277	NORTH NEW RIVER	GOOD	FAIR	X	X	X				X	X	X								X	X	X		X	X	X	X			X			X	X	X	X	X
21	3276	C-12	FAIR	FAIR	X	X	X				X	X	X								X	X	X		X	X	X				X			X	X	X		X
23*	3275	L-35A BORROW		FAIR	X							X	X								X	X												X	X			
24	3272	CONSERVATION AREA 2B	GOOD	POOR	X				X			X	X							X		X			X						X							
25	3274	C-13 EAST	GOOD	FAIR	X	X	X					X	X								X	X	X		X									X	X	X		X
26	3273	C-13 WEST	GOOD	FAIR	X							X	X								X	X												X	X			
27	3271	POMPANO CANAL	FAIR	FAIR	X							X	X								X	X												X	X			
28	3270	C-14	GOOD	POOR	X		X		X			X	X																		X			X	X			
30	3265	CONSERVATION ARSA 2A	FAIR	THREAT	X		X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X	X				X				X			
31	3264	HILLSBORO CANAL	GOOD	THREAT	X	X	X	X	X		X	X	X	X		X	X	X		X	X	X	X	X	X	X	X				X			X	X	X	X	
46	3226	INTERCOASTAL	GOOD	FAIR	X	X	X	X	X	X	X	X	X			X	X	X		X	X	X	X	X	X	X	X	X			X			X	X	X	X	X
48*	3232	LOXAHATCHEE RIVER		FAIR	X	X	X	X	X		X									X	X	X	X								X	X		X	X	X	X	X
49	3224	JONATHAN DICKINSON	GOOD	FAIR	X		X	X	X							X				X	X	X	X								X			X	X	X	X	X



TAYLOR-CREEK BASIN
03090102

AVERAGE WATER QUALITY
1984-1993 STORET DATA
WATERSHED ID NUMBERS LINK MAP TO TABLES
* INDICATES QUALITATIVE ASSESSMENT

WATER QUALITY
- GOOD
- THREATENED
- FAIR
- POOR
- UNKNOWN

TAYLOR CREEK BASIN

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Basic Facts

Drainage Area: 282 square miles
Major Land Uses: agriculture, rangeland, improved pasture
Population Density: low (Okeechobee)
Major Pollution Sources: dairy operations and agriculture
Best Water Quality Areas: none
Worst Water Quality Areas: Lettuce Creek, Taylor Creek, Nubbin Slough, Chandler Hammock Slough, Popash Slough
Water Quality Trends: stable quality at 2 sites, Mosquito Creek improving
OFW Waterbodies: none
SWIM Waterbodies: none
Reference Reports:
Florida Rivers Assessment, DEP/FREAC/NPS, 1989
Florida Nonpoint Source Assessment, DEP (Tallahassee), 1988
Basin Water Quality Experts:
Greg Graves, DEP (Port St. Lucie), 407/878-3890
Tom Fontaine, Ken Todd, Anthony Waterhouse, SFWMD, 407/686-8800

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In the News

* As part of the Lake Okeechobee SWIM plan, some dairies are being removed from the basin.
* Other dairies are implementing Best Management Practices (BMP) to comply with the DEP "Dairy Rule".
* A SWIM Plan phosphorus discharge concentration limit of 0.18 mg/l established for the basin discharge at the S-191 Structure has not been met.

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Ecological Characterization

The Taylor Creek basin forms a portion of the northeast drainage basin of Lake Okeechobee. The basin is relatively small, draining only 282 square miles. Taylor Creek, the largest stream, has an average flow of 100 cfs 9 miles above its mouth at Lake Okeechobee. Although sparsely populated, the basin is highly developed with agriculture lands and rangelands. There are also many dairies in the basin, often located directly adjacent to the streams and creeks.

Anthropogenic Impacts

All of the reaches in this basin have severe pollution problems. There are frequent violations of the DO standard. Fifty percent of the Taylor Creek DO samples and about 80% of the Nubbin Slough DO samples were less than 5.0 mg/l. In addition, the reaches have elevated bacteria and nutrient levels. The majority of the problems are due to dairy farm runoff which contains high concentrations of BOD and nutrients. Many of the creeks in the basin actually run through dairy operations. The State has recently established a "Dairy Rule" regulating feedlot and dairy runoff and establishing time frames for compliance. As part of the South Florida Water Management District's SWIM Plan for Lake Okeechobee, dairies are being bought out on a "price per cow" basis. To date, thousands of cows have been purchased and moved out of the drainage basin.

Phosphorus concentrations at off-site discharges of bought-out dairies have become lower. For farms that have installed BMP's, phosphorus concentrations are lower, but not as much as the farms that have discontinued operation. The dairy rule has not been as effective in reducing phosphorus discharges as had been expected. Improved pastures are one of the major problems affecting the basin's water quality

In 1992 a $1.3 billion Cypress Energy Project was proposed for building two coal fired power plants at a site located less than 5 miles from the Kissimmee River. The project did not get approved by the PSC and the application was withdrawn. Another project is the Berman Road landfill operated by Chambers Waste Systems. This 35 acre facility may be expanded to a 2000 acre solid waste disposal facility which has the potential to affect surface and groundwater.

** USGS HYDROLOGIC UNIT: 03090102 TAYLOR CREEK

SURFACE WATER QUALITY DATA FOR 1970-1993
MEDIAN VALUES FOR EACH WATERSHED
CURRENT PERIOD OF RECORD (1989-1993) USED WHERE AVAILABLE
PERIOD PRIOR TO 1989 IS EVALUATED AS HISTORICAL INFORMATION

INDEX	GOOD	FAIR	POOR
WQI-RIVER	0-44	45-59	60-90
TSI-ESTUARY	0-49	50-59	60-100
TSI-LAKE	0-59	60-69	70-100

WATERSHED ID	NAME	WATERSHED DATA RECORD				WATER CLARITY				DISSOLVED OXYGEN		OXYGEN DEMAND			PH ALKALINITY		TROPHIC STATUS			COLIFORM		BIOLOGICAL SPECIES DIVERSITY			COND	FLOW	WATER QUALITY INDICES	
		MAX #OBS	BEG YR	END YR	DATA PERIOD	TURB	SD	COLOR	TSS	DO	DOSAT	BOD	COD	TOC	PH	ALK	NITRO	PHOS	CHLA	TOTAL	FECL	NAT	ART	BECK	COND	FLOW	WQI	TSI
* WATER BODY TYPE: STREAM																												
1	Popash Slough	14	89	89	Current	2.8	0.9	113	.	3.3	38	.	.	.	7.2	.	2.34	0.85	.	.	13	.	.	.	785	.	45	.
2	NUBBIN SLOUGH	661	89	93	Current	2.3	0.8	169	3	4.4	58	.	.	.	6.9	46	1.70	0.46	.	41	33	.	.	.	587	.	49	.
3	L63 CANAL	58	89	93	Current	2.8	0.8	70	.	4.9	55	.	.	.	7.1	.	1.60	0.57	.	.	10	.	.	.	472	.	[illegible]	.
4	Turkey Slough	3	78	78	Historical	6.8	.	208	23	0.8	10	.	.	26	6.2	26	4.16	0.18	.	.	17	.	.	.	125	.	63	.
5	Mosquito Creek	9	89	89	Current	2.0	0.8	65	.	5.9	62	.	.	.	7.2	.	1.42	0.32	.	.	660	.	.	.	832	.	53	.
7	TAYLOR CR	68	89	93	Current	4.5	0.7	100	.	1.6	18	.	.	.	6.5	.	1.78	0.42	.	.	80	.	.	.	241	.	56	.

LEGEND:
ALK-ALKALINITY MG/L
ART-ARTIFICIAL SUBSTRATE DI
BEG YR-BEGINNING SAMPLING YEAR
BECK-BECK'S BIOTIC INDEX
BOD-BIOCHEMICAL OXYGEN DEMAND MG/L
CHLA-CHLOROPHYLL UG/L
COD-CHEMICAL OXYGEN DEMAND MG/L
COLOR-COLOR PCU
COND-CONDUCTIVITY UMHOS
DO-DISSOLVED OXYGEN MG/L
DOSAT-DO % SATURATION
END YR-ENDING YEAR
FECL-FECAL COLIFORM MPN/100ML
FLOW-FLOW CFS
MAX #OBS-MAXIMUM NUMBER OF SAMPLES
NAT-NATURAL SUBSTRATE DIVERSITY
NITRO-TOTAL NITROGEN MG/L
PH-PH STANDARD UNITS
PHOS-TOTAL PHOSPHORUS MG/L
SD-SECCHI DISC METERS
TOC-TOTAL ORGANIC CARBON MG/L
TOTAL-TOTAL COLIFORM MPN/100ML
TSI-TROPHIC STATE INDEX
TSS-TOTAL SUSPENDED SOLIDS MG/L
TURB-TURBIDITY MG/L
WQI-WATER QUALITY INDEX

SURFACE WATER QUALITY DATA SCREENING REPORT
MEDIAN VALUES FOR EACH WATERSHED SCREENED

** USGS HYDROLOGIC UNIT: 03090102 TAYLOR CREEK

'x'=EXCEEDS SCREENING CRITERIA
'0'=WITHIN SCREENING CRITERIA
'.'=MISSING DATA

				SCREENING VARIABLES AND CRITERIA												
		RANK	DATA RECORD	TN	STREAM TP	LAKE TP	PH	ALK	TURB & TSS	COND	OXYGEN DEMAND	DO	COLIFORM BACTI	BIOL DIV	CHLA	SECCHI DISC
WATERSHED ID	NAME	WQI OR TSI	CURRENT OR HISTORICAL	TN>2.0	TP>.46	TP>.12	PH>8.8 PH<5.2	ALK<20	TURB>16.5 TSS>18	COND>1275	BOD>3.3 COD>102 TOC>27.5	DO<4	TOT>3700 FECAL>470	DIART<1.95 DINAT<1.5 BECK<5.5	CHLA>40	SD<.7
* WATER BODY TYPE: STREAM																
1	Popash Slough	FAIR	Current	x	x	.	0	.	0	.	.	x	0	.	.	0
2	NUBBIN SLOUGH	FAIR	Current	0	0	.	0	0	0	.	.	0	0	.	.	0
3	L63 CANAL	POOR	Current	0	x	.	0	.	0	.	.	0	0	.	.	0
4	Turkey Slough	POOR	Historical	x	0	.	0	0	x	.	0	x	0	.	.	.
5	Mosquito Creek	FAIR	Current	0	0	.	0	.	0	.	.	0	x	.	.	0
7	TAYLOR CR	POOR	Current	0	0	.	0	.	0	.	.	x	0	.	.	0

LEGEND:
ALK-ALKALINITY
BECK-BECK'S BIOTIC INDEX
BIOL DIV-BIOLOGICAL DIVERSITY
CHLA-CHLOROPHYLL
COND-CONDUCTIVITY
DO-DISSOLVED OXYGEN
CURRENT-1989 TO 1993
DIART-ARTIFICIAL SUBSTRATE DIVERSITY
DINAT-NATURAL SUBSTRATE DIVERSITY
FECAL-FECAL COLIFORM BACTERIA
HISTORICAL-1970 TO 1988
OXYGEN DEMAND-BOD,COD,TOC
PH-PH
TN-NITROGEN
TP-PHOSPHORUS
TOT-TOTAL COLIFORM BACTERIA
TSS-TOTAL SUSPENDED SOLIDS
TURB-TURBIDITY
SD-SECCHI DISC METERS
WQI OR TSI-WATER QUALITY INDEX RATING WHICH INDEX USED, WQI OR TSI, IS BASED ON WATERBODY TYPE

SURFACE WATER QUALITY ASSESSMENT REPORT
TRENDS-SOURCES-CLEANUP

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1984 - 1993 TRENDS (PLEASE READ THESE COLUMNS VERTICALLY)

WATERSHED ID	NAME	QUALITY RANK: MEETS USE ?	QUALITY RANK: WQI OR TSI	OVER-ALL TREND	WQI or TSI	TN	TP	CHLA	SD	PH	ALK	TURB	TSS	BOD	TOC	DO	DOSAT	TCOLI	FCOLI	TEMP	FLOW	DEGRADATION SOURCES, PRESENT CONDITIONS AND CLEANUP EFFORTS
* WATER BODY TYPE: STREAM																						
1	Popash Slough	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
2	NUBBIN SLOUGH	PARTIAL	FAIR	+	+	+	+	.	0	+	.	0	0	.	.	0	0	0	+	0	.	
3	L63 CANAL	NO	POOR	0	0	0	0	.	.	0	.	.	.	.	.	0	0	.	.	0	.	
4	Turkey Slough	NO	POOR																			
5	Mosquito Creek	PARTIAL	FAIR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
7	TAYLOR CR	NO	POOR	0	0	.	0	.	.	0	.	.	.	.	.	0	0	.	.	0	.	

LEGEND:

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THE * ON MAPID INDICATES NO STORET INFORMATION AVAILABLE FOR THIS WATERSHED
-SEE PAGE 11 FOR LEGEND FOR THIS TABLE-

CATNAME=TAYLOR CREEK HUC=03090102

MAP_ID	WBID	BASIN	WQ305	WQNPS	NUTRIENT	BACTERIA	SEDIMENT	OIL	PESTICID	OTHECHE	DEBRIS	OXYGEN	SALINITY	PH	METAL	HABITAT	FLOW	THERMAL	OTHERPO-L	FISHKILL	ALGAL	WEED	TURBIDIT	ODOR	FISHDBCL	NOSWIM	NOFISH	OTHERSYM	IND	STP	AG	REL	SL	LD	UR	CN	HM	OT
1	3205C	Popash Slough	FAIR	THREAT	X	X	X															X	X								X			X	X			
2	3203A	NUBBIN SLOUGH	FAIR	THREAT	X		X															X	X											X		X		
3	3203C	L63 CANAL	POOR	THREAT	X		X															X	X						X	X				X		X		
4	3199A	Turkey Slough	POOR	THREAT	X			X													X	X	X								X			X		X		
5	3203B	Mosquito Creek	FAIR	THREAT	X		X															X	X											X		X		
6*	3199B	Chandler Hammock Sloug		THREAT	X			X													X	X	X								X			X		X		
7	3205	TAYLOR CR	POOR	THREAT	X	X	X															X	X								X			X	X			

BEDMAN CREEK	17
BEE BRANCH	17
COCOHATCHEE RIVER CANA	24
CYPRESS CREEK	17
DAUGHTREY CREEK	17
EAST CALOOSAHATCHEE	17
ESTERO RIVER	24
FISHEATING CREEK	32
HARNEY POND CANAL	32
HICKEY CREEK	17
IMPERIAL RIVER	24
INDIAN PRAIRIE CANAL	32
JACKS BRANCH	17
L63 CANAL	64
LAKE OKEECHOBEE	43
LETTUCE CREEK	43
NAPLES BAY	24
NUBBIN SLOUGH	64
OAK CREEK	24
POPASH SLOUGH	64
S-135	43
TAYLOR CR	64
TOWNSEND CANAL	17
TROUT CREEK	17