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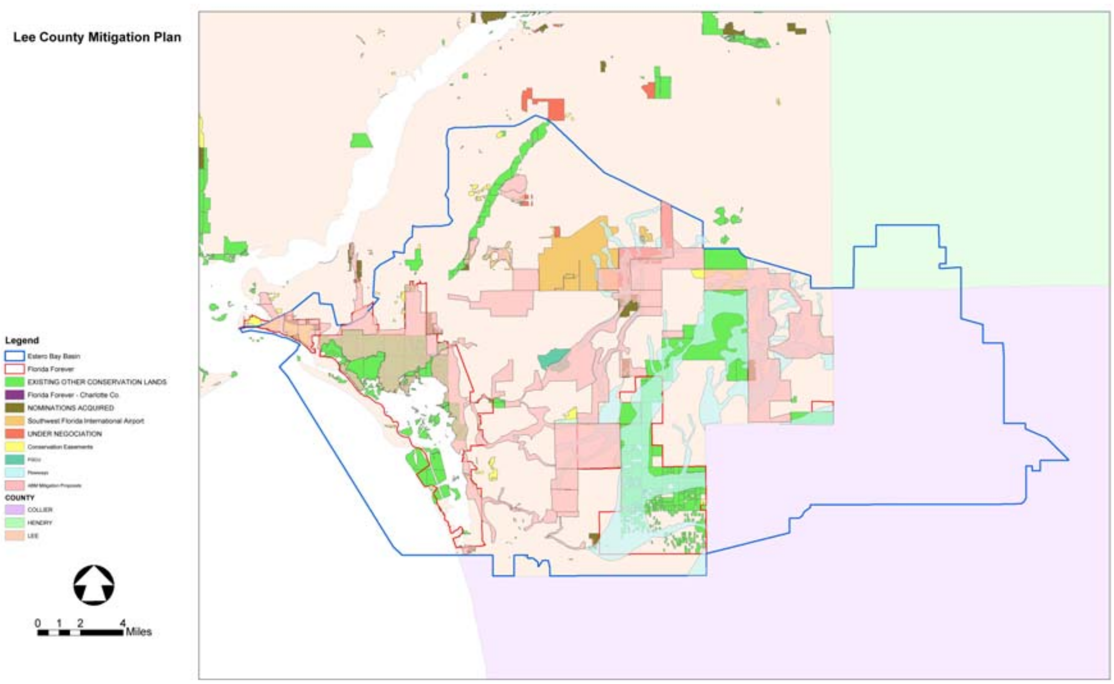
Estero Bay Agency on Bay Management

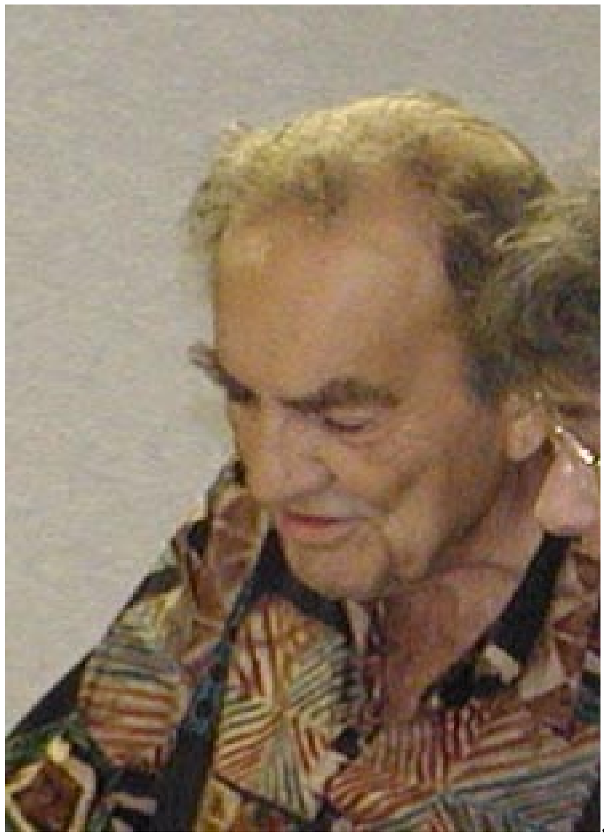
State of the Bay Update

Trends and Analysis



May 25, 2004

Dedication

.

On October 29, 2003, we lost one of the pioneers of responsible growth management in Southwest Florida—Dr. Eugene S. Boyd. Gene was one of the recipients of the first Estero Bay Agency on Bay Management Exemplary Service Environmental Stewardship Awards for 2002. This volume is dedicated to Gene, whose hard work, sacrifices, and vision brought about the Agency and our State of the Bay report

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Contents

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Introduction

The Estero Bay Agency on Bay Management (ABM) was established in accordance with the settlement agreement for the completion of permitting for the Florida Gulf Coast University (FGCU), upon the completion of the Arnold Committee study process. The ABM Membership consists of, but is not limited to, delegations from the following: local chambers of commerce, citizen and civic associations, Lee County, SFWMD, FDEP, FWC, FGCU, SWFRPC, commercial and recreational fishing interests, environmental and conservation organizations, the Responsible Growth Management Coalition, Fort Myers Beach, Sanibel, scientists, affected property owners and the land development community. The ABM is a non-regulatory, advisory body whose directive is to make recommendations for the management of Estero Bay and its watershed.

Principles of the Estero Bay Agency on Bay Management

Note: the following is the accepted revision of the Principles of the Estero Bay Agency on Bay Management dated May 13, 2002.

The Estero Bay Agency on Bay Management (ABM) is a non-regulatory body whose directive is to make comments and recommendations for the management of Estero Bay and its watershed. The waters of Estero Bay provide a tremendous resource for local residents and tourists who enjoy fishing and appreciate the local vegetation and wildlife. It is also important to note that Estero Bay is Florida's first aquatic preserve. Due to the forthcoming increase in population density on and near the shores of Estero Bay and its watershed and the attendant increase in boat traffic, the Estero Bay Agency on Bay Management have adopted the following guiding principles. These principles are an attempt by the ABM to make strong and clear recommendations for the preservation and restoration of this rare and unique ecosystem. The ABM realizes that some situations within the Estero Bay Watershed may not allow the strict adherence to these principles; however, the ABM recommends that they be utilized wherever and whenever possible.

I. General

I. A. The ABM will be cognizant of the "big picture" and to the concept of "ecosystem management" and sustainable development.

I. B. Water conservation practices and wastewater reuse will be encouraged throughout the watershed to protect potable water supplies."

I.C. All re-zoning requests within the Estero Bay watershed will be critically evaluated to ensure protection of water quality, rare and unique habitats, listed wildlife, and ecosystem functions.

I.D. Variances from environmental regulations and deviations from development standards will be the exception, not the rule.

I.E. Environmental protection and long-term quality of life will not suffer based on short-term economic impacts or political pressures.

I.F. Zoning resolutions that are required as a part of the approval for re-zoning must be tracked for future compliance and enforcement.
I.G. Compliance and enforcement of existing environmental regulations will be a top priority for regulatory agencies.
I.H. Additional staff will be hired to assist in the compliance and enforcement of zoning resolutions related to environmental issues.
I.I. Agency staffing will keep pace with increased demand on services, especially environmental protection issues. Trained and experienced wildlife biologists and environmental scientists will be hired to ensure adequate development review.
I.J. Activities in the watershed by any regulatory agency shall provide the opportunity for public participation.

II. Uplands, Headwaters and Isolated Wetlands

II. A. Land Management and Acquisition
II. A. (1) Lands identified as critical for listed species shall be targeted for public purchase and managed to maintain their environmental value.
II. A. (2) The Lee County Conservation Land Acquisition and Stewardship Advisory Committee will consider priorities for land purchases adopted by the "Arnold Committee" and the ABM.
II. A. (3) The Lee County Conservation Land Acquisition and Stewardship Advisory Committee will use proactive approaches to investigate the willingness of landowners to be voluntary sellers, as specified in the requirements of the ordinance that established the land acquisition program.
II. A. (4) Regulations within the existing "Notice of Clearing" process by Lee County will be developed that require wildlife surveys, habitat assessments, and a development plan for the agricultural operations so that critical habitats for state and federal listed species can be preserved.
II. A. (5) Conservation easements will be used as an option to protect critical habitats.
II. A. (6) Programs such as the "Keep It Clean" and "Florida Yards and Neighborhoods" programs should be promoted, to minimize inputs of storm water pollutants into the bay.
II. A. (7) Before off-site mitigation for wetland and listed-species upland impacts is considered, opportunities for avoidance, minimization, and on-site mitigation must be exhausted.
II. A. (8) Off-site mitigation projects should be within watershed and within habitat type wherever possible.

II. B. Vegetation
II. B. (1) Natural, native vegetation within natural systems will be retained to the greatest extent possible.
II. B. (2) Physical removal of invasive vegetation will be utilized for control rather than widespread chemical treatment.
II. B. (3) Limited application of herbicides that rapidly degrade may be used, according to the product label, on a case by case basis for the control of nuisance and invasive non-native vegetation and to maintain native plant communities.
II. B. (4) Promote, whenever possible, the active and aggressive removal of invasive non-native plants from all common areas, conservation easements, preserves and natural areas within the Estero Bay watershed.

II. B. (5) Isolated and seasonal wetlands are recognized for their importance for flood protection, unique fish and wildlife habitat, water quality, and water quantity. These wetlands should be preserved to the greatest extent possible.

II. C. Physiographic

II. C. (1) Consideration will be given to the ancient relief of the watershed by: preserving vegetation that provide the characteristic habitat and canopy; retaining the relic natural features; and reconnecting historic natural flow ways that have been diverted or severed.

II. D. New Construction

II. D. (1) Construction within flood plains shall be avoided wherever possible.

II. D. (2) For construction that must occur within flood plains, utilize techniques that do not adversely impact the capacity of the floodplain (e.g. use of pilings to raise living floor elevations versus use of fill).

II. D. (3) Utilize non-polluting construction materials (e.g. concrete pilings versus treated wood) within flood plains.

II. E. Hazardous Materials

II. E. (1) Specifically placed larvicides and biological controls are the preferred methods for mosquito control. Adulticides should only be used in compliance with Section 388.011(1) Florida Statutes.

II. F. Agriculture

II. F. (1) Tax incentives should be created so that landowners may continue land use practices that maintain ecologically important habitat.

II. F. (2) Adequate staff at Property Appraisers Offices within the watershed will be provided to review the high number of applications and strictly enforce the rules for Bona fide agricultural tax exemptions.

II. F. (3) The minimum time period for re-zoning of agricultural land should be increased from three years to ten years to reduce the speculative clearing of agricultural land for "higher use" which results in the loss of natural habitat and the loss of tax revenue.

II. F. (4) Legislation should be implemented that provides inheritance tax, real estate tax and estate tax relief for agriculture landowners and their heirs, who will maintain their land in agriculture.

II. F. (5) Legislation should be implemented that provides inheritance tax, real estate tax and estate tax relief for landowners and their heirs, who provide permanent conservation easements on their property.

II. G. Urban

II. G. (1) Old surface water management (SWM) systems built before current regulations will be retrofitted, using best available management practices, to meet current SWM standards.

II. G. (2) Permitting must address cumulative impacts to the water storage capacity of the watershed.

II. G. (3) Grants or incentives should be provided for retrofitting old surface water management systems that are not effectively managing water volume or flow, or removing nutrients and other pollutants.

II. G. (4) Proposal s that reduce impacts to Estero Bay and its watershed, that might include: rural village concepts, urban infill, redevelopment sites, greenways; should be encouraged.

II. H. Roadways

II. H. (1) All future roadways to be located in the floodplain within the Estero Bay watershed will be designed and constructed to not impede flows from a 25-year, 3 day, storm event.

II. H. (2) Transportation planning shall be undertaken with goals of increasing public transportation and enhancing new and existing roads with walkable, bikeable passageways that are connected and landscaped.

III. Water Courses

III. A. Physiographic

III. A. (1) Non-structural approaches versus structural approaches will be used for water resource management solutions.

III. A. (2) No further canalization or dredging of remaining natural watercourses will occur.

III. A. (3) A better balance of ecological needs versus water flow will be used for water resource management decisions.

III. A. (4) Establish and restore the historic basin flood plains to the maximum extent possible.

III. A. (5) The ancient relief of the upper tributary reaches will be maintained by: preserving vegetation that provide the characteristic riparian habitat and canopy, retaining the relic natural features of the tributary bank contours, and reconnecting historic natural flow ways that have been diverted or severed.

III. B. Vegetation

III. B. (1) Natural, native vegetation versus non-native invasive vegetation within flow ways and natural systems will be retained to the greatest extent possible.

III. B. (2) Physical removal of invasive vegetation versus widespread chemical treatment will be utilized for control.

III. B. (3) Limited application of herbicides that rapidly degrade may be used on a case-by-case basis, under the supervision of certified personnel, for control of nuisance and invasive non-native vegetation and to maintain native plant communities.

III. B. (4) Promote, whenever possible, the active and aggressive removal of invasive non-native plants from all common areas, conservation easements, preserves and natural areas within the Estero Bay watershed.

III. C. New Construction

III. C (1) New setback criteria will be developed and implemented along watercourses to provide construction setbacks to the maximum extent possible. These setback criteria will be based on the best available scientific data.

III. C. (2) Construction within tributary flood plains shall be avoided wherever possible.

III. C. (3) For construction that must occur within flood plains, utilize techniques that do not adversely impact the capacity of the floodplain (e.g. pilings to raise living floor elevations versus fill).

III. C. (4) Utilize non-polluting construction materials (e.g. concrete pilings versus treated wood) within flood plains.

III. D. Hazardous Materials

III. D. (1) Specifically placed larvicides and biological controls are the preferred methods for mosquito control. Adulticides should only be used in compliance with Section 388.011(1) Florida Statutes.

III. E. Boating

III. E. (1) No special accommodations will be made for boats (e.g. no cutting of over story vegetation, no removal of oxbows, no dredging or filling except for permitted maintenance of navigation channels).

IV. Bay Waters

IV. A. Water Quality

IV. A. (1) Regulatory agencies will adopt requirements for "Best Management Practices."

IV. A. (2) Operation of overloaded and outdated package wastewater treatment plants will be discontinued.

IV. A. (3) All urbanization will be served by centralized sewage systems.

IV. A. (4) There should be uniform application of water quality protection measures by regulatory agencies. A holistic management scheme should be implemented that takes into consideration ecological impacts of regulated activities.

IV. A. (5) Compliance and enforcement of existing regulations are needed to protect water quality and biological integrity.

IV. A. (6) There shall be no discharge of hazardous materials into Estero Bay.

IV. A. (7) Surface water management systems in new developments will be required to utilize state-of-the-art best management practices and increased BMP's.

IV. A. (8) Grants and other incentives for retrofitting old or ineffective storm water systems should be encouraged.

IV. A. (9) The State of Florida will actively investigate and prosecute water quality violators.

IV. A. (10) Retrofitting existing shorelines hardened with vertical seawalls to sloping lime rock revetments or native, salt tolerant vegetation, should be encouraged wherever possible.

IV. A. (11) Compliance and enforcement of existing environmental regulations will be a top priority for regulatory agencies.

IV. B. Habitat Alteration

IV. B. (1) No further alteration of Estero Bay bottom shall occur, except as proven necessary for the health, safety and welfare of the natural resources of Estero Bay and of the people in the watershed.

IV. C. New Construction

IV. C. (1) New construction projects should utilize best management practices to minimize negative impacts to the bay to the greatest extent possible; and in addition, the project as a whole, including mitigation, should be necessary to protect the public health, safety, or welfare, or the property of others, and should improve the current condition and relative value of functions being performed by the areas affected by the project.

IV.C.(2) Utilize non-polluting construction materials (e.g. concrete pilings versus treated wood).

IV. D. Wildlife

IV. D. (1) A manatee protection plan will be adopted to reduce the number of boat-related manatee mortalities and that respects the rights of other users of the bay; to achieve a sustainable manatee population (the goal of the Marine Mammal Protection Act); to protect manatee habitat; to promote boating safety; and to increase public awareness of the need to protect manatees and their environment.

IV. D. (2) Efforts by wildlife protection agencies will be accelerated to reduce other non-boat related manatee mortalities.

IV. D. (3) Maintain and improve the overall ecology of the bay and its watershed.

IV. D. (4) Wildlife resources such as rookeries, sea grass beds and fisheries are under increasing threat from human activity. Greater efforts are required by regulatory and other agencies and groups to insure the sustained productivity of these resources.

IV. D. (5) Additional manatee research funding should be provided.

IV. E. Recreation

IV. E. (1) Regulatory agencies and boaters will make special effort to maintain the bay as a major natural resource for fishing and appreciation of vegetation and wildlife.

IV. E. (2) Safe operation of vessels is mandatory.

IV. E. (3) Respect for wildlife, its habitat, and other bay users are particularly important in a crowded bay.

IV. E. (4) Use of non-motorized boats, such as kayaks and canoes, is encouraged and supported.

Water Quality

2001 Water Quality Status

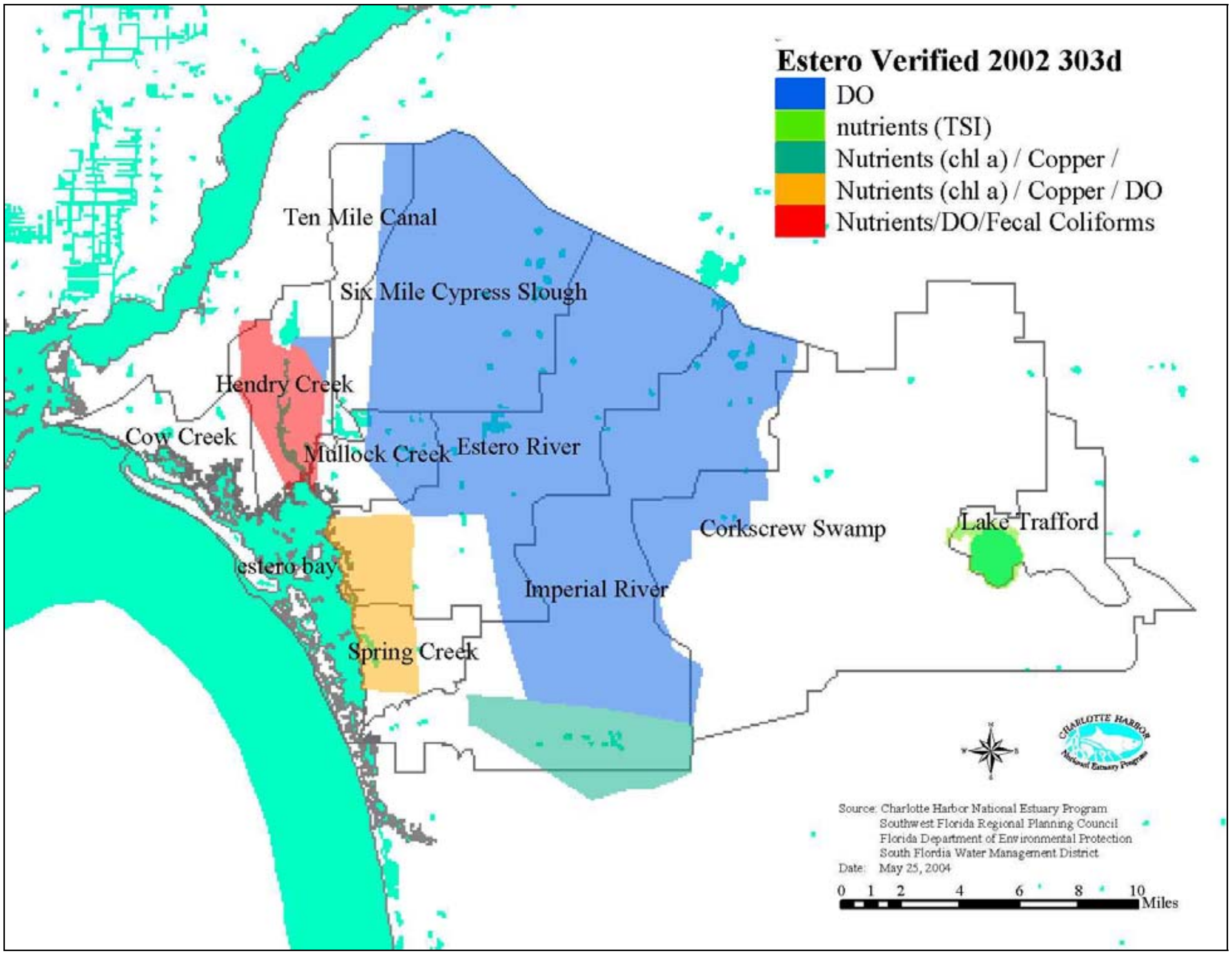
	Chlor-ophyll a	Copper	Dissolved Oxygen	Fecal Coliform	Total Nitrogen	Total Phos-phorous	Turbidity	Total Met
Marine								
Estero Bay								7
Mullock Creek								5
Hendry Creek	V		V	V				4
Estero River	V	V	V					3
Spring Creek	V	V	V					3
Imperial River								7
Freshwater								
Mullock Creek			V					4
10-mile Canal								6
Hendry Creek								5
Spring Creek								6
Imperial River	V	V	V					3
Total Met	8	8	3	4	10	10	10	

(red)	- Water Quality Standard not met in 2001
(yellow)	- Water Quality in caution zone (for selected parameters) in 2001, No data for Estero River Copper
V	- On the FDEP Verified List for Water Quality Impairments

There is a relationship between presence of nutrients and low dissolved oxygen. Although the State of Florida does not provide a quantitative standard for nutrients such as nitrogen and phosphorous, the level at which fish and wildlife resources are affected is a concern. Nutrients are often the pollutant cited for low dissolved oxygen levels.

Based on this understanding, Estero Bay, the marine portion of Imperial River, and the freshwater portion of Spring Creek did not have problems concerning nutrients in 2001. The rest of the water bodies measured in Estero Bay basin show potential nutrient impacts.

Copper is a pollutant of concern in Estero Bay. In 2001, the freshwater potions of Mullock Creek and Hendry Creek showed amounts of copper which exceeded State standards. It does appear that, in general, copper levels are decreasing over the last decade. Turbidity is the only parameter measured here for which all water bodies meet State standards.



The Florida Department of Environmental Protection establishes a list of water quality impairments. The above map illustrates the location of these impairments related to the locations of the South Florida Water Management District sub-basin geography. The verified list does not conform entirely to the 2001 water quality assessment above. As will be shown below, water quality varies each year. The 2001 assessment provides a snapshot in time, where the FDEP information shows chronic water quality problems.

Based on the FDEP analysis, the water bodies and sub-basins with the worst water quality include marine Hendry Creek, marine Estero River, and marine Spring Creek. Each of these areas has three water quality impairments. Freshwater Imperial River has two water quality impairments.

The status and trends information at the end of this water quality section provides a different look at water quality for a different time frame and geography. As you can see, analysis of water quality varies based on the geography used and the time frame.

Parameter: Chlorophyll-a

Chlorophyll-a is a measure of phytoplankton activity in the water column based on the primary photosynthetic pigment of green and other algae. It is a resultant parameter that synthesizes many environmental factors including nutrients, temperature, salinity, trace elements, toxics, tides, and relative dilution, including water flows. It is proposed as a presumptive measure of estuarine health for the purpose of determining impaired waters. A standard of equal to or exceeding 11 mg/ml3 in marine conditions is considered impaired. A standard of equal to or exceeding 20 mg/ml3 in freshwater conditions is considered impaired.

Florida Department of Environmental Protection provided the data for all Chlorophyll a analysis.

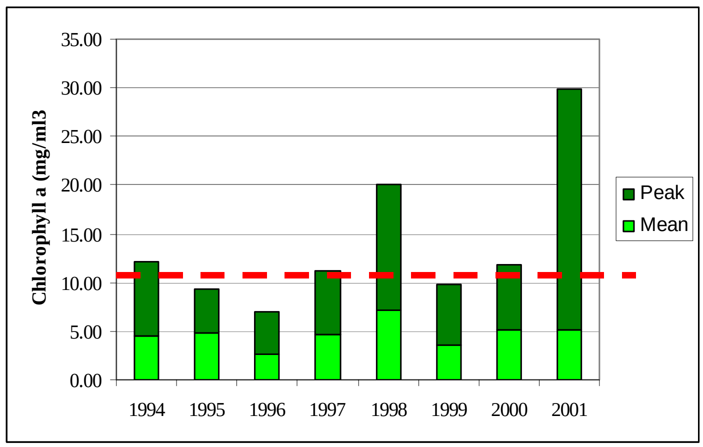
Chlorophyll-a in Marine Systems

Chlorophyll a in Estero Bay

1999-2001 change: +45% mean, +204% peak

WQ Standard Met? Yes

Year	Mean	Peak	Month of Peak
1999	3.56	9.80	October
2000	5.08	11.90	March
2001	5.19	29.80	October

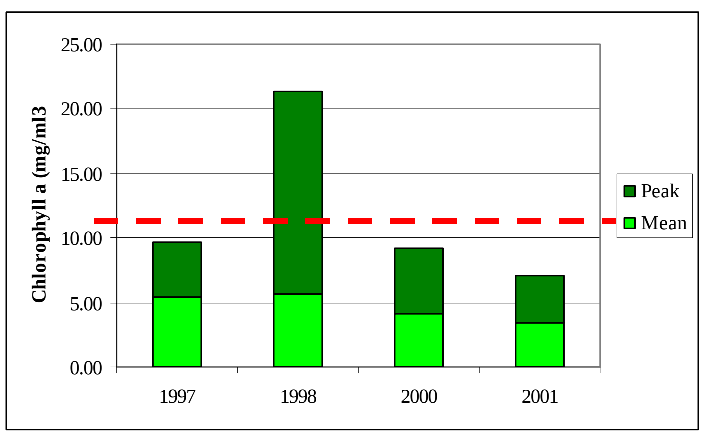


Chlorophyll-a in the Marine Estero Bay Drainage aka Mullock Creek

1998-2001 change: -39% mean -67% peak

WQ Standard Met? Yes

Year	Mean	Peak	Month of Peak
1998	5.63	21.30	April
2000	4.12	9.16	June
2001	3.44	7.07	June

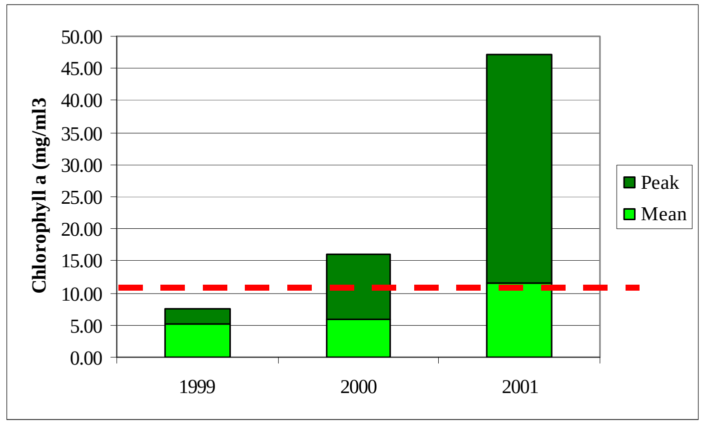


Chlorophyll-a in Marine Hendry Creek

1998-2001 Change: +117% mean, +520% peak

WQ standard met: No

Year	Mean	Peak	Month of Peak
1998	5.28	7.60	December
2000	5.93	16.10	June
2001	11.46	47.10	June

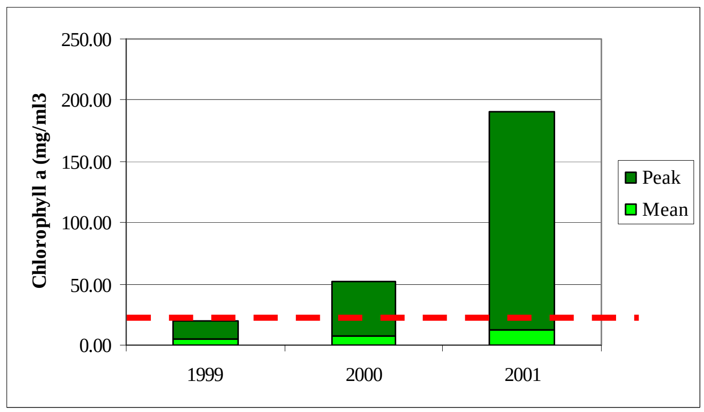


Chlorophyll-a in the Estero River

1999-2001 change: 160% mean 892% peak

WQ Standard Met? Yes

Year	Mean	Peak	Month of Peak
1999	4.87	14.33	December
2000	7.21	44.59	August
2001	12.67	17.83	June

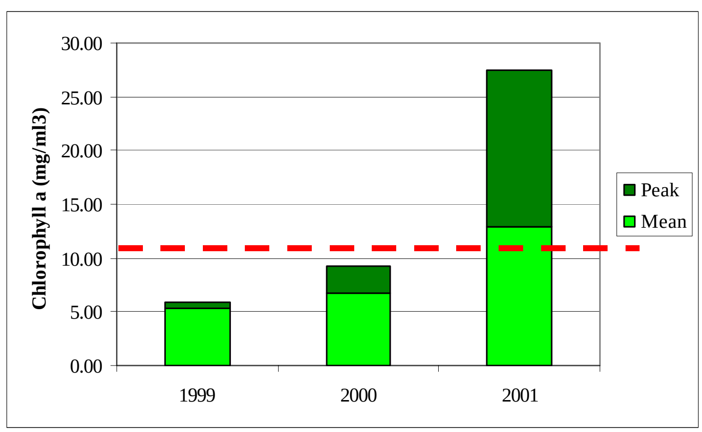


Chlorophyll-a in Marine Spring Creek

1999-2001 change: 140% mean, 365% peak

WQ Standard Met? No

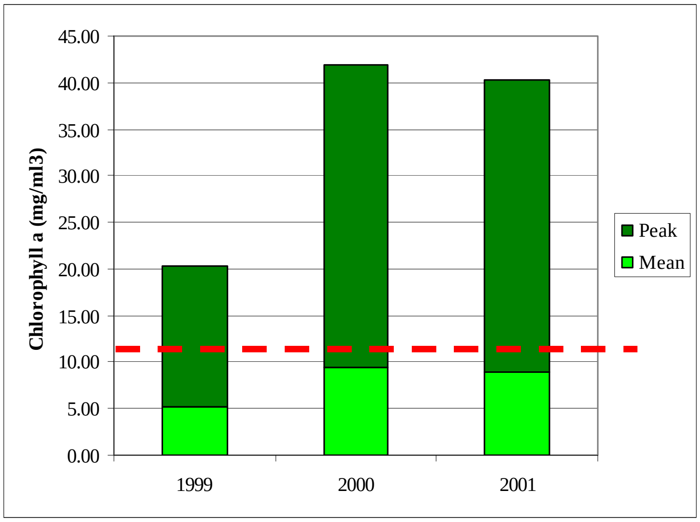
Year	Mean	Peak	Season of Peak
1999	5.38	5.90	Summer
2000	6.76	9.25	Fall
2001	12.93	27.45	Spring



Chlorophyll-a in the Marine Imperial River

1999-2001 change: 73% mean
99% peak
WQ Standard Met? Yes

Year	Mean	Peak	Month of Peak
1999	5.14	20.3	December
2000	9.49	41.9	June
2001	8.87	40.3	May

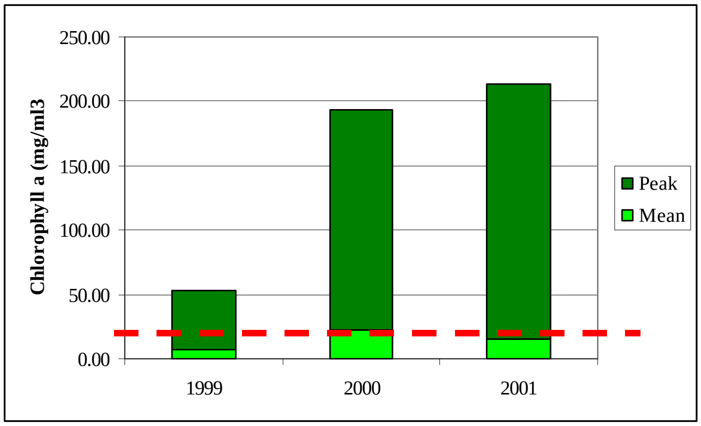


Chlorophyll-a in Freshwater Systems

Chlorophyll-a in the Freshwater Estero Bay Drainage aka Mullock Creek

1999-2001 change: +111% mean,
+299% peak
WQ Standard Met? Yes

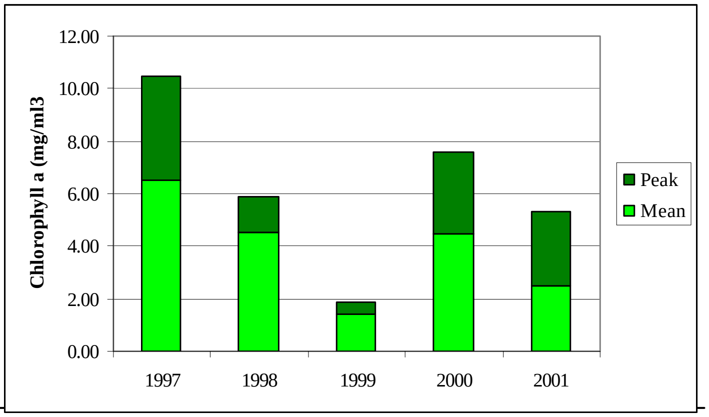
Year	Mean	Peak	Month of Peak
1999	7.49	53.60	December
2000	22.89	193.00	August
2001	15.83	213.90	December



Chlorophyll-a in the Ten Mile Canal

1999-2001 change: +75% mean,
+185% peak
WQ Standard Met? Yes

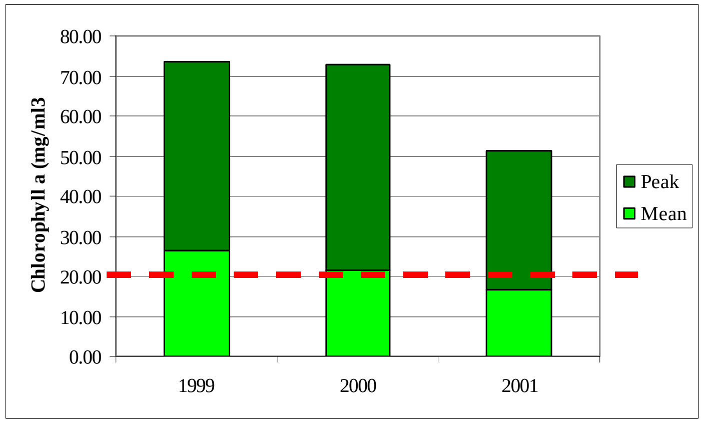
Year	Mean	Peak	Month of Peak
1998	1.41	1.86	
2000	4.50	7.60	
2001	2.47	5.31	



Chlorophyll-a in Freshwater Hendry Creek

1999-2001 Change: -38% mean, -31% peak
WQ standard met: Yes

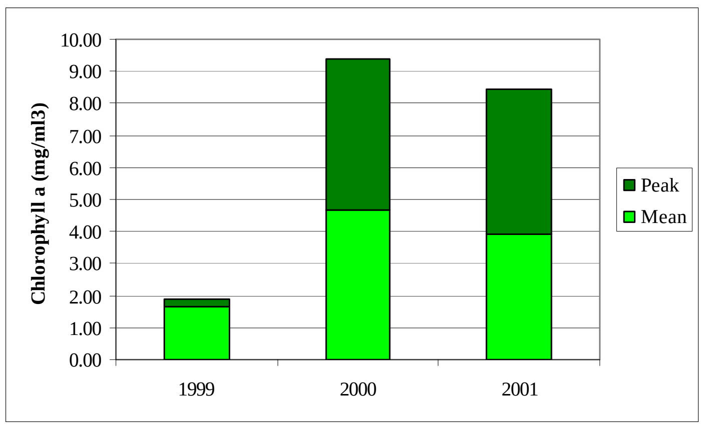
Year	Mean	Peak	Month of Peak
1998	26.45	73.7	September
2000	21.66	73.0	March
2001	16.48	34.72	January



Chlorophyll-a in Freshwater Spring Creek

1999-2001 change: +138% mean, +344% peak
WQ Standard Met? Yes

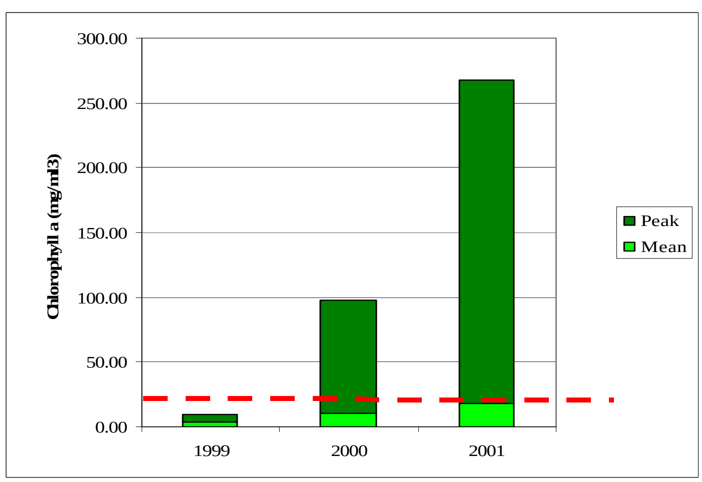
Year	Mean	Peak	Month of Peak
1999	1.65	1.90	Summer
2000	4.65	9.40	Fall
2001	3.92	8.44	Spring



Chlorophyll-a in the Freshwater Imperial River

1999-2001 change: +374% mean, +266% peak
WQ Standard Met? Yes

Year	Mean	Peak	Month of Peak
1999	3.77	9.7	December
2000	10.64	97.7	June
2001	17.88	268	May



Parameter: Copper

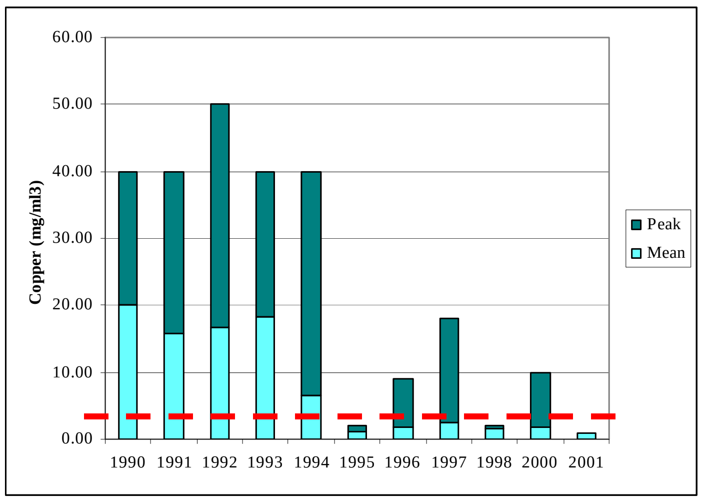
Copper (Cu) is a measure of all dissolved copper in the water column including hexavalent, bivalent and trivalent ions. It is a resultant parameter that synthesizes many environmental inputs of copper including the dissolved copper from roadways, antifouling paints, and treated wood including pilings, aquatic algaecides, lake treatments, architectural sources, marine cathodes, human debris and natural sources. Based on Environmental Protection Agency measures it is normal and healthy to have less than 0.025 mg/l of Cu in a steam or estuary. When Cu is ranging from 0.025 to 0.125 mg/l this indicates an enriched system. If Cu exceeds 0.125 mg/l the stream or estuary is polluted. Cu in and of itself does not identify the source of copper. All of Estero Bay and its tributaries are Outstanding Florida Waters and the Cu standard should be set at the measures taken by the Florida Department of Environmental Regulation at the time of the OFW designation. The general non-OFW standard for copper is 3.7 mg/ml3 in Class III marine and Class II Freshwater. Florida Department of Environmental Protection provided the data for all copper analysis.

Copper in Marine Systems

Cooper in the Marine Estero Bay Drainage aka Mullock Creek

1998-2001 change: -39% mean
                                  -50% peak
WQ Standard Met?   Yes

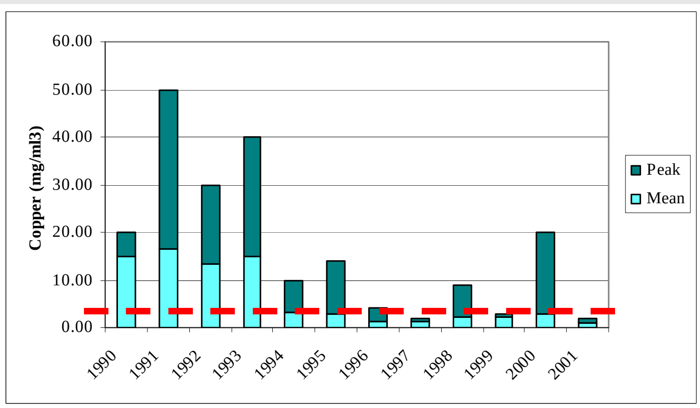
Year	Mean	Peak	Month of Peak
1998	1.64	2.00	June-Dec.
2000	1.71	10.00	August
2001	1.00	1.00	No Peak



Copper in Marine Hendry Creek

1998-2001 Change: -53% mean, -78% peak
WQ standard met: Yes

Year	Mean	Peak	Month of Peak
1999	2.08	3.00	February
2000	3.00	20.00	November
2001	1.06	2.00	August

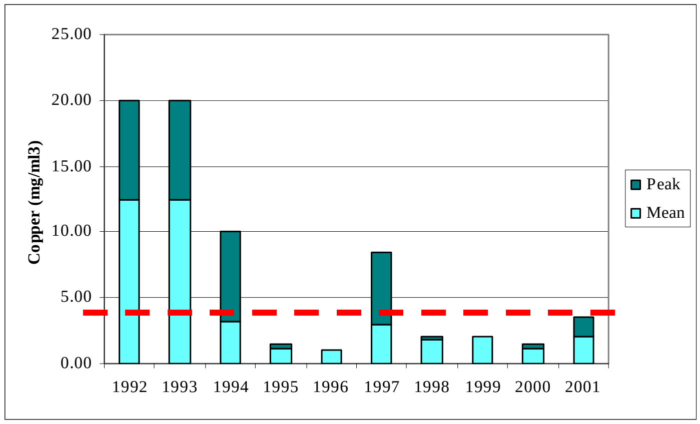


Copper in Marine Spring Creek

1999-2001 change: 0% mean, 75% peak

WQ Standard Met? Yes

Year	Mean	Peak	Season of Peak
1999	2.00	2.00	No Peak
2000	1.13	1.50	Fall
2001	2.00	3.50	Summer

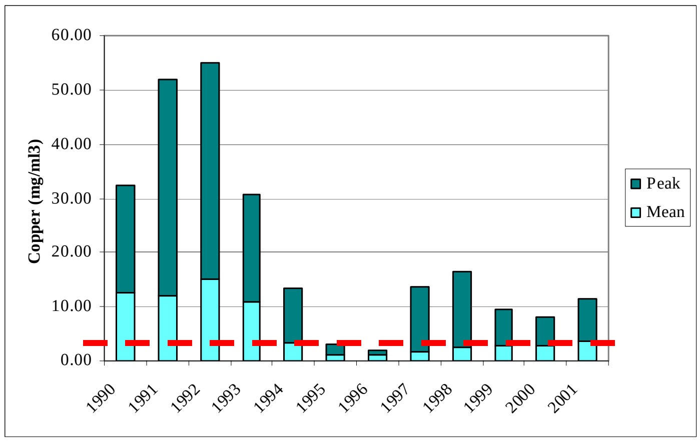


Copper in the Marine Imperial River

1999-2001 change: +31% mean +16% peak

WQ Standard Met? Yes

Year	Mean	Peak	Month of Peak
1999	2.75	6.83	December
2000	2.83	5.28	July
2001	3.60	7.90	June

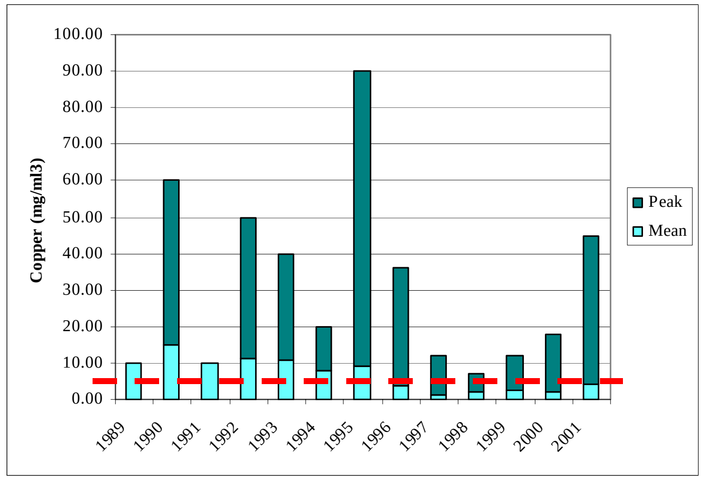


Hendry Creek Viewed Upstream from Mouth

Copper in Freshwater Systems

Copper in the Freshwater Estero Bay Drainage aka Mullock Creek

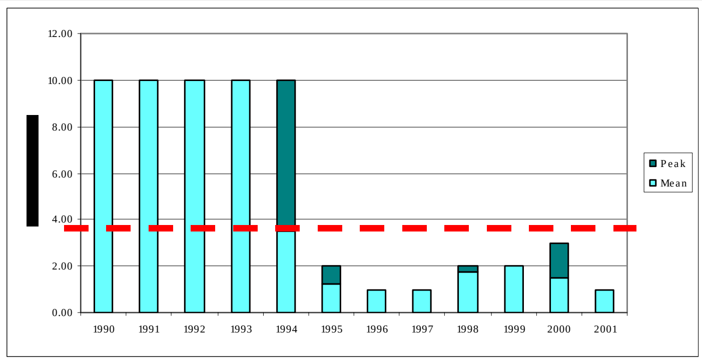
1999-2001 change:	+71% mean, +275% peak
WQ Standard Met?	No



Year	Mean	Peak	Month of Peak
1999	2.32	12.00	February
2000	2.04	18.00	September
2001	3.97	45.00	October

Copper in the Ten Mile Canal

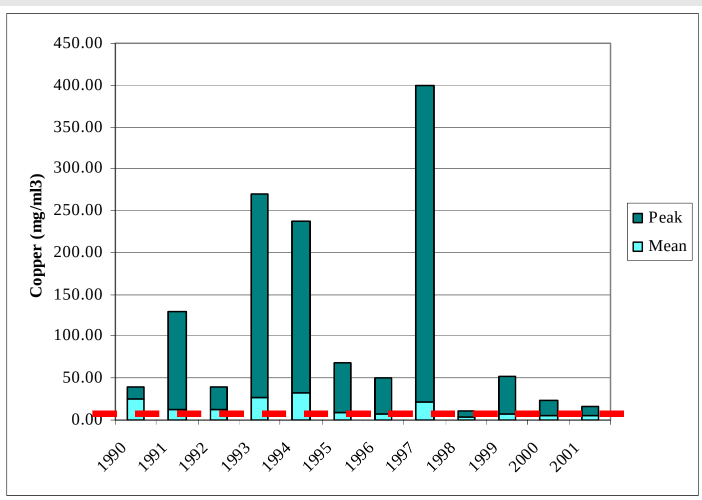
1999-2001 change:	-50% mean, -50% peak
WQ Standard Met?	Yes



Year	Mean	Peak	Season of Peak
1998	2.00	2.00	No Peak
2000	1.50	3.00	Winter
2001	1.00	1.00	No Peak

Copper in Freshwater Hendry Creek

1999-2001 Change:	-35% mean, -70% peak
WQ standard met:	No



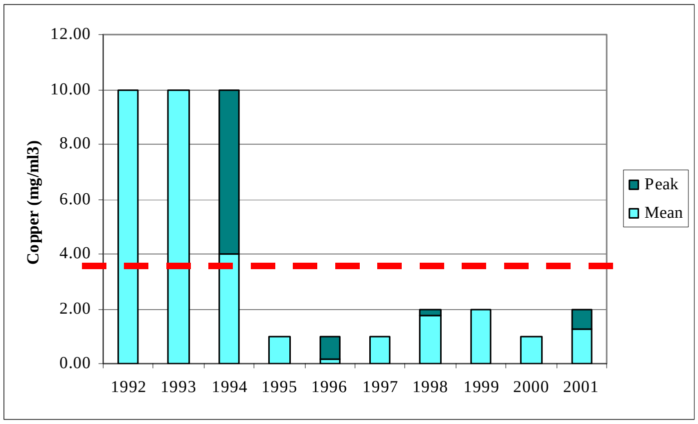
Year	Mean	Peak	Month of Peak
1998	7.08	53.00	May
2000	6.19	23.00	March
2001	4.59	34.72	September

Copper in Freshwater Spring Creek

1999-2001 change: -38% mean, +0% peak

WQ Standard Met? Yes

Year	Mean	Peak	Month of Peak
1999	1.65	1.90	Summer
2000	4.65	9.40	Fall
2001	3.92	8.44	Spring

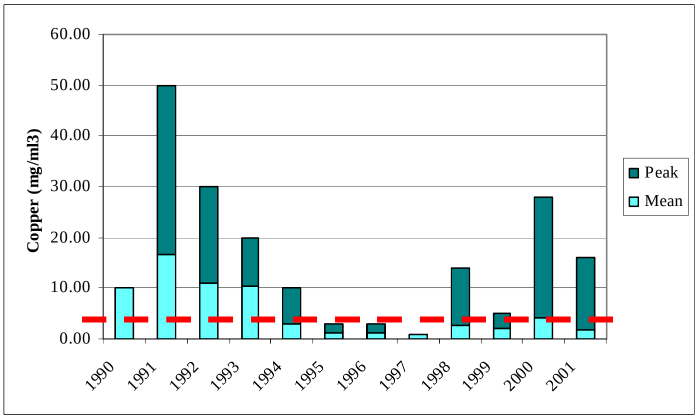


Copper in the Freshwater Imperial River

1999-2001 change: -24% mean, +220% peak

WQ Standard Met? Yes

Year	Mean	Peak	Month of Peak
1999	2.21	5.00	July
2000	4.06	28.00	August
2001	1.69	16.00	July



Estero River Looking Upstream

Parameter: Dissolved Oxygen

Dissolved Oxygen (DO) is a measure of all dissolved oxygen in the water column. DO is vital to aerobic organisms in the aquatic ecosystem with most higher taxa requiring higher DO levels for healthy life cycles and successful reproduction. Many factors affect DO including wind mixing, turbulence, flow volumes and rates, biochemical oxygen demand, algal blooms, vegetative photosynthesis and respiration, salinity and thermal stratification, cultural eutrophication, and toxic spills Based on Environmental Protection Agency measures it is healthy have at least 5 mg/l of DO in a steam or estuary. When DO is ranging above 7 mg/l this indicates a very healthy system. If DO is below 4 mg/l on average the stream or estuary is suffering DO depression. Some natural estuaries will experience periods of low DO due to community respiration exceeding the level of dissolved oxygen in the water column during night time. In naturally low DO events this is rapidly recovered by community photosynthesis the following day. Prolonged periods of DO below 4 mg/l indicate problems. These may also be transient such as an algal bloom. Prolonged systemic DO depression from cultural eutrophication and other excess nutrient loading such as atmospheric deposition is not recoverable without source reduction efforts. Conditions below 2mg/l are considered anoxic and can be fatal to most fishes and invertebrates. The Florida Department of Environmental Protection provided the data for all dissolved oxygen analysis.

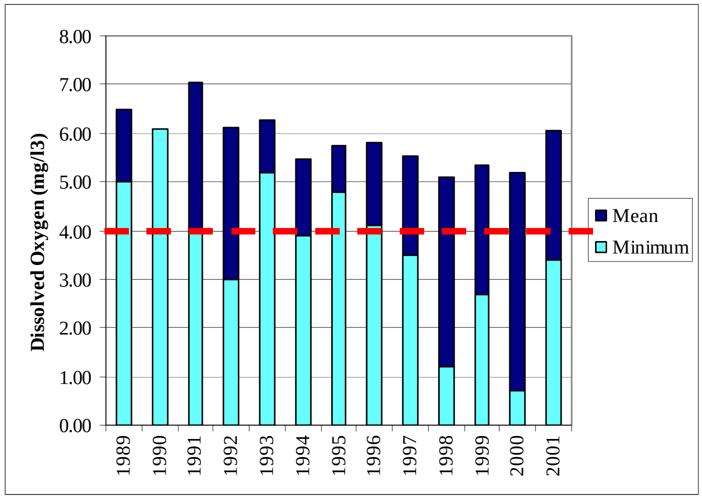
Dissolved Oxygen in Marine Systems

Dissolved Oxygen in Estero Bay

1999-2001 change: +13% mean, +26% minimum

WQ Standard Met? Yes

Year	Mean	Mini-mum	Month of Minimum
1999	5.35	2.70	June
2000	5.18	0.70	September
2001	6.06	3.40	October

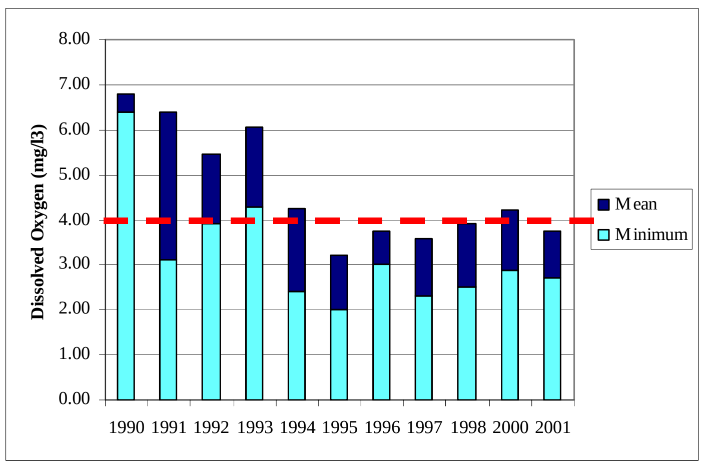


Dissolved Oxygen in the Marine Estero Bay Drainage aka Mullock Creek

1998-2001 change: -4% mean +8% minimum

WQ Standard Met? No

Year	Mean	Mini-mum	Month of Minimum
1998	3.93	2.50	July
2000	4.21	2.88	July
2001	3.75	2.70	June

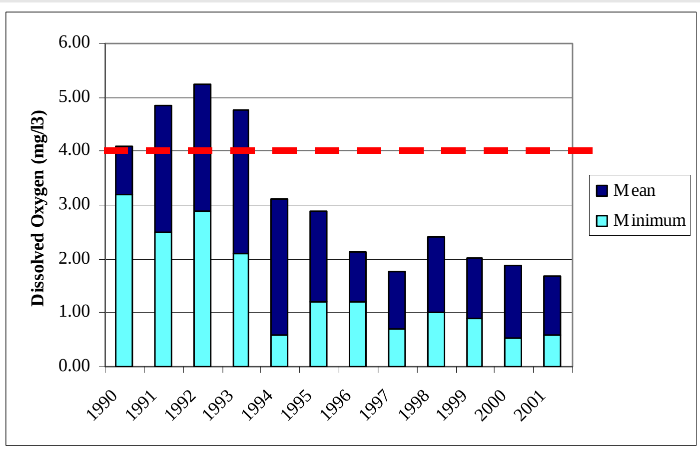


Dissolved Oxygen in Marine Hendry Creek

1998-2001 Change: -30% mean, -40% minimum

WQ standard met: No

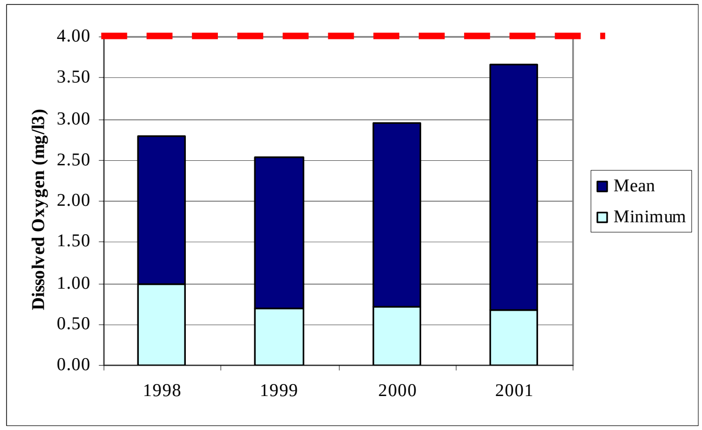
Year	Mean	Mini-mum	Month of Minimum
1999	2.02	0.90	February
2000	1.88	0.52	April
2001	1.69	0.60	June/Aug



Dissolved Oxygen in Estero River

1999-2001 change:	+45% mean, -4% minimum
WQ Standard Met?	No

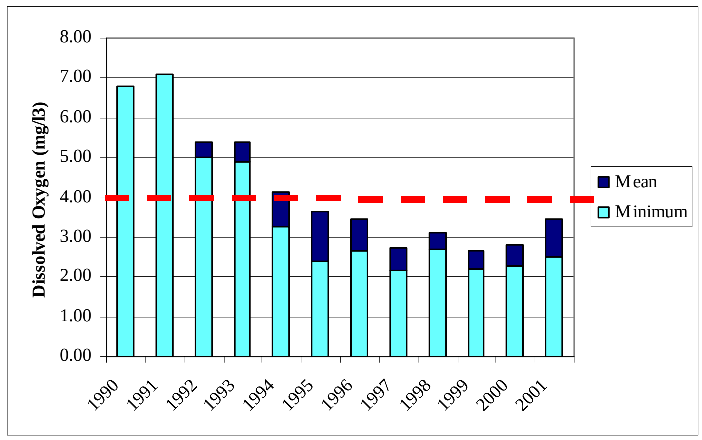
Year	Mean	Mini-mum	Season of Minimum
1999	2.53	0.70	September
2000	2.96	0.72	March
2001	3.67	0.98	July



Dissolved Oxygen in Marine Spring Creek

1999-2001 change:	+31% mean, +13% minimum
WQ Standard Met?	No

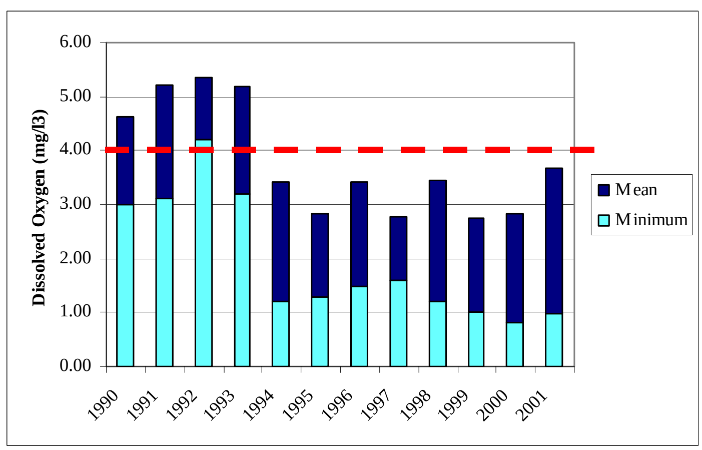
Year	Mean	Mini-mum	Season of Minimum
1999	2.65	2.20	Spring
2000	2.80	2.27	Spring
2001	3.46	2.50	Spring



Dissolved Oxygen in the Marine Imperial River

1999-2001 change:	+34% mean, -1% minimum
WQ Standard Met?	Yes

Year	Mean	Mini-mum	Month of Minimum
1999	2.75	1.00	September
2000	2.83	0.80	September
2001	3.68	0.99	September



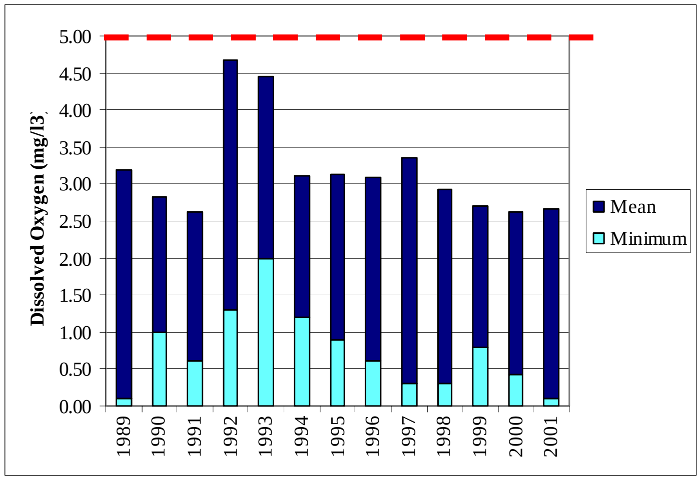
Dissolved Oxygen in Freshwater Systems

Dissolved Oxygen in the Freshwater Estero Bay Drainage aka Mullock Creek

1999-2001 change: -1% mean, -88% minimum

WQ Standard Met? No

Year	Mean	Minimum	Month of Minimum
1999	2.70	0.80	September
2000	2.62	0.42	August
2001	2.67	0.10	October

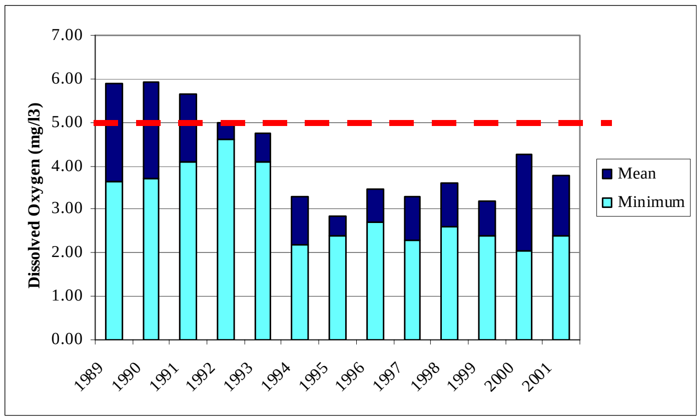


Dissolved Oxygen in the Ten Mile Canal

1999-2001 change: +19% mean, +0% minimum

WQ Standard Met? No

Year	Mean	Minimum	Season of Minimum
1998	3.18	2.40	Summer
2000	4.26	2.05	Summer
2001	3.79	2.40	Fall

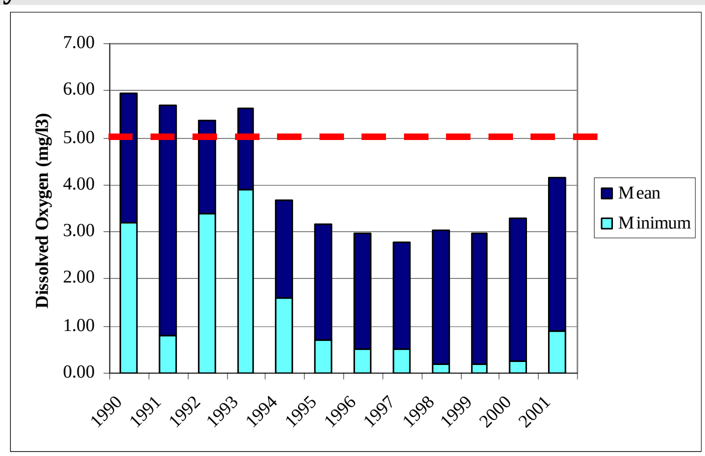


Dissolved Oxygen in Freshwater Hendry Creek

1999-2001 Change: +41% mean, +350% minimum

WQ standard met: Yes

Year	Mean	Minimum	Month of Minimum
1998	2.96	0.20	May
2000	3.28	0.27	June
2001	4.17	0.90	June

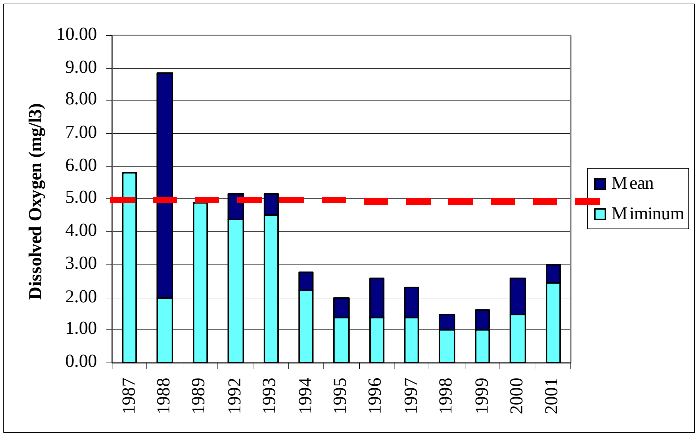


Dissolved Oxygen in Freshwater Spring Creek

1999-2001 change: +87% mean, +146% minimum

WQ Standard Met? No

Year	Mini-mum	Peak	Season of Minimum
1999	1.60	1.00	Summer
2000	2.60	1.48	Fall
2001	2.99	2.46	Spring

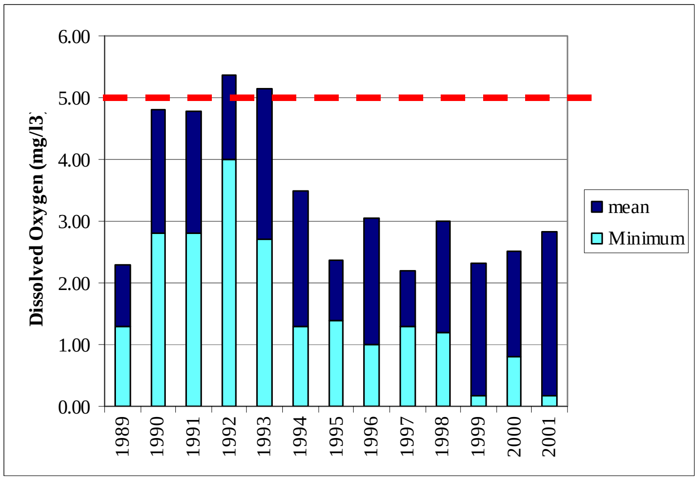


Dissolved Oxygen in the Freshwater Imperial River

1999-2001 change: +22% mean, +0% minimum

WQ Standard Met? Yes

Year	Mean	Mini-mum	Month of Minimum
1999	2.31	0.17	October
2000	2.51	0.80	March/Oct
2001	2.83	0.17	May



Lower Spring Creek

Parameter: Fecal Coliform

Fecal Coliform is a measure of bacteriological contamination of the water column based on the activity of *Eschericia coli*, commensal bacteria of higher vertebrates. It is a surrogate measure for other more harmful bacteriological and viral contaminants associated with waste material from human, and vertebrate fecal discharges. This parameter includes inputs from many environmental inputs of fecal waste including human sewage from a variety of sources (including vessels, septic tanks, land sludge spreading, and package and other sewage treatment plants), waste from livestock including cattle, and chickens, and waste material from wild and feral animals. Fecal Coliform can be naturally high in association with active bird rookeries. Therefore a healthy estuary with normal animal activity will have a natural background level. A State of Florida standard of a single count of equal to or exceeding 1,000counts/100 ml, or a monthly average of 200counts/100ml is considered impaired in Class III State waters. In order for a section of Estero Bay to meet Class II Shellfish Harvesting standards it would have to have less than 70 counts/100ml single sample and 14 counts/100ml median. All of Estero Bay and its tributaries are Outstanding Florida Waters and the fecal Coliform standard should be set at the measures taken by the Florida Department of Environmental Regulation at the time of the OFW designation   Florida Department of Environmental Protection provided the data for all fecal coliform analysis.

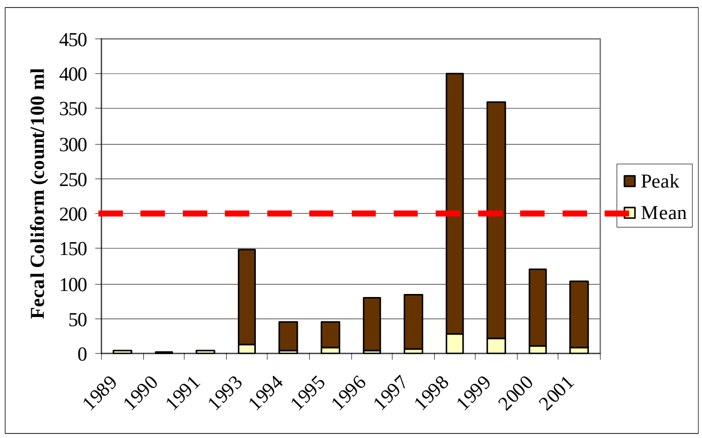
Fecal Coliform in Marine Systems

Fecal Coliform in Estero Bay

1999-2001 change: -62% mean, -71% peak

WQ Standard Met? Yes

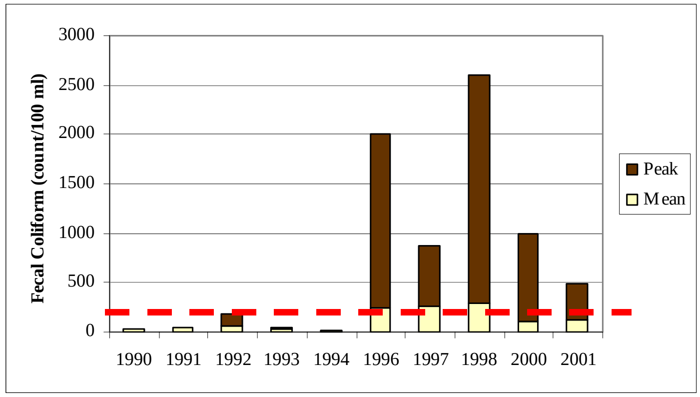
Year	Mean	Peak	Month of Peak
1999	20.72	306	June
2000	10.97	120	August
2001	7.79	104	February



Fecal Coliform in the Marine Estero Bay Drainage aka Mullock Creek

1998-2001 change: -61% mean
-81% peak
WQ Standard Met? No, monthly avg

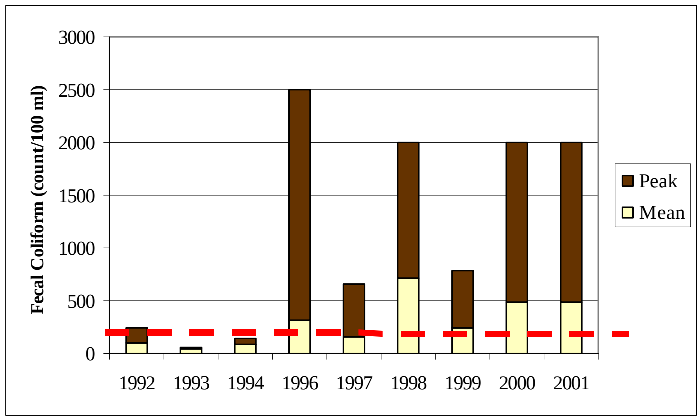
Year	Mean	Peak	Month of Peak
1998	296.36	2600	February
2000	110.50	1000	September
2001	116.36	1000	February



Fecal Coliform in Marine Hendry Creek

1998-2001 Change: +105% mean,
+153% peak
WQ standard met: No

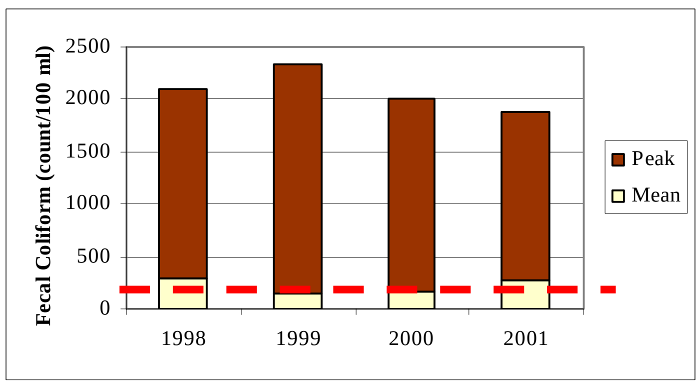
Year	Mean	Peak	Month of Peak
1999	240.00	790	February
2000	487.50	2000	September
2001	491.25	2000	June/Aug



Fecal Coliform in Estero River

1999-2001 change: +85% mean,
-19% peak
WQ Standard Met? No

Year	Mean	Peak	Season of Peak
1999	149.32	2180	April
2000	157.51	2000	September
2001	276.47	1880	January

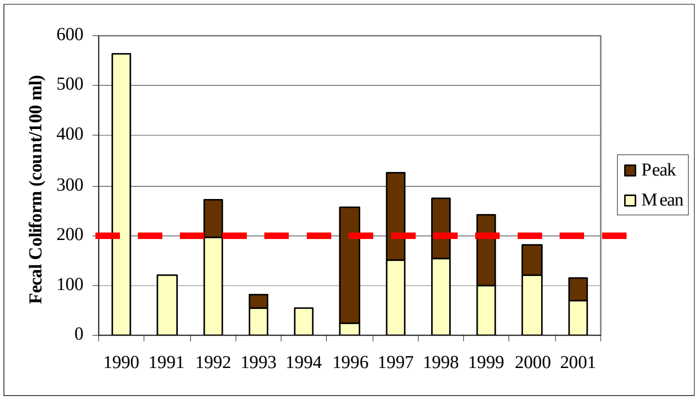


Fecal Coliform in Marine Spring Creek

1999-2001 change: -31% mean, -52% peak

WQ Standard Met? No

Year	Mean	Peak	Season of Peak
1999	100.00	240	Winter
2000	120.00	180	Fall
2001	68.75	115	Winter

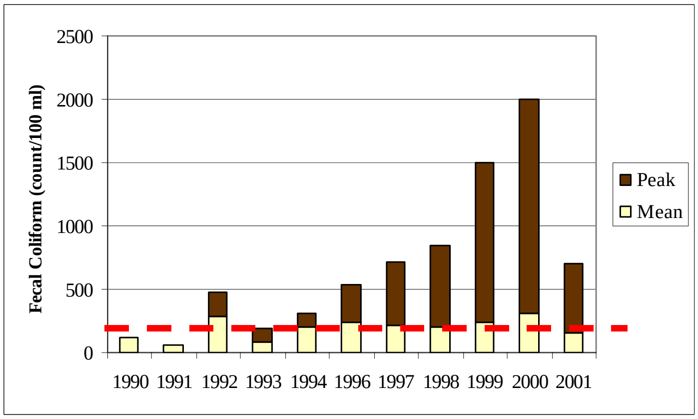


Fecal Coliform in the Marine Imperial River

1999-2001 change: -35% mean -53% peak

WQ Standard Met? Yes

Year	Mean	Peak	Month of Peak
1999	243.75	1500	January
2000	308.75	2000	August
2001	158.25	700	February



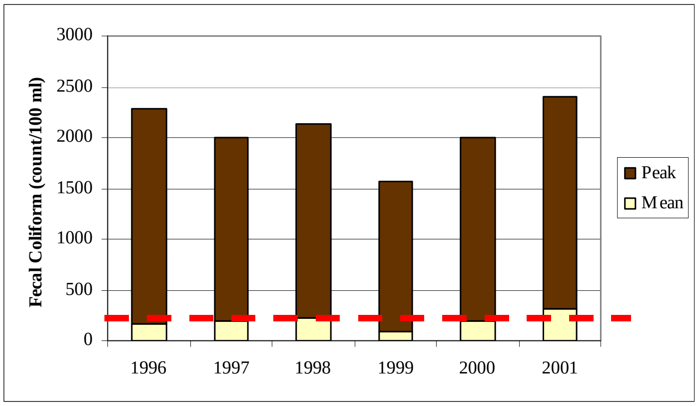
Fecal Coliform in Freshwater Systems

Fecal Coliform in the Freshwater Estero Bay Drainage aka Mullock Creek

1999-2001 change: +229% mean, +53% peak

WQ Standard Met? No

Year	Mean	Peak	Month of Peak
1999	94.07	1570	August
2000	193.26	2000	September
2001	309.29	2400	August

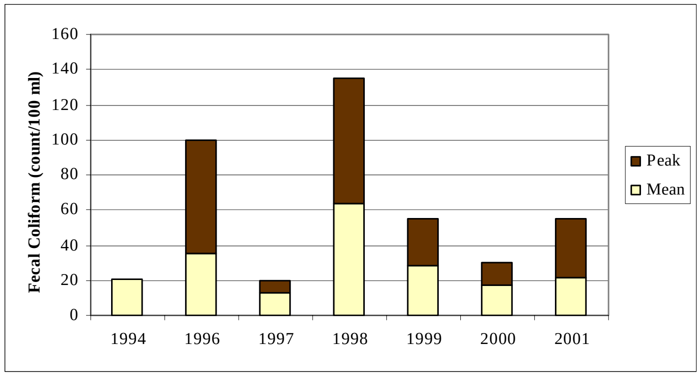


Fecal Coliform in the Ten Mile Canal

1999-2001 change: -26% mean, +0% peak

WQ Standard Met? Yes

Year	Mean	Peak	Season of Peak
1998	28.75	55	Winter
2000	17.50	30	Summer
2001	21.25	55	Summer

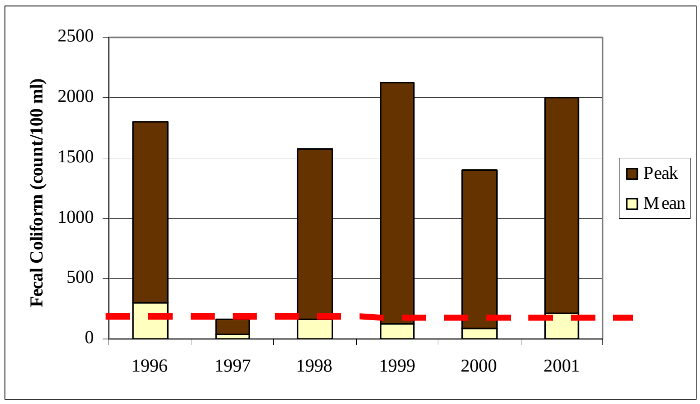


Fecal Coliform in Freshwater Hendry Creek

1999-2001 Change: +58% mean, -6% peak

WQ standard met: No

Year	Mean	Peak	Month of Peak
1998	131.25	2130	September
2000	84.23	1400	December
2001	207.17	2000	June/Aug

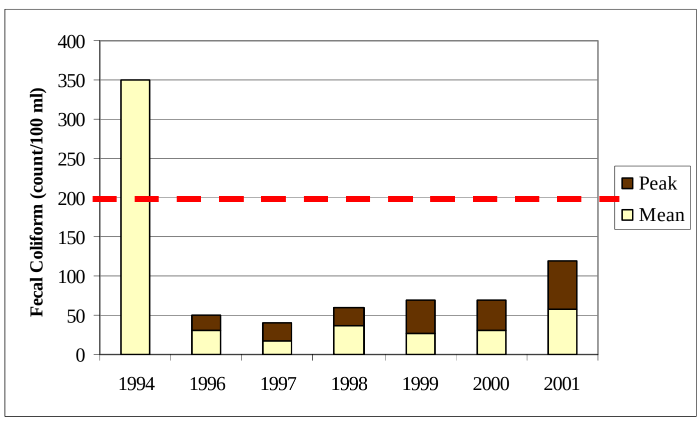


Fecal Coliform in Freshwater Spring Creek

1999-2001 change: +109% mean, +71% peak

WQ Standard Met? Yes

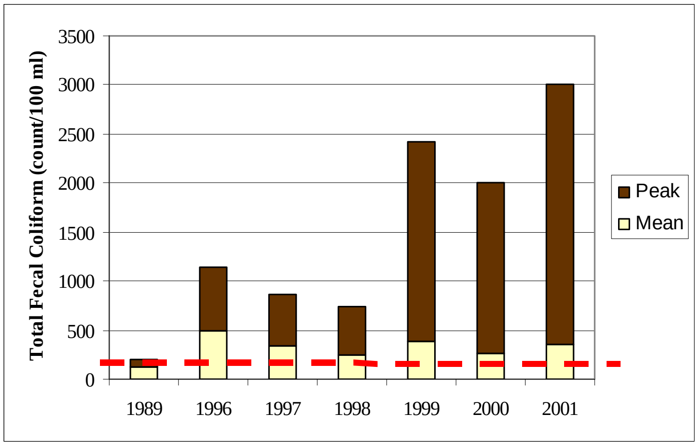
Year	Mean	Peak	Season of Peak
1999	27.50	70	Summer
2000	31.25	70	Winter
2001	57.50	120	Summer



Fecal Coliform in the Freshwater Imperial River

1999-2001 change:	-9% mean, +24% peak
WQ Standard Met?	No

Year	Mean	Peak	Month of Peak
1999	383.75	2420	November
2000	257.83	2000	August
2001	348.24	3000	June



Hendry Creek

Parameter: Total Nitrogen

Total Nitrogen (TN) is a measure of all dissolved nitrogen in the water column including nitrates, nitrites and ammonia. It is a resultant parameter that synthesizes many environmental inputs of nitrogen including the dissolved organics from algae, sea grass, mangrove, and phytoplankton productivity. Based on Environmental Protection Agency measures it is normal and healthy to have less than 0.7 mg/l of TN in a steam or estuary. When TN is ranging from 0.7 to 3.5 mg/l this indicates an enriched system on its way to eutrophication (fair). If TN exceeds 3.5 mg/l the stream or estuary is eutrophied. TN in and of itself does not identify the source of nitrogen. All of Estero Bay and its tributaries are Outstanding Florida Waters and the TN standard should be set at the measures taken by the Florida Department of Environmental Regulation at the time of the OFW designation. Florida Department of Environmental Protection provided the data for all Total Nitrogen analysis.

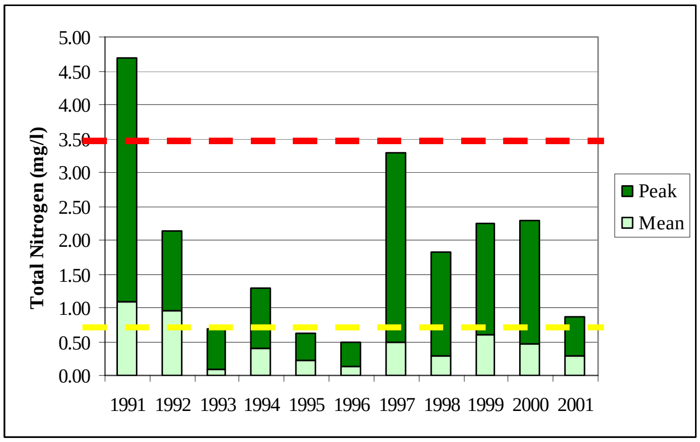
Total Nitrogen in Marine Systems

Total Nitrogen in Estero Bay

1999-2001 change: -51% mean, -62% peak

WQ Standard Met? Yes

Year	Mean	Peak	Month of Peak
1999	0.60	2.24	December
2000	0.47	2.29	October
2001	0.30	0.86	October

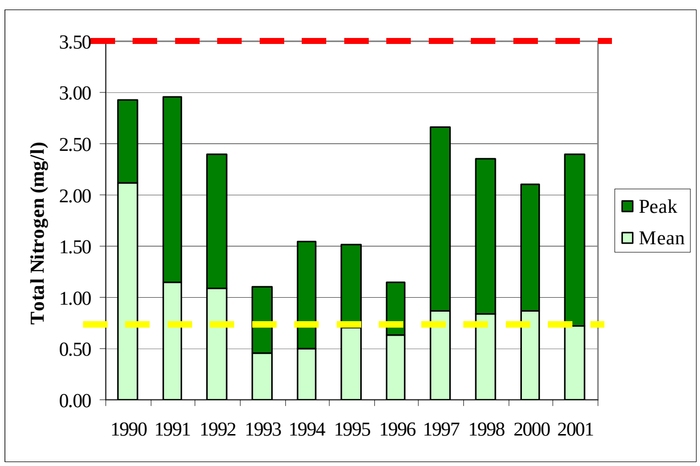


Total Nitrogen in the Marine Estero Bay Drainage aka Mullock Creek

1998-2001 change: -14% mean +2% peak

WQ Standard Met? Caution

Year	Mean	Peak	Month of Peak
1998	0.84	2.35	December
2000	0.86	2.11	April
2001	0.73	2.40	February

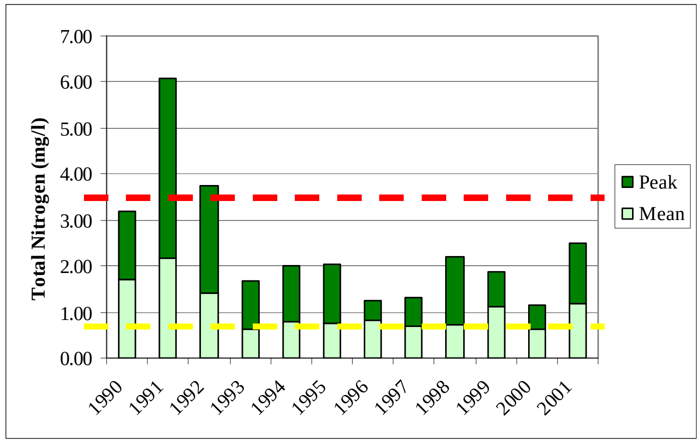


Total Nitrogen in Marine Hendry Creek

1998-2001 Change: +6% mean, +34% peak

WQ standard met: Caution

Year	Mean	Peak	Month of Peak
1999	1.11	1.88	November
2000	0.63	1.14	September
2001	1.17	2.51	February

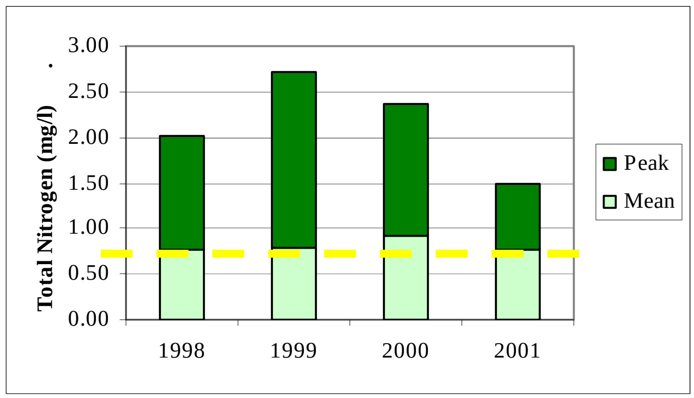


Total Nitrogen in Estero River

1999-2001 change: -3% mean, -45% peak

WQ Standard Met? Caution

Year	Mean	Peak	Month of Peak
1999	0.79	2.72	January
2000	0.92	2.36	April
2001	0.77	1.50	January

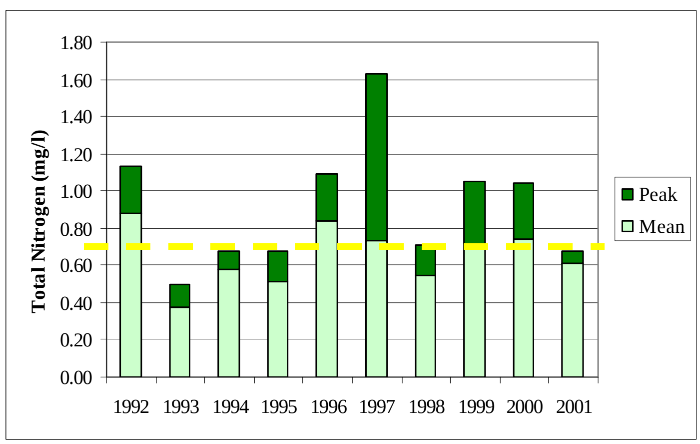


Total Nitrogen in Marine Spring Creek

1999-2001 change: -15% mean, -36% peak

WQ Standard Met? Yes

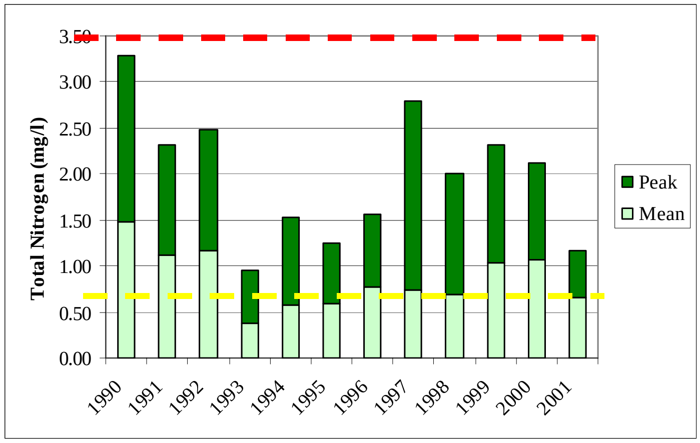
Year	Mean	Peak	Season of Peak
1999	0.72	1.05	Summer
2000	0.84	1.05	Summer
2001	0.61	0.68	Fall



Total Nitrogen in the Marine Imperial River

1999-2001 change: -37% mean
-50% peak
WQ Standard Met? Yes

Year	Mean	Peak	Month of Peak
1999	1.04	2.31	January
2000	1.07	2.12	October
2001	0.65	1.16	May

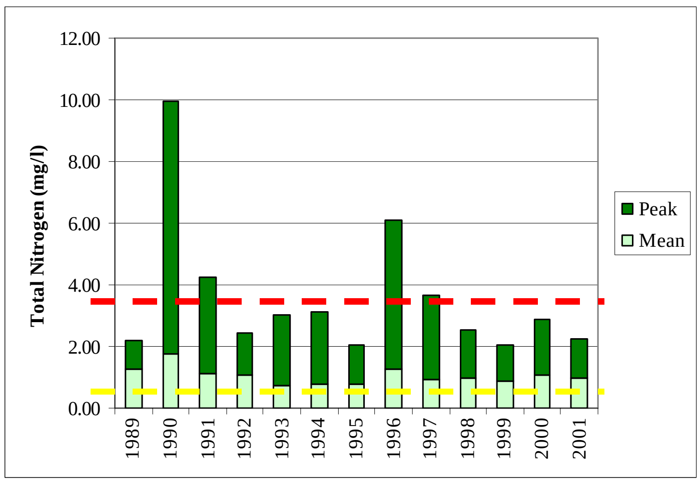


Total Nitrogen in Freshwater Systems

Total Nitrogen in the Freshwater Estero Bay Drainage aka Mullock Creek

1999-2001 change: +12% mean,
+10% peak
WQ Standard Met? Caution

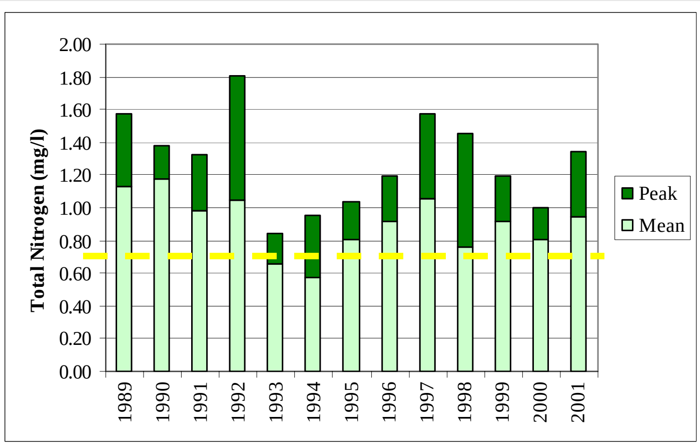
Year	Mean	Peak	Month of Peak
1999	0.89	2.03	June
2000	1.07	2.87	July
2001	1.00	2.24	August



Total Nitrogen in the Ten Mile Canal

1999-2001 change: +3% mean,
+12% peak
WQ Standard Met? Caution

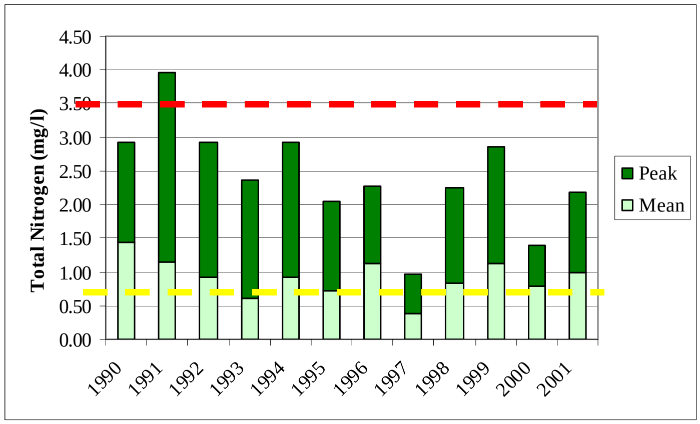
Year	Mean	Peak	Season of Peak
1998	0.92	1.20	Spring
2000	0.81	1.00	Fall
2001	0.95	1.34	Winter



Total Nitrogen in Freshwater Hendry Creek

1999-2001 Change:	-11% mean, -24% peak
WQ standard met:	Caution

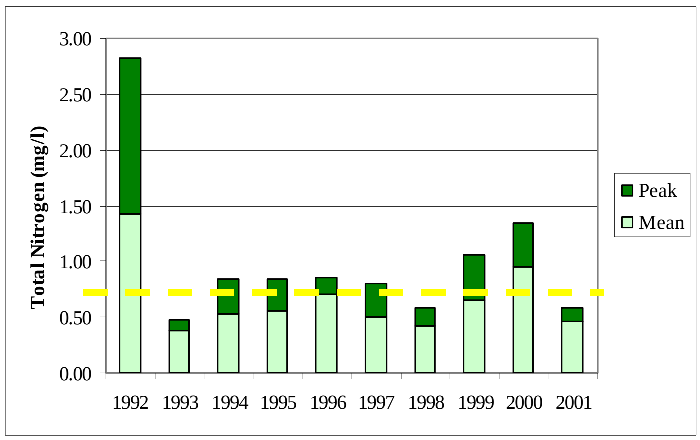
Year	Mean	Peak	Month of Peak
1999	1.12	2.86	October
2000	0.79	1.40	November
2001	1.00	2.18	February



Total Nitrogen in Freshwater Spring Creek

1999-2001 change:	-29% mean, -56% peak
WQ Standard Met?	Yes

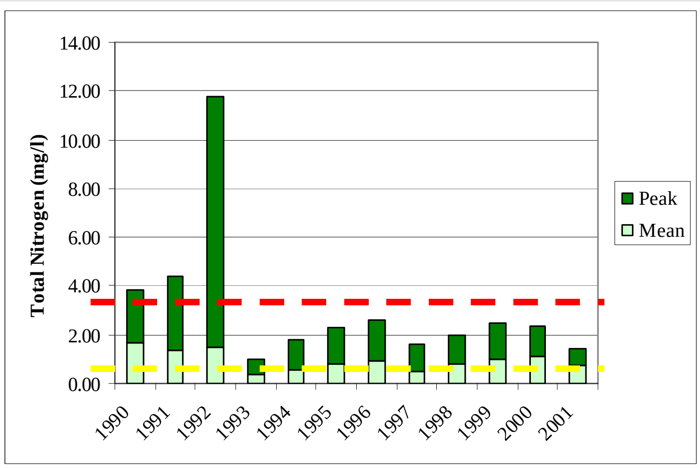
Year	Mean	Peak	Month of Peak
1999	0.65	1.06	Summer
2000	0.95	1.34	Fall
2001	0.46	0.59	Spring



Total Nitrogen in the Freshwater Imperial River

1999-2001 change:	+23% mean, +43% peak
WQ Standard Met?	Caution

Year	Mean	Peak	Month of Peak
1999	0.98	2.47	December
2000	1.14	2.35	July
2001	0.75	1.41	May



Parameter: Total Phosphorus

Total Phosphorus (TN) is a measure of all dissolved Total Phosphorus in the water column including phosphates. It is a resultant parameter that synthesizes many environmental inputs of phosphates. Based on Environmental Protection Agency measures it is normal and healthy to have less than 0.1 mg/l of TP in a steam or estuary. When TP is ranging from 0.1 to 0.5 mg/l this indicates an enriched system on its way to eutrophication (fair). If TP exceeds 0.5 mg/l the stream or estuary is eutrophied. TP in and of itself does not identify the source of nitrogen. All of Estero Bay and its tributaries are Outstanding Florida Waters and the TP standard should be set at the measures taken by the Florida Department of Environmental Regulation at the time of the OFW designation. Florida Department of Environmental Protection provided the data for all Total Phosphorus analysis.

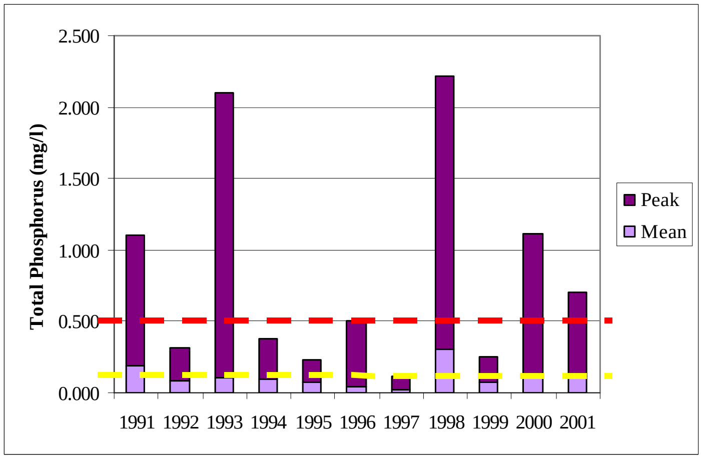
Total Phosphorus in Marine Systems

Total Phosphorus in Estero Bay

1999-2001 change: +53% mean, +180% peak

WQ Standard Met? Caution

Year	Mean	Peak	Month of Peak
1999	0.07	0.25	March
2000	0.12	1.11	June
2001	0.11	0.70	March

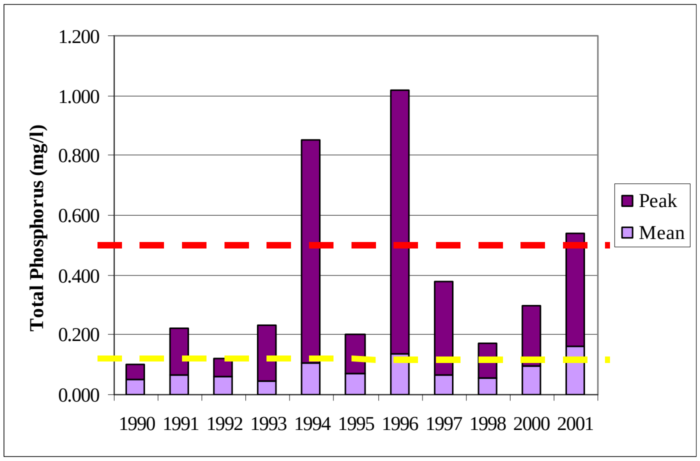


Total Phosphorus in the Marine Estero Bay Drainage aka Mullock Creek

1998-2001 change: +187% mean +375% peak

WQ Standard Met? Caution

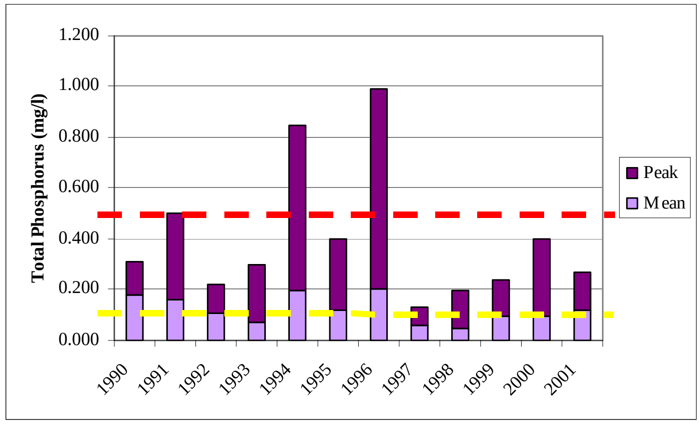
Year	Mean	Peak	Month of Peak
1998	0.06	0.17	October
2000	0.09	0.30	February
2001	0.16	0.54	March



Total Phosphorus in Marine Hendry Creek

1999-2001 Change:	+28% mean, +13% peak
WQ standard met:	Caution

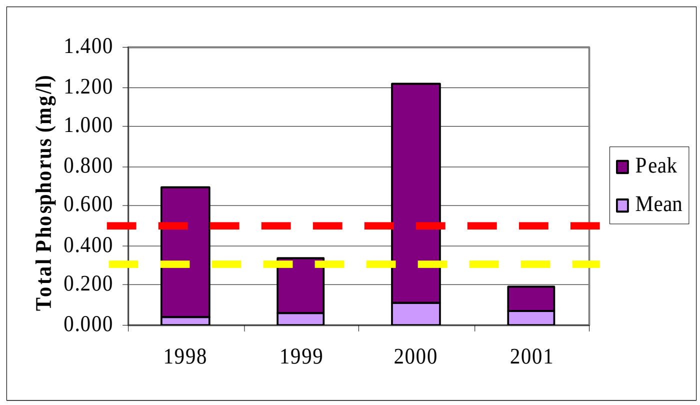
Year	Mean	Peak	Month of Peak
1999	0.10	0.24	December
2000	0.09	0.40	June
2001	0.12	0.27	June



Total Phosphorus in Estero River

1999-2001 change:	+16% mean, -44% peak
WQ Standard Met?	Yes

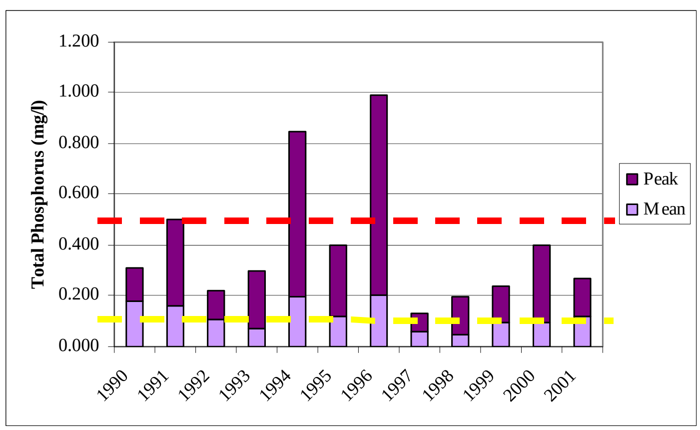
Year	Mean	Peak	Month of Peak
1999	0.06	0.34	November
2000	0.11	1.22	August
2001	0.07	0.19	June



Total Phosphorus in Marine Spring Creek

1999-2001 change:	+49% mean, +80% peak
WQ Standard Met?	Yes

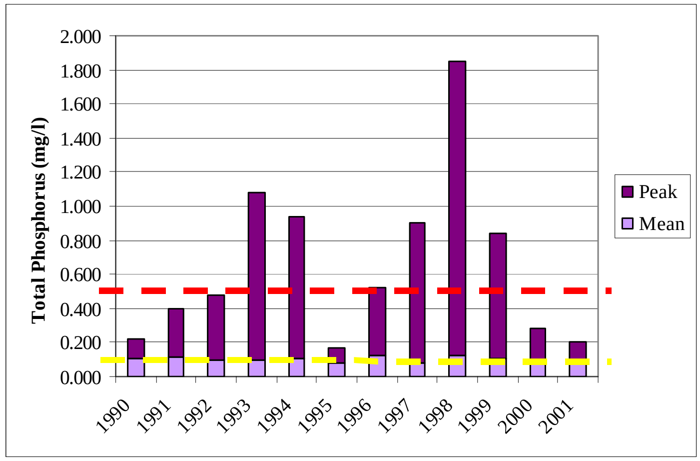
Year	Mean	Peak	Month of Peak
1999	0.05	0.05	All
2000	0.07	0.14	Summer
2001	0.07	0.09	Winter



Total Phosphorus in the Marine Imperial River

1999-2001 change:	-28% mean -76% peak
WQ Standard Met?	Caution

Year	Mean	Peak	Month of Peak
1999	0.11	0.84	October
2000	0.08	0.28	June
2001	0.07	0.20	July/Sept

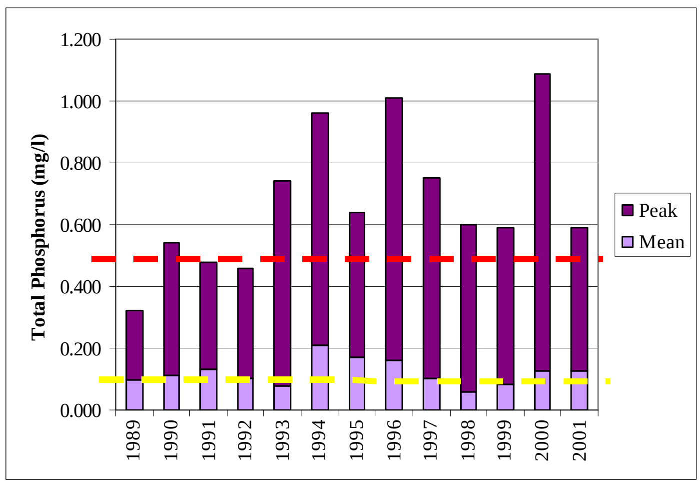


Total Phosphorus in Freshwater Systems

Total Phosphorus in the Freshwater Estero Bay Drainage aka Mullock Creek

1999-2001 change:	+53% mean, 0% peak
WQ Standard Met?	Caution

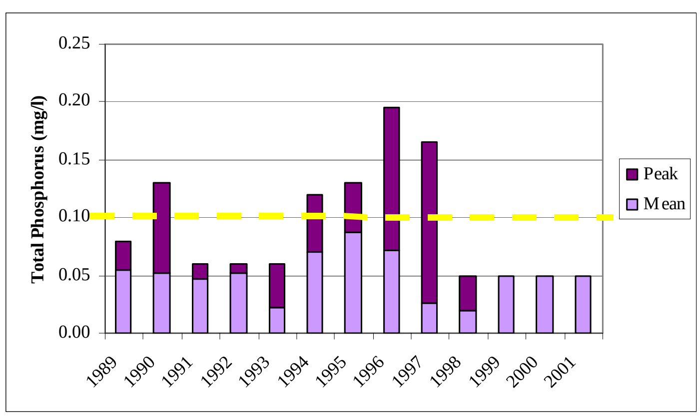
Year	Mean	Peak	Month of Peak
1999	0.08	0.59	December
2000	0.13	1.09	August
2001	0.13	0.59	December



Total Phosphorus in the Ten Mile Canal

1999-2001 change:	0% mean, 0% peak
WQ Standard Met?	Yes

Year	Mean	Peak	Month of Peak
1998	0.05	0.05	All
2000	0.05	0.05	All
2001	0.05	0.05	All

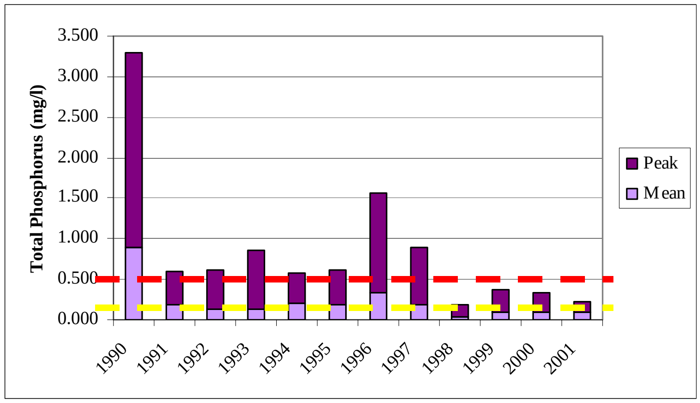


Total Phosphorus in Freshwater Hendry Creek

1999-2001 Change: 0% mean, -42% peak

WQ standard met: Yes

Year	Mean	Peak	Month of Peak
1998	0.09	0.38	May
2000	0.09	0.34	August
2001	0.09	0.22	June

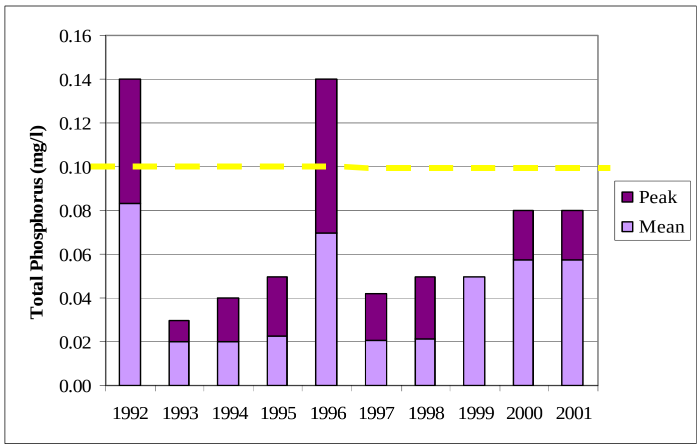


Total Phosphorus in Freshwater Spring Creek

1999-2001 change: +15% mean, +60% peak

WQ Standard Met? Yes

Year	Mean	Peak	Month of Peak
1999	0.05	0.05	All
2000	0.06	0.08	Fall
2001	0.06	0.08	Spring

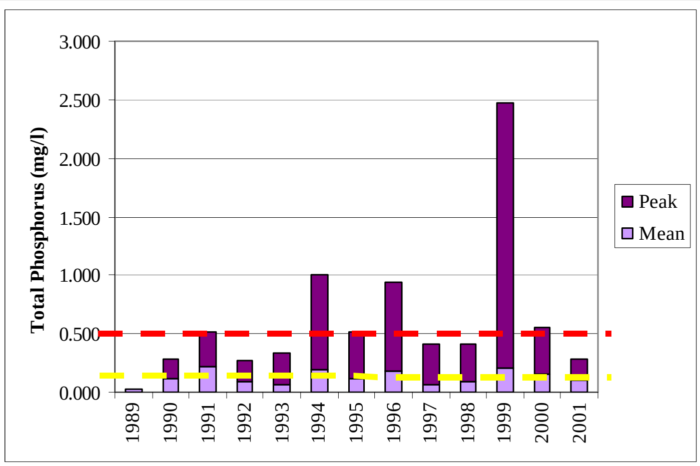


Total Phosphorus a in the Freshwater Imperial River

1999-2001 change: -49% mean, --89% peak

WQ Standard Met? Caution

Year	Mean	Peak	Month of Peak
1999	0.21	2.47	December
2000	0.15	0.56	June
2001	0.11	0.28	May



Parameter: Salinity

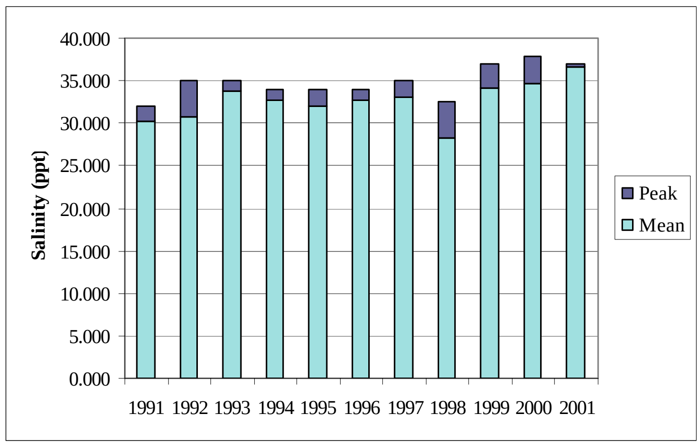
Long term salinity changes in estuaries can reflect many changing factors. With Gulf of Mexico estuaries landscape changes which alter the volume and periodicity of freshwater delivery to the estuaries can result in measurable changes. Examples include hypersalinity in lagoons and major freshwater dumping to bays at the receiving end of major canals such as the Faka-Union canal in Collier County. We are seeing a rising trend of salinity for Estero Bay over the last decade. Florida Department of Environmental Protection provided the data for all Salinity analysis.

Salinity in Marine Systems

Salinity in Estero Bay

1999-2001 change: +7% mean, 0% peak

Year	Mean	Peak	Month of Peak
1999	34.18	36.9	June
2000	34.59	37.8	May
2001	36.59	37.0	May



Parameter: Turbidity

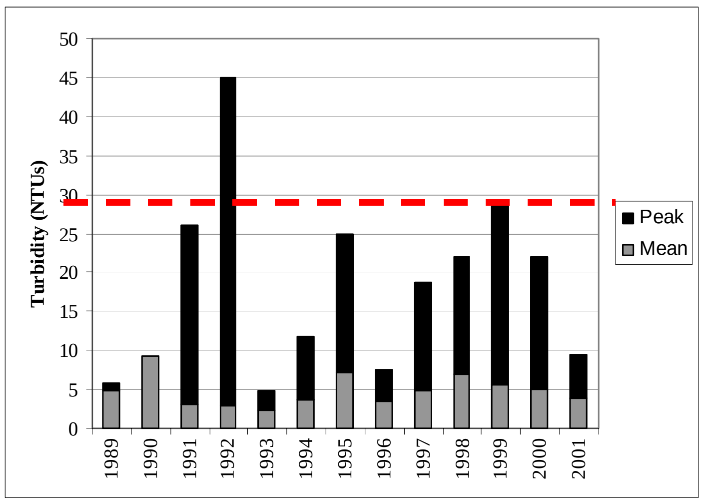
Turbidity is a measure of water clarity. It is a resultant parameter that synthesizes many environmental inputs of particles and dissolved materials including the organics from detritus, plankton productivity, natural suspended particles, and pollutants. Based on Environmental Protection Agency measures it is normal and healthy to have less than 25 JTU of Turbidity in a steam or estuary. When TP is ranging from 25 to 100 JTU this indicates an system on its way to water quality and water clarity problems (fair). If TN exceeds 100 JTU the stream or estuary is polluted by either eutrophication or inorganic materials. A standard of equal to or exceeding 29 NTU over background turbidity is considered impaired. Turbidity in and of itself does not identify the source of particles or dissolved materials. All of Estero Bay and its tributaries are Outstanding Florida Waters and the TP standard should be set at the measures taken by the Florida Department of Environmental Regulation at the time of the OFW designation. The reported data is in NTU. Florida Department of Environmental Protection provided the data for all Turbidity analysis.

Turbidity in Marine Systems

Turbidity in Estero Bay

1999-2001 change: -31% mean
-68% peak
WQ Standard Met? Yes

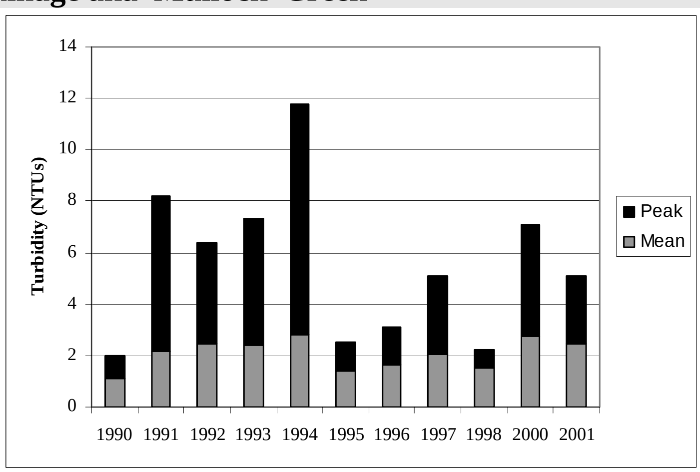
Year	Mean	Peak	Month of Peak
1999	5.62	29.00	March
2000	5.02	22.00	March
2001	3.88	9.40	March



Turbidity in the Marine Estero Bay Drainage aka Mullock Creek

1998-2001 change: +57% mean
+132% peak
WQ Standard Met? Yes

Year	Mean	Peak	Month of Peak
1998	1.55	2.20	April
2000	2.73	7.10	September
2001	2.44	5.10	June

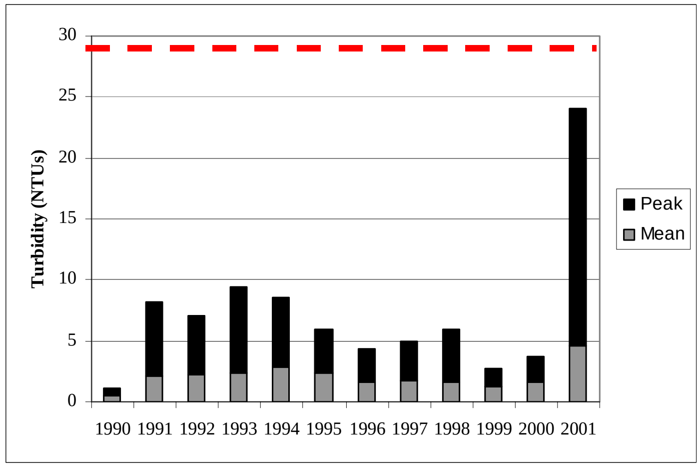


Turbidity in Marine Hendry Creek

1999-2001 Change: +269% mean, +789% peak

WQ standard met: Yes

Year	Mean	Peak	Month of Peak
1999	1.23	2.70	February
2000	1.56	3.70	June
2001	4.54	24.00	June

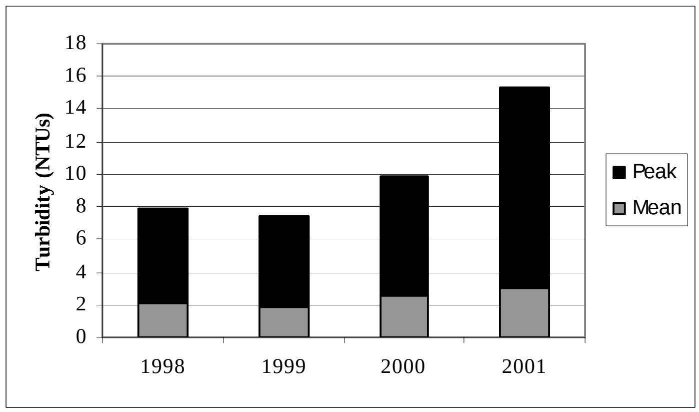


Turbidity in Estero River

1999-2001 change: 69% mean, 107% peak

WQ Standard Met? Yes

Year	Mean	Peak	Month of Peak
1999	1.82	7.40	September
2000	2.60	9.90	May
2001	3.08	12.22	June

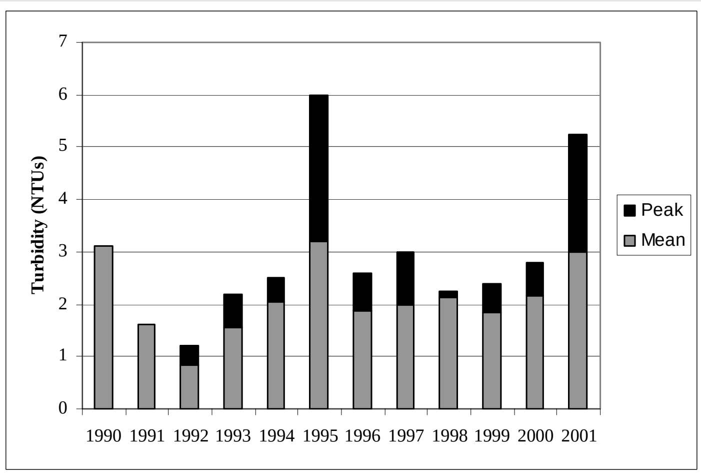


Turbidity in Marine Spring Creek

1999-2001 change: 62% mean, 119% peak

WQ Standard Met? Yes

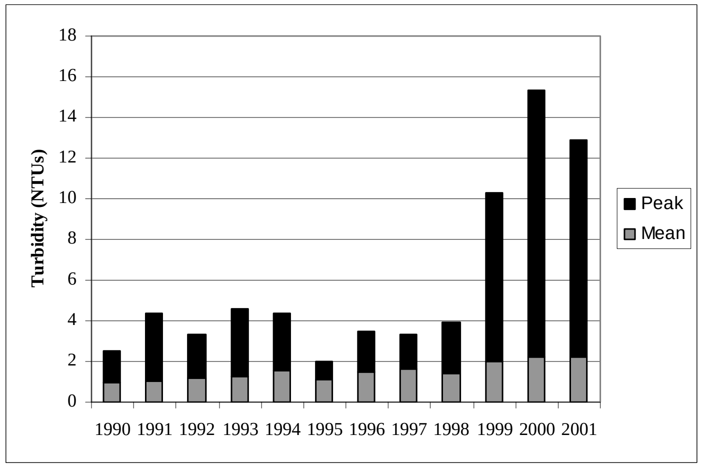
Year	Mean	Peak	Season of Peak
1999	1.85	2.40	Winter
2000	2.16	2.80	Summer
2001	2.99	5.25	Winter



Turbidity in the Marine Imperial River

1999-2001 change:	11% mean 25% peak
WQ Standard Met?	Yes

Year	Mean	Peak	Month of Peak
1999	2.02	10.30	June
2000	2.21	15.30	August
2001	2.25	12.90	February

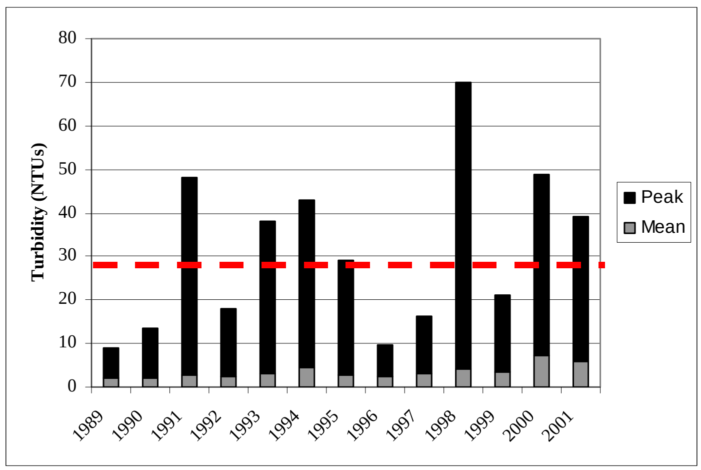


Turbidity in Freshwater Systems

Turbidity in the Freshwater Estero Bay Drainage aka Mullock Creek

1999-2001 change:	+75% mean, +86% peak
WQ Standard Met?	Yes

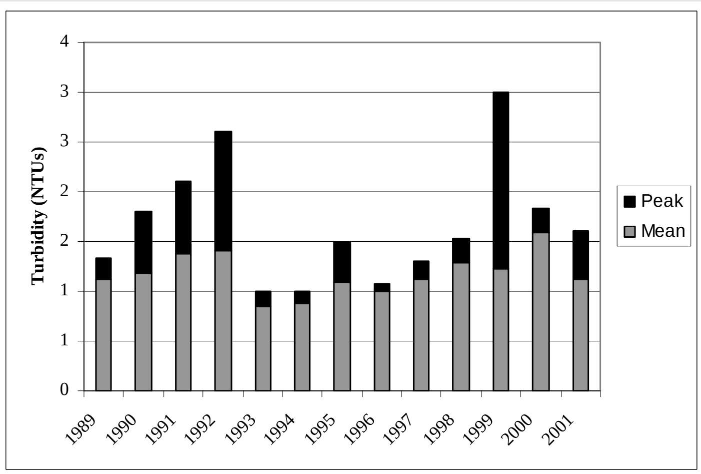
Year	Mean	Peak	Month of Peak
1999	3.32	21.00	April
2000	7.44	49.00	November
2001	5.82	39.00	July



Turbidity in the Ten Mile Canal

1999-2001 change:	-9% mean, -46% peak
WQ Standard Met?	Yes

Year	Mean	Peak	Month of Peak
1999	1.23	3.00	Spring
2000	1.59	1.84	Winter
2001	1.13	1.61	Spring

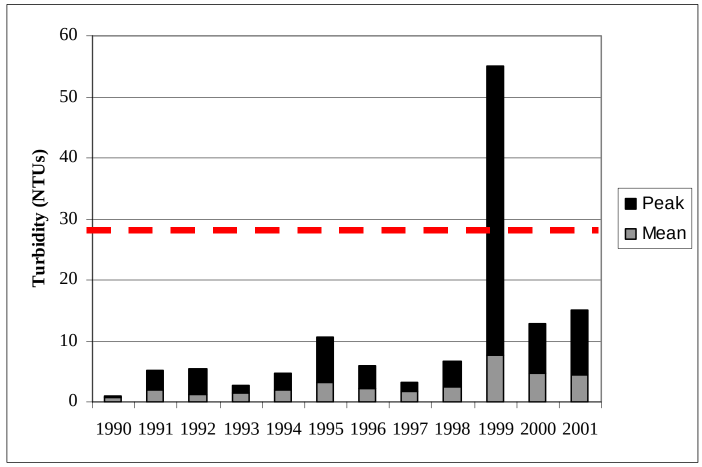


Turbidity in Freshwater Hendry Creek

1999-2001 Change: -41% mean, -73% peak

WQ standard met: Yes

Year	Mean	Peak	Month of Peak
1999	7.57	55.00	May
2000	4.67	12.90	March
2001	4.44	15.00	February

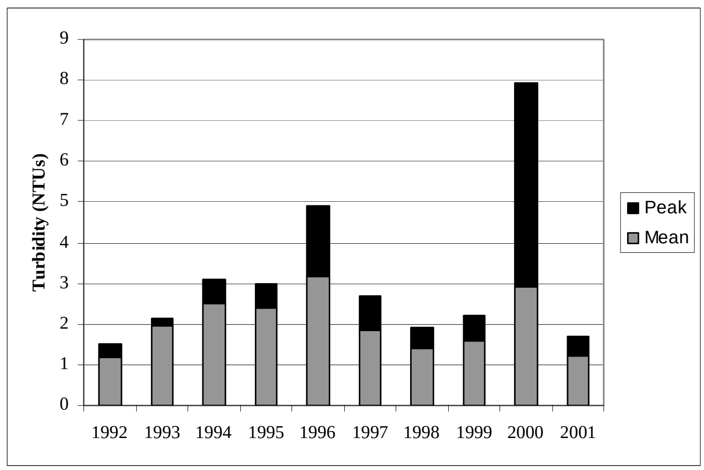


Turbidity in Freshwater Spring Creek

1999-2001 change: -25% mean, -23% peak

WQ Standard Met? Yes

Year	Mean	Peak	Month of Peak
1999	1.60	2.20	Spring
2000	2.91	7.92	Fall
2001	1.20	1.70	Spring

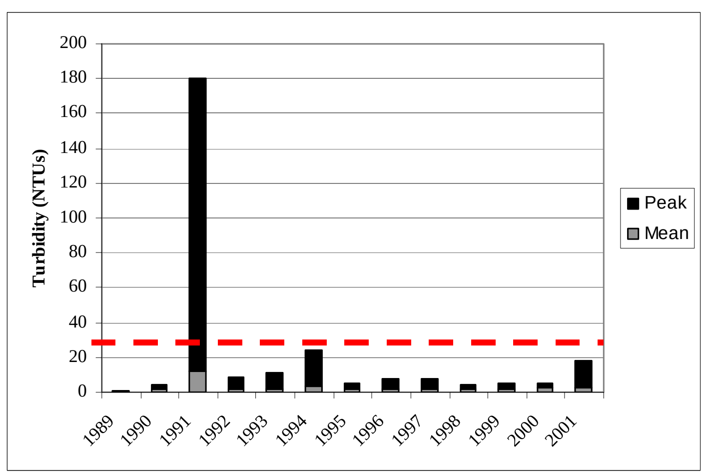


Turbidity in the Freshwater Imperial River

1999-2001 change: +38% mean, +269% peak

WQ Standard Met? Yes

Year	Mean	Peak	Month of Peak
1999	1.78	4.80	May
2000	2.99	4.80	October
2001	2.46	17.70	May



Charlotte Harbor NEP Status and Trends Assessment

The Charlotte Harbor National Estuary Program (CHNEP) completed a water quality status and trends assessment on August 27, 2003. Estero Bay was among the 8 basins assessed. The CHNEP had the following findings and recommendations:

- DO is down and nutrients, specific conductivity, and turbidity are up in Estero Bay.
- Charlotte Harbor proper is not showing many trends at all.
- Findings about tidal Caloosahatchee aren't relevant until we get salinity under control.
- Current development standards don't work well, even in areas designated OFW.
- Current development has led to flashier hydrology.
- Overall, the study area has experienced more water quality degradation than improvement.
- The Caloosahatchee basin has the best long term monitoring program of all the basins in the CHNEP study area. It has also demonstrated the most overall degradation.
- The Estero Bay basin has shown water quality degradation even though most of the area has been designated an Outstanding Florida Water during most of the trends period.
- The greatest degradation has been in Total Suspended Solids for the CHNEP study area.
- Chloride levels have improved in the SFWMD area and degraded in the SWFWMD area. Turbidity has improved in the SWFWMD area and degraded in the SFWMD area.
- All sub-basins, except for Matlacha Pass and Lemon Bay trigger some Impaired Waters Rule (IWR) standard (note: IWR Verified List will be different based on geographic area of analysis and time-frame).
- Regarding those parameters that were compared to IWR standards, ammonia is the most triggered parameter, followed by dissolved oxygen, chlorophyll a, and then total coliform. No sub-basin triggered the standards for fecal coliform.
- The sub-basins with the best overall water quality include Matlacha Pass, Pine Island Sound, and Estero Bay proper.
- The sub-basins with the worst overall water quality include Hendry Creek (in Estero Bay basin), the Peace River (at Arcadia, Bartow, and lower), Coastal Venice, Joshua Creek, and tidal Caloosahatchee (including estuarine Cape Coral).
- Note: 1 in 20 stations may falsely conclude trend. Low D.O. can be present in improving system. Inorganic nutrients are a better measure than total nutrients.

Percent of Station Improvements by Basin

Parameter	Estero	Caloosahatchee	Pine Is S./M.L.P	Charlotte Harbor
BOD	0%	0%	0%	
Chl a Corrected	33%	0%		0%
Cl	24%	27%	100%	0%
Color	0%	0%		0%
Cond	24%	9%	29%	0%
DO	0%	4%	20%	5%
Fcoli	27%	8%	0%	
NH3	0%	0%	0%	
NO23	0%	3%	0%	
pH	10%	21%	8%	71%
PO4	0%	0%	0%	
Salinity		0%	0%	0%
SO4	0%	0%		
Temp	45%	14%	1%	0%
TkN	4%	6%	7%	20%
TN	0%	9%	0%	
TOC				20%
TP	11%	4%	0%	40%
TSS	0%	3%	0%	0%
Turbidity	7%	11%	25%	29%

Percent of Station Degradation by Basin

Parameter	Estero	Caloosahatchee	Pine Is S./M.L.P	Charlotte Harbor
BOD	19%	53%	86%	
Chl a Corrected	0%	0%		0%
Cl	0%	12%	0%	20%
Color	100%	0%		0%
Cond	34%	23%	0%	0%
DO	62%	49%	17%	7%
Fcoli	9%	24%	25%	
NH3	3%	3%	0%	
NO23	15%	9%	0%	
pH	21%	21%	38%	0%
PO4	35%	4%	0%	
Salinity		10%	7%	0%
SO4	0%	0%		
Temp	0%	8%	57%	40%
TkN	4%	24%	50%	0%
TN	0%	37%	57%	
TOC				0%
TP	0%	7%	0%	0%
TSS	17%	51%	29%	80%
Turbidity	52%	37%	17%	0%

Net Station Improvement and Degradation by Basin

Parameter	Estero	Caloosahatchee	Pine Is S./M.L.P	Charlotte Harbor
BOD	-5	-36	-12	
Chl a Corrected	1	0		0
Cl	7	5	2	-1
Color	-2	0		0
Cond	-3	-10	7	0
DO	-18	-34	2	-1
Fcoli	4	-8	-2	
NH3	-1	-2	0	
NO23	-4	-4	0	
pH	-3	0	-7	10
PO4	-6	-2	0	
Salinity		-4	-5	0
SO4	0	0		
Temp	13	5	-39	-17
TkN	0	-13	-6	1
TN	0	-19	-8	
TOC				1
TP	3	-2	0	2
TSS	-5	-33	-4	-4
Turbidity	-13	-19	2	2
Average	-2	-9	-4	-1

Number of Stations for Trends Analysis by Basin

Parameter	Estero	Caloosahatchee	Pine Is S./M.L.P	Charlotte Harbor Proper
BOD	27	68	14	0
Chl a	3	1	0	5
Cl	29	33	2	5
Color	2	3	0	5
Cond	29	75	24	14
DO	29	76	70	43
Fcoli	22	49	8	0
Fl	0	0	0	0
NH3	29	58	11	0
NO23	27	70	14	0
pH	29	73	24	14
PO4	17	47	8	0
Salinity	0	42	68	29
SO4	2	1	0	0
Tcoli	0	0	0	0
Temp	29	77	70	43
TkN	27	71	14	5
TN	27	68	14	0
TOC	0	0	0	5
TP	27	71	14	5
TSS	29	69	14	5
Turbidity	29	73	24	7
Total	413	1,025	393	185

Quartiles by Sub-basin (comparison by waterbody type) (1=good, 4=bad)

Parameter		BOD	Chl a Corrected	Cl	Fcoli	NH3	NO23	PO4	Sechhi	Tcoli	TkN	TN	TP	TSS	Turb	Avg
Estero Bay	Estero Bay Proper	1	3		1	2	1	1	1		1	1	1		4	1.5
	Estero River	3	1	1	3	1	3	2			2	3	1	3	1	1.8
	Hendry	4	4		3	1	2	3			4	4	2	2	4	3.0
	Imperial	2	1		4	2	4	3			3	3	2	1	1	2.4
	Spring	2	3		3	1	3	2			2	2	1	1	1	1.9
	10-mile	2	2		3	1	1	2			3	3	1	1	1	1.8
Caloosahatchee	Tidal Caloosahatchee	3	4		2	4	1	1	3		2	2	2	3	4	2.6
	Caloosa Streams	3	3	4	3	1	1		1		1	2	2	4	1	2.2
	Orange River	3	1	2	4	3	3	3			3	3	3	1	3	2.4
Pine Is S./M.L.P	Matlacha Pass	1	1		1	1	1	1	2		1	3	2		1	1.3
	Pine Island Sound	2	2	3	1		1				1	1	1	1	1	1.4
Charlotte Harbor Proper	Charlotte Harbor Proper	1	1		1	3	2	1	2		2	3	3	4	1	1.7
	Gasparilla Sound				3								3		1	2.3
Average		2.3	2.2	2.3	2.4	2.2	2.3	2.3	2.4	1.8	2.4	2.4	2.5	2.2	1.5	2.2

rameter		Chl a Corrected*	Cl*	Cond*	Fl*	NH3*	Tcoli*	TN	TP	Turbidity
	Estero Bay Proper	0%	0%	12%		33%	0%	97%	95%	0%
	Estero River	0%	0%	17%		30%		100%	100%	0%
	Hendry	100%		0%		57%		100%	100%	0%
	Imperial	50%		25%		51%		100%	100%	0%
	Spring	0%		33%		26%		100%	100%	0%
Estero	10-mile	25%		33%		25%		100%	100%	0%
	Tidal Caloosahatchee	57%	0%	17%	0%	38%	0%	100%	93%	0%
Caloosahatchee	Orange River	0%	0%	0%		41%		100%	81%	0%
Pine Is S./M.L.P	Matlacha Pass	0%		0%		0%		100%	93%	0%
	Pine Is	0%	0%	0%		83%		90%	70%	0%
Charlotte Harbor Proper	Charlotte Harb	0% or 100%				67%		94%	85%	0%
	Gasparilla	100%		0%		0%		100%	100%	0%
verage		32%	4%	9%	0%	56%	12%	94%	94%	0%

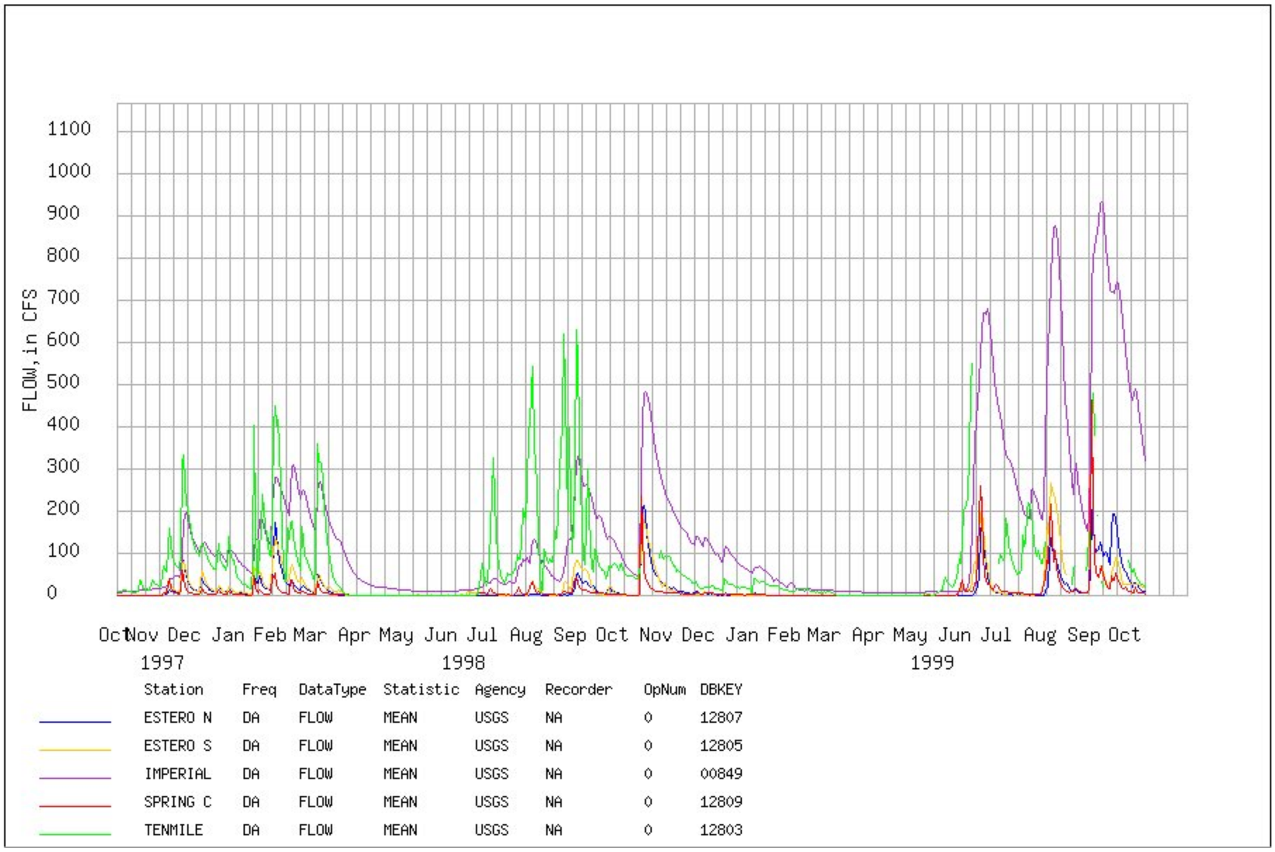
* Colored squares compared to Impaired Waters Rules standards, non-colored square compared to average of 3 alternative methods.

Prepared by L. Beever 5/25/2004

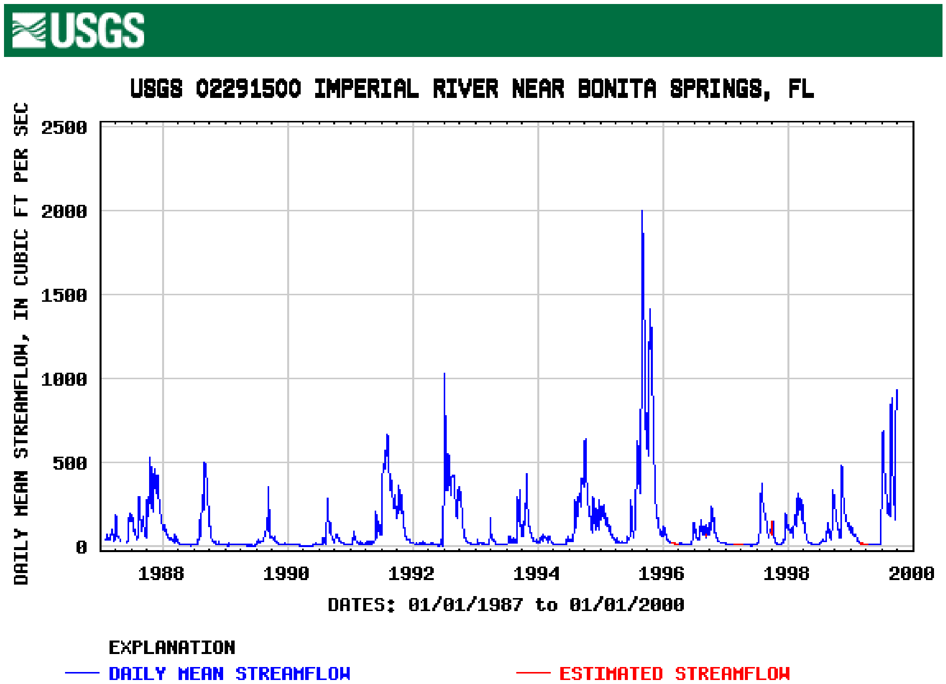
Hydrology

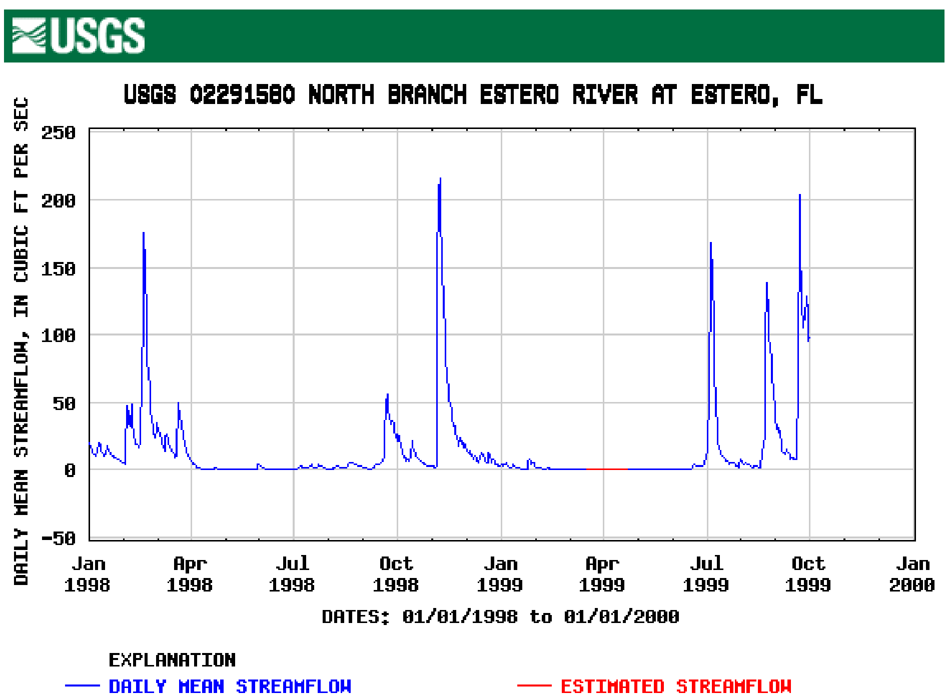
Factor: Tributary Flows

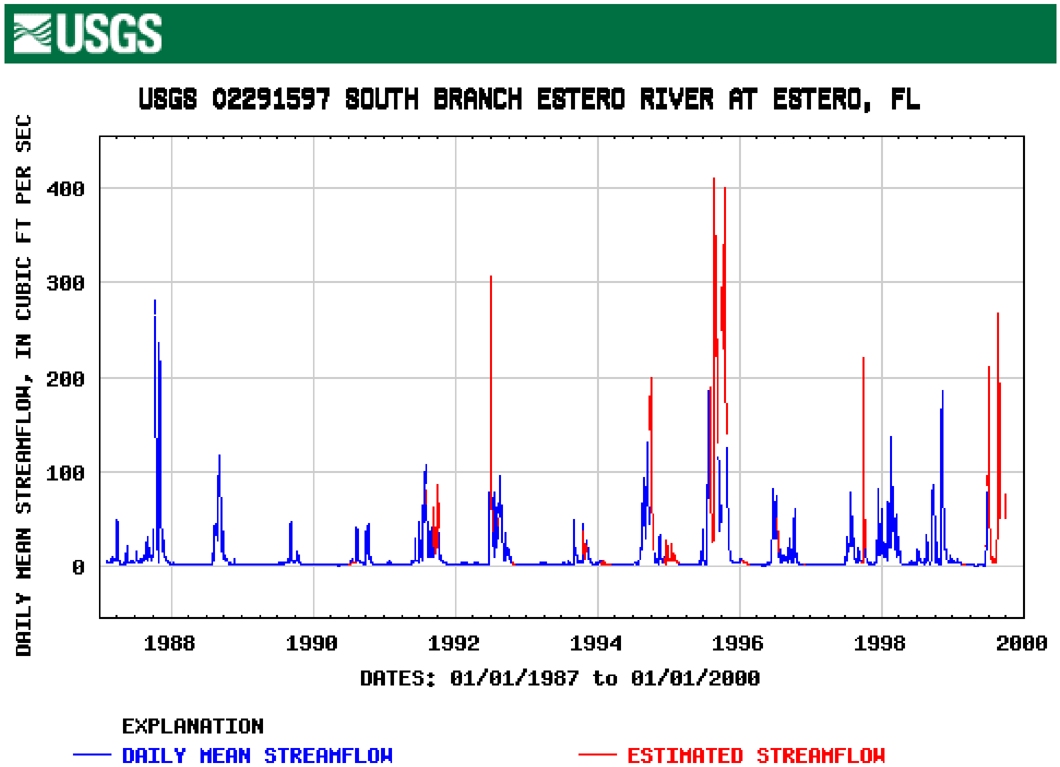
Estero Bay Tributary Flows

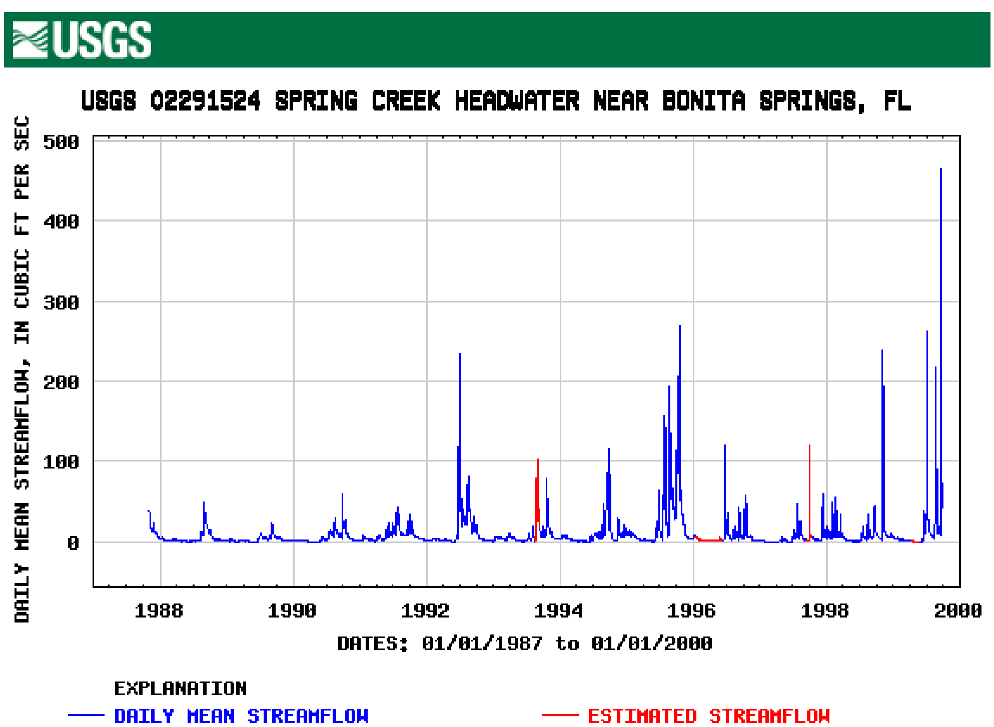


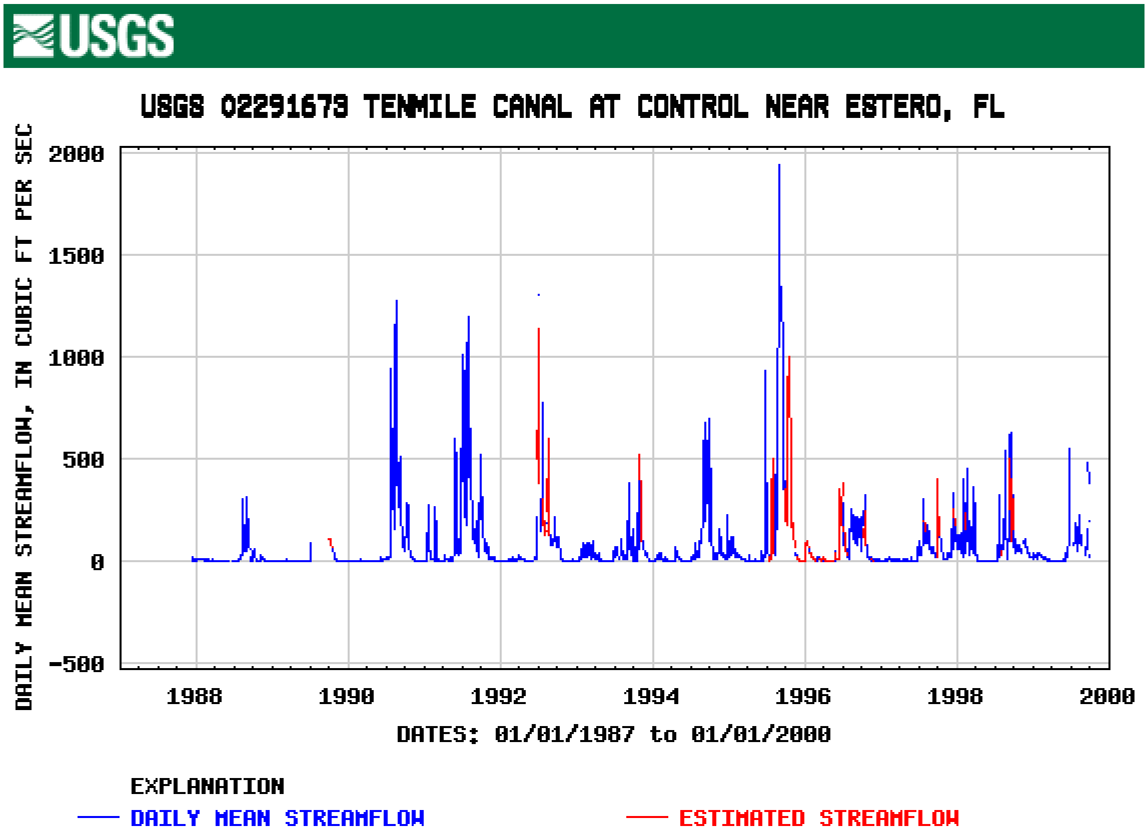
Tributary flows to Estero Bay have been altered through enhancements to drain land surfaces during wet season and retain water behind weirs and salinity barriers during dry season. This has resulted in a spiked hydroperiod with little discharge in the dry season and sharp peaks during rain events particularly when water control structures are opened. The lack of surface water retention on the landscape and the elimination of gradual sheetflow delivery to the estuary has shortened freshwater wetland hydroperiods Surface water table elevations are rapidly lowered and drought conditions are accentuated incurring exotic vegetation to invade into wetlands and an increased severity of fire season. Fisheries and wildlife dependent on depressional wetlands and riparian habitats lose valuable breeding periods and nursery habitats as the hydrologic systems acts as a flush plumbing mechanism. In some areas wading bird breeding is truncated and fails as wetlands drain to quickly and vital food concentration is lost, Amphibians such as gopher frogs and tree frogs are unable to complete reproductive life-cycles. Exotic fish, amphibians, and plants dominate.


USGS
USGS 02291500 IMPERIAL RIVER NEAR BONITA SPRINGS, FL
DAILY MEAN STREAMFLOW, IN CUBIC FT PER SEC
2500
2000
1500
1000
500
0
1988
1990
1992
1994
1996
1998
2000
DATES: 01/01/1987 to 01/01/2000
EXPLANATION
DAILY MEAN STREAMFLOW
ESTIMATED STREAMFLOW

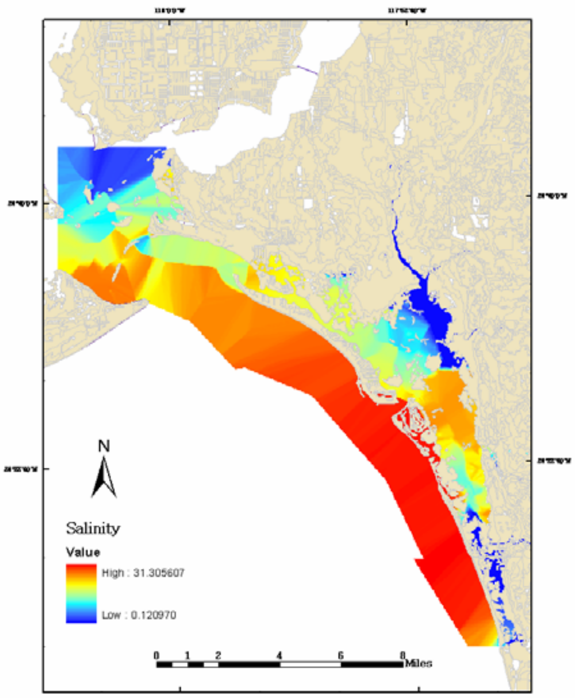

USGS
USGS 02291580 NORTH BRANCH ESTERO RIVER AT ESTERO, FL
DAILY MEAN STREAMFLOW, IN CUBIC FT PER SEC
250
200
150
100
50
0
-50
Jan 1998
Apr 1998
Jul 1998
Oct 1998
Jan 1999
Apr 1999
Jul 1999
Oct 1999
Jan 2000
DATES: 01/01/1998 to 01/01/2000
EXPLANATION
DAILY MEAN STREAMFLOW
ESTIMATED STREAMFLOW


USGS
USGS 02291597 SOUTH BRANCH ESTERO RIVER AT ESTERO, FL
DAILY MEAN STREAMFLOW, IN CUBIC FT PER SEC
400
300
200
100
0
1988
1990
1992
1994
1996
1998
2000
DATES: 01/01/1987 to 01/01/2000
EXPLANATION
DAILY MEAN STREAMFLOW
ESTIMATED STREAMFLOW

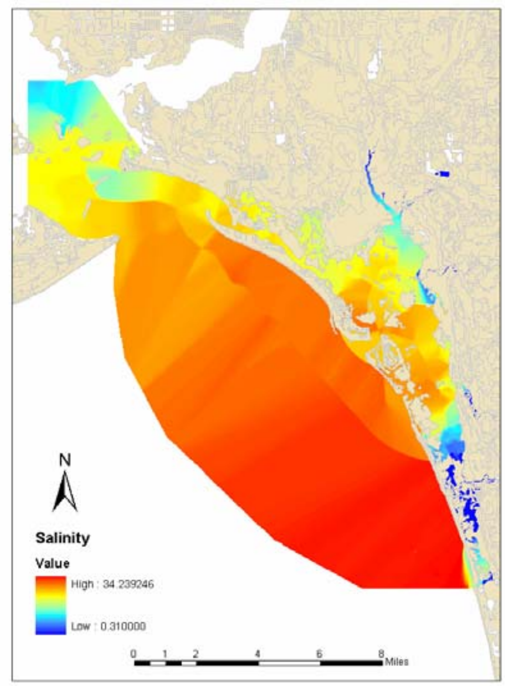

USGS
USGS 02291524 SPRING CREEK HEADWATER NEAR BONITA SPRINGS, FL
DAILY MEAN STREAMFLOW, IN CUBIC FT PER SEC
500
400
300
200
100
0
1988
1990
1992
1994
1996
1998
2000
DATES: 01/01/1987 to 01/01/2000
EXPLANATION
DAILY MEAN STREAMFLOW
ESTIMATED STREAMFLOW



Mullock Creek at Ten-Mile Canal

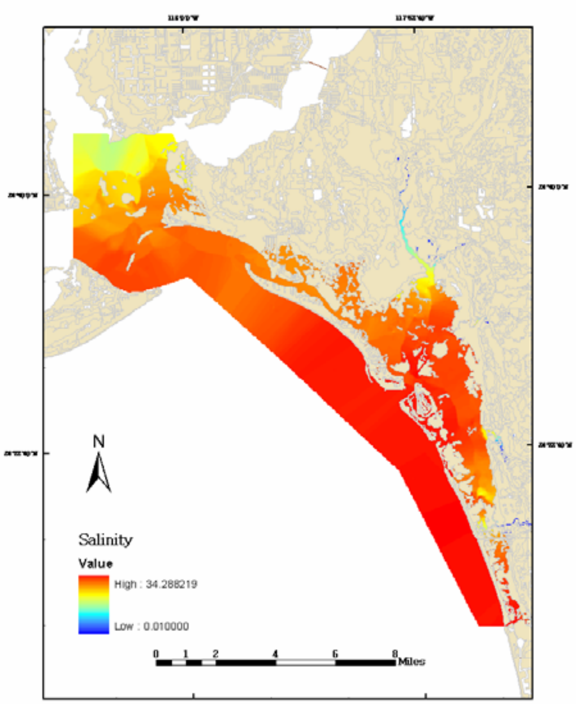


September 13, 2002



October 16, 2002

The South Florida Water Management District provided funding to the Unites States Geological Service (USGS) to conduct salinity mapping of Estero Bay and adjacent waters. Initial results are shown on these three maps.



March 7, 2003

Wildlife

Factor: Red-Cockaded Woodpecker Presence

Measure:	Number of Red-Cockaded Woodpecker Family Groups
Time Frame:	1991-2001
Data Source	FWC
Level of Change:	-68% in EBABM area
Meeting Recovery?	No

Significant loss of red cockaded woodpecker families and individuals have occurred in south and central Florida within the past ten years from catastrophic natural events (Hurricane Andrew), loss of foraging and nesting habitat to exotic invaders melaleuca and Brazilian pepper, direct violation takes, hydrologic change and land conversion from pine flatwoods to residential and agricultural landscapes lacking pines. This includes 68% loss in Lee County, 37%loss in Collier County west of the Big Cypress National Preserve, apparent local extinction from Sarasota, Manatee, Hillsborough, northern Hendry, and perhaps Hardee Counties in the last ten years. The average loss of clusters in the Southwest Florida Regional Planning Council Area on private lands in the past ten years is 44%.

Photo by: Florida Fish and Wildlife Conservation Commission

2001																					
% Change	100	90	80	70	60	50	40	30	20	10	00	10	20	30	40	50	60	70	80	90	

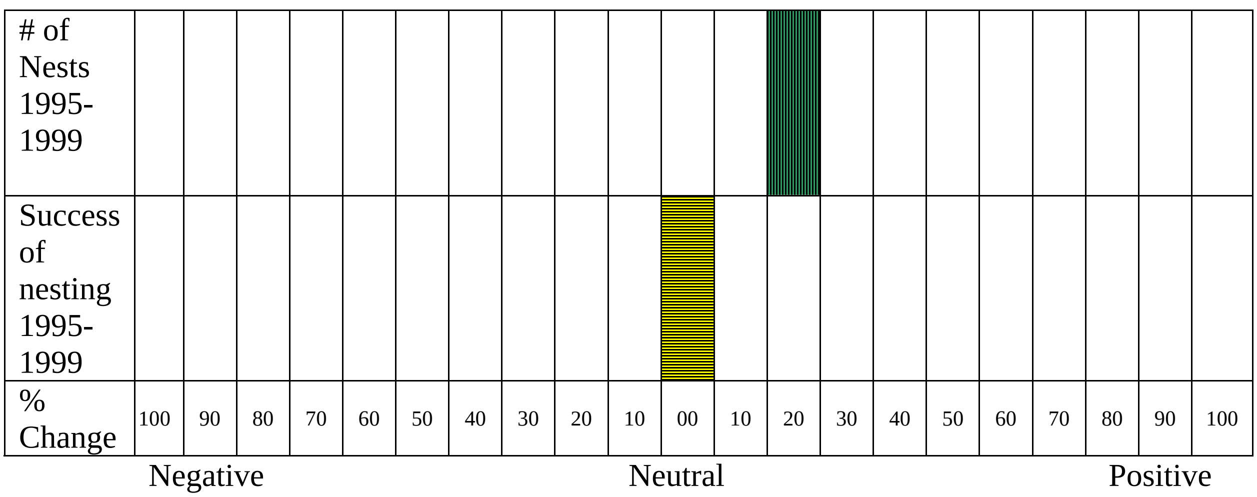
Negative Neutral Positive

Factor: Bald Eagle Nesting

Measure:	Number of Successful Bald Eagle Nests
Time Frame:	1995-1999
Data Source	FWC
Level of Change:	0 ± 15% in EBABM area
Meeting Recovery?	Not Yet

Changes in the nesting success of bald eagles have occurred in the Estero Bay Basin in response to land use changes and shifts in food resources. In 1995 there were 9 bald eagle nests in the basin. By 1999 there were 11. Nests in interior locations depending on freshwater wetlands were less productive in fledging young than coastal nests. A new successful nest was established on the Imperial River. A less than successful nest was established west of the Southwest Florida International Airport.

Year	Number of Nests	Success Rate
1995	9	5 (55%)
1996	10	6 (60%)
1997	10	4 (40%)
1998	11	7 (64 %)
1999	11	6 (55 %)



Factor: Florida Scrub Jay Nesting

Measure:	Number of Successful Florida Scrub Jay Nests
Time Frame:	1995-2001
Data Source	FWC
Level of Change:	-100% in EBABM area
Meeting Recovery?	No

The Florida scrub jay became locally extinct in the Estero Bay Basin in the mid-1990's. At least one and perhaps two families of Florida scrub jays were found on the Chapel Ridge scrub system. Presence was confirmed during surveys by Estero Bay Aquatic Preserve biologists in 1989. The nest territories were within the proposed acquisition area for the Estero Bay Buffer Preserve CARL project. During site reviews for the development project now known as West Bay Club these jay families were no longer present. The last confirmed siting was in 1994.

Photo by: Joe Vidulich

Year	Number of Nests	Success Rate
1989	2	2 (100%)
1993	1	unknown
1995	0	0
1999	0	0
2001	0	0

# of Nests 1989-2001																
% Change	100	90	80	70	60	50	40	30	20	10	00	10	20	30	40	50

Negative Neutral Positive

Factor: Gopher Tortoise Habitat

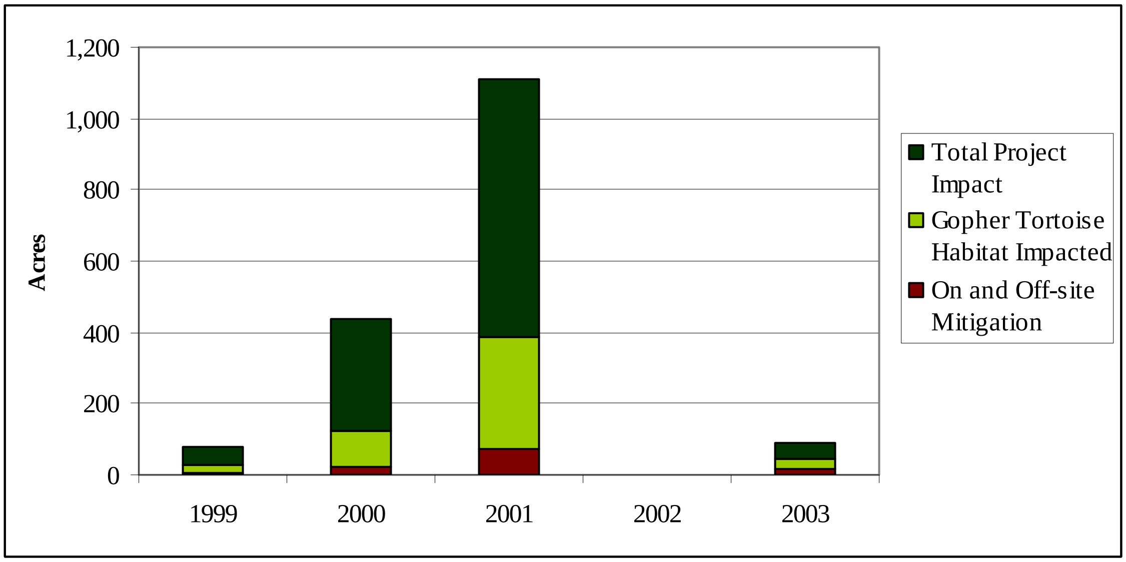
The gopher tortoise utilizes dry, well-drained soils with areas of open herbaceous understory (Auffenberg 1978), including Unimproved Pastures (212), Woodland Pastures (213), Herbaceous (310), Shrub and Brushland (320), Palmetto Prairies (321), Coastal Scrub (322), Other Shrubs and Brush (329), Mixed Rangeland (330), Coniferous Forests (410), Pine Flatwoods (411), Longleaf - Xeric Oak (412), Sand Pine Scrub (413), Pine- Mesic Oak (414), Longleaf - Upland Oak (415), Other Pine (419), Upland Hardwood Forests (420), Xeric Oak (421), Brazilian Pepper (422), Oak - Pine - Hickory (423), Melaleuca (424), Temperate Hardwood Hammock (425), Tropical Hardwood Hammock (426), Live Oak Hammock (427), Cabbage Palm (428), Wax Myrtle - Willow (429), Beech - Magnolia (431), Sand Live Oak (432), Western Everglades Hardwoods (433), Hardwood - Conifer Mixed (434), Dead Trees (435), Australian Pines (437), Mixed Hardwoods (438), Other Hardwoods (439), Tree Plantations (440), Coniferous Tree Plantations (441), Hardwood (442), Forest Regeneration Area (443), Experimental Tree Plots (444), Seed Plantation (445), Beaches Other Than Swimming Beaches (710), Sand Other Than Beaches (720), Disturbed Lands (740), Rural Land in Transition Without Positive Indicators of Intended Activity (741), Borrow Areas (742), Spoil Areas (743), Fill Areas (744), and Burned Areas (745).

In most of south Florida, perennially dry habitats exist as islands surrounded by a reticulation of hydric habitats. The gopher tortoise forages in both the upland and the adjacent hydric habitats when water levels recede and throughout the dry-season. The gopher tortoises that utilize natural hydric habitats construct dry-season burrows in hydric habitats, and wet-season burrows in dry, upland ridge islands. In drained Hydric Pine Flatwoods (624), gopher tortoises construct dry-season burrows in the upper portions of the flatwoods.

During development review in the Estero Bay Basin, Lee County requires listed species surveys. These surveys reveal the presence of gopher tortoises and generate a measure of gopher tortoise habitat. In the course of conservation land acquisition and large-scale land development, some areas are set aside as gopher tortoise habitat.

Gopher Tortoise. *Original photograph by Dawn Jennings.*

Date	Acres Gopher Tortoise Habitat Impacted	Acres Gopher Tortoise Habitat Preserved Off-Site	Acres Gopher Tortoise Habitat Preserved Onsite	Total Project Impact
1999	27	4	0	76
2000	121	18	5	436
2001	387	56	15	1,108
2002	0	0	0	0
2003	43	9	6	88
5-year total	577	86	26	1,707



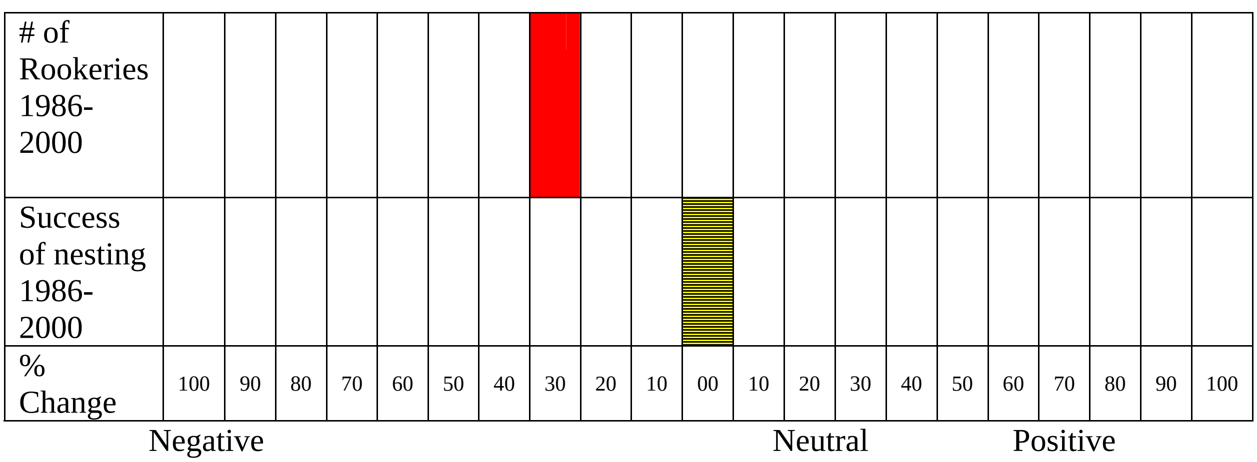
The table and graph display the gopher tortoise incidental take permit activity for the Estero Bay Basin from 1999 through 2003. This does not include habitat losses accrued where off-site relocation or less-than-five on-site relocation permitting occurred. The effective mitigation ratio for the five year period was 1 acre of habitat preserved for every 5 acres impacted. Not all off-site mitigation occurs in the Estero Bay basin. A substantial part of this mitigation occurred at the Hickey Creek Gopher Tortoise Mitigation Park in the Caloosahatchee River basin.

Factor: Wading Bird and Brown Pelican Rookeries

Time Frame: 1986-1999/2000
Data Source FWC
Level of Change: 0 ± 15% in EBABM area
Meeting Recovery? Not Yet

Changes in the nesting success of wading birds and brown pelicans have occurred in the Estero Bay Basin in response to land use changes, altered hydrology, and shifts in food resources. In 1986 there were 9 wading bird or brown pelican rookeries in the basin. By 1999 there were 6. Nests in interior locations depending on freshwater wetlands were where the rookeries were lost.

Year	Number of Rookeries	Success Rate
1986	9	5 (55%)
1999	6	6 (55 %)



Parameter: Landings

Landings for all of Lee County were collected for Spotted Sea Trout, Mullet, and Blue Crab. Pounds (landings), number of trips and landings per trip are shown below for all three species.

In general, landings for all three species have had a downward trend for the period between 1998 and 2002. In addition, the number of successful fishing trips for the 3 species has similarly declined. There is a correlation between

Spotted Sea Trout

	Landings	*Trips*	*Landings/Trip*
Landings	1		
Trips	0.947523	1	
Landings/Trip	0.728029	0.495319	1

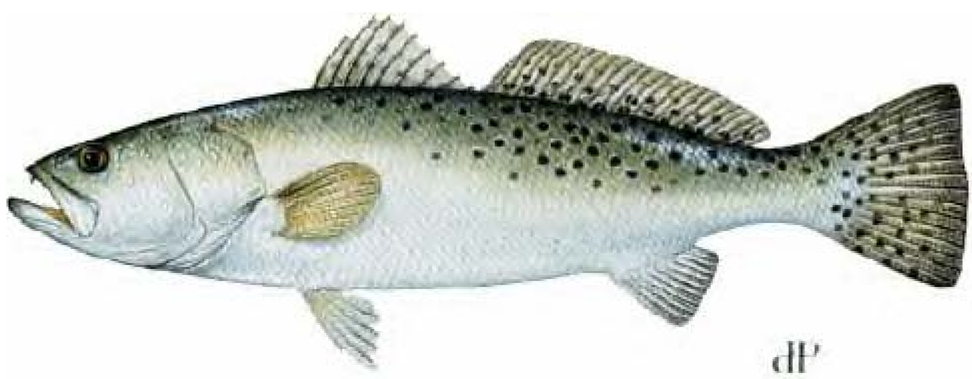
Mullet

	Landings	*Trips*	*Landings/Trip*
Landings	1		
Trips	0.849932	1	
Landings/Trip	0.630751	0.12927	1

Blue Crab

	Landings	*Trips*	*Landings/Trip*
Landings	1		
Trips	0.993261	1	
Landings/Trip	0.988036	0.984689	1

Spotted sea trout and blue crab has had a general decline in the amount of pounds per successful trip, both until 2002. Mullet has had a general increase in the amount of pounds per successful trip, also until 2002.

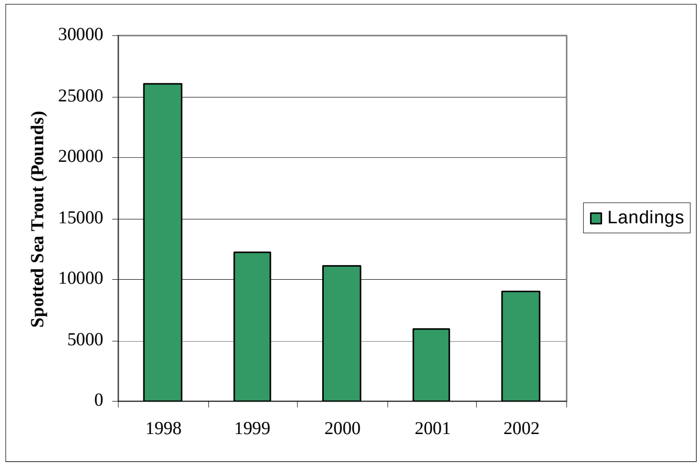


Landings

Spotted Sea Trout

1999-2001 change: -51%

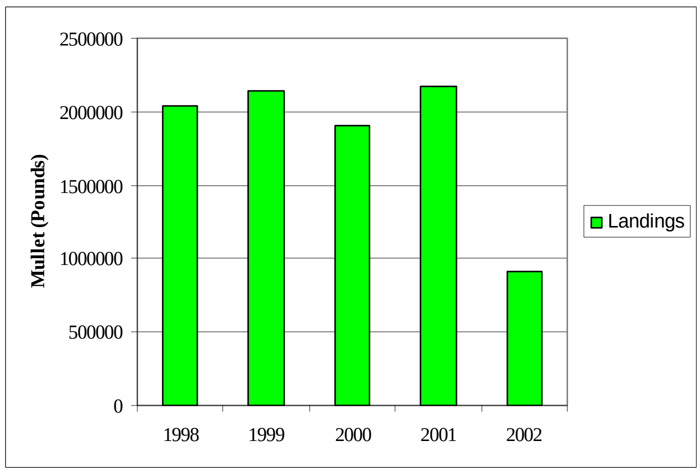
Year	Landings
1998	26,085
1999	12,224
2000	11,054
2001	5,975
2002	8,963



Mullet

1999-2001 change: +1%

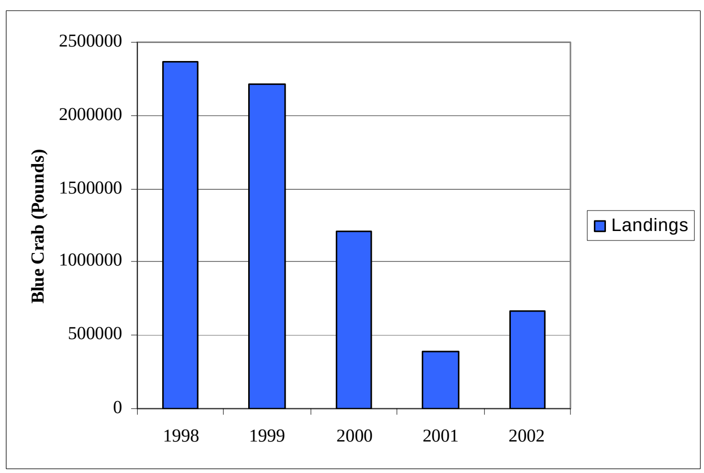
Year	Landings
1998	2,035,783
1999	2,141,311
2000	1,900,655
2001	2,168,389
2002	912,046



Blue Crab

1999-2001 change: -83%

Year	Landings
1998	2,361,740
1999	2,217,971
2000	1,205,304
2001	384,724
2002	661,615

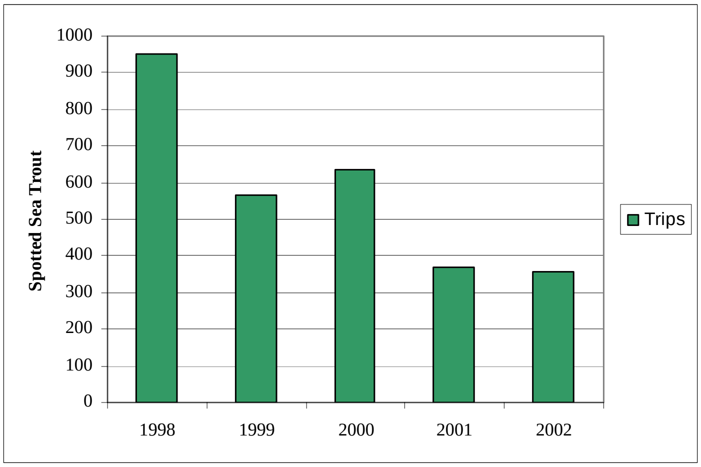


Trips

Spotted Sea Trout

1999-2001 change: -34%

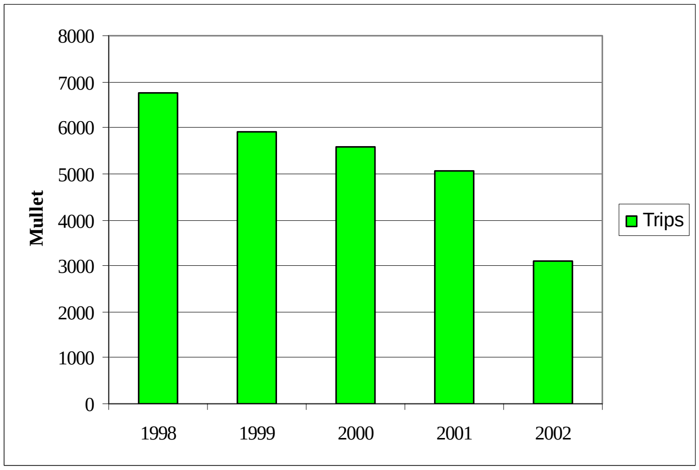
Year	Trips
1998	949
1999	566
2000	636
2001	369
2002	358



Mullet

1999-2001 change: -15%

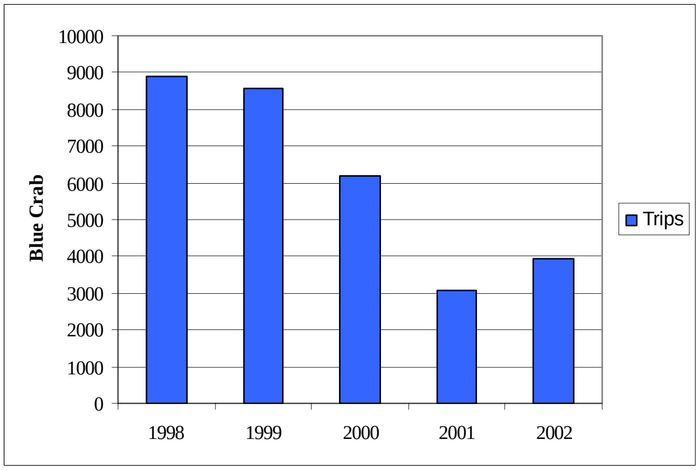
Year	Trips
1998	6,755
1999	5,904
2000	5,586
2001	5,045
2002	3,118



Blue Crab

1999-2001 change: -64%

Year	Trips
1998	8,889
1999	8,549
2000	6,194
2001	3,075
2002	3,914

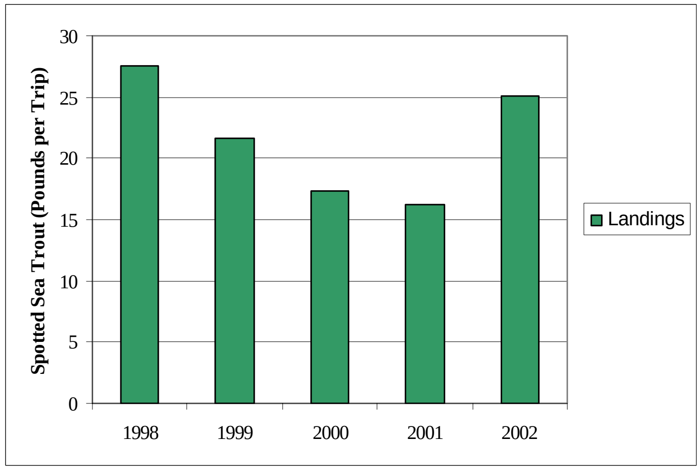


Landings per Trip

Spotted Sea Trout

1999-2001 change: -25%

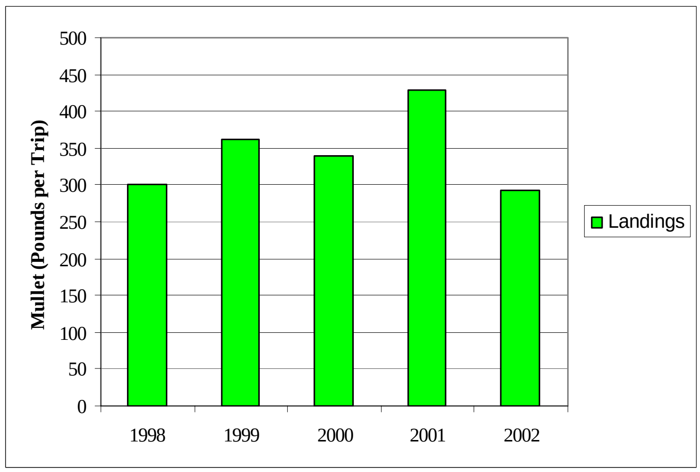
Year	Landings/Trip
1998	27
1999	22
2000	17
2001	16
2002	25



Mullet

1999-2001 change: +19%

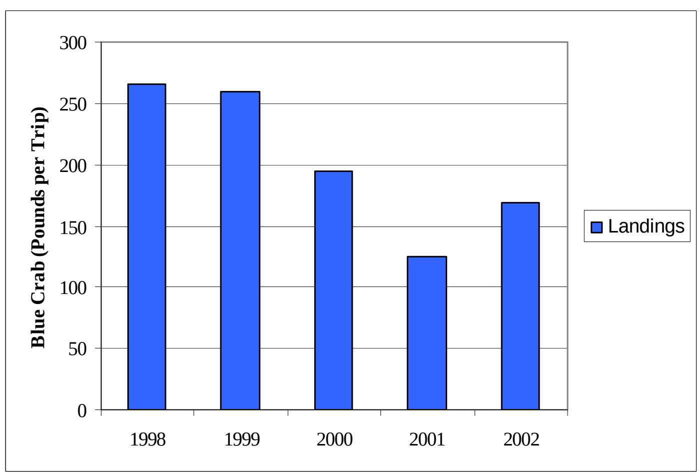
Year	Landings/Trip
1998	301
1999	363
2000	340
2001	430
2002	293



Blue Crab

1999-2001 change: -52%

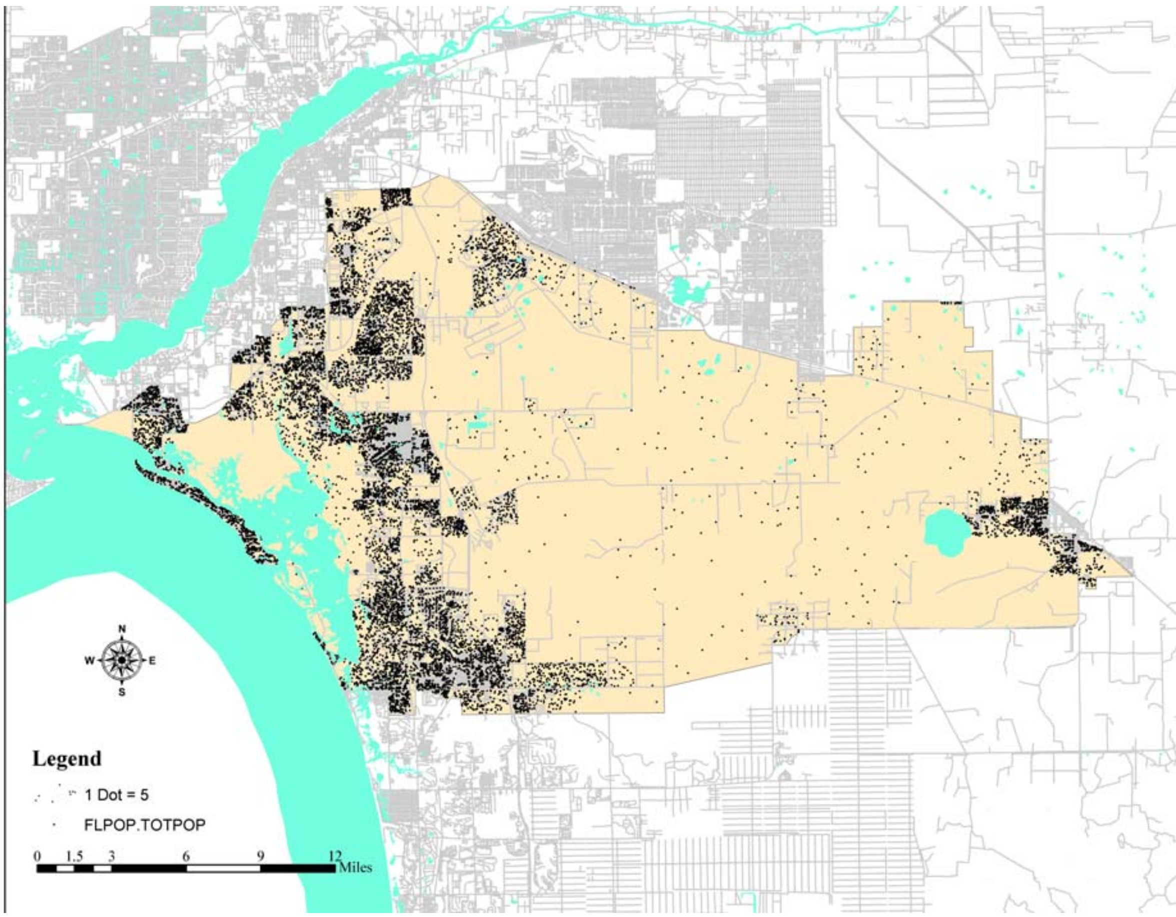
Year	Landings/Trip
1998	266
1999	260
2000	195
2001	125
2002	169



Social

Factor: Population

At the time of the year 2000 Census, the Estero Bay basin had nearly 145,000 people living within its boundaries. Most of the population is concentrated around Estero Bay itself. The presence of the Estero Bay state reserve has set the population back somewhat from the Bay. A second population concentration resides in Immokalee, within Collier County and near Lake Trafford.



Nearly 86% of the Estero Bay basin population is in Lee County. However, only 49% of minority populations are in Lee. The largest minority population in Estero Bay basin is Hispanic, most of who are in Collier County.

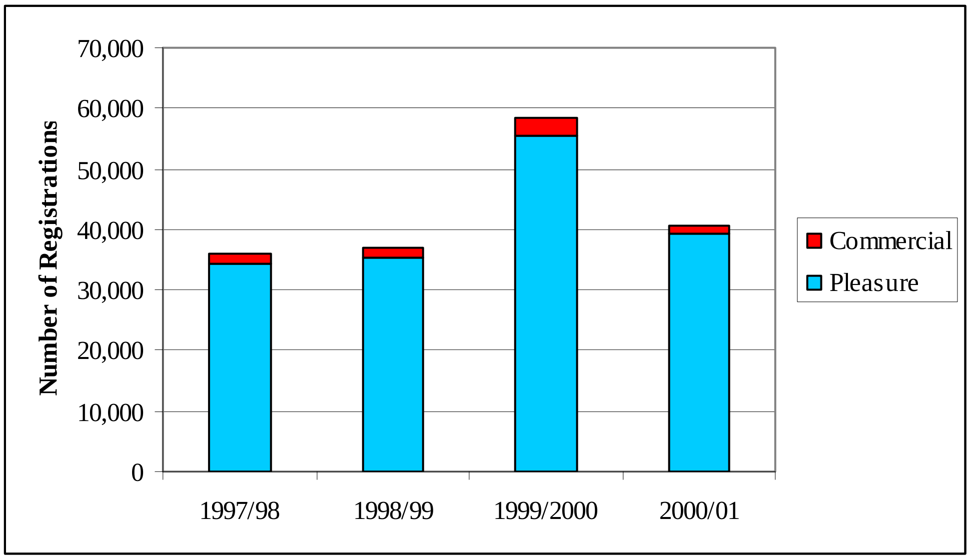
Census 2000 Population in the Estero Bay Basin

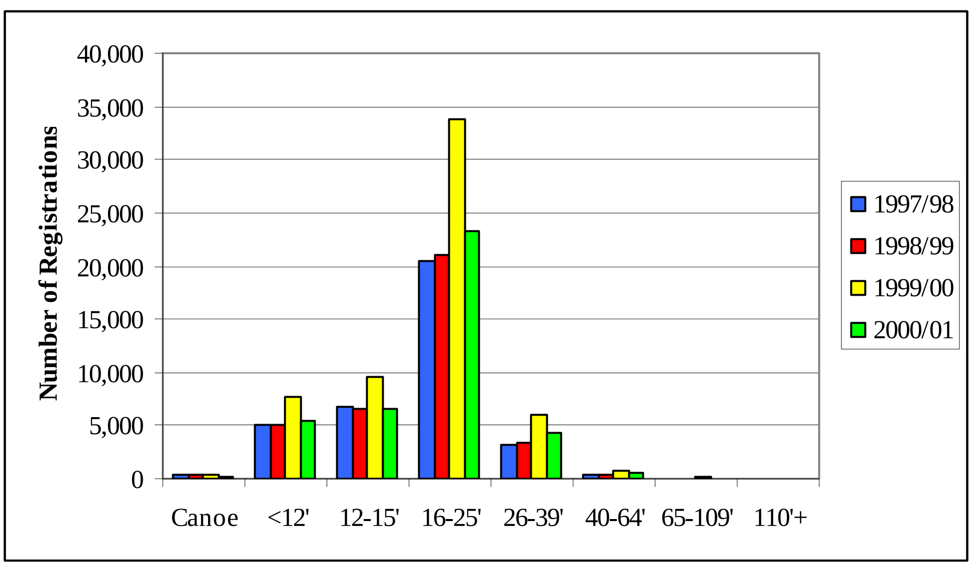
	Population	White	Black	Am. Indian	Asian	Pacific Is.	Other	Hispanic	Non-Hispanic White	Minority
Collier	20,158	9,866	2,843	222	58	27	6,076	12,335	7,257	12,901
Hendry	201	163	6	6	0	0	26	58	143	58
Lee	124,631	116,067	1,943	252	832	42	4,011	11,439	112,337	12,294
Total	144,990	126,096	4,792	480	890	69	10,113	23,832	119,737	25,253
% in Collier	13.90%	7.82%	59.33%	46.25%	6.52%	39.13%	60.08%	51.76%	6.06%	51.09%
% in Hendry	0.14%	0.13%	0.13%	1.25%	0.00%	0.00%	0.26%	0.24%	0.12%	0.23%
% in Lee	85.96%	92.05%	40.55%	52.50%	93.48%	60.87%	39.66%	48.00%	93.82%	48.68%

Factor: Recreational Uses

Vessel registration in Lee County is dominated by pleasure, recreational, vessels that are less than 26 feet in length. It is not possible to separate Estero Bay vessels from other Lee County vessels, and in fact vessels form elsewhere in Lee County, from Collier County and from other parts of the United States and the Caribbean utilize and moor in Estero Bay and its tributaries. Several of the largest vessels that use the Bay would not be registered in Lee County but at their port of registration.

Registration trends in pleasure vessels reflect the general state of the economy and available disposable incomes.





Factor: Building Permits

Data for all Lee County building permits were obtained. It appears that in 1996, enforcement of obtaining smaller permits such as fencing, pools, and docks was increased. In addition annexations confound a realistic view of development pressures. A finding that can be substantiated is an increase of multi-family housing as a percentage of total housing has been increasing over the past decade- from 30% in 1992 to 52% in 2001.

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
Single Family	1,837	2,227	2,449	2,225	2,352	2,390	2,067	2,401	2,636	3,109	3,616	27,309
Duplex Units	100	124	228	210	236	178	230	312	300	400	362	2,680
Res. Completion	34	29	31	34	125	52	43	48	15	0	5	416
Mobile Home	9	5	11	14	326	327	327	277	244	332	256	2,128
Recreational Vehicle	10	14	2	7	171	200	169	129	67	106	60	935
Motel	0	1	2	10	2	1	5	5	4	7	1	38
Apartment 3-4 Units	189	335	302	307	341	483	439	495	492	749	498	4,630
Apartment 5-up Units	580	693	876	942	1,329	1,507	1,676	1,852	2,412	2,580	2,392	16,839
Church	7	7	4	3	3	5	7	1	6	3	3	49
Industrial	8	6	9	7	5	8	4	11	4	0	3	65
Commercial	72	83	100	121	128	147	223	165	262	316	250	1,867
School	1	1	0	1	1	0	0	1	1	0	0	6
Miscellaneous	240	311	414	602	10,984	10,356	10,215	9,532	10,155	12,512	13,729	79,050
Total	3,087	3,836	4,428	4,483	16,003	15,654	15,405	15,229	16,598	20,114	21,175	136,012
					*					*		
MF	769	1,028	1,178	1,249	1,670	1,990	2,115	2,347	2,904	3,329	2,890	21,469
% of housing	30%	32%	32%	36%	42%	45%	51%	49%	52%	52%	44%	44%

Discussion and Conclusion

The four general categories of bay attributes linked together: increases in population, bay use, and land conversion appear to have affected water quality, hydrology, and wildlife in Estero Bay and its watershed. Most of the 145,000 population in the basin is concentrated around the bay itself. Recreational boating use far exceeds commercial use with most vessels between 15 and 25 feet. Multi-family housing has almost doubled in nine years. At the same time, hydrology of the tributary streams to the bay has become significantly flashier with increased floods and extended droughts, most likely associated with drainage practices.

Landings of economically important indicator species including mullet and blue crab have declined from 1998-2002. The number of trips taken to harvest these species has declined while landings per trip have remained roughly the same for sea trout and mullet. However, blue crab has declined by 52%.

Wildlife dependant upon interior habitats of the basin including xeric (dry) communities and pine forests has declined significantly. Florida scrub jays have been extirpated from the basin sometime in the middle 1990's. Red-cockaded woodpeckers have declined 68% since 1991. Gopher tortoise habitat has been eliminated from the basin while being mitigated in the Caloosahatchee River basin. Water dependent bird species display a mixed result. While the number of rookeries has declined, success rates remain at 55%. In contrast, bald eagle nests have increased and success rates also remain roughly the same at 55%.

Existing water quality can be interpreted in many different ways and the trends vary by location and parameter. Our analysis of 2001 water quality data indicates that standards for chlorophyll a were exceeded in marine Hendry and marine Spring Creek. Standards for copper were exceeded in freshwater Mullock and freshwater Hendry. For dissolved oxygen, standards were not met in freshwater and marine Mullock Creek, freshwater and marine Spring Creek, freshwater 10-mile canal, and marine Hendry Creek. Fecal Coliform standards were exceeded in freshwater and marine Mullock Creek, freshwater and marine Hendry Creek, marine Spring Creek, and freshwater Imperial River. Nutrient cautions for total nitrogen and total phosphorus are indicated for freshwater and marine Mullock Creek, marine Hendry Creek, and freshwater Imperial River. Nutrient cautions exist for total nitrogen in freshwater 10-mile canal and freshwater Hendry Creek. Nutrient caution for total phosphorus is found in marine Imperial River and Estero Bay proper.

The Charlotte Harbor National Estuary Program (CHNEP) completed a water quality status and trends assessment on August 27, 2003. Estero Bay was among the 8 basins assessed. The status applied to 1996-2000 data and the trends were for the total period of record. The study found that DO is down and nutrients, specific conductivity, and turbidity are up in Estero Bay. Current development standards don't work well, even in areas designated OFW. Current development has led to flashier hydrology. The Estero Bay basin has shown water quality degradation even though most of the area has been designated an Outstanding Florida Water during most of the trends period. The greatest degradation has been in Total Suspended Solids for the CHNEP study area. The sub-basin with the best overall water quality within the Estero Bay basin was

Estero Bay proper. The sub-basin with the worst overall water quality within the Estero Bay basin was Hendry Creek including Mullock.

Application of the Impaired Waters Rule criteria to 1996-2000 data by sub-basin (rather than by actual IWR water body IDs) indicate that Hendry Creek, Imperial River, and 10-mile canal are impaired for Chlorophyll a corrected and all sub-basins are impaired for ammonia. Trends are indicated by net station degradation by basin indicate water quality improvements for Estero Bay basin taken in total in Chlorophyll a, chlorides, fecal Coliform, temperature and total organic phosphorus and degradation in BOD, conductivity, dissolved oxygen, ammonia, nitrate-nitrite, pH, phosphate, total suspended solids and turbidity. IT is interesting to note that although total nitrogen indicates a neutral trend in Estero Bay, ammonia and nitrate-nitrite are degrading. Total nitrogen appears to be a poor measure of anthropogenic nitrogen pollution in Estero Bay.

Clearly the period of record, the combination of user defined thresholds, and data inclusion, influences the outcomes of analysis of water quality status for Estero Bay and its tributaries. In all methods used, there is the definite indication of declines in water quality in several parameters identified in each separate analysis. The need for a nutrient management partnership to address these issues is clearly confirmed.

To solve problems with habitat loss, alterations in hydrology, and declines in fisheries and wildlife will require more than nutrient management. The Lee County Mitigation Plan is the type of integrated restoration and acquisition plan that can address issues of biodiversity, hydrology, and water quality. The solution to pollution in the Estero Bay basin will occur on a landscape scale, requiring both Smart Growth including areas without growth that allow the Estero Bay ecosystem to provide the many invaluable natural functions and services that provide clean water, natural hydrology and fish and wildlife resources.

The Estero Bay Agency on Bay Management will continue participate in these important public-private partnerships for nutrient management, biodiversity, hydrologic and water quality restoration. If these projects are successfully implemented, we anticipate an improved State of the Bay when the next report is issued in 2005.