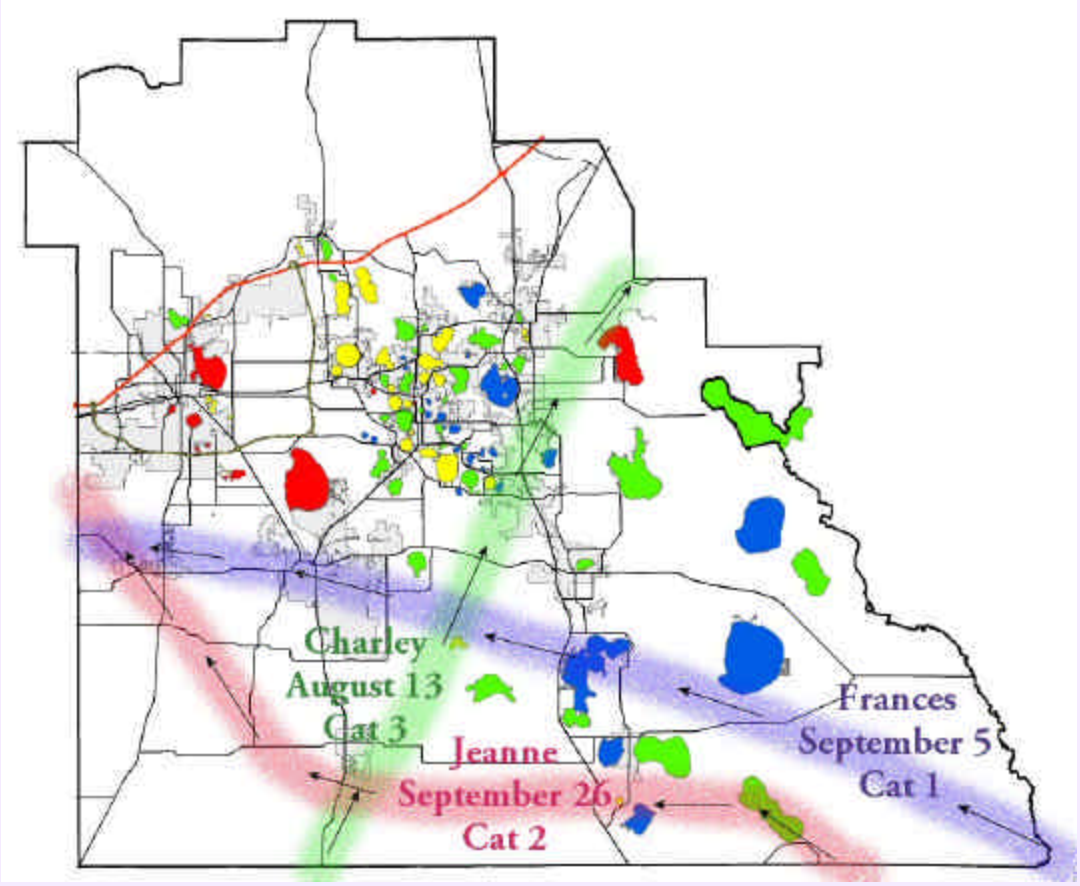

Polk County

2004 Annual Lake & Stream Report

Polk County Board of County Commissioners
Transportation Department
Natural Resources Division

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2005

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ACKNOWLEDGMENTS

Water Resources' staff wishes to thank all who assisted with the compilation of this report and whose names may have been inadvertently left out.

Cover	Created by Michele Medani
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Special thanks are extended to all who have collected additional data used in this report. Contributors include various departments of Polk County Government, State agencies, Water Management Districts, and citizens of Polk County. Without their help and dedication this report would not be possible.

SECTION I

MISSION
And
SCOPE OF WORK

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MISSION STATEMENT

The mission of the Water Resources Section of the Natural Resources Division is to collect and analyze surface water samples for Polk County and to educate the citizens about the quality and value of our water resources.

INTRODUCTION

The Water Resources Section consists of two groups: the Stormwater group that implements the National Pollutant Discharge Elimination System (NPDES) program and the Water Resources group which is comprised of the lab and surface water monitoring. The programs implemented by the Water Resources Section are mandated by federal or state regulations, County ordinances, the County Comprehensive Plan, or as directed by the Board of County Commissioners. This annual report provides a brief description of each of these programs.

LABORATORY

The laboratory staff consists of a Manager, a Chemist, an Environmental Technician, an Environmental Specialist, and a QA/QC Data Manager. The laboratory is responsible for the collection and analysis of water samples. The laboratory has adopted the Florida Department of Environmental Protection (FDEP) Standard Operating Procedures (SOP) for sample collection and National Environmental Laboratory Accreditation Conference (NELAC), Figure 1, standards for lab operations. The laboratory participates in semiannual performance evaluations and system audits conducted by the Florida Department of Health. Continued State Certification for the Clean Water Act depends upon successful completion of these audits. Additionally, all lab results are subject to quality assurance/quality control (QA/QC) according to the NELAC Quality Systems Manual.

Figure 1 Water Resources Laboratory

SAMPLE COLLECTION AND LABORATORY ANALYSIS

Water quality samples are collected and analyzed by Water Resources laboratory staff, see Figures 2 through 4, in support of Polk County's ambient monitoring program. In 2004, samples were collected from 107 lakes and 29 streams/creeks. These lakes and streams were sampled at least twice a year. Many were sampled quarterly to meet FDEP data requirements for impaired or potentially impaired waterbodies. Table 1 shows the 2004 sampling schedule.

Figure 2 - Boat loaded for Sampling

Laboratory staff participated in projects with several local agencies in 2004. Samples were collected and analyzed from lakes located within the Lake Region Lakes Management District (LRLMD or Canal Commission) boundaries. As part of a contract with the South Florida Water Management District (SFWMD), monthly samples were collected on the Upper Kissimmee River and Upper Kissimmee Chain of Lakes. Monitoring was also performed on groundwater wells at Kissimmee Park and Lake Weohyakapka as part

Figure 3 Chris running bacteria samples

of the Florida Department of Environmental Protection (FDEP) Temporal Variability Groundwater Monitoring Program. Inter-laboratory samples were analyzed by members of the Southwest Regional Ambient Monitoring Program (SWRAMP) and results discussed in an effort to provide comparable water quality data among different agencies.

In addition to ambient monitoring of water quality, samples were delivered by other Division staff to the lab for analysis of complaint investigations. Samples were also collected in response to the flooding caused by the hurricanes that hit Polk County. In total, 716 samples were collected and 9,838 analyses were run during 2004.

Figure 4 John running turbidity samples.

Table 1. Polk County Water Resources Laboratory
Sampling Groups

	Group 1	Group 2	Group 3	Group 4	Quarterly Projects	Landfill
	Jun, Dec	*May, Nov*	*Feb, Aug*	*Jan, Jul*	*Jan, Apr, Jul, Oct*	*Mar, Sep*
1	AlafiaR (2)	Agnes	Annie	Arbuckle	Peace Crk (11)	Monitor Wells
2	Blue	Alfred	Bess	Buffum	Cannon (4)	Leachate
3	Cannon	Ariana	Buckeye	Clinch	Inwood Ditch (4)	Saddle Creek
4	Deer	Banana (4)	Confusion	Crooked (2)		
5	Eagle (2)	Blackwater Crk	Conine	Crooked, Ltl		
6	Eloise	Bonny	Daisy	Easy	**IMPAIRED LAKES / EXTRA MONITORING**	
7	Grassy	Carter Rd Park (2)	Echo	Ft Meade Pit		
8	Hartridge	Crystal	Elbert (2)	Garfield	***Feb, Aug***	***Mar, Sep***
9	**Howard**	**Deeson**	**Eva (2)**	**Hatchineha**	**Banana (9)**	**Blue**
10	**Idylwild**	**Engle**	**Fannie**	**Hickory**	**Hancock (12)**	**Shipp**
11	**Jessie**	**Gator Creek**	**Haines**	**Livingston**	**Bonny**	**Eloise**
12	**Lulu**	**Gibson**	**Hamilton**	**Marion**	**Hollingsworth**	**Alafia R (2)**
13	**Lulu Run**	**Hancock (12)**	**Hamilton, Ltl**	**Marion Crk**	**Hunter**	**Lulu Run**
14	**Martha**	**Hollingsworth**	**Hamilton, Mdl**	**Pierce**	**Parker**	
15	**Maude**	**Hunter**	**Henry (2)**	**Reedy**	**Crystal**	
16	**May**	**Itchepackesassa Crk**	**Horseshoe Crk**	**Reedy Crk**	**Lena**	
17	**McLeod**	**John**	**Lowery**	**Rosalie**	**Mud**	
18	**Mirror**	**Juliana**	**Mariam**	**Surveyors**	**Ariana**	
19	**Poley Creek (2)**	**Lena**	**Mariana**	**Tiger**	**Mattie**	
20	**Roy**	**Lena Run (2)**	**Marie (2)**	**Tiger Crk**		
21	**Sears**	**Mattie**	**Menzie**	**Wailes**	**Apr, Oct**	
22	**Shipp**	**Mud**	**Ned**	**Weohyakapka**	**Arbuckle**	
23	**Spring**	**Pansy**	**Rochelle**		**Crooked (2)**	
24	**Summit**	**Parker**	**Ruby**		**Crooked, Ltl**	
25	**Thomas**	**Saddle Crk**	**Smart**		**Garfield**	
26	**Winterset**	**Saddle Crk Park**	**Swoope (2)**		**Marion**	
27		**Somerset**	**Tracy**		**Mariam**	
28		**Tennessee**			**Horseshoe Creek**	
29		**Tenoroc Outfall**				
30		**Withlacoochee River**				

In 2005, the water quality monitoring schedule will be completely revised. This is in response to the FDEP requirement that water quality data for lakes and streams on the impaired waters list, or those that are potentially impaired, be collected quarterly.

Also beginning in January 2005, a project with the Southwest Florida Water Management District (SWFWMD) will involve testing for extra parameters twice a year on 46 lakes currently being sampled. Those additional parameters are ortho phosphorus, total suspended solids, alkalinity, sulfate, calcium, sodium, magnesium, and iron. See Table 2 for the new groups and to see which lakes will have the extra testing performed.

Table 2

Polk County Water Resources Laboratory

Sampling Groups

effective Jan 2005

	Group 1 *Jan, Apr, Jul, Oct*	Group 2 *Feb, May, Aug, Nov*	Group 3 *Mar, Jun, Sep, Dec*
1	Annie	Agnes	Alafia River (2)
2	Arbuckle	Agnes, Little	Blue
3	Bess	Alfred	Buckeye
4	Buffum	Ariana	Cannon
5	Clinch	Banana (4) Feb / Aug	Confusion
6	Conine	Banana (9) May / Nov	Deer
7	Crooked (2) (#3 for SWFWMD)	Blackwater Creek (2)	Eagle (2)
8	Crooked, Little	Bonny	Echo
9	Daisy	Bonney, Little	Elbert (2)
10	Eva (2)	Carter Rd Park (2)	Eloise
11	Fannie	Crystal	Grassy
12	Ft Meade Pit	Deeson	Haines
13	Garfield	Engle	Hartridge
14	Hamilton	Gator Creek	Henry (2)
15	Hamilton, Little	Gibson	Horseshoe Creek
16	Hamilton, Middle	Hancock (12) (grid 32 for SWFWMD)	Howard
17	Hatchineha	Hollingsworth	Idylwild
18	Hickory	Hunter	Jessie
19	Livingston	Itchepackesassa Creek	Lowery
20	Marie (2)	John	Lulu
21	Marion Creek	Juliana	Lulu Run
22	Marion	Lena	Mariam
23	Menzie	Lena Run (2)	Mariana
24	Ned	Mattie	Martha
25	Pierce	Mud	Maude
26	Reedy Creek	Pansy	May
27	Reedy	Parker	McLeod
28	Rosalie	Peace Creek (11)	Mirror
29	Ruby	Saddle Creek	Poley Creek (2)
30	Smart	Saddle Creek Park	Rochelle
31	Surveyors	Somerset	Roy
32	Tiger	Tennessee	Sears
33	Tiger Creek	Tenoroc Outfall	Shipp
34	Tracy	Withlacoochee River	Spring
35	Wailes		Summit
36	Weohyakapka		Swoope (2)
37			Thomas
38			Winterset

Blue colored lake names are lakes sampled for SWFWMD, ext ra parameters are collected on these lakes.

Water Quality Tools

Two numeric tools are used to alert staff to changes in ambient water quality and to evaluate the success of water quality improvement efforts: the Florida Trophic State Index (TSI) and the Lake Water Quality Index (WQI) (King, 1993).

The original TSI, which was developed by the University of Florida Water Resources Research Center, is a numeric tool used to describe the relative productivity or eutrophication of a lake. The FDEP has eliminated the secchi disc measurement in its TSI calculation for the statewide Ambient Water Quality, 305(b), Report. Polk County Natural Resources currently uses the FDEP-modified version of the original TSI which uses the following water quality parameters: total nitrogen, total phosphorus, and chlorophyll a. See Table 3.

The secchi disc measurement can have a large degree of variance in the precision among sampling conditions, sampling personnel, and weather conditions that may make the readings difficult to interpret. Secchi disc values are not used for the TSI calculation in this report; however, this Division still collects the information, as it is a quick and easily understood measurement for water clarity.

The Water Quality Index (WQI), published for south Florida waters (King, 1993), has been modified for use in Polk County as shown in Table 4. The WQI is an algebraic and parameter weighted calculation based on Florida Class III Water Quality Standards. The index compares a derived water quality value within the formula to a Class III Standard baseline number of 6.5. A WQI number above the baseline indicates the waterbody does not meet Class III Standards and number below the baseline indicates it meets or exceeds the Standard. The WQI is more sensitive to small changes in water quality than the TSI.

Table 3

Florida Trophic State Index Equations[1] (TSI)

TSI CHL a	=	10 x (1.68+1.44xLN (CHL a))
TSITP	=	10 x (2.36xLN (TPx1000)-2.38)
TSITN	=	10 x (5.96+2.15xLN(TN))
TSITNB	=	10 x (5.6+1.98xLN(TN))
TSITPB	=	10 x (1.86xLN(TPx1000)-1.84)
TSINUTR	=	0.5 x (TSITNB+TSITPB)

Phosphorus Limited Lakes (PLL) TN/TP > 30

TSIAVG = ½ x (TSICHL a + TSITP)

Nitrogen Limited Lakes (NLL) TN/TP < 10

TSIAVG = ½ x (TSICHL a + TSITN)

Nutrient Balanced Lakes (NBL) > 10 TN/TP < 30

TSIAVG = ½ x (TSICHL a + TSINUTR)

Where:

TSICHL a	=	Trophic State Index based on Chlorophyll a
CHL a	=	Chlorophyll a concentration (mg/m^3)
TSITP	=	Trophic State Index based on Total Phosphorus
TP	=	Total Phosphorus Concentration (mg/l)
TSITN	=	Trophic State Index based on Total Nitrogen
TN	=	Total Nitrogen Concentration (mg/l)
TSITNB	=	Trophic State Index based on total Nitrogen Budget
TSITPB	=	Trophic State Index based on Total Phosphorus Budget
TSINUTR	=	Trophic State Index based on Total Nutrient Budget
TSIAVG	=	Average Trophic State Index

TSI Averages	
0-49	(BEST) Oligotrophic
50-59	(GOOD) Mesotrophic
60-69	(FAIR) Eutrophic
70-Above	(POOR) Hypereutrophic

[1] * Modified from, Huber, et. Al., (1982)

Table 4

Water Quality Index Equations [2]

Parameter	
A	Dissolved Oxygen, mg/l
B	Turbidity, NTU
C	Ammonia Nitrogen, mg/l
D	Total Nitrogen, mg/l
E	Total Phosphorus, mg/l
F	Chlorophyll a, mg/m3
Baseline Value = 6.50	

Water Quality Index (WQI) = [1.5*(4/**A**+0.001)] + [0.5*(**B**/10)+[0.75*(**C**/0.1)] + [1*(**D**/1.5)] + [1*(**E**/0.05)] + [2*(**F**/40)]

The baseline closely approximates Florida's Class III criteria for Surface Water Quality. Class III waters are for propagation and maintenance of a healthy, well-balanced population of fish and wildlife. WQI values more than 6.50 do not meet the criteria and values less than 6.50 meet or exceed the criteria.

[2] King, J., Technical Report Series, TR 93-06, Broward County DNRP, Florida.

STORMWATER QUALITY

This Section is responsible for coordinating implementation of the National Pollutant Discharge Elimination System (NPDES) permit for Polk County's stormwater drainage system. A Professional Engineer, two Environmental Specialists, and a Secretary staff the Section. The primary duties of the Section involve monitoring and reporting on stormwater quality to the Florida Department of Environmental Protection (FDEP) and the U.S. Environmental Protection Agency (EPA).

This section conducts Habitat Assessments for our lakes and streams. Sampling sites are selected to assess the effects of human activities in the watershed, which may include point and non-point source discharges of stormwater from urban or agricultural activities.

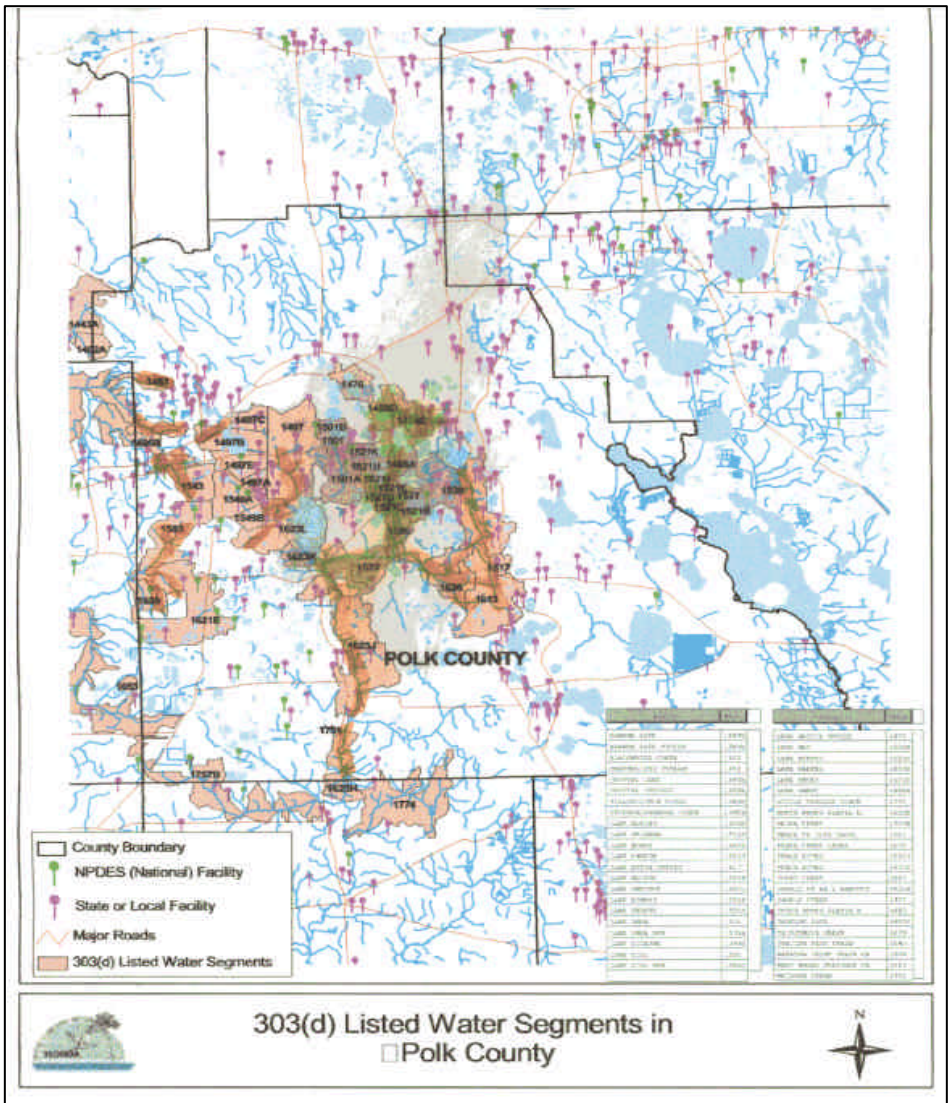

Figure 5 Polk County 303 (d) Impaired Water Segments

The assessments involve field sampling of aquatic biological communities as a detector of environmental stress. The assessments will be used to help identify impaired waterbodies (Figures 5) and develop waste load allocations known as a Total

Maximum Daily Load (TMDL) to reduce pollutants to a level sufficient to protect the water quality of the system. The information gathered through Habitat Assessments can help prioritize and target activities to protect and restore water bodies.

This Section is also identifies potential stormwater retrofit project sites to improve the quality of water discharged to lakes and streams within the County. Staff are responsible for obtaining project funding to secure land for project construction, hiring consultants for the design and permitting, and selecting contractors to complete the construction. Grants are obtained through state (FDEP) and federal (EPA) government while cooperative funding through the Water Management Districts help offset the initial construction costs. Upon completion of construction staff monitor the sites and assure proper maintenance is performed so the facilities operate as designed.

LAKE MANAGEMENT / WATER QUALITY PROJECTS

The Board of County Commissioners entered into inter-local agreements with the Southwest Florida Water Management District, the South Florida Water Management District, the Florida Department of Environmental Protection, and the Charlotte Harbor National Estuary Program on various water quality management projects that affect watersheds, lakes and streams. A brief description of current projects follows.

Lake Hancock / Upper Peace River Enhancement Project

The Lake Hancock is part of the watershed constitutes the headwaters of the Peace River. The Peace River is clearly a regional system of statewide importance. Beneficial uses include wildlife habitat (Figure 6 & 7), drainage, natural resources,

Figure 6 Wildlife on Lake Hancock

Figure 7 Northern area of Lake Hancock

recreation, flood control and potable water supply. Pollutant loads from the three main tributaries in the watershed have degraded the lake for over half a century. Impacts from the discharge of poor water quality from Lake Hancock have been observed as far south as the Peace River / Manasota Water Supply Authority Potable Water Facility, just north of Charlotte Harbor. The Peace River flows through Polk, Hardee, Desoto, and Charlotte Counties and discharges to the Gulf of Mexico at Charlotte Harbor. Charlotte Harbor and the entire Peace River watershed, including Lake Hancock, is a federally designated National Estuary. Improvement of Lake Hancock's water quality has been an objective of the Charlotte Harbor National Estuary Program (NEP) and was included in their Comprehensive Conservation and Management Plan.

In July 2000 the legislature provided $750,000 to Polk County through the Governor's Water Advisory Panel to help restore the watershed. Five goals were established for this project:

1. Improve the quality of the water discharged from Lake Hancock by applying TMDL's for nutrient and un-ionized ammonia.
2. Preserve and, where feasible, enhance the natural greenway/wildlife corridor (Peace River/Green Swamp) through Polk County.
3. Maintain the exceptional wildlife values on Lake Hancock.
4. Enhance the diversity of the fishery.
5. Provide habitat compatible for public access for nature-based recreational activities and commercial fishing.

A portion of the initial funding was used to hire the firm of Camp, Dresser and McKee (CDM) to develop the Lake Hancock Restoration Management Plan. The Plan was completed in January 2002. It was concluded that without restoration, the lake will continue to decline in water quality

and that restoration must entail control to phosphorus release from the extensive muck layer on the lake bottom. Treatment of water quality from the three major inflows to the lake, along with raising the lake level, and removal of the bottom muck deposit would be required to restore the lake (see Figure 8).

The remainder of the initial funding was allocated to restoration of the lands adjacent to Banana Creek on the Circle B Bar reserve in Lakeland. The 1,200 acre reserve was obtained through the County's Environmental Lands Program in cooperation with the Southwest Florida Water Management District. The property contains the majority of the remnant floodplain of the Banana Creek marsh, 450 acres of which will be restored using funds to mitigate the wetland impacts for construction of the Polk Parkway. The restoration will enhance the existing wetland system and reduce the nutrient load to Lake Hancock. Surveys of the property were completed and the engineering design has been submitted to the FDEP for permitting. Construction by the SWFWMD operation section is expected to commence in August 2005.

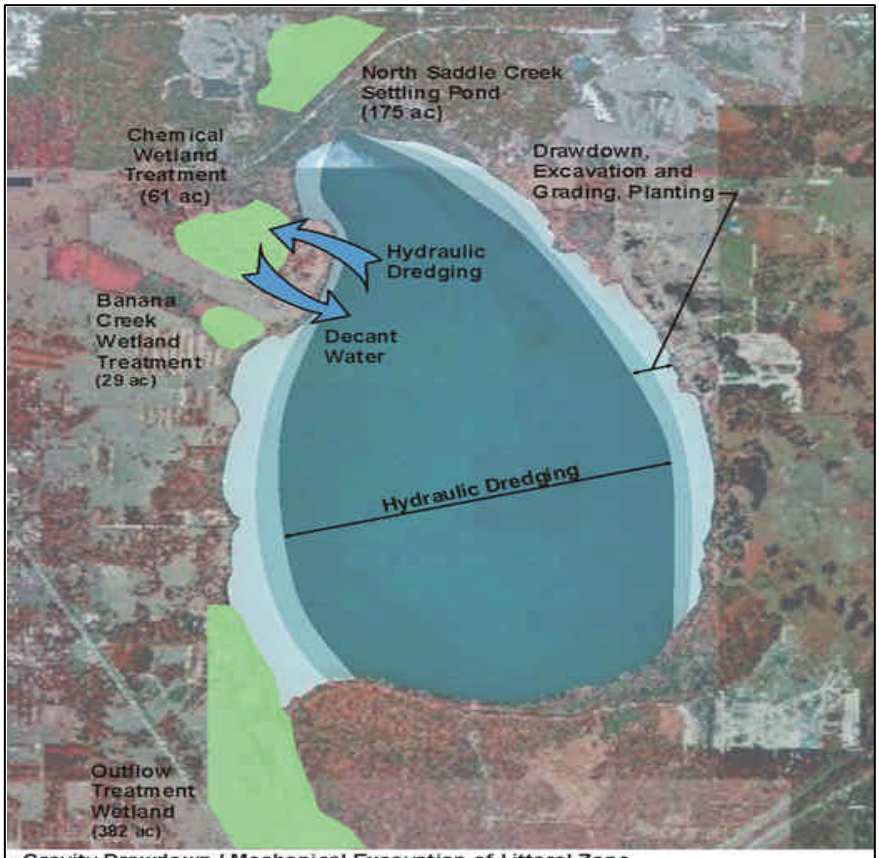

Figure 8 Lake Hancock Plans

In July of 2002 an additional $750,000 was appropriated by the Florida Legislature toward the restoration efforts. During 2004 the engineering firm of PEC, Inc. was contracted to evaluate the

feasibility of treating flows from Saddle Creek to reduce the nutrient loading to Lake Hancock. A $600,000 construction project was identified to divert flood water from the creek to an existing 100 acre mined pit that is owned by the Florida Audubon Society. A feasibility evaluation for restoring a mined area owned by the Florida Audubon Society along Saddle Creek was completed in 2004. The project has been discontinued as an easement could not be obtained from the Audubon Society.

The Lake Mariana Stormwater Quality Improvement Project

Figure 9 Lake Mariana NE corner

Lake Mariana is part of the Winter Haven Chain of Lakes (WHCL) located in north-central Polk County and forms the headwaters of the Peace River. Lake Mariana is a 500-acre lake with a history of poor water quality located in a 1,400-acre urban watershed. Over the past decade, the lake has suffered from repeated submerged plant die-offs and has become more turbid as suspended algae growth has increased. In response to the water quality problems in Lake Mariana, Polk County and the Southwest Florida Water Management District completed a cooperative diagnostic feasibility study in 1996. The study identified a tenfold increase in sediment phosphorus levels over the past 90 years. The increases have been linked to external nutrient loading from the watershed. Additionally, the study indicated that the greatest nutrient loads were associated with an approximately 600-acre sub-basin located along the southwest side of the lake. Roughly sixty percent of the total areas of urban land uses in the Lake Mariana Watershed are contained within this 600-acre basin. Virtually no stormwater treatment is provided as region was developed prior to the enactment of 1984 stormwater regulations. Runoff from this basin is currently conveyed directly to Lake Mariana through a network of drainage ditches. As a result of these findings this highly urbanized sub-basin became the focus area for pollutant load reduction measures.

A cooperative funding project focusing on reduction pollutant loads from the southwest basin was initiated in FY 1999 between Polk County and the SWFWMD. This first phase (Phase I) of the overall project consisted of a cost-benefit analysis of various stormwater treatment options for the southwest drainage basin. In addition to wet detention, the County evaluated alternatives for providing stormwater treatment that included wetland treatment, chemical treatment with alum, and mechanical filtration. The wet detention alternative was the least costly treatment method in terms of both the capital cost for construction as well as the annual cost of operation and maintenance.

Figure 10 Lake Mariana digging pond

Under the second phase (Phase II) of the project the County was able to acquire a 10 acre parcel located in an area prime for treating a large portion of the runoff from the southwest basin. Prior to acquisition by the County, the site was being marketed for development. Following the land acquisition, an engineering design was completed for an 8-acre treatment pond, and a Permit was obtained in October 2003.

Phase III was initiated in May of 2004 with construction of an 8-acres stormwater wet detention pond and diversion structure within the 10-acre upland parcel. The pond will substantially reduce the pollutant load to the lake. Construction is expected to be completed in 2005.

EDUCATION PROJECTS

The Water Resources Section participates in many environmental education events as part of its educational commitment. In accordance with the County's NPDES permit, the stormwater program participates in additional programs related to stormwater runoff and pollution prevention. The goals of the public education efforts are to provide Polk County citizens with information concerning the services provided by the Division and to raise environmental awareness.

Figure 11 FFA Outdoor Adventures

Figure 12 Educational Day at Lake Hancock

Education Presentations

Water Resources staff travel to many Polk County schools for presentations on water related issues see Figures 11 through 13. These programs reach hundreds of Polk County students from kindergarten through high school. Staff participates with local lake groups including the Lakes Education/Action Drive (LE/AD), Lake Hollingsworth EcoFest, and Lake Hancock Educational display as well as many other local lake associations throughout the county.

Events in which the Division participated in 2004 included LE/AD Annual Conference, Public Works Week, Polk County classroom presentations, and the FFA summer Youth Leadership conferences. The Division provides erosion and sediment control training to construction site inspectors and site contractors. FDEP certification is available to all participants who pass the course exam.

Figure 13 Lake Hollingsworth Ecofest 5/04

Polk County Water Atlas

The County has contracted with the University of South Florida (USF) to maintain the web-based atlas of Polk County lakes that was developed to provide the public with information via the Internet. The atlas can be viewed at www.polk.wateratlas.org, Figure 14, and was completed in 2001. The Atlas is a tool to provide water quality and other information for each of the public access lakes monitored within Polk County. It is also a resource for lakes related publications and links. Information is continually updated on public recreational opportunities, water quality data, historical photographs, local regulations, etc. Maintenance of the Atlas is funded cooperatively between Polk County, the Cities of Lakeland and Winter Haven, and the Lakes Education/Action Drive (LE/AD). In 2004, the atlas was modified to include watershed and stream information.

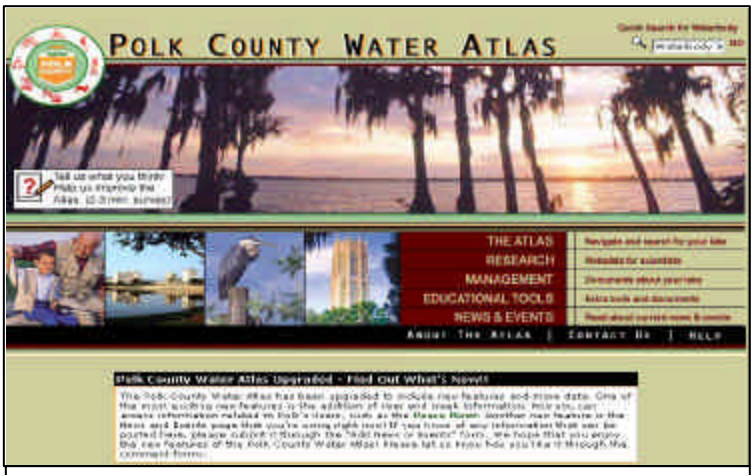

Figure 14 Polk County Water Atlas Home Page

Boat Access Lake Directory

The Water Resources section has compiled a directory of all public access lakes within Polk County. The directory includes such information as lake size, depth, fisheries, ramp and/or access conditions, directions to the access, general directional maps, contour maps (where available), and photos of the ramp areas. See Figure 15 for an example of information on each public access lake. This directory can be requested on CD by contacting this Division, or it can be accessed from the Polk County Water Atlas under the History/Recreation tab.

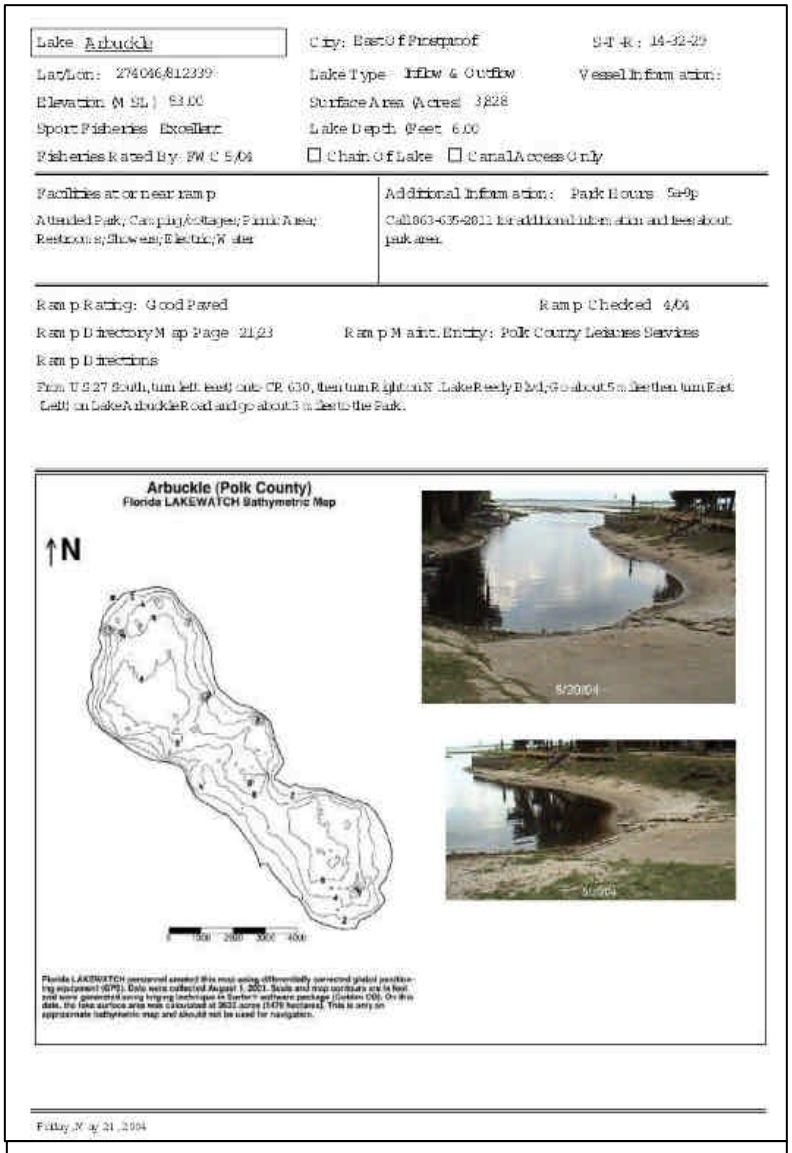

Figure 15 - Example of Boat Directory Page

SECTION II

LAKE
And
STREAM
WATER QUALITY

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WATER QUALITY DATA

In an effort to consistently provide accurate data, all laboratory results are subjected to quality assurance/quality control (QA/QC) in accordance with the NELAC Quality Systems Manual. Water quality results are incorporated into the Division's database. All surface water data are uploaded into the USEPA's and FDEP's STORET data repository. Due to the stringent requirements the FDEP has for TMDL's, the water quality data goes through many checks before it is actually sent to the FDEP STORET.

LAKE MONITORING

There were 107 lakes sampled in 2004. Public access lakes included in the routine lake sampling program are usually sampled in the center of the lake at 0.5 meters at least twice a year. In anticipation of Total Maximum Daily Load (TMDL) development, 30 lakes were sampled quarterly to meet FDEP requirements. Sometimes it is not possible to collect a sample from a lake or stream. Whenever this happens, a note is made in the permanent field logbook to show that the attempt was made but sample collection was not successful. There are a variety of reasons why a sample cannot be collected, including: lack of access to ramp, extremely low water in canal or at ramp, insufficient flow at a stream site, or even high water at a stream site.

Figure 16 Collection of field parameters with the YSI

As a general rule, the Water Resources section only collects samples from public access lakes and streams. Occasionally, private lakes may be sampled if there is a particular interest or benefit to the County. Lakes may be dropped from the sampling list if they are no longer public access, and lakes that have a public ramp installed can be added.

Figure 17 Water sample collection with a beta bottle

Water quality parameters tested include field measurements, see Figures 16 & 17, and laboratory analyses. Table 5 provides the mean value and ranges for each parameter routinely tested. The 2003 values are included for comparison purposes. Table 6 lists each lake tested in 2004 with the averaged results of each parameter. This year, the lakes have been grouped together according to their location in the Lake Region of Florida (see Figure 18). This allows better comparison between lakes in specific geologic and physiographic regions. Appendix A has general information, levels, historical water quality data and charts for each lake monitored in 2004.

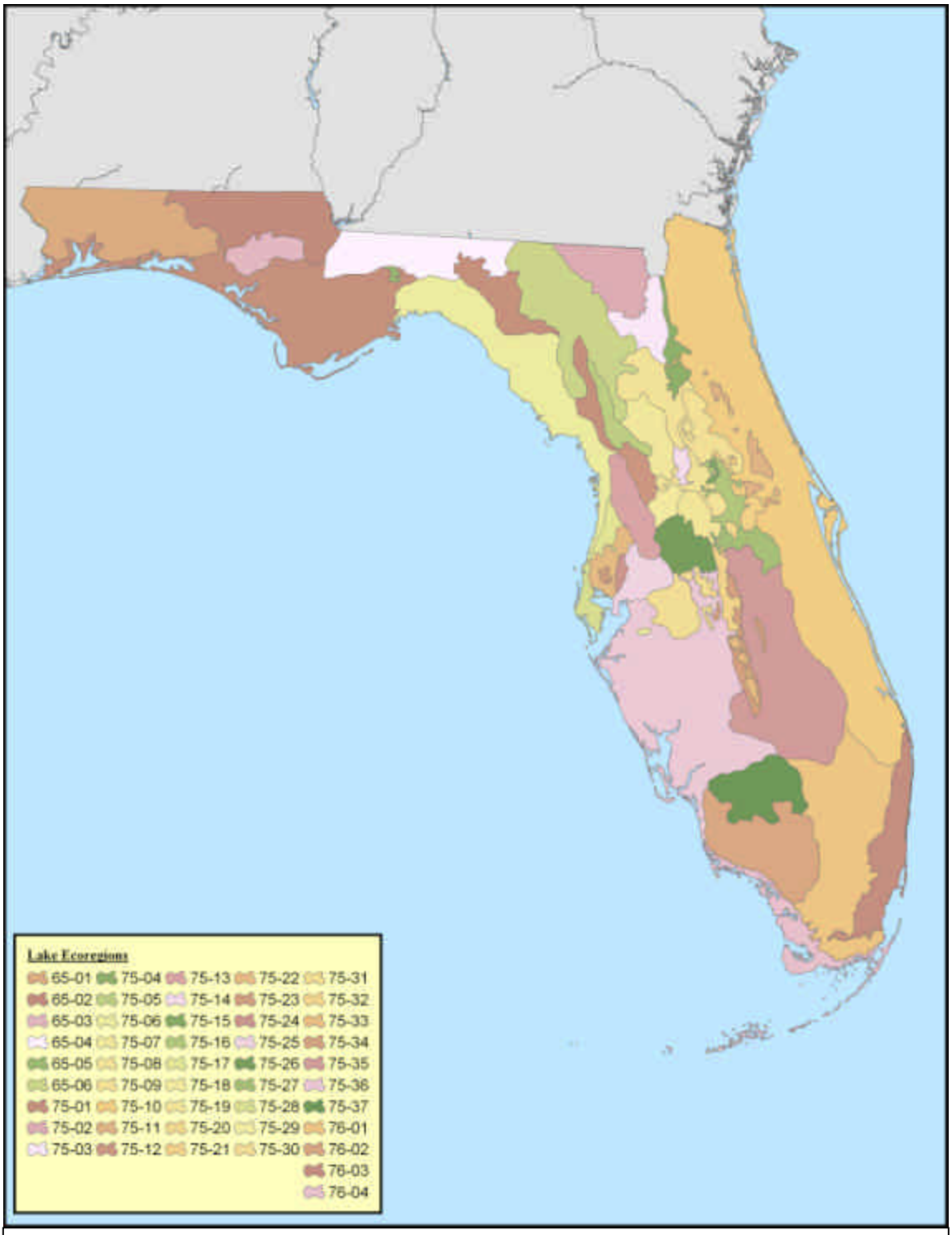

Figure 18 Florida Lake Regions

Table 5

2004 Median Chemical Lake Parameters

Parameter	Unit	2004 Median Value [3]	2004 Range	2003 Mean Value [3]
Temperature	Deg C	24.00	16.29-31.73	24.88
Secchi Disk	m	0.85	0.00-3.62	1.16
pH	SU	7.41	5.94-9.22	7.41
Specific Conductivity	umhos/cm	202	78-369	197
Dissolved Oxygen	mg/l	8.12	2.69-11.21	7.82
Color	CPU	22	8-400	51
Turbidity	NTU	4.80	0.58-29.25	5.76
Ammonia	mg/l	0.008	0.003-0.191	0.016
Kjeldahl Nitrogen	mg/l	1.035	0.378-4.414	1.194
$NO_2 + NO_3$	mg/l	0.008	0.004-0.297	0.028
Total Nitrogen	mg/l	1.06	0.38-4.42	1.22
Total Phosphorus	mg/l	0.043	0.005-0.843	0.106
Chlorophyll a	mg/m^3	17.17	1.25-154.02	25.96
TSI		56	26-90	56
WQI		3.57	1.54-25.07	5.55

[3] * Actual values below the laboratory detection limits were extrapolated to one-half the method detection level; Mean value is arithmetic; ND – Not Detected.

Table 6

POLK COUNTY NATURAL RESOURCES DIVISION LABORATORY
2004 LAKE WATER QUALITY RESULTS

LAKE NAME	S-T-R	ACRES	Chlor a mg/m3	COLOR CPU	COND umhos/cm	DO mg/l	NH3 mg/l	TKN mg/l	NO2+NO3 mg/l	TN mg/l	pH SU	TP mg/l	SECCHI M	TEMP Deg C	TURB NTU
75-30 - Lakeland/Bone Valley Upland															
Banana	10-29-24	252.3	91.69	39	199	9.45	0.007	2.478	0.007	2.48	8.49	0.692	0.37	25.34	15.57
Banana North Pit	10-29-24	252.3	52.26	40	216	9.86	0.007	1.202	0.005	1.20	6.74	0.299	0.82	22.33	4.17
Banana South Pit	10-29-24	252.3	154.02	20	200	11.21	0.015	2.542	0.093	2.63	8.60	0.272	0.72	24.47	7.80
Bonny	20-28-24	246.49	35.56	30	135	8.19	0.008	1.665	0.007	1.66	7.56	0.053	0.62	23.91	6.18
Carter Road X Pit	25-29-23		107.12	40	324	8.60	0.008	0.883	0.007	0.89	7.37	0.524	1.10	24.80	3.85
Carter Road Y Pit	25-29-23		98.17	35	148	7.67	0.005	2.175	0.006	2.18	7.12	0.843	0.35	25.10	20.60
Crystal (Lkld)	21-28-24	27.18	43.63	23	188	9.60	0.008	1.366	0.008	1.37	8.15	0.077	0.75	25.13	29.25
Deeson	29-27-24	117	20.01	25	164	8.39	0.008	1.271	0.008	1.27	7.47	0.059	0.78	25.62	3.85
Engle	20-29-24	9.05	94.12	30	258	7.40	0.008	2.229	0.006	2.23	7.72	0.192	0.00	25.42	15.55
Hollingsworth	30-28-24	352.04	31.84	10	166	9.06	0.008	1.463	0.007	1.46	7.51	0.063	0.75	24.42	5.84
Hunter	24-28-23	93.48	142.44	20	147	9.72	0.008	3.348	0.014	3.36	8.54	0.231	0.27	24.20	28.28
John	32-28-24	84.63	43.79	28	198	8.74	0.008	1.109	0.006	1.11	8.05	0.321	0.67	26.48	5.67
Parker (Lkld)	08-28-24	2150.4	75.62	28	174	8.89	0.008	2.542	0.008	2.55	8.06	0.084	0.36	25.55	12.86
Somerset	32-28-24	49.86	51.71	20	201	7.81	0.008	1.450	0.004	1.45	8.31	0.355	0.65	26.47	6.45
		Average	74.43	28	194	8.90	0.008	1.837	0.013	1.85	7.84	0.290	0.59	24.95	11.85
		Median	63.94	28	193	8.82	0.008	1.564	0.007	1.56	7.89	0.252	0.66	25.12	7.13
		Maximum	154.02	40	324	11.21	0.015	3.348	0.093	3.36	8.60	0.843	1.10	26.48	29.25
		Minimum	20.01	10	135	7.40	0.005	0.883	0.004	0.89	6.74	0.053	0.00	22.33	3.85
75-31 - Winter Haven/Lake Henry Ridges															
Agnes	04-27-25	374.18	7.21	42	136	6.93	0.008	0.608	0.052	0.66	6.76	0.047	1.50	23.18	1.31
Alfred	30-27-26	721.82	28.08	27	290	7.31	0.008	1.690	0.008	1.69	7.62	0.026	0.78	23.10	6.10
Ariana	03-28-25	1034.28	24.76	10	242	8.12	0.014	1.085	0.018	0.86	7.28	0.027	0.81	23.31	5.85
Bess	18-29-27	149.4	3.20	16	323	8.29	0.008	0.621	0.008	0.62	7.27	0.026	2.90	23.53	1.05
Blue	13-28-25	52.21	90.12	32	143	7.57	0.006	2.859	0.007	2.86	7.81	0.102	0.36	24.31	17.12
Buckeye	22-28-26	70.25	22.41	17	265	7.66	0.008	1.023	0.015	1.03	7.58	0.028	0.92	25.95	5.57
Cannon	19-28-26	326.94	20.73	16	207	8.97	0.007	1.054	0.017	1.07	7.87	0.034	0.74	23.24	5.96
Conine	09-28-26	237.75	31.24	29	234	8.15	0.008	1.226	0.008	1.23	7.92	0.045	0.78	25.67	5.33
Daisy	06-29-27	131.41	3.82	16	171	7.64	0.008	0.481	0.008	0.48	7.27	0.028	1.43	26.18	1.69

POLK COUNTY NATURAL RESOURCES DIVISION LABORATORY
2004 LAKE WATER QUALITY RESULTS

LAKE NAME	S-T-R	ACRES	Chlor a mg/m3	COLOR CPU	COND umhos/cm	DO mg/l	NH3 mg/l	TKN mg/l	NO2+NO3 mg/l	TN mg/l	pH SU	TP mg/l	SECCHI M	TEMP Deg C	TURB NTU
Deer	25-28-25	125	7.61	31	182	7.35	0.025	0.927	0.060	0.98	7.34	0.044	1.75	22.22	1.18
Dexter	2-29-26	153.53	1.25	11	232	7.69	0.008	0.459	0.008	0.46	8.28	0.015	3.00	31.08	0.64
Eagle	01-29-25	654.26	11.62	14	245	8.49	0.008	0.601	0.035	0.63	7.20	0.057	1.68	23.06	1.68
Echo	05-28-26	68.54	13.93	15	240	7.38	0.016	0.792	0.029	0.82	7.48	0.026	1.33	23.40	3.45
Elbert	22-28-26	175.39	3.16	8	165	7.80	0.008	0.378	0.008	0.38	6.93	0.018	3.20	25.89	0.83
Eloise	03-29-26	1178.29	30.60	15	262	9.05	0.006	1.212	0.006	1.21	8.44	0.040	0.79	24.43	5.52
Fannie	11-28-26	831.86	29.91	50	244	7.62	0.008	1.157	0.008	1.16	7.15	0.047	0.74	25.64	7.77
Florence	35-28-26	73.77	16.98	25	237	7.64	0.008	0.816	0.008	0.82	7.41	0.033	1.30	31.73	2.40
Hartridge	08-28-26	442.53	9.47	14	165	8.16	0.008	0.655	0.006	0.66	7.66	0.023	2.03	23.95	1.82
Howard	30-28-26	613.6	39.23	18	211	8.25	0.008	1.548	0.008	1.55	7.99	0.031	0.56	24.90	9.21
Idylwild	18-28-26	99.68	20.43	21	195	8.40	0.008	0.943	0.008	0.94	7.93	0.038	0.97	23.85	4.53
Ina	34-28-26	8.65	6.41	16	274	6.12	0.008	0.802	0.008	0.80	7.61	0.026	2.80	31.19	0.99
Jessie	12-28-25	189.15	24.33	24	202	8.69	0.008	0.989	0.006	0.99	7.89	0.050	0.88	22.37	4.88
Juliana	15-27-25	917.04	33.91	25	223	8.29	0.008	1.323	0.027	1.35	7.92	0.047	0.68	23.33	5.95
Lena	09-28-25	210.01	37.20	14	222	8.08	0.008	1.714	0.010	1.71	7.14	0.050	0.58	23.47	11.18
Link	27-28-26	24.5	13.62	22	222	7.26	0.008	0.924	0.008	0.92	7.53	0.026	1.30	31.39	2.40
Little Eagle	01-29-25		18.03	12	245	8.27	0.008	0.664	0.037	0.70	7.33	0.046	1.95	23.07	7.07
Little Elbert	22-28-26		3.95	10	160	7.79	0.006	0.431	0.006	0.43	6.86	0.016	3.00	23.93	0.97
Lulu	04-29-26	304.25	25.82	22	242	9.35	0.006	1.129	0.007	1.13	8.27	0.055	0.69	23.62	5.53
Mariana	01-28-25	502.11	34.51	20	200	7.69	0.008	1.400	0.007	1.40	7.17	0.054	0.69	24.79	9.95
Martha	21-28-26	85.83	3.20	15	227	7.37	0.008	0.522	0.010	0.53	7.67	0.019	3.10	26.16	0.83
Maude	21-28-26	54.47	22.43	20	239	7.63	0.008	0.782	0.020	0.80	7.54	0.022	1.20	23.18	4.50
May	29-28-26	42.69	40.32	21	219	8.23	0.005	1.583	0.008	1.58	7.48	0.068	0.50	23.46	9.63
Mc Leod	07-29-26	397.14	13.72	15	201	8.88	0.008	0.577	0.008	0.58	7.28	0.066	1.00	20.79	2.49
Mirror (WH)	20-28-27	123.99	25.60	19	209	8.53	0.008	1.187	0.006	1.19	8.15	0.036	0.70	23.77	5.40
Ned	01-29-26	71.46	6.44	19	222	7.91	0.006	0.611	0.014	0.62	7.13	0.024	2.43	26.38	1.33
Otis	28-28-26	142.67	10.41	17	219	7.22	0.008	0.601	0.008	0.60	7.58	0.027	1.60	31.21	2.30
Pansy	08-28-26	49.91	9.65	51	135	6.89	0.011	0.708	0.012	0.72	7.27	0.033	1.35	23.61	2.12
Ring	34-28-26	2.77	16.82	20	302	6.72	0.008	1.292	0.008	1.29	7.58	0.045	0.00	31.21	7.10
River	01-29-26	26.55	3.68	40	142	2.69	0.008	1.023	0.008	1.02	7.40	0.029	1.00	30.04	0.75
Round	13-29-26	26.33	11.21	13	369	7.64	0.008	0.870	0.008	0.87	8.05	0.005	1.10	31.17	3.70
Roy	34-28-26	64.7	19.35	18	249	9.65	0.008	0.921	0.006	0.92	8.58	0.027	1.27	24.81	3.59
Ruby	12-29-26	257.71	17.73	8	327	8.65	0.008	1.089	0.008	1.09	7.03	0.020	0.91	23.48	5.25
Sears	36-28-25	79.45	10.02	24	165	7.76	0.037	0.711	0.084	0.80	7.06	0.061	1.53	23.12	5.14

POLK COUNTY NATURAL RESOURCES DIVISION LABORATORY
2004 LAKE WATER QUALITY RESULTS

LAKE NAME	S-T-R	ACRES	Chlor a mg/m3	COLOR CPU	COND umhos/cm	DO mg/l	NH3 mg/l	TKN mg/l	NO2+NO3 mg/l	TN mg/l	pH SU	TP mg/l	SECCHI M	TEMP Deg C	TURB NTU
Shipp	32-28-26	283.63	44.49	20	215	8.99	0.006	1.609	0.005	1.61	8.18	0.047	0.49	24.50	8.58
Smart	09-28-26	278.06	30.17	24	242	7.83	0.008	1.527	0.012	1.53	7.85	0.045	0.70	25.68	5.03
Spring	20-28-27	25.26	15.62	18	203	8.53	0.017	0.804	0.009	0.81	7.98	0.030	1.33	24.33	2.63
Summit	34-28-26	55.81	10.87	14	252	9.33	0.006	0.762	0.005	0.76	8.41	0.030	1.52	25.10	2.14
Swoope North	29-27-26	85.99	9.61	44	327	7.26	0.005	1.185	0.005	1.19	7.11	0.026	1.68	23.09	2.55
Swoope South	29-27-26	85.99	8.01	21	323	6.59	0.017	1.236	0.015	1.25	6.83	0.028	1.63	23.33	2.48
Tennessee	09-27-25	107.23	19.48	12	211	8.12	0.008	1.023	0.008	1.02	7.41	0.033	0.75	23.39	7.55
Winterset	11-29-26	554.3	13.12	12	288	9.24	0.006	0.801	0.005	0.80	8.45	0.019	1.70	24.48	3.38
		Average	19.13	21	229	7.88	0.009	0.999	0.014	1.00	7.59	0.036	1.33	25.14	4.44
		Median	16.82	18	223	7.83	0.008	0.927	0.008	0.92	7.54	0.031	1.20	23.95	3.70
		Maximum	90.12	51	369	9.65	0.037	2.859	0.084	2.86	8.58	0.102	3.20	31.73	17.12
		Minimum	1.25	8	135	2.69	0.005	0.378	0.005	0.38	6.76	0.005	0.00	20.79	0.64
75-32 - Northern Lake Wales Ridge															
Annie	03-29-27	536.68	9.06	15	221	8.11	0.019	0.808	0.005	0.81	7.02	0.010	1.88	24.15	1.46
Clinch	31-31-28	1205.21	3.97	12	142	7.93	0.008	0.427	0.005	0.43	6.59	0.012	3.30	25.82	0.58
Crooked	01-31-27	5483.4	3.06	38	78	7.61	0.017	0.592	0.008	0.60	6.59	0.018	2.27	24.52	1.22
Easy	19-30-28	422.58	1.25	10	232	7.02	0.008	0.684	0.008	0.68	7.19	0.011	2.60	31.50	1.14
Eva North	32-27-27	160.62	18.16	13	158	8.46	0.008	1.016	0.006	1.02	6.95	0.033	1.03	24.08	4.80
Eva South	32-27-27	160.62	17.35	11	158	8.61	0.008	1.036	0.005	1.04	6.63	0.043	0.90	23.99	5.10
Hickory (FP)	17-32-28	102.21	41.25	11	364	7.97	0.008	2.065	0.297	2.36	6.66	0.027	0.39	23.32	18.65
Little Hamilton	05-28-27	368.32	9.11	38	236	8.32	0.003	1.034	0.018	1.05	7.31	0.027	1.40	18.56	1.82
Marie North	27-28-27	26.92	9.72	21	150	6.89	0.008	0.681	0.086	0.77	7.21	0.018	2.55	24.01	1.53
Marie South	27-28-27	26.92	5.82	22	135	7.30	0.009	0.638	0.036	0.67	6.77	0.016	2.33	23.95	1.16
Menzie	28-28-27	18.21	3.21	11	190	8.73	0.006	0.623	0.032	0.65	7.53	0.014	3.62	22.45	0.74
Reedy	35-31-28	3475.47	7.84	11	262	6.96	0.191	1.502	0.162	1.66	6.47	0.026	1.20	23.67	4.80
Tracy	29-27-27	132.43	6.81	31	177	7.83	0.024	1.012	0.043	1.05	6.78	0.031	2.26	23.88	1.05
Wailes	01-30-27	306.21	25.43	15	138	9.49	0.004	1.269	0.008	1.27	7.76	0.024	0.65	24.20	5.05
		Average	11.57	19	189	7.95	0.023	0.956	0.051	1.00	6.96	0.022	1.88	24.15	3.51
		Median	8.45	14	168	7.95	0.008	0.910	0.013	0.92	6.87	0.021	2.07	24.00	1.50
		Maximum	41.25	38	364	9.49	0.191	2.065	0.297	2.36	7.76	0.043	3.62	31.50	18.65
		Minimum	1.25	10	78	6.89	0.003	0.427	0.005	0.43	6.47	0.010	0.39	18.56	0.58

POLK COUNTY NATURAL RESOURCES DIVISION LABORATORY
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75-34 - Lake Wales Ridge Transition															
Buffum	12-31-26	1554.37	15.22	50	134	8.26	0.013	0.787	0.005	0.79	6.95	0.040	0.62	21.20	5.47
Marion	05-28-28	3005.79	35.78	53	168	8.52	0.015	1.805	0.078	1.88	8.23	0.067	0.47	24.72	9.66
Pierce	09-29-28	3832.21	3.50	21	154	10.76	0.008	0.789	0.005	0.79	9.22	0.024	1.67	21.63	0.83
		Average	18.17	41	152	9.18	0.012	1.127	0.029	1.15	8.13	0.044	0.92	22.52	5.32
		Median	15.22	50	154	8.52	0.013	0.789	0.005	0.79	8.23	0.040	0.62	21.63	5.47
		Maximum	35.78	53	168	10.76	0.015	1.805	0.078	1.88	9.22	0.067	1.67	24.72	9.66
		Minimum	3.50	21	134	8.26	0.008	0.787	0.005	0.79	6.95	0.024	0.47	21.20	0.83
75-35 - Kissimmee/Okeechobee Lowland															
Arbuckle	14-32-29	3793.62	11.48	167	154	8.60	0.008	1.107	0.100	1.21	6.71	0.055	0.38	19.43	7.37
Hatchineha	27-28-29	6600.33	18.03	125	154	8.59	0.008	1.311	0.007	1.32	7.93	0.047	0.65	23.62	3.80
Rosalie	27-29-29	4565.54	6.41	55	130	8.58	0.005	0.750	0.004	0.76	7.36	0.042	0.95	23.64	3.25
Tiger	06-30-30	2163.86	39.26	63	125	9.05	0.006	1.268	0.040	1.31	8.11	0.102	0.72	26.38	9.87
Weohyakapka	03-31-29	7717.75	4.80	35	141	8.41	0.008	0.659	0.014	0.67	7.61	0.019	1.55	23.33	1.60
		Average	16.00	89	141	8.65	0.007	1.019	0.033	1.05	7.54	0.053	0.85	23.28	5.18
		Median	11.48	63	141	8.59	0.008	1.107	0.014	1.21	7.61	0.047	0.72	23.62	3.80
		Maximum	39.26	167	154	9.05	0.008	1.311	0.100	1.32	8.11	0.102	1.55	26.38	9.87
		Minimum	4.80	35	125	8.41	0.005	0.659	0.004	0.67	6.71	0.019	0.38	19.43	1.60
75-36 - Southwestern Flatlands															
Confusion	30-27-27	13.83	6.25	20	240	7.63	0.008	0.863	0.006	0.87	6.65	0.013	1.83	24.39	1.94
Garfield	05-30-26	664.16	45.41	102	136	8.30	0.006	1.274	0.007	1.28	7.32	0.090	0.30	23.75	17.70
Gibson	25-27-23	484.09	6.41	47	142	7.60	0.008	0.657	0.008	0.66	7.20	0.130	0.97	25.24	3.93
Grassy	2-29-25	80.28	33.44	38	228	9.10	0.008	1.692	0.008	1.69	8.09	0.143	0.58	22.51	5.55
Haines	33-27-26	727.6	35.78	61	222	7.83	0.031	1.320	0.006	1.32	7.65	0.061	0.82	25.61	4.23
Hamilton	18-28-27	2174.36	2.00	75	214	8.99	0.024	1.013	0.070	1.08	7.35	0.110	0.70	18.31	6.70
Hancock	08-29-25	4532.74	151.72	70	200	10.80	0.008	4.414	0.007	4.42	8.83	0.461	0.17	19.43	28.49
Henry (HC)	36-27-26	856.66	5.49	298	158	7.73	0.017	1.345	0.123	1.47	6.66	0.164	0.32	23.04	10.43
Little Crooked	23-31-27		6.21	245	90	6.95	0.038	1.020	0.018	1.04	7.07	0.054	0.49	24.32	7.03
Livingston	21-32-28	1172.13	3.77	400	115	9.41	0.019	1.360	0.119	1.48	5.94	0.260	0.40	16.29	2.60
Lowery	14-27-26	935.72	16.43	77	154	8.12	0.010	1.385	0.034	1.42	6.70	0.025	1.13	23.12	3.10
Mariam	27-28-26	190.13	11.71	151	196	7.01	0.028	0.960	0.059	1.02	7.03	0.060	0.45	26.32	9.25

POLK COUNTY NATURAL RESOURCES DIVISION LABORATORY
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Mattie	14-27-25	1076.6	9.65	185	195	8.21	0.024	1.344	0.129	1.47	7.09	0.152	0.42	22.15	7.04
Middle Hamilton	07-28-27	115.7	13.62	125	209	7.67	0.008	1.359	0.029	1.39	7.28	0.053	0.75	18.65	3.90
Mud (PC)	06-27-25	144.21	31.60	61	99	7.40	0.005	1.318	0.011	1.33	6.95	0.070	0.68	23.80	4.43
Rochelle	04-28-26	581.68	32.84	33	231	7.85	0.008	1.303	0.008	1.30	7.91	0.046	0.73	25.50	5.47
Surveyors	26-30-26	294.41	21.89	95	142	7.65	0.012	1.030	0.189	1.22	6.75	0.065	0.58	23.43	7.85
		Average	25.54	123	175	8.13	0.015	1.392	0.049	1.44	7.20	0.115	0.67	22.70	7.63
		Median	13.62	77	195	7.83	0.010	1.318	0.018	1.32	7.09	0.070	0.58	23.43	5.55
		Maximum	151.72	400	240	10.80	0.038	4.414	0.189	4.42	8.83	0.461	1.83	26.32	28.49
		Minimum	2.00	20	90	6.95	0.005	0.657	0.006	0.66	5.94	0.013	0.17	16.29	1.94
		Overall Average	26.43	42	203	8.14	0.012	1.175	0.026	1.19	7.49	0.082	1.16	24.42	5.89
		Overall Median	17.17	22	202	8.12	0.008	1.035	0.008	1.06	7.41	0.043	0.85	24.00	4.80
		Overall Maximum	154.02	400	369	11.21	0.191	4.414	0.297	4.42	9.22	0.843	3.62	31.73	29.25
		Overall Minimum	1.25	8	78	2.69	0.003	0.378	0.004	0.38	5.94	0.005	0.00	16.29	0.58

POLK COUNTY NATURAL RESOURCES DIVISION LABORATORY
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LAKE NAME	S-T-R	ACRES	NP Ratio	Limiting Nutrient	TSI Chlor a	TSI SD	TSI TN	TSI TP	TSI TNB	TSI TPB	TSI NUTR	W/SD TSI AVG	**WO/SD TSI AVG**	WQI 2004
75-30 - Lakeland/Bone Valley Upland														
Banana	10-29-24	252.3	3.58	NLL	81.87	89.83	79.13					83.61	**80.50**	21.55
Banana North Pit	10-29-24	252.3	4.01	NLL	73.77	65.95	63.52					67.75	**68.64**	10.26
Banana South Pit	10-29-24	252.3	9.67	NLL	89.33	69.86	80.39					79.86	**84.86**	15.93
Bonny	20-28-24	246.49	31.32	PLL	68.23	74.34		69.90				70.82	**69.06**	5.05
Carter Road X Pit	25-29-23		1.70	NLL	84.10	57.14	57.09					66.11	**70.60**	17.38
Carter Road Y Pit	25-29-23		2.59	NLL	82.85	91.49	76.36					83.57	**79.60**	25.07
Crystal (Lkld)	21-28-24	27.18	17.79	NBL	71.17	68.63	66.37	78.71	62.23	62.39	62.31	67.37	**66.74**	6.78
Deeson	29-27-24	117	21.53	NBL	59.95	67.45	64.74	72.43	60.73	57.44	59.09	62.16	**59.52**	4.00
Engle	20-29-24	9.05	11.61	NBL	82.24		76.84	100.28	71.88	79.39	75.63		**78.94**	11.68
Hollingsworth	30-28-24	352.04	23.17	NBL	66.63	68.63	67.74	73.98	63.49	58.66	61.08	65.45	**63.86**	4.84
Hunter	24-28-23	93.48	14.55	NBL	88.21	99.28	85.66	104.64	80.00	82.83	81.41	89.63	**84.81**	16.07
John	32-28-24	84.63	3.46	NLL	71.22	72.01	61.84					68.36	**66.53**	10.38
Parker (Lkld)	08-28-24	2150.4	30.36	PLL	79.09	90.65		80.77				83.50	**79.93**	8.54
Somerset	32-28-24	49.86	4.08	NLL	73.62	72.92	67.59					71.38	**70.60**	11.80
	Average		12.82									73.81	**73.16**	12.10
	Median		10.64									70.82	**70.60**	11.03
	Maximum		31.32									89.63	**84.86**	25.07
	Minimum		1.70									62.16	**59.52**	4.00
75-31 - Winter Haven/Lake Henry Ridges														
Agnes	04-27-25	374.18	14.04	NBL	45.25	47.84	50.67	67.06	47.77	53.21	50.49	47.86	**47.87**	2.73
Alfred	30-27-26	721.82	65.00	PLL	64.82	67.45		53.09				61.79	**58.96**	4.24
Ariana	03-28-25	1034.28	31.85	PLL	63.01	66.32		53.98				61.11	**58.50**	3.49
Bess	18-29-27	149.4	23.85	NBL	33.55	28.06	49.32	53.09	46.53	42.20	44.37	35.33	**38.96**	1.93
Blue	13-28-25	52.21	28.04	NBL	81.62	90.65	82.19	85.35	76.81	67.62	72.22	81.49	**76.92**	10.15
Buckeye	22-28-26	70.25	36.79	PLL	61.58	62.50		54.84				59.64	**58.21**	3.49
Cannon	19-28-26	326.94	31.47	PLL	60.45	69.03		59.42				62.97	**59.94**	3.45
Conine	09-28-26	237.75	27.33	NBL	66.36	67.45	64.05	66.04	60.10	52.40	56.25	63.36	**61.31**	4.35
Daisy	06-29-27	131.41	17.14	NBL	36.10	49.27	43.82	54.84	41.47	43.58	42.52	42.63	**39.31**	2.00

POLK COUNTY NATURAL RESOURCES DIVISION LABORATORY
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LAKE NAME	S-T-R	ACRES	NP Ratio	Limiting Nutrient	TSI Chlor a	TSI SD	TSI TN	TSI TP	TSI TNB	TSI TPB	TSI NUTR	W/SD TSI AVG	**WO/SD TSI AVG**	WQI 2004
Deer	25-28-25	125	22.27	NBL	46.02	43.21	59.17	65.51	55.60	51.99	53.79	47.68	**49.91**	2.98
Dexter	2-29-26	153.53	30.67	PLL	20.01	27.04		40.11				29.05	**30.06**	1.54
Eagle	01-29-25	654.26	11.05	NBL	52.12	44.44	49.67	71.62	46.85	56.80	51.83	49.46	**51.97**	2.99
Echo	05-28-26	68.54	31.54	PLL	54.73	51.44		53.09				53.09	**53.91**	2.87
Elbert	22-28-26	175.39	21.22	NBL	33.37	25.11	38.91	44.41	36.95	35.36	36.15	31.54	**34.76**	1.64
Eloise	03-29-26	1178.29	30.25	PLL	66.06	67.07		63.26				65.46	**64.66**	4.12
Fannie	11-28-26	831.86	24.68	NBL	65.73	69.03	62.79	67.06	58.94	53.21	56.08	63.61	**60.90**	4.45
Florence	35-28-26	73.77	24.85	NBL	57.58	52.13	55.33	58.72	52.07	46.64	49.35	53.02	**53.47**	3.02
Hartridge	08-28-26	442.53	28.57	NBL	49.17	38.76	50.57	50.20	47.68	39.92	43.80	43.91	**46.49**	2.26
Howard	30-28-26	613.6	50.00	PLL	69.64	77.39		57.24				68.09	**63.44**	4.86
Idylwild	18-28-26	99.68	24.74	NBL	60.24	60.91	58.27	62.05	54.77	49.26	52.02	57.73	**56.13**	3.41
Ina	34-28-26	8.65	30.77	PLL	43.55	29.11		53.09				41.92	**48.32**	2.47
Jessie	12-28-25	189.15	19.80	NBL	62.76	63.84	59.38	68.52	55.80	54.36	55.08	60.56	**58.92**	3.87
Juliana	15-27-25	917.04	28.72	NBL	67.54	71.57	66.05	67.06	61.94	53.21	57.58	65.56	**62.56**	4.62
Lena	09-28-25	210.01	34.24	PLL	68.87	76.34		68.52				71.25	**68.70**	5.36
Link	27-28-26	24.5	35.38	PLL	54.41	52.13		53.09				53.21	**53.75**	2.82
Little Eagle	01-29-25		15.22	NBL	58.45	39.97	51.93	66.56	48.94	52.81	50.88	49.76	**54.66**	3.43
Little Elbert	22-28-26		26.88	NBL	36.58	27.04	41.45	41.63	39.29	33.17	36.23	33.28	**36.41**	1.67
Lulu	04-29-26	304.25	20.55	NBL	63.62	71.13	62.23	70.77	58.42	56.14	57.28	64.01	**60.45**	4.11
Mariana	01-28-25	502.11	25.93	NBL	67.79	71.13	66.83	70.34	62.66	55.80	59.23	66.05	**63.51**	5.08
Martha	21-28-26	85.83	27.89	NBL	33.55	26.06	45.95	45.69	43.43	36.37	39.90	33.17	**36.72**	1.81
Maude	21-28-26	54.47	36.36	PLL	61.59	54.53		49.15				55.09	**55.37**	3.17
May	29-28-26	42.69	23.24	NBL	70.03	80.79	69.43	75.78	65.06	60.08	62.57	71.13	**66.30**	5.68
Mc Leod	07-29-26	397.14	8.79	NLL	54.51	60.00	47.89					54.13	**51.20**	3.25
Mirror (WH)	20-28-27	123.99	33.06	PLL	63.49	70.70		60.77				64.99	**62.13**	3.83
Ned	01-29-26	71.46	25.83	NBL	43.62	33.36	49.32	51.20	46.53	40.71	43.62	40.20	**43.62**	2.09
Otis	28-28-26	142.67	22.22	NBL	50.54	45.90	48.62	53.98	45.89	42.90	44.39	46.94	**47.46**	2.47
Pansy	08-28-26	49.91	21.79	NBL	49.44	51.00	52.51	58.72	49.47	46.64	48.05	49.50	**48.75**	2.68
Ring	34-28-26	2.77	28.67	NBL	57.44		65.07	66.04	61.04	52.40	56.72		**57.08**	3.91
River	01-29-26	26.55	35.17	PLL	35.56	60.00		55.67				50.41	**45.62**	3.77
Round	13-29-26	26.33	174.00	PLL	51.60	57.14		14.18				40.98	**32.89**	2.27
Roy	34-28-26	64.7	34.07	PLL	59.46	52.83		53.98				55.42	**56.72**	2.98
Ruby	12-29-26	257.71	54.50	PLL	58.20	62.83		46.90				55.98	**52.55**	3.03
Sears	36-28-25	79.45	13.11	NBL	49.99	47.24	54.80	73.22	51.58	58.06	54.82	50.68	**52.40**	3.56

POLK COUNTY NATURAL RESOURCES DIVISION LABORATORY
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LAKE NAME	S-T-R	ACRES	NP Ratio	Limiting Nutrient	TSI Chlor a	TSI SD	TSI TN	TSI TP	TSI TNB	TSI TPB	TSI NUTR	W/SD TSI AVG	**WO/SD TSI AVG**	WQI 2004
Shipp	32-28-26	283.63	34.26	PLL	71.45	81.40		67.06				73.31	**69.26**	5.38
Smart	09-28-26	278.06	34.00	PLL	65.86	70.70		66.04				67.53	**65.95**	4.51
Spring	20-28-27	25.26	27.00	NBL	56.38	51.44	55.07	56.47	51.83	44.86	48.34	52.06	**52.36**	2.88
Summit	34-28-26	55.81	25.33	NBL	51.16	47.44	53.70	56.47	50.57	44.86	47.71	48.77	**49.44**	2.45
Swoope North	29-27-26	85.99	45.77	PLL	49.38	44.44		53.09				48.97	**51.24**	2.79
Swoope South	29-27-26	85.99	44.64	PLL	46.76	45.34		54.84				48.98	**50.80**	2.96
Tennessee	09-27-25	107.23	30.91	PLL	59.56	68.63		58.72				62.30	**59.14**	3.49
Winterset	11-29-26	554.3	42.11	PLL	53.87	44.08		45.69				47.88	**49.78**	2.43
	Average		32.07									54.06	**53.52**	3.43
	Median		28.57									53.15	**53.75**	3.17
	Maximum		174.00									81.49	**76.92**	10.15
	Minimum		8.79									29.05	**30.06**	1.54

75-32 - Northern Lake Wales Ridge

Annie	03-29-27	536.68	81.00	PLL	48.54	41.06		30.54				40.05	**39.54**	2.15
Clinch	31-31-28	1205.21	35.83	PLL	36.65	24.18		34.84				31.89	**35.75**	1.57
Crooked	01-31-27	5483.4	33.17	PLL	32.91	35.41		44.41				37.57	**38.66**	1.89
Easy	19-30-28	422.58	61.82	PLL	20.01	31.33		32.79				28.05	**26.40**	1.71
Eva North	32-27-27	160.62	30.91	PLL	58.55	59.11		58.72				58.79	**58.63**	3.26
Eva South	32-27-27	160.62	24.19	NBL	57.89	63.16	60.44	64.96	56.78	51.56	54.17	58.41	**56.03**	3.43
Hickory (FP)	17-32-28	102.21	87.41	PLL	70.36	88.25		53.98				70.86	**62.17**	5.92
Little Hamilton	05-28-27	368.32	38.89	PLL	48.61	49.91		53.98				50.83	**51.30**	2.53
Marie North	27-28-27	26.92	42.78	PLL	49.55	31.92		44.41				41.96	**46.98**	2.37
Marie South	27-28-27	26.92	41.88	PLL	42.16	34.62		41.63				39.47	**41.90**	2.01
Menzie	28-28-27	18.21	46.43	PLL	33.59	21.41		38.48				31.16	**36.04**	1.64
Reedy	35-31-28	3475.47	63.85	PLL	46.45	54.53		53.09				51.36	**49.77**	4.55
Tracy	29-27-27	132.43	33.87	PLL	44.42	35.54		57.24				45.74	**50.83**	2.66
Wailes	01-30-27	306.21	52.92	PLL	63.40	72.92		51.20				62.51	**57.30**	3.51
	Average		48.21									46.33	**46.52**	2.80
	Median		42.33									43.85	**48.38**	2.45
	Maximum		87.41									70.86	**62.17**	5.92
	Minimum		24.19									28.05	**26.40**	1.57

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LAKE NAME	S-T-R	ACRES	NP Ratio	Limiting Nutrient	TSI Chlor a	TSI SD	TSI TN	TSI TP	TSI TNB	TSI TPB	TSI NUTR	W/SD TSI AVG	**WO/SD TSI AVG**	WQI 2004
75-34 - Lake Wales Ridge Transition														
Buffum	12-31-26	1554.37	19.75	NBL	56.01	74.34	54.53	63.26	51.33	50.21	50.77	60.37	**53.39**	3.19
Marion	05-28-28	3005.79	28.06	NBL	68.31	82.65	73.17	75.43	68.50	59.81	64.15	71.71	**66.23**	5.68
Pierce	09-29-28	3832.21	32.92	PLL	34.84	44.62		51.20				43.55	**43.02**	1.84
	Average		26.91									58.54	**54.21**	3.57
	Median		28.06									60.37	**53.39**	3.19
	Maximum		32.92									71.71	**66.23**	5.68
	Minimum		19.75									43.55	**43.02**	1.84
75-35 - Kissimmee/Okeechobee Lowland														
Arbuckle	14-32-29	3793.62	22.00	NBL	51.94	89.03	63.70	70.77	59.77	56.14	57.96	66.31	**54.95**	3.61
Hatchineha	27-28-29	6600.33	28.09	NBL	58.45	72.92	65.57	67.06	61.50	53.21	57.35	62.91	**57.90**	3.67
Rosalie	27-29-29	4565.54	18.10	NBL	43.55	61.54	53.70	64.41	50.57	51.12	50.84	51.98	**47.20**	2.57
Tiger	06-30-30	2163.86	12.84	NBL	69.65	69.86	65.41	85.35	61.35	67.62	64.49	68.00	**67.07**	6.08
Weohyakapka	03-31-29	7717.75	35.26	PLL	39.39	46.85		45.69				43.98	**42.54**	1.92
	Average		23.26									58.63	**53.93**	3.57
	Median		22.00									62.91	**54.95**	3.61
	Maximum		35.26									68.00	**67.07**	6.08
	Minimum		12.84									43.98	**42.54**	1.92
75-36 - Southwestern Flatlands														
Confusion	30-27-27	13.83	66.92	PLL	43.19	41.87		36.73				40.60	**39.96**	2.10
Garfield	05-30-26	664.16	14.22	NBL	71.75	96.12	64.91	82.40	60.89	65.30	63.09	76.99	**67.42**	6.58
Gibson	25-27-23	484.09	5.08	NLL	43.55	60.91		91.07				65.18	**67.31**	4.41
Grassy	2-29-25	80.28	11.82	NBL	67.34	76.34	70.88	93.32	66.39	73.91	70.15	71.28	**68.74**	6.66
Haines	33-27-26	727.6	21.64	NBL	68.31	65.95	65.57	73.22	61.50	58.06	59.78	64.68	**64.05**	5.10
Hamilton	18-28-27	2174.36	9.82	NLL	26.78	70.70	61.25					52.91	**44.02**	4.20
Hancock	08-29-25	4532.74	9.59	NLL	89.12	113.16	91.55					97.94	**90.33**	21.79
Henry (HC)	36-27-26	856.66	8.96	NLL	41.32	94.18	67.88					67.80	**54.60**	5.96
Little Crooked	23-31-27		19.26	NBL	43.10	81.40	60.44	70.34	56.78	55.80	56.29	60.26	**49.69**	3.59
Livingston	21-32-28	1172.13	5.69	NLL	35.91	87.49	68.03					63.81	**51.97**	7.29
Lowery	14-27-26	935.72	56.80	PLL	57.11	56.33		52.17				55.20	**54.64**	3.24
Mariam	27-28-26	190.13	17.00	NBL	52.23	83.96	60.03	72.83	56.39	57.75	57.07	64.42	**54.65**	4.00

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Mattie	14-27-25	1076.6	9.67	NLL	49.44	86.03	67.88					67.78	**58.66**	5.77
Middle Hamilton	07-28-27	115.7	26.23	NBL	54.41	68.63	66.68	69.90	62.52	55.45	58.98	60.67	**56.69**	3.71
Mud (PC)	06-27-25	144.21	19.00	NBL	66.53	71.57	65.73	76.46	61.65	60.62	61.13	66.41	**63.83**	4.94
Rochelle	04-28-26	581.68	28.26	NBL	67.08	69.44	65.24	66.56	61.19	52.81	57.00	64.51	**62.04**	4.53
Surveyors	26-30-26	294.41	18.77	NBL	61.24	76.34	63.88	74.72	59.94	59.24	59.59	65.72	**60.41**	4.48
	Average		20.51									65.07	**59.35**	5.78
	Median		17.00									64.68	**58.66**	4.53
	Maximum		66.92									97.94	**90.33**	21.79
	Minimum		5.08									40.60	**39.96**	2.10
	Overall Average		29.19									57.71	**56.22**	4.91
	Overall Median		26.94									60.32	**56.08**	3.57
	Overall Maximum		174.00									97.94	**90.33**	25.07
	Overall Minimum		1.70									28.05	**26.40**	1.54

The Natural Resources Division utilizes the TSI and WQI as assessment tools. The TSI is used by lake managers to describe one aspect of water quality, the relative eutrophication (aging) of lakes. The TSI is a calculated measurement using the concentrations of chlorophyll a, total nitrogen, and total phosphorus. The WQI is an index used to indicate how well a waterbody satisfies the Florida Class III Surface Water Standards. All the lakes in Polk County are Class III waterbodies. Like all indices, the TSI and WQI are methods of summarizing and reducing the information of a complex system, and can be misleading or misinterpreted. Used together they can aid in identifying water quality problems and evaluating management decisions and projects.

Lakes can be classified according to their productivity or aging. The three major categories are: Oligotrophic, Mesotrophic, and Eutrophic. An Oligotrophic lake is typically a young lake with few dissolved nutrients, little or no organic sediment, and the lack of littoral vegetation. The water clarity is high and there are no suspended solids or algal blooms. Biological productivity is low; therefore few fish and other aquatic organisms are present. Typically, this is the type of lake people like to have for swimming and water-skiing. A Eutrophic lake is an older, much more biologically productive waterbody. Eutrophic lakes in their final stage will eventually convert to a swamp, wetland, or bog if natural conditions persist. Eutrophic lakes have a high nutrient concentration, a thick layer of organic sediments and poor light penetration. The littoral zone is heavily covered with vegetation and there may be frequent algal blooms. Fish and other aquatic life may be in abundance, at least until the final stages of eutrophication. Recreation, because of aesthetic reasons, may be limited. A Mesotrophic lake is the relative middle stage between the Oligotrophic and Eutrophic. This life cycle of lakes is a natural one. Human activities may speed the process up, and management activities may slow

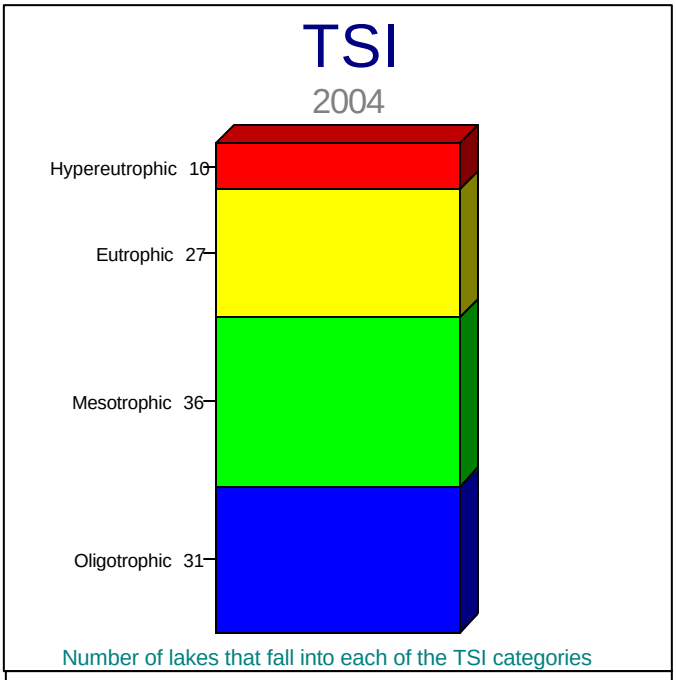


Figure 19 TSI Categories

down the progression to the final stages of eutrophication. Lakes that did not have two or more critical water quality analytes reported were not characterized and the water quality boxes were labeled, *insufficient data.* See Figure 19 to see how many lakes fell into the different classifications in 2004. About two-thirds of the lakes sampled in 2004 have a TSI of "best" or "good".

Nutrient Balance Lake Systems

The nutrient balance of lakes includes the ratios between three major elements; nitrogen, phosphorus, and carbon. In an ideal world all lakes would be nutrient balanced, i.e., the elements in the perfect molar weight ratios to each other to optimize biotic productivity (food webs). This report does not take into consideration the element carbon in the nutrient balance equations, because of insufficient data. Based on the concentrations, i.e., mg/l as P or N, the ratios of nitrogen to phosphorus were calculated and the results are included in Table 6. A summary follows for the lake samples in 2004.

The nutrient ratios can be helpful in identifying the nutrient input that is contributing to the eutrophication of the lake or stream. The ratios of nitrogen to phosphorus can be calculated and using the appropriate formula, the nutrient balance can be determined, see Tables 5 and 6. In 2004, 48 lakes proved to be nutrient balanced lakes, 14 were nitrogen limited, and 42 were phosphorus limited, see Figure 20. Figure 21 graphically displays each lake tested and is color-coded based upon the TSI value. Figure 22 shows the WQI for each lake tested in 2004.

Figure 20

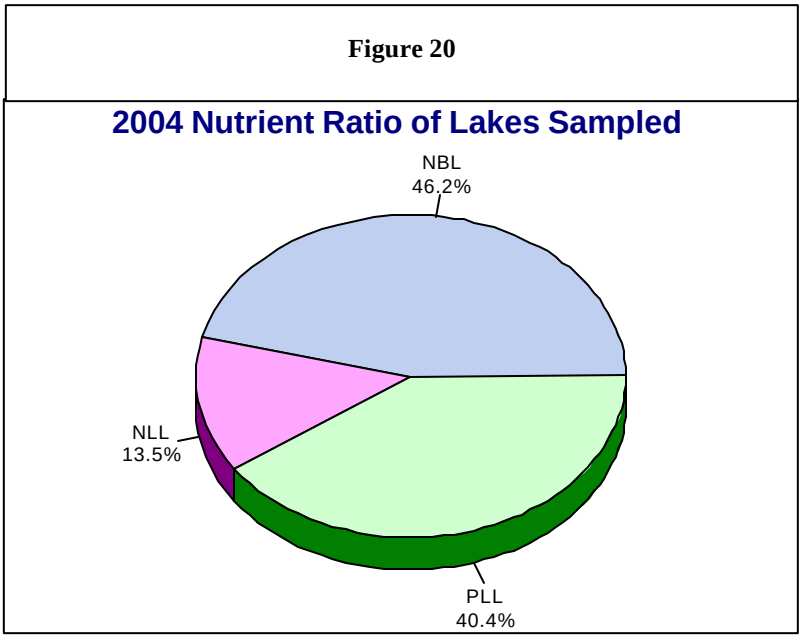


Figure 21

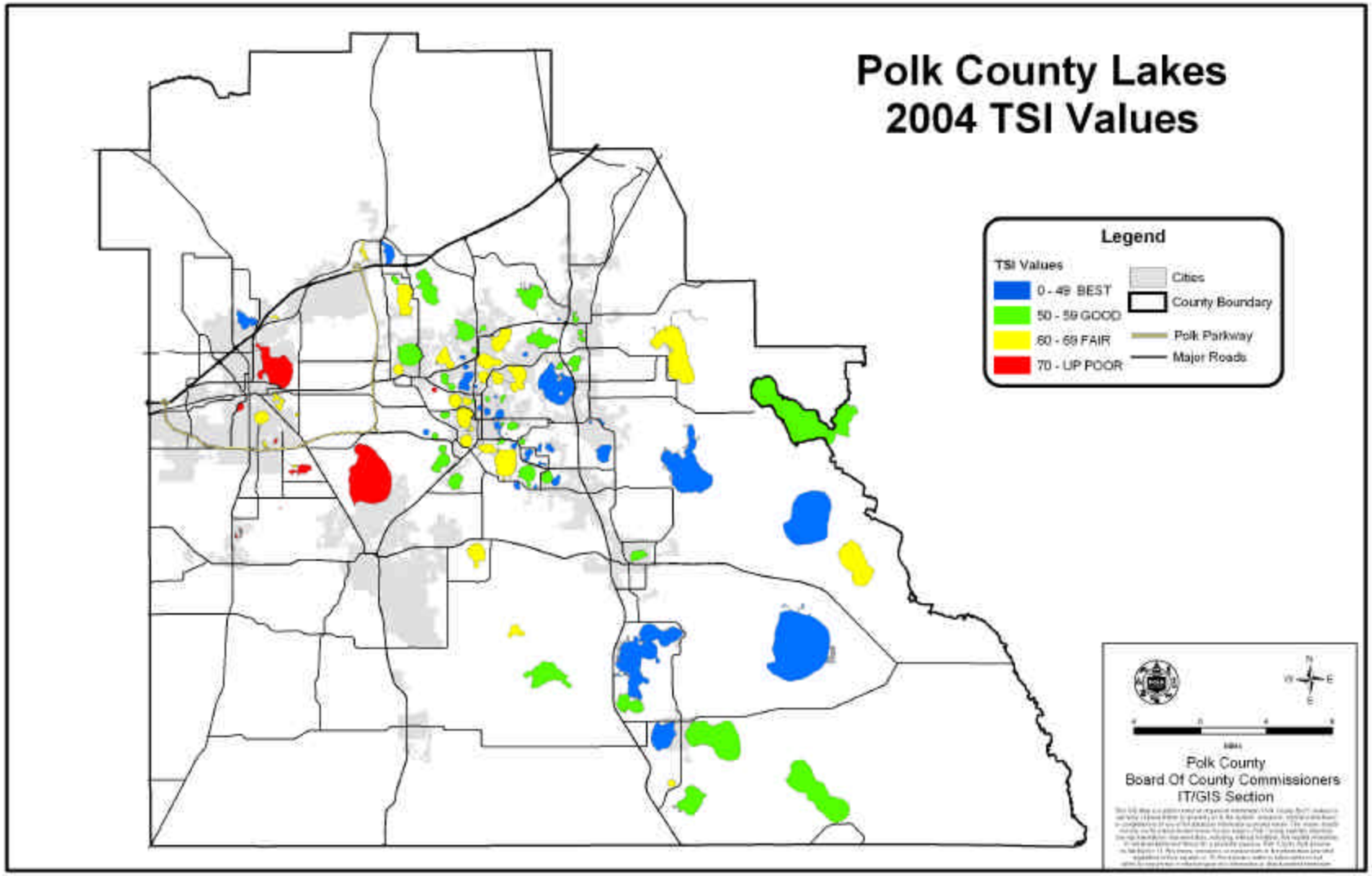
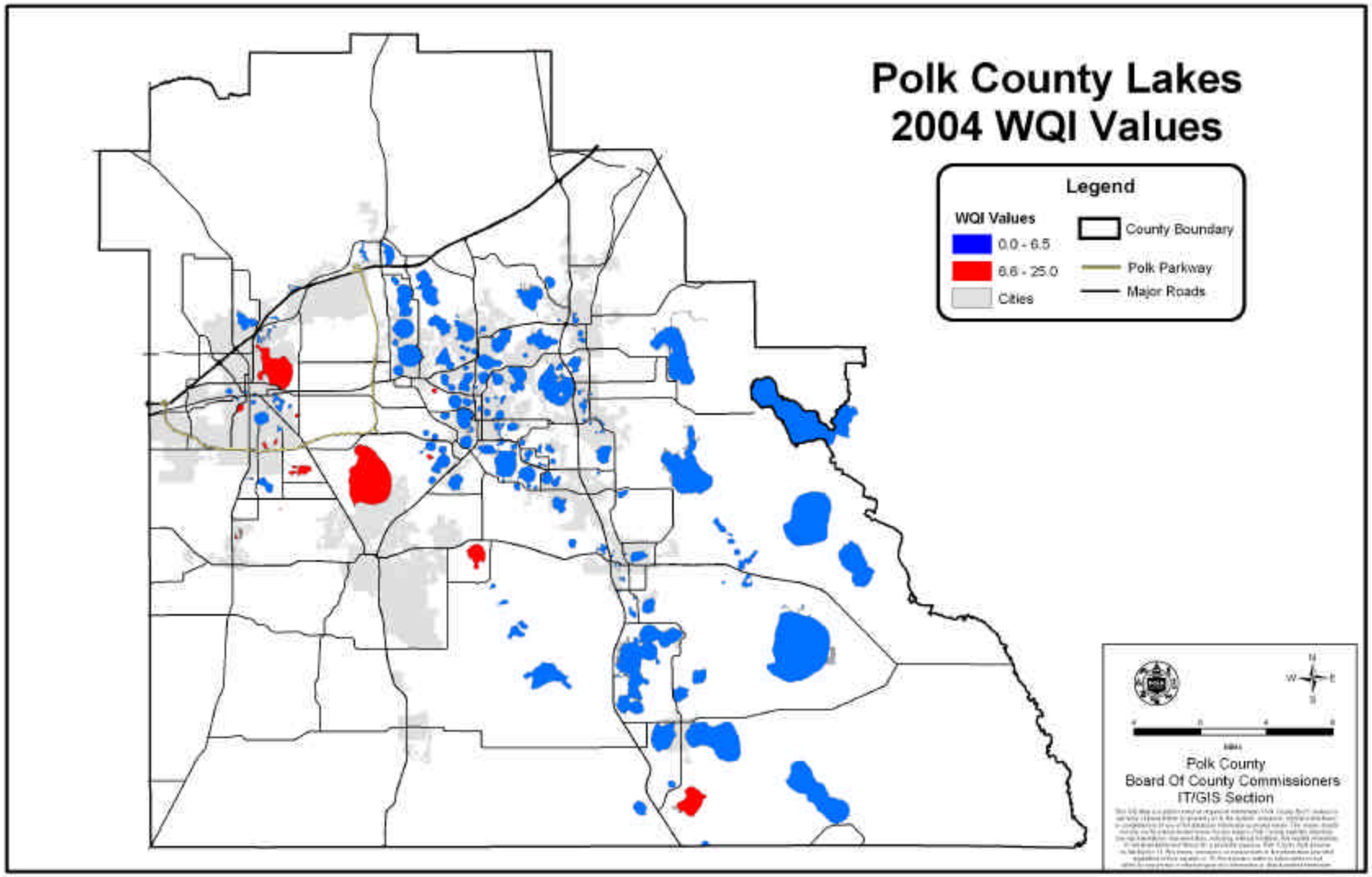

Polk County Lakes
2004 TSI Values
Legend
TSI Values
0 - 49 BEST
50 - 59 GOOD
60 - 69 FAIR
70 - UP POOR
Cities
County Boundary
Polk Parkway
Major Roads
Polk County
Board Of County Commissioners
IT/GIS Section

Figure 22


Polk County Lakes
2004 WQI Values
Legend
WQI Values
0.0 - 6.5
6.6 - 25.0
Cities
County Boundary
Polk Parkway
Major Roads
Polk County
Board Of County Commissioners
IT/GIS Section

Lake Water Quality Trends

As the TSI increases, water quality generally decreases and vice versa. To assess current trends in lake water quality, TSI data between the years 1992 and 2004 were plotted and a linear regression of the plot determined for each lake. The slope of the regression line will indicate if the TSI values are increasing or decreasing (or remain relatively the same). Therefore, any positive slope will represent declining water quality and a negative slope, improving water quality. The last 12 years of data were selected to provide the current lake trend, and results are shown in the following two lists: one for declining and one for improving water quality trends.

DECLINING WATER QUALITY TREND

2003 List		2004 List
Deeson	Spring	Banana South Pit
Echo	Tracy	Blue
Hunter		Deeson
Marie		Florence
Marion		Tiger
Mud		Tracy

IMPROVING WATER QUALITY TRENDS

2003 List		2004 List	
Agnes	Pansy	Alfred	Pansy
Alfred	Sears	Annie	Ruby
Annie	Swoope	Conine	Sears
Conine	Tennessee	Deer	Tennessee
Howard	Wailes	Livingston	Wailes

Lakes Condition Index (LCI)

The Water Resources staff are members of the FDEP Biocriteria Committee and have trained with the FDEP to conduct LCI assessments. Lakes are divided into two categories based on water color (CPU). Dark lakes, color $\geq$ 20 CPU's, are evaluated using the aquatic macrophyte species, Floristic Quality Index and coefficient of condition; non-dark lakes, < 20 CPU's, are

evaluated using benthic macroinvertebrate species ("bugs") and diversity calculations. The LCI for non-colored lakes (< 20 CPU) is regulatory as defined by the State's Impaired Waters Rule.

Federal Clean Water Act (CWA)

The CWA addresses both point and nonpoint sources of pollution and water quality in the United States. Section 303(d) of the CWA requires that states report streams and waterbodies that do not meet ambient water quality standards, and requires the establishment of Total Maximum Daily Load or TMDL for these waters on a prioritized schedule. A TMDL is the maximum amount of a specific pollutant that a waterbody can naturally assimilate without any water quality degradation. The TMDL's will be calculated/modeled using the concentrations or sum of waste load allocations (point sources), load allocations (nonpoint sources), background loads, and a margin of safety. The TMDL's will then be based on the natural assimilation of all the loadings in that waterbody. Waterbodies will not be allowed to exceed the TMDL and may in some cases be required to reduce specific pollutant loading to improve water quality.

The 303(d) list, commonly referred to as the Impaired Waters List, is prepared by FDEP and forwarded to USEPA. Annual reports are made to the EPA using a rotating basis scheme listing Verified Impaired Waters. The FDEP Rule for identifying impaired waters is in development at this time. Polk County has several waterbodies on the original 303(d) list and those are identified on the individual data sheet for each waterbody, see Appendix A.

Florida Watershed Restoration Act of 1999

This Act by the Florida legislature authorizes the FDEP to establish a statewide TMDL program and prioritize the TMDL schedule. The Act provides a process for listing impaired waters and developing, adopting, and implementing TMDL's. In 2002 there were seven streams in Polk County on the State's verified list for development of a TMDL.

STREAM MONITORING

There are six major rivers which make up Polk County's watersheds: the Alafia, Hillsborough, Kissimmee, Palatlakaha, Peace, and Withlacoochee. Additionally, there are approximately 30 streams or creeks that flow through Polk County, see Figure 23. These streams collect and

transport water for the rivers and some lakes and act as natural drainage conveyances. Streams provide a link between wildlife habitats. Some streams also provide recreation, such as canoeing and fishing.

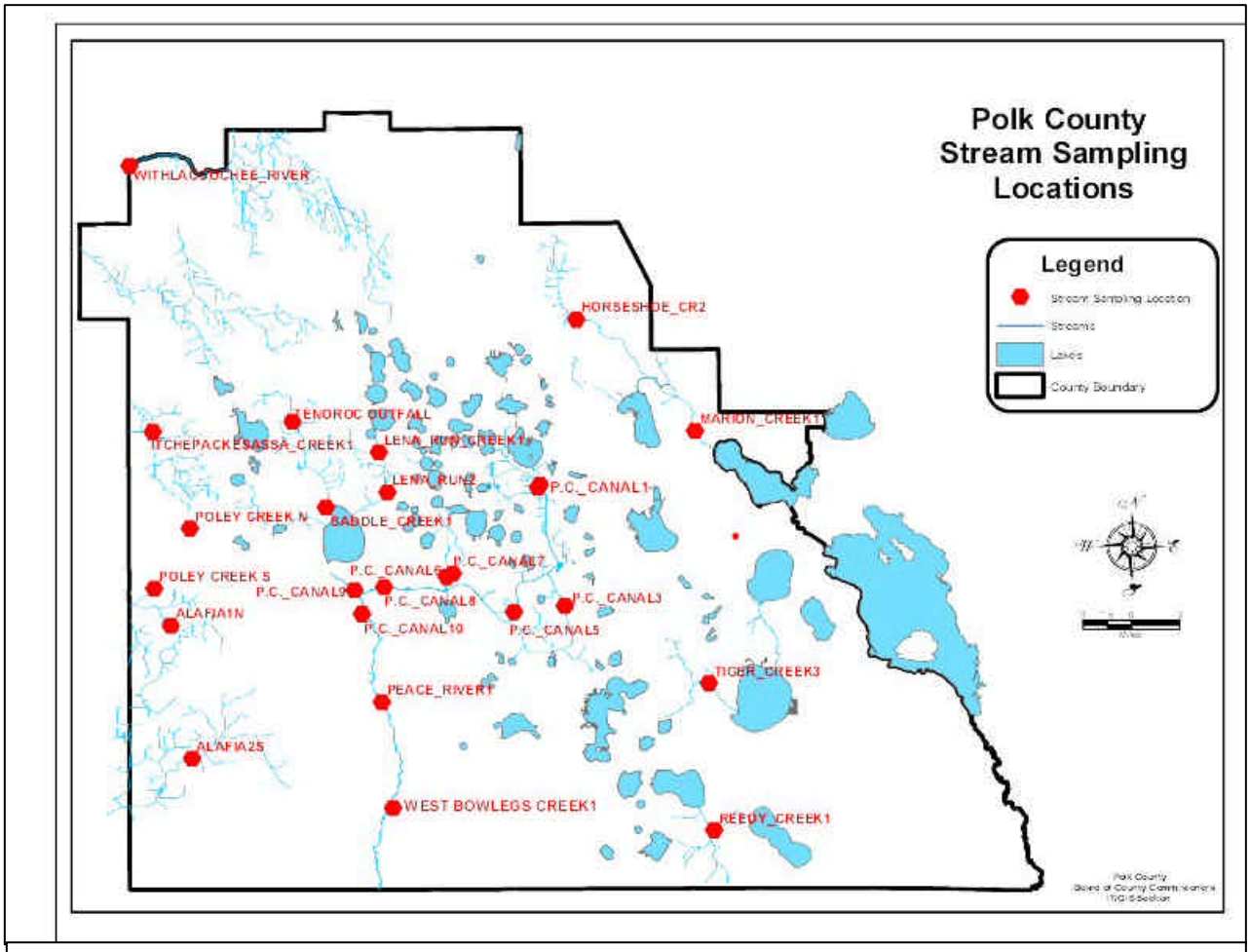


Figure 23 - Stream Sampling Map

A total of 26 stream segments were sampled on the following streams, rivers, and canals in Polk County in 2004: Gator, Horse, Itchepackesassa, Lena Run, Lulu Run, Marion, Peace, Reedy, Saddle, Poley, and Tiger creeks, Alafia River – north and south Prongs, Wahneta drainage, Peace Creek drainage, and the Withlacoochee River. Several stream segments were not tested due to low levels or no flow. Routine analyses of these streams include field measurements of temperature, specific conductance, dissolved oxygen, and pH *in situ.* Color, turbidity, corrected

chlorophyll a, chlorophyll a, ammonia, kjeldahl nitrogen, total phosphorus, nitrate/nitrite nitrogen, total nitrogen, fecal coliform, and total coliform are analyzed in the laboratory.

Table 5 provides the mean value and range for each water quality parameter routinely tested and the WQI range for streams in 2004 and 2003. TSI is not calculated for streams. Table 6 provides the mean water quality results for each stream/creek that was tested in 2004. Appendix B has historical water quality values and charts for each stream segment tested.

Stream Habitat Assessments/Stream Condition Index (SCI)

SCI's are a State of Florida regulatory tool used to assess "impaired waters". Habitat Assessment is an approved methodology by the FDEP to evaluate and rank functional habitat for flora and fauna in freshwater streams and rivers. The assessment data are used to evaluate the relationship of the stream biology and habitat to the stream water quality. The analysis also includes riparian zone quality and buffering capacity, general water quality observations, and immediate sub-basin land use. A SCI is the extension of the Habitat Assessment. Net "sweeps" are conducted to collect the macroinvertebrates in productive habitats for identification and indexing to evaluate the current water quality/habitat/biology condition. Staff has trained with FDEP to be state certified to conduct Habitat Assessments and the SCI's. Stream assessments (SCI) began in March 2003. As data becomes available they will be included in future reports.

Table 7

2004 Mean Chemical

Stream Parameters

Parameter	Unit	2004 Mean Value [4]	2004 Range	2003 Mean Value [4]
Temperature	Deg C	22.10	18.83-24.46	21.73
pH	SU	6.81	6.41-7.62	6.59
Specific Conductivity	umhos/cm	258	81-1065	276
Dissolved Oxygen	mg/l	4.75	1.16-7.85	5.06
Color	CPU	152	21-415	169
Turbidity	NTU	6.44	1.45-31.73	6.84
Ammonia	mg/l	0.476	0.010-9.569	0.123
Kjeldahl Nitrogen	mg/l	1.823	0.238-10.502	1.385
$NO_2 + NO_3$	mg/l	0.373	0.008-1.850	0.397
Total Nitrogen	mg/l	2.16	0.93-11.80	1.78
Total Phosphorus	mg/l	0.573	0.026-3.741	0.711
Chlorophyll a	mg/m^3	11.17	1.04-104.80	11.34
WQI		18.95	2.61-156.42	18.82

[4] * Actual values below the laboratory detection limits were extrapolated to one-half the method detection level; Mean value is arithmetic; ND – Not Detected.

Table 8
POLK COUNTY NATURAL RESOURCES DIVISION LABORATORY
2004 STREAM WATER QUALITY RESULTS

SITE	LOCATION	Chlor a	COLOR	COND	DO	NH3	TKN	NOx	TN	pH	TP	TEMP	TURB	NP	Limiting	WQI
		mg/m3	CPU	umhos/cm	mg/l	mg/l	mg/l	mg/l	mg/l	SU	mg/l	Deg C	NTU	Ratio	Nutrient	2004
Alafia North Prong	N Prong @ Nichols Bridge On Hwy 676	3.81	75	1065	4.54	9.569	10.502	1.295	11.8	6.76	3.741	22.82	9.13	3.15	NL	156.42
Alafia South Prong	S Prong Bridge On Sr37 S 9.3 miles S Of Hwy 60	5.17	64	523	2.5	0.150	1.040	0.055	1.09	7.12	1.844	23.6	2.84	0.59	NL	41.53
Gator Creek	On N Moore Rd Off Old Polk City Rd	12.07	300	94	1.16	0.292	2.134	0.008	2.13	6.41	0.183	24.04	2.2	11.64	NB	13.16
Horseshoe Creek	Hwy 547 N at RR Trestle Davenport	2.22	256	134	2.32	0.100	1.812	0.224	2.03	6.69	0.109	22.47	3.48	18.62	NB	7.16
Itchepackesassa Creek	Bridge On Walker Rd S Of Hwy 582	9.75	77	238	6.67	0.074	1.246	0.557	1.81	7.02	0.584	23.72	11.7	3.10	NL	15.42
Lena Run Creek 1	N Side Of 655 On The W Side Of Fl Dist.	6.41	21	229	3.03	0.151	1.110	0.211	1.32	6.47	0.053	24.39	2.4	24.91	PL	5.49
Lena Run Creek 2	1 Mile S Of 540 On E Side Of Thornhill	3.81	150	249	6.65	0.039	1.065	0.215	1.28	6.8	0.310	22.39	6.75	4.13	NL	8.78
Lulu Run	S on 655; L on American Superior Blvd; R on Hoover Rd where lake discharges into Lulu Run	17.22	80	215	2.9	0.365	1.770	0.016	1.79	6.74	0.135	23.2	5.55	13.26	NB	9.84
Marion Creek	N Of 542 - Bridge On Poinciana Pkw	8.01	133	162	7.51	0.024	1.540	0.316	1.86	6.73	0.073	18.83	4.15	25.48	PL	4.29
Peace Creek1	3/10 Mile W Off Hwy 27S On SR 542	5.02	368	190	4.47	0.112	2.185	0.090	2.28	6.62	0.152	19.79	9.7	15.00	NB	7.48
Peace Creek10	Bridge On Hwy 60 W Of Kincade Marine	16.13	210	237	4.34	0.125	1.856	0.263	2.12	6.92	0.826	21.72	8.98	2.57	NL	21.51
Peace Creek4	Alturas Rd Cutoff +520 Yds S Of RR W	7.21	290	81	1.64	0.081	1.662	0.008	1.66	6.5	0.056	24.46	6	29.64	PL	7.15
Peace Creek5	Bridge @ Hwy 60 W 2/10 Mile W Of RR	9.81	255	277	4.52	0.138	1.874	0.569	2.44	6.58	0.215	22.08	8.88	11.35	NB	9.23
Peace Creek6	19th St W Of Hwy 655 3/10 Mile Dirt Rd	6.28	86	194	5.5	0.087	1.054	0.215	1.27	6.86	0.113	21.47	4.05	11.24	NB	5.37
Peace Creek7	Hwy 655 N + 100 Yds N Of 12th St E	6.13	69	201	4.68	0.097	1.134	0.259	1.39	6.41	0.100	21.63	4.2	13.90	NB	5.45
Peace Creek8	P.C. Bridge On 91 Mine Rd N Of Hwy 60	5.73	240	231	4.62	0.108	1.547	0.255	1.8	6.82	0.486	21.12	6.38	3.70	NL	13.64
Peace Creek9	1 Mile W Old Bartow/Eagle Lk Cutoff Rd	104.8	82	285	6.52	0.047	3.913	0.029	3.14	7.62	0.980	19.89	31.73	3.20	NL	29.79
Peace River1	Bridge On Hwy 640 E Of SR 17 Homeland	34.59	105	444	5.16	0.071	1.730	0.339	2.07	7.06	1.624	20.85	7.03	1.27	NL	37.64
Poley Creek North	W on Pipkin; R on S Pipkin Rd 1/4 Mile of R, Sample at staff gage approx 50' E from road	2.63	78	232	6.39	0.031	0.649	0.284	0.93	7.07	0.647	22.07	11.35	1.44	NL	15.43
Poley Creek South	Bridge on SR60 1/2 mile E of Coronet Rd; W of Mulberry; Easy access on E bound on SR60	1.25	94	245	6.12	0.029	0.790	0.228	1.02	7.17	0.770	22.03	6.9	1.32	NL	17.69
Reedy Creek	Arbuckle Rd To Rucks Dairy Rd At Bridge	7.01	72	226	6.75	0.168	1.160	0.518	1.68	6.65	0.059	22.3	3.3	28.47	NB	4.97
Saddle Creek1	Hwy 540 E (Winter Lake Rd) On N Side	4.23	57	228	2.36	0.061	1.067	0.107	1.18	6.81	0.515	22.93	2.32	2.29	NL	14.42
Teneroc Outfall	Bridge approx 1/2 mile E of Fish Hatchery Rd on CR546 (Saddle Creek Rd)	6.21	98	237	4.38	0.371	1.464	0.259	1.72	6.81	0.830	22.985	3.25	2.07	NL	22.37
Tiger Creek	On Walk In Water Rd Call 813-678-1551	1.04	42	196	7.85	0.010	0.238	1.446	1.68	6.84	0.026	19.69	1.45	64.62	PL	2.61
W Bowlegs Creek	Where 657 crosses Bowlegs S of Ft Meade E of US17	1.25	229	173	6.56	0.027	1.108	1.850	2.96	7.03	0.322	20.82	1.93	9.19	NL	9.69
Withlachoochee River	Under Bridge On SR 471 3 mile N Of Hwy 98 N	2.68	415	110	4.23	0.060	1.747	0.069	1.81	6.55	0.146	23.29	1.7	12.40	NB	6.22
AVERAGE		11.17	151.77	257.54	4.75	0.476	1.823	0.373	2.16	6.81	0.573	22.10	6.44			18.95
MAXIMUM		104.80	415.00	1065.00	7.85	9.569	10.502	1.850	11.80	7.62	3.741	24.46	31.73			156.42
MINIMUM		1.04	21.00	81.00	1.16	0.010	0.238	0.008	0.93	6.41	0.026	18.83	1.45			2.61

SECTION III

LAKE LEVELS
And
RAINFALL

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LAKE LEVELS

To maintain a healthy lake ecosystem, it is important that lake levels fluctuate. Therefore, it is necessary to determine what elevation is too high or too low and what elevations constitute a desirable range of water fluctuation. The SWFWMD has a Lake Level Program to track these levels on a number of lakes within its district.

Levels that are established for each lake consists of a ten year Flood Warning, Minimum Flood, Minimum Water Level (Low Management), and Extremely Low Management Levels. As of October 1995, the SWFWMD has adopted levels on 154 Polk County lakes in its district.

The Water Resources Section receives lake levels from SWFWMD, which are used to update the Division's database. For projects requiring more detailed information, daily level readings are obtained from SWFWMD or read directly by Division staff. At present, this office has lake level information on approximately 200 lakes within the County. The period of record ranges from a few years to more than 30 years. The SWFWMD has automated equipment, which records water levels on some lakes. Averaged levels for each month are put into a spreadsheet, and compared to set levels, see Table 7. Figures 15 through 26 graphically illustrate the levels for several lakes.

There are many factors that can affect the water level in a lake. For example, in the upper Peace River Basin of Polk County, the changes in lake levels can be attributed to fluctuations in water levels of the Floridan Aquifer over the past several years. Ground water withdrawals have shown to have an effect on lake levels as well. During the rainy season lakes that have control structures on them may be opened to allow for the increased volume from possible rains, and to prevent flooding. Lakes will also fluctuate directly from rainfall or lack thereof and evaporation.

Table 9

Lake Levels

Waterbody, S-T-R	2004 Mean	2004 Mean / Min Flood Difference	2004 Max	2004 Max. / Record High Difference	Record High		2004 Min	2004 Min. / Record Low Difference	Record Low		10 Year Flood	100 Year Flood	Min Flood Level	Min Low Level	Min Ext. Low Level	Max Desire Level
Ada, 33-28-27	114.68	-8.32	117.97	0.00	12/13/04	117.9	112.34	5.43	6/25/01	106.9	123.8	127.3	123.0	120.0	118.0	122.5
Agnes, 4-27-25	134.65	-1.10	136.16	0.00	10/11/04	136.1	133.80	3.34	6/26/01	130.4	135.2	136.4	135.7	132.7	130.7	135.0
Alfred, 30-27-26	129.10	-1.65	130.76	-2.00	03/26/98	132.7	127.72	5.32	05/24/77	122.4	132.3	134.2	130.7	128.2	126.2	130.2
Altamaha, 11-30-27	118.26	-4.24	121.26	-0.08	01/26/98	121.3	116.36	4.04	5/31/01	112.3	122.6	123.4	122.5	120.0	118.0	122.0
Amoret, 24-30-27	107.21	-8.05	110.10	0.00	10/5/04	110.1	105.18	3.96	5/31/01	101.2	115.5		115.2	113.0	111.0	
Annie, 3-29-27	114.46	-4.54	115.97	-1.39	03/25/98	117.3	113.26	4.90	6/1990	108.3	122.1	124.4	119.0	116.0	114.0	118.5
Ariana, 3-28-25	136.16	-0.84	137.28	-0.62	08/28/46	137.9	135.32	4.04	05/06/76	131.2	137.1	138.3	137.0	134.5	132.5	136.7
Arietta, 27-27-25	142.10	-1.90	144.12	0.00	10/10/04	144.1	141.04	4.54	05/25/77	136.5	144.0	144.8	144.0	141.0	138.0	143.0
Ashton, 19-29-27	117.56	-0.94	119.07	0.00	9/14/04	119.0	116.80	3.82	06/23/89	112.9	118.7	119.5	118.5	116.5	114.5	118.0
Aurora, 13-30-28	94.57	-5.43	96.16	-1.78	09/29/98	97.94	93.19	2.27	05/31/01	90.92	103.3	107.0	100.0	97.00	95.00	99.00
Banana, 10-29-24	104.11	-2.39	106.96	0.00	9/7/04	106.9	103.38	1.33	6/11/01	102.0	106.7	107.4	106.5	103.5	102.0	105.5
Banana North Pit,	104.11	-2.39	106.96	0.00	9/7/04	106.9	103.38	1.33	6/11/01	102.0	106.7	107.4	106.5	103.5	102.0	105.5
Banana South Pit,	104.11	-2.39	106.96	0.00	9/7/04	106.9	103.38	1.33	6/11/01	102.0	106.7	107.4	106.5	103.5	102.0	105.5
Belle, 11-30-27	117.02	-2.98	117.90	-4.40	11/23/04	122.3	116.08	6.46	06/02/94	109.6	123.6		120.0	117.0	115.0	119.0
Bentley, 29-28-24	114.42		115.36	-0.24	12/15/02	115.6	113.95	1.00	6/22/01	112.9		119.7				
Bess, 18-29-27	124.62	-0.63	125.72	0.00	9/14/04	125.7	123.96	3.16	6/20/01	120.8	125.5	126.2	125.2	123.0	121.0	125.0
Beulah (Lkld), 13-28-23	179.63		181.15	0.00	9/10/04	181.1	178.79	4.06	1991	174.7						
Big Gum, 26-29-28	93.23	-1.77	95.17	-0.65	1/27/03	95.82	91.66	5.56	1/31/01	86.10	95.10	96.00	95.00	92.00	89.00	94.50
Blue, 13-28-25	148.11	-0.89	149.80	0.00	9/7/04	149.8	147.16	0.66	05/31/00	146.5	149.8	150.9	149.0	146.5	144.5	148.5
Blue S, 24-30-27	112.10	-4.90	114.40	-0.17	09/28/98	114.5	110.32	6.94	05/22/82	103.3	118.0	125.3	117.0	114.0	112.5	116.0

Waterbody, S-T-R	2004 Mean	2004 Mean / Min Flood Difference	2004 Max	2004 Max. / Record High Difference	Record High		2004 Min	2004 Min. / Record Low Difference	Record Low		10 Year Flood	100 Year Flood	Min Flood Level	Min Low Level	Min Ext. Low Level	Max Desire Level
Bonnet, 12-27-26	130.53		131.73	0.00	10/25/04	131.7	129.70	0.00	5/27/04	129.7		135.0				
Bonnet (Lkld), 14-28-23	144.59	-0.41	145.15	-1.47	11/23/88	146.6	143.33	1.23	05/30/97	142.1	146.4	147.2	145.0	145.0	142.5	147.5
Bonny (Lkld), 20-28-24	130.51	0.01	133.10	0.00	9/27/04	133.1	129.10	6.18	6/22/01	122.9	130.9	132.4	130.5	128.0	126.0	130.0
Buckeye, 22-28-26	128.16	-0.84	129.46	0.00	9/7/04	129.4	127.30	2.30	6/22/01	125.0	130.1	131.6	129.0	126.0	124.5	128.7
Buffum, 12-31-26	131.24	-1.01	132.22	-0.20	02/24/98	132.4	130.56	6.66	06/19/91	123.9	132.7	133.4	132.2	129.2	126.7	132.0
Camp, 20-27-26	132.01	-2.49	133.19	-0.19	02/18/98	133.3	131.00	2.28	6/20/01	128.7	133.4	133.9	134.5	132.0	130.0	134.0
Cannon, 19-28-26	131.56	-0.44	133.08	-0.02	09/11/60	133.1	130.79	3.10	5/30/01	127.6	132.6	133.4	132.0	129.5	127.0	131.5
Clearwater, 5-27-25	143.10	-0.40	145.10	-0.96	08/28/94	146.0	142.04	4.11	5/30/01	137.9	146.2	148.5	143.5	141.0	139.0	143.0
Clinch, 31-31-28	105.48	-1.27	107.78	-2.43	10/10/48	110.2	104.06	3.96	06/19/91	100.1	108.0	110.4	106.7	104.0	102.5	106.0
Conine, 9-28-26	128.52	-0.23	129.95	0.00	9/28/04	129.9	127.47	3.36	5/30/01	124.1	129.7	130.5	128.7	126.5	124.5	128.5
Cooper, 2-30-27	121.44	-2.06	121.90	-0.42	11/16/94	122.3	121.08	3.18	3/27/01	117.9	124.2	125.3	123.5	121.0	119.0	123.0
Crooked, 1-31-27	118.66	-3.34	121.17	-2.81	10/08/48	123.9	116.88	10.78	05/20/91	106.1	122.6	125.8	122.0	118.5	117.0	121.0
Crystal (Lkld), 21-28-24	136.72		138.68	-1.94	09/20/96	140.6	135.25	7.35	6/22/01	127.9		140.0				
Crystal (LW), 2-30-27	115.19	-6.06	119.18	-0.68	03/25/98	119.8	112.90	4.70	3/27/01	108.2	121.4	123.0	121.2	118.0	115.0	121.0
Cummings, 31-27-26	129.55	-1.45	130.65	-0.55	03/23/98	131.2	128.70	2.87	5/29/01	125.8	131.5	133.5	131.0	127.5	125.5	129.5
Cypress, 36-29-28	94.90	-3.60	96.82	-1.78	03/25/98	98.60	93.21	3.88	5/31/01	89.33	100.2	101.8	98.50	95.00	93.00	98.00
Daisy, 6-29-27	128.88	-1.12	129.75	-0.15	9/11/01	129.9	128.40	2.65	06/20/00	125.7	130.9	131.7	130.0	127.0	126.0	129.7
Deer (WH), 25-28-25	139.28	-1.47	140.32	-2.08	03/30/98	142.4	138.50	1.60	6/12/01	136.9	141.3	142.2	140.7	138.5	136.5	140.5
Deeson, 29-27-24	127.92		129.56	-5.93	09/28/54	135.4	126.48	8.85	6/25/01	117.6	129.5	133.1				
Dell, 28-28-27	123.14	-0.61	123.92	-0.38	09/21/94	124.3	122.31	3.62	6/25/01	118.6	125.7	126.0	123.7	121.5	119.5	123.5
Dexter, 2-29-26	130.47	-1.53	131.90	0.00	9/7/04	131.9	129.70	3.02	7/27/01	126.6	132.2	132.7	132.0	129.0	127.5	131.5
Dinner, 15-29-27	112.53	-5.97	115.12	-0.24	3/20/98	115.3	110.59	6.77	6/25/01	103.8	120.9	124.0	118.5	116.0	114.0	118.0
Eagle, 1-29-25	128.93	-1.82	130.58	-0.92	09/23/96	131.5	127.66	8.90	05/10/76	118.7	131.0	131.9	130.7	128.5	126.5	130.5

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Easy, 19-30-28	105.94	-9.31	108.37	-0.51	03/25/98	108.8	104.28	3.38	6/26/01	100.9	115.5		115.2	113.0	111.0	115.0
Echo, 5-28-26	129.61	-1.39	130.40	-0.25	08/14/90	130.6	128.78	2.72	5/25/01	126.0	132.3	134.0	131.0	128.0	126.0	130.5
Effie, 3-30-27	114.91	-3.09	116.72	-0.98	10/4/04	117.7	114.30	0.90	03/24/77	113.4	119.6	121.7	118.0	115.0	113.0	117.0
Elbert, 22-28-26	135.28	-0.22	137.26	0.00	10/29/04	137.2	133.84	5.06	06/19/89	128.7	137.5	138.6	135.5	133.0	131.5	135.0
Eloise, 3-29-26	131.56	-0.44	133.08	-0.02	09/11/60	133.1	130.79	3.10	5/30/01	127.6	132.6	133.4	132.0	129.5	127.0	131.5
Eva, 29-27-26	129.30	-2.20	130.89	-1.17	03/11/98	132.0	128.04	2.39	6/20/01	125.6	132.3	134.7	131.5	129.0	127.0	131.0
Fannie, 11-28-26	124.93	-0.82	126.45	0.00	10/25/04	126.4	123.80	5.13	05/27/77	118.6	127.0	128.1	125.7	123.5	120.0	125.5
Florence, 35-28-26	127.55	-0.95	128.80	0.00	9/7/04	128.8	126.88	2.14	6/26/01	124.7	128.8	129.5	128.5	127.0	125.0	128.5
Fox, 6-29-27	134.10	-0.90	135.10	0.00	9/7/04	135.1	133.48	2.07	6/20/01	131.4	135.2	135.9	135.0	132.0	131.0	134.7
Garfield, 5-30-26	103.29	-1.46	105.02	-1.38	10/4/04	106.4	101.96	4.58	6/26/01	97.38	105.7	107.9	104.7	101.0	100.0	103.5
Gator, 26-30-26	130.94	-2.06	131.59	-0.29	02/24/98	131.8	130.20	0.10	04/23/02	130.1	133.6	134.7	133.0	130.7	128.5	132.7
George, 6-28-26	130.12	0.12	130.64	-0.12	06/27/03	130.7	129.38	0.38	09/03/98	129.0	130.7	131.0	130.0	127.5	125.5	129.5
Gibson, 25-27-23	142.87	-0.63	143.46	-1.94	09/08/88	145.4	142.55	2.15	06/06/85	140.4	144.2	145.5	143.5	141.5	141.5	143.0
Gordon, 16-28-27	114.32	-4.68	118.00	0.00	10/14/04	118.0	111.77	6.61	9/25/01	105.1	121.3		119.0	116.0	114.0	118.0
Grassy (EL), 2-29-25	128.26	-0.74	129.39	-7.20	09/21/60	136.5	127.32	4.22	06/06/91	123.1	134.8	136.4	129.0	126.5	125.5	128.5
Grassy (LA), 19-27-26	132.17	0.17	133.88	0.00	10/25/04	133.8	130.96	5.00	7/2/01	125.9	133.2	133.8	132.0	129.5	128.0	131.5
Griffin, 30-27-26	131.02	-0.48	131.78	-0.76	05/14/98	132.5	130.14	3.89	5/17/01	126.2	132.3	134.7	131.5	129.0	127.0	131.0
Gross, 14-29-26	135.48	-0.52	137.56	-0.14	10/15/04	137.7	133.74	3.18	6/26/01	130.5	138.5	140.0	136.0	133.5	132.0	135.7
Gum, 17-27-26	131.96	0.96	133.12	-0.10	02/18/98	133.2	131.04	3.12	06/07/79	127.9	132.6	133.0	131.0	128.5	126.0	130.5
Haines, 33-27-26	128.34	-0.41	129.66	0.00	10/15/04	129.6	126.24	1.65	6/25/01	124.5	129.7	130.6	128.7	126.5	124.5	128.5
Hamilton, 18-28-27	122.27	0.77	123.58	-0.76	10/03/48	124.3	121.34	4.65	6/18/01	116.6	122.5	123.7	121.5	119.0	117.2	121.2
Hancock, 8-29-25	98.48	-0.52	101.55	-0.33	09/16/60	101.8	97.45	3.47	05/23/68	93.98	102.1	102.4	99.00	96.00	94.00	95.50
Hart, 24-29-26	120.19	-4.31	123.24	0.00	10/14/04	123.2	118.02	5.49	7/11/01	112.5	124.7	125.6	124.5	122.0	120.0	124.0

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Hartridge, 8-28-26	131.56	-0.44	133.08	-0.02	09/11/60	133.1	130.79	3.10	5/30/01	127.6	132.6	133.4	132.0	129.5	127.0	131.5
Helene, 34-26-25	143.17	-0.83	145.10	-1.32	03/23/98	146.4	141.10	3.29	06/03/02	137.8	144.8	147.2	144.0	141.0	139.0	143.0
Hendry, 16-31-26	159.20	0.20	160.30	0.00	9/21/04	160.3	158.40	5.66	06/22/88	152.7	160.1	160.4	159.0	156.0	154.0	158.5
Henry (HC), 36-27-26	125.78	-0.72	126.65	-0.55	10/13/04	127.2	125.07	3.95	6/18/01	121.1	127.0	127.5	126.5	124.0	122.5	126.0
Hickory (FP), 17-32-28	97.25	-1.25	98.08	-0.10	9/16/03	98.18	96.00	5.26	6/19/01	90.74	98.50	99.30	98.50	96.00	94.00	98.00
Hollingsworth, 30-28-24	131.08		132.32	-0.89	07/13/91	133.2	130.60	4.88	6/9/00	125.7	134.2	134.8				
Holloway, 21-28-24	138.60		140.02	-0.30	07/24/98	140.3	137.72	2.19	6/22/01	135.5		141.0				
Howard, 30-28-26	131.56	-0.44	133.08	-0.02	09/11/60	133.1	130.79	3.10	5/30/01	127.6	132.6	133.4	132.0	129.5	127.0	131.5
Hunter, 24-28-23	161.30	-1.45	162.26	-0.99	12/13/02	163.2	159.90	0.31	02/23/96	159.5	162.3	163.0	162.7	160.2	159.0	162.2
Ida (FP), 28-31-28	78.90	-0.10	80.21	0.00	10/4/04	80.21	78.08	0.36	05/12/86	77.72	80.00	81.10	79.00	76.50	75.00	78.50
Ida (WH), 17-28-26	134.68	-0.57	135.30	-0.87	08/14/92	136.1	134.24	3.40	5/25/01	130.8	136.7	137.9	135.2	132.0	130.5	135.0
Idyl, 16-28-26	132.50	-1.50	133.48	0.00	9/7/04	133.4	132.18	0.90	06/28/00	131.2	134.9	136.9	134.0	133.5	131.5	133.5
Idylwild, 18-28-26	131.56	-0.44	133.08	-0.02	09/11/60	133.1	130.79	3.10	5/30/01	127.6	132.6	133.4	132.0	129.5	127.0	131.5
Jessie, 12-28-25	131.56	-0.44	133.08	-0.02	09/11/60	133.1	130.79	3.10	5/30/01	127.6	132.6	133.4	132.0	129.5	127.0	131.5
John, 32-28-24	108.21		109.46	-1.54	11/14/91	111.0	107.75	0.47	4/16/99	107.2		112.6				
Josephine (D), 27-28-27	112.64	-8.86	115.52	0.00	12/13/04	115.5	110.54	5.62	6/25/01	104.9	124.1	127.7	121.5	118.0	116.5	121.0
Josephine (LW),	113.02	-6.98	116.71	0.00	11/8/04	116.7	110.40	4.42	5/31/01	105.9	121.3		120.0	116.5	114.5	119.5
Juliana, 15-27-25	132.09	-0.41	133.70	-0.40	03/21/98	134.1	131.27	5.07	05/07/76	126.2	134.7	136.3	132.5	130.0	127.5	132.0
Lee, 10-29-27	115.86	-3.14	117.09	-0.31	10/26/04	117.4	114.76	5.33	6/25/01	109.4	122.1	124.4	119.0	116.0	114.0	118.5
Lee (LH), 16-28-27	118.64	-4.86	122.10	0.00	10/14/04	122.1	116.42	6.13	6/25/01	110.2	123.5		123.5	121.5	120.0	123.2
Leonore, 10-31-28	85.33	-1.67	86.06	0.00	10/5/04	86.06	84.50	1.56	06/11/86	82.94	87.40	88.40	87.00	84.50	83.00	86.50
Link, 27-28-26	127.17	-0.83	128.50	0.00	9/24/04	128.5	125.72	5.44	6/12/01	120.2	128.7	129.9	128.0	125.0	123.0	127.0
Ltl Agnes, 4-27-25	134.71	-1.29	136.04	0.00	10/11/04	136.0	134.00	2.80	6/18/01	131.2	135.2	136.4	136.0	133.0	131.0	135.2

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Ltl Aurora, 13-30-28	94.02	-6.48	96.36	-0.80	03/25/98	97.16	92.39	3.09	5/31/01	89.30	103.3		100.5	98.00	96.00	100.0
Ltl Crooked, 23-31-27	118.77		121.24	0.00	10/26/04	121.2	117.03	4.23	06/13/91	112.8	122.6	125.8				
Ltl Eagle, 1-29-25	128.93	-1.82	130.58	-0.92	09/23/96	131.5	127.66	8.90	05/10/76	118.7	131.0	133.8	130.7			130.5
Ltl Elbert, 22-28-26	135.28	-0.22	137.26	0.40	9/30/03	136.8	133.84	5.06	06/19/89	128.7	137.5	138.6	135.5			135.0
Ltl Gum, 35-29-28	94.86	-0.64	96.56	-0.30	04/06/98	96.86	93.24	3.86	5/31/01	89.38	96.80	97.80	95.50	94.00	92.00	96.00
Ltl Hamilton, 5-28-27	122.27	0.77	123.58	-0.76	10/03/48	124.3	121.34	4.65	6/18/01	116.6	122.5	123.7	121.5	119.0	117.2	121.2
Ltl Van, 26-27-25	137.18	-1.82	137.84	-0.84	08/19/82	138.6	136.94	1.10	6/19/00	135.8	141.4	142.0	139.0	136.5	135.5	138.5
Lulu, 4-29-26	131.56	-0.44	133.08	-0.02	09/11/60	133.1	130.79	3.10	5/30/01	127.6	132.6	133.4	132.0	129.5	127.0	131.5
Mabel, 11-29-27	105.23	-5.52	109.19	0.99	03/25/98	108.2	103.46	4.71	6/25/01	98.75	114.5	117.0	110.7	107.0	105.0	110.0
Mariam, 27-28-26	124.69	-0.06	125.80	0.00	9/7/04	125.8	123.84	3.12	05/10/90	120.7	125.6	126.3	124.7	122.7	121.0	124.5
Mariana, 1-28-25	137.05	-0.45	138.22	-0.36	09/15/60	138.5	136.24	2.34	07/01/56	133.9	138.6	139.6	137.5	135.0	133.0	137.0
Marie, 27-28-27	112.44	-8.56	114.83	0.00	12/13/04	114.8	110.56	5.74	6/25/01	104.8	122.3	124.3	121.0	118.0	116.0	120.0
Martha, 21-28-26	141.44	-0.56	142.36	-0.26	10/27/95	142.6	140.52	3.47	6/20/01	137.0	142.5	143.8	142.0	139.0	137.0	141.5
Mattie, 14-27-25	132.14	-0.36	133.50	0.00	10/11/04	133.5	131.40	3.50	6/18/01	127.9	133.0	134.7	132.5	130.0	127.5	132.0
Maude, 21-28-26	139.89	-0.61	140.52	0.00	10/29/04	140.5	139.18	3.18	5/25/01	136.0	141.7	143.3	140.5	137.5	136.0	140.0
May, 29-28-26	131.56	-0.44	133.08	-0.02	09/11/60	133.1	130.79	3.10	5/30/01	127.6	132.6	133.4	132.0	129.5	127.0	131.5
Mc Leod, 7-29-26	129.32	-2.68	131.45	-0.53	09/28/98	131.9	127.88	12.77	05/12/76	115.1	133.1	134.6	132.0	129.5	128.0	131.5
Mdl Hamilton, 7-28-27	122.27	0.77	123.58	-0.76	10/03/48	124.3	121.34	4.65	6/18/01	116.6	122.5	123.7	121.5	119.0	117.2	121.2
Medora, 36-27-25	136.04	-1.96	137.85	-1.90	03/26/98	139.7	134.80	2.12	5/29/01	132.6	140.4	141.4	138.0	134.5	133.0	137.0
Menzie, 28-28-27	121.70	-0.30	123.87	0.00	10/20/04	123.8	120.16	5.46	6/25/01	114.7	127.0	128.8	122.0	120.0	118.0	121.7
Millsite, 11-29-25	123.34	-0.16	124.63	-0.19	09/21/94	124.8	122.62	3.04	05/15/81	119.5	125.3	126.2	123.5	121.0	119.0	123.0
Mirror (Lkld), 18-28-24	178.51		178.83	-1.19	1988	180.0	178.15	0.77	5/24/00	177.3						
Mirror (WH), 20-28-27	131.56	-0.44	133.08	-0.02	09/11/60	133.1	130.79	3.10	5/30/01	127.6	132.6	133.4	132.0	129.5	127.0	131.5

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Moody, 17-31-28	90.96	-2.54	91.88	-0.38	03/26/98	92.26	89.76	3.56	06/04/85	86.20	92.80	94.10	93.50	91.00	89.00	93.00
Morton, 19-28-24	178.31		179.38	-1.09	1991	180.4	177.64	1.34	1955	176.3						
Mountain, 26-29-27	108.85		111.48	-8.18	1960	119.6	107.28	2.68	1981	104.6	116.1	120.6				
Mud (PC), 6-27-25	140.23	-1.27	141.26	-0.02	12/17/02	141.2	139.60	2.75	5/30/01	136.8	141.8	142.5	141.5	137.7	136.0	141.0
Myrtle (A), 32-27-25	141.01	0.01	142.88	-0.15	1/9/03	143.0	140.20	3.54	06/05/86	136.6	141.7	142.4	141.0	138.5	136.5	140.5
N Wales, 1-30-27	105.60	-9.40	109.49	-0.67	03/25/98	110.1	102.99	2.99	8/27/01	100.0	116.8	120.3	115.0	112.0	110.0	114.5
Ned, 1-29-26	128.16	-0.34	129.12	-0.38	10/22/98	129.5	127.60	3.56	6/25/01	124.0	130.6	130.9	128.5	126.0	124.0	127.7
Otis, 28-28-26	127.17	-0.83	128.50	-0.62	09/10/60	129.1	125.72	6.14	05/15/76	119.5	128.7	133.7	128.0	125.0	123.0	127.0
Pansy, 8-28-26	128.43	-0.57	129.48	-0.22	07/15/91	129.7	127.16	2.70	5/25/01	124.4	130.0	130.6	129.0	126.5	124.5	128.5
Parker (Lkld), 8-28-24	130.60	-0.40	129.68	-2.73	9/29/04	132.4	132.41	5.55	6/25/01	126.8	131.6	133.5	131.0	128.7	127.5	130.7
Parker (LW), 32-29-27	120.21	-1.79	121.50	-0.80	02/24/98	122.3	119.48	4.86	06/23/92	114.6	122.5	123.3	122.0	119.5	117.5	121.5
Parks, 36-29-28	101.83	-0.67	103.58	-0.22	03/23/98	103.8	100.56	3.16	05/12/91	97.40	104.5	105.2	102.5	100.0	98.00	102.0
Polecat, 27-30-26	140.99	-1.01	141.66	-1.14	09/26/94	142.8	140.24	2.94	06/02/86	137.3	142.4	143.5	142.0	139.5	137.5	141.5
Reedy, 35-31-28	78.39	-1.36	79.98	-0.68	10/01/60	80.66	77.39	0.50	06/01/67	76.89	80.00	81.10	79.75	77.25	75.25	79.50
Reeves, 13-29-26	123.02	-1.48	124.85	-0.45	10/21/94	125.3	121.38	3.27	5/22/01	118.1	125.1	126.1	124.5	122.0	120.0	124.0
River, 1-29-26	137.26	-2.24	139.20	-1.36	11/28/95	140.5	134.40	3.01	6/20/01	131.3	141.6	142.6	139.5	136.0	134.0	139.0
Rochelle, 4-28-26	128.46	-0.29	129.96	-0.09	09/16/60	130.0	127.47	3.36	5/30/01	124.1	129.7	130.6	128.7	126.5	124.6	128.5
Roy, 34-28-26	131.56	-0.44	133.08	-0.02	09/11/60	133.1	130.79	3.10	5/30/01	127.6	132.6	133.4	132.0	129.5	127.0	131.5
Ruby, 12-29-26	124.57	-0.68	125.98	0.28	10/5/04	125.7	123.82	6.41	05/04/76	117.4	125.5	126.2	125.2	123.0	121.0	125.0
Ruth (D), 28-28-27	114.87	-6.63	117.62	0.00	12/13/04	117.6	112.71	5.53	6/25/01	107.1	123.5	126.3	121.5	117.5	115.5	120.5
Saddlebag, 6-30-29	101.54	-3.46	103.69	-0.81	03/25/98	104.5	99.81	3.41	06/12/91	96.40	106.8	108.2	105.0	102.0	100.0	104.5
Sara, 17-28-27	120.57	-0.93	123.50	0.00	10/14/04	123.5	118.96	5.28	6/25/01	113.6	122.5		121.5	119.0	117.2	121.0
Scott, 18-29-24	166.97	-1.03	168.14	-1.05	09/13/60	169.1	166.49	7.20	11/18/72	159.2	168.6	172.2	168.0	165.0	164.2	167.5

Waterbody, S-T-R	2004 Mean	2004 Mean / Min Flood Difference	2004 Max	2004 Max. / Record High Difference	Record High		2004 Min	2004 Min. / Record Low Difference	Record Low		10 Year Flood	100 Year Flood	Min Flood Level	Min Low Level	Min Ext. Low Level	Max Desire Level
Sears, 36-28-25	140.09	-0.91	142.15	-0.33	09/20/95	142.4	138.90	4.50	6/12/01	134.4	143.2	144.3	141.0	138.0	136.0	140.5
Shipp, 32-28-26	131.75	-0.25	133.00	0.00	9/7/04	133.0	130.94	3.22	5/25/01	127.7	132.6	133.4	132.0	129.5	127.0	131.5
Silver (FP), 5-32-28	105.68	2.68	107.34	0.00	11/8/04	107.3	104.05	6.70	06/11/86	97.35	105.0	105.8	103.0	100.5	98.50	102.5
Silver (WH), 20-28-26	145.69	-0.81	147.10	0.00	9/24/04	147.1	144.46	4.56	5/25/01	139.9	147.1	147.9	146.5	144.0	142.0	146.0
Smart, 9-28-26	128.49	-0.26	129.96	0.00	9/28/04	129.9	127.58	4.22	6/20/01	123.3	129.7	130.5	128.7	126.5	124.5	128.5
Spirit, 35-28-25	128.16	-3.34	130.18	-3.20	04/06/98	133.3	126.88	4.52	05/15/91	122.3	134.1	135.2	131.5	129.0	127.0	131.0
Spring, 20-28-27	131.56	-0.44	133.08	-0.11	09/11/60	133.1	130.79	3.10	5/30/01	127.6	132.6	133.4	132.0	129.5	127.0	131.5
St Anne, 14-30-28	91.49	-4.51	94.19	-0.48	04/04/98	94.67	90.00	3.02	5/30/01	86.98	97.50		96.00	93.00	91.00	95.50
Starr, 14-29-27	103.74	-9.26	106.20	0.00	12/27/04	106.2	102.18	5.85	6/25/01	96.33	115.5	117.4	113.0	110.0	108.0	112.5
Streety, 24-32-27	104.67	-0.83	106.15	0.00	9/1/04	106.1	103.50	2.60	06/23/92	100.9	108.7	109.6	105.5	102.5	101.0	104.5
Surveyors, 26-30-26	131.17	-1.83	131.68	-1.00	04/01/87	132.6	130.55	3.55	03/14/91	127.0	133.6	134.7	133.0	130.7	128.5	132.7
Swoope, 29-27-26	131.59	-0.91	133.44	-0.12	02/16/98	133.5	130.50	5.50	10/08/81	125.0	133.0	133.5	132.5	130.0	128.0	132.0
Tennessee, 9-27-25	131.03	-2.97	132.36	-1.04	10/12/04	133.4	130.39	2.43	6/18/01	127.9	134.7	136.3	134.0	130.0	128.0	133.0
Thomas, 1-30-28	96.71	-2.79	99.18	-0.54	09/29/98	99.72	94.78	4.58	06/12/91	90.20	104.2	105.6	99.50	97.00	94.50	99.00
Thomas (WH), 35-28-25	128.92	-3.08	131.21	-1.84	03/21/98	133.0	127.39	4.05	6/20/01	123.3	135.6	136.9	132.0	128.0	126.0	131.0
Tractor, 14-30-27	124.68	1.43	126.58	0.00	10/5/04	126.5	122.86	6.91	06/07/94	115.9	125.0		123.2	121.0	119.0	123.0
Twin Lakes E, 2-30-27	119.54	-4.21	123.77	-0.93	02/24/98	124.7	117.24	5.70	3/27/01	111.5	124.1	127.7	123.7	120.0	118.0	123.5
Twin Lakes W, 2-30-27	120.01	-3.74	124.12	-0.58	02/24/98	124.7	117.80	6.16	05/22/90	111.6	124.1	127.7	123.7	120.0	118.0	123.5
Van, 25-27-25	132.62	-0.13	133.68	-0.77	02/18/98	134.4	131.90	1.99	6/18/01	129.9	133.0	134.7	132.7	130.0	128.0	132.0
Venus, 9-29-27	119.53	-5.47	121.56	-1.14	03/25/98	122.7	118.10	5.20	6/25/01	112.9	126.1	127.0	125.0	122.0	120.0	124.5
Wailes, 1-30-27	104.55	-7.95	107.08	-3.01	12/31/51	110.0	102.68	5.59	05/21/90	97.09	114.1	120.3	112.5	110.0	108.0	112.0
Walker, 21-30-26	142.88	1.88	145.29	0.00	11/16/04	145.2	141.00	11.57	09/01/77	129.4	143.0		141.0	137.0	135.0	140.0
Warren, 11-30-27	117.62	-5.88	122.20	0.00	10/5/04	122.2	114.96	5.52	6/26/01	109.4	124.6	127.8	123.5	121.0	119.0	123.0

Waterbody, S-T-R	2004 Mean	2004 Mean / Min Flood Difference	2004 Max	2004 Max. / Record High Difference	Record High		2004 Min	2004 Min. / Record Low Difference	Record Low		10 Year Flood	100 Year Flood	Min Flood Level	Min Low Level	Min Ext. Low Level	Max Desire Level
Weader, 3-30-27	120.03	-1.72	120.56	-0.32	10/25/02	120.8	119.62	4.20	5/29/01	115.4	122.0	123.4	121.7	119.0	117.0	121.2
Whistler, 33-27-25	136.95	-0.55	138.50	0.00	10/2/04	138.5	135.90	2.06	5/16/01	133.8	140.9	141.5	137.5	135.0	133.7	136.7
Winterset, 11-29-26	131.56	-0.44	133.08	-0.02	09/11/60	133.1	130.79	3.10	5/30/01	127.6	132.6	133.4	132.0	129.5	127.0	131.5
Wire, 13-28-23	194.99		196.23	-2.00	1959	198.2	199.25	7.42	6/22/01	191.8						

Figure 24

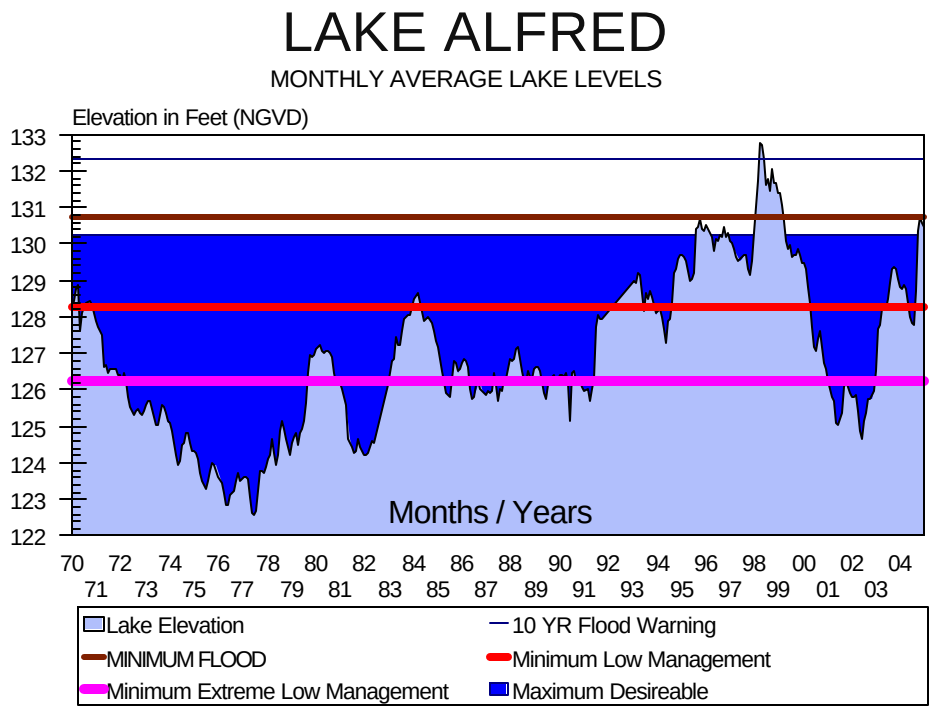


Figure 25

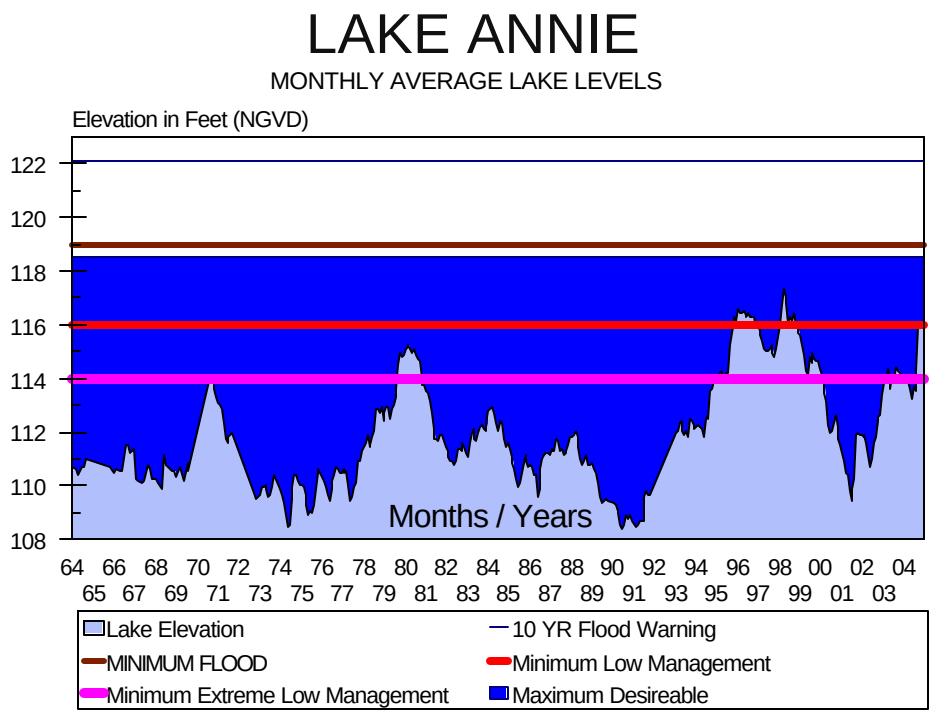


Figure 26

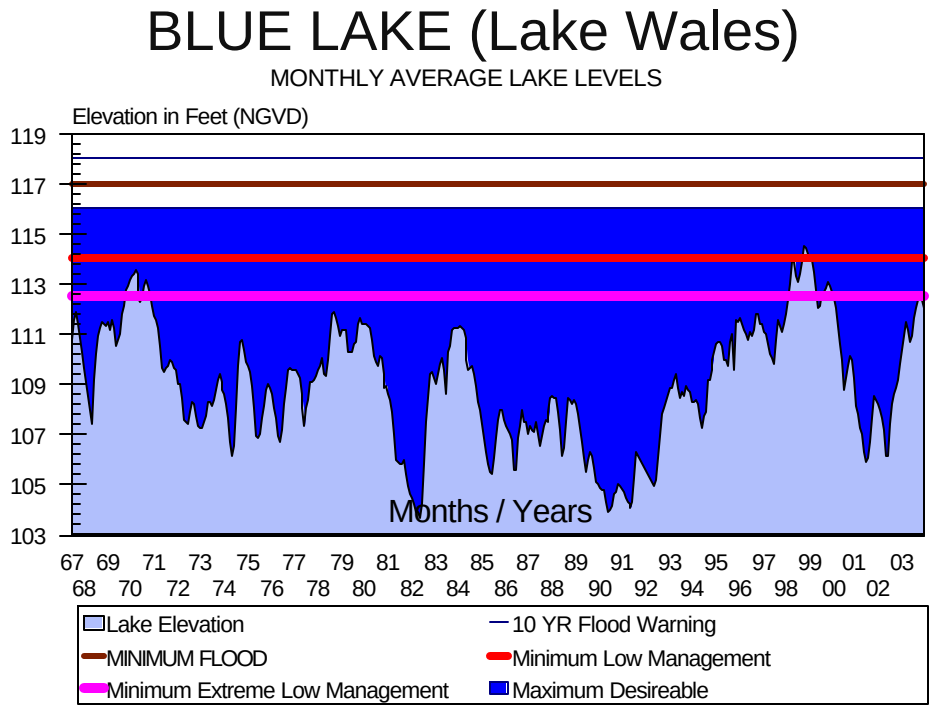
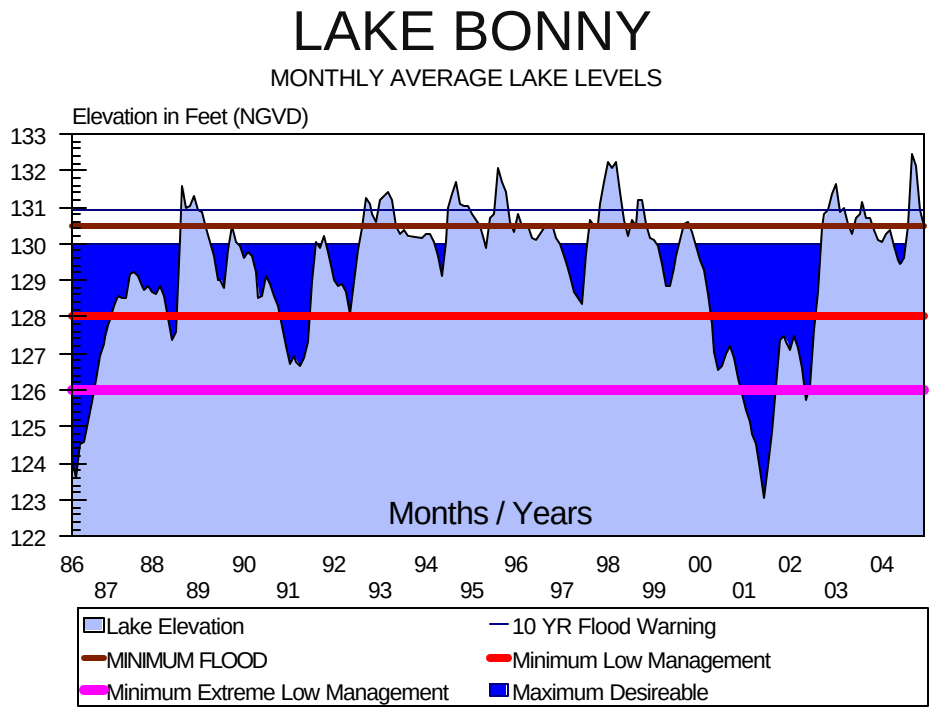


Figure 27



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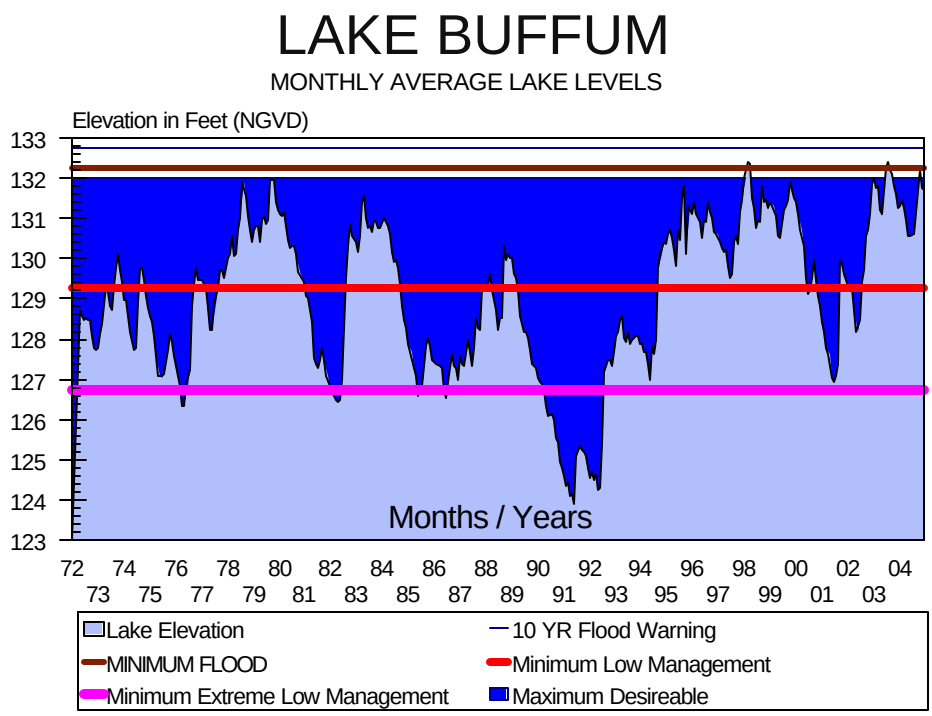


Figure 29

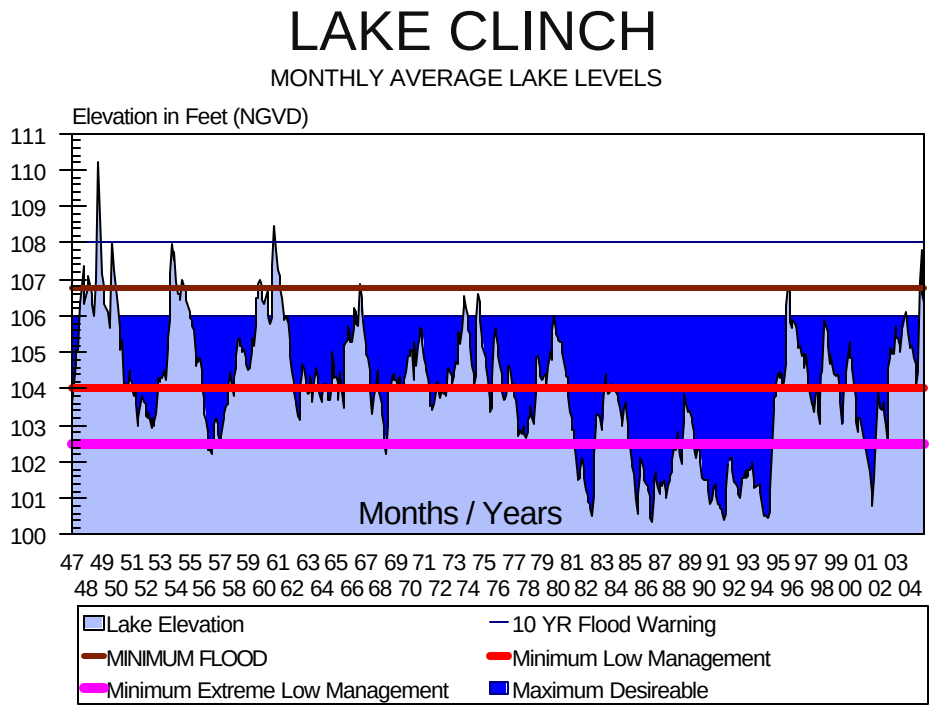


Figure 30

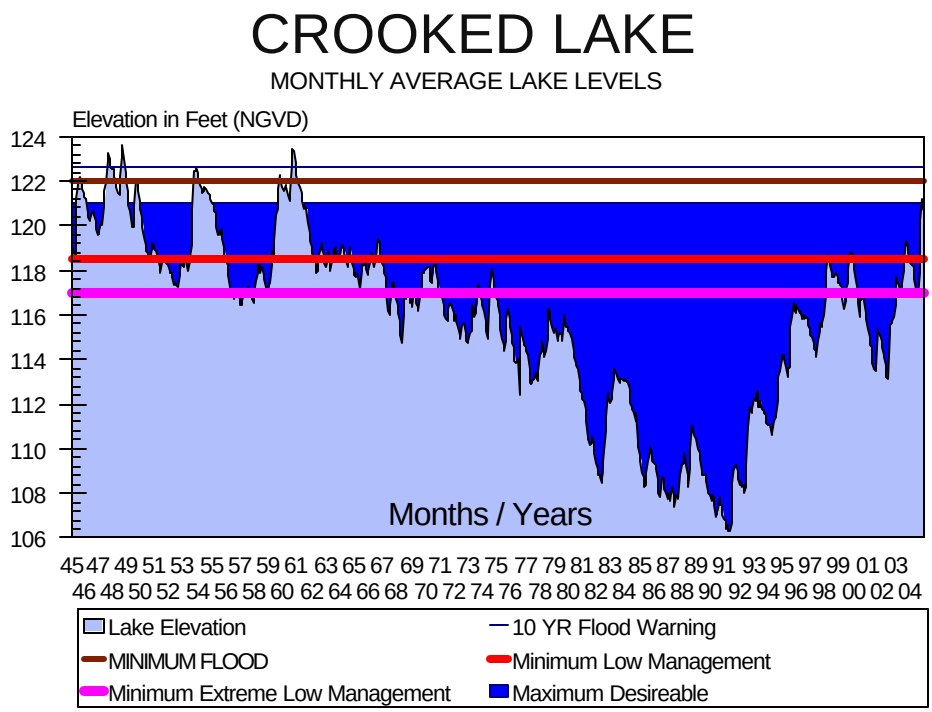


Figure 31

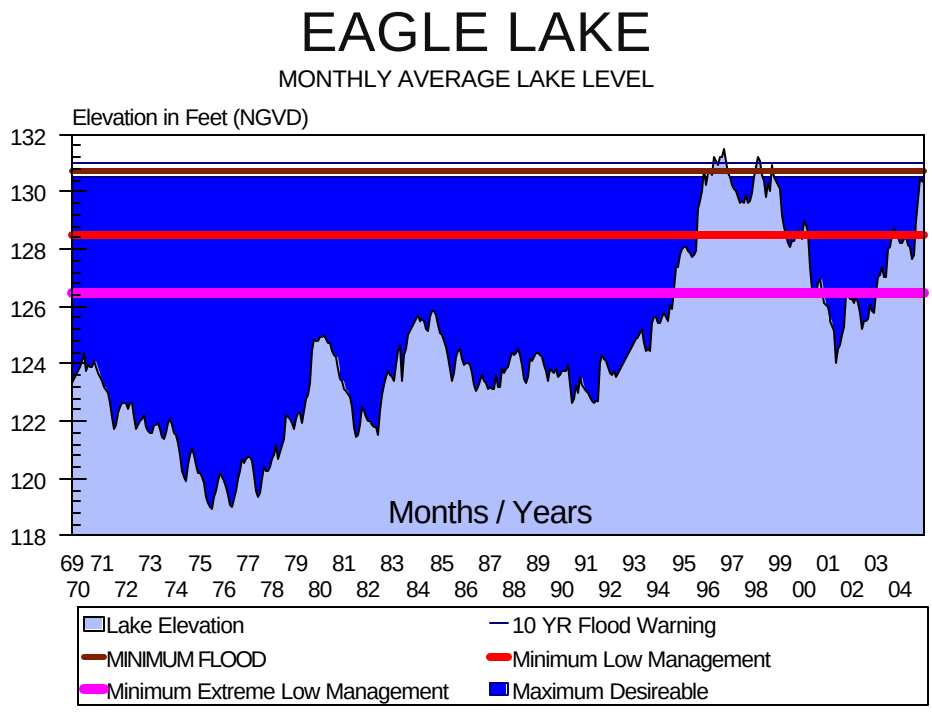


Figure 32

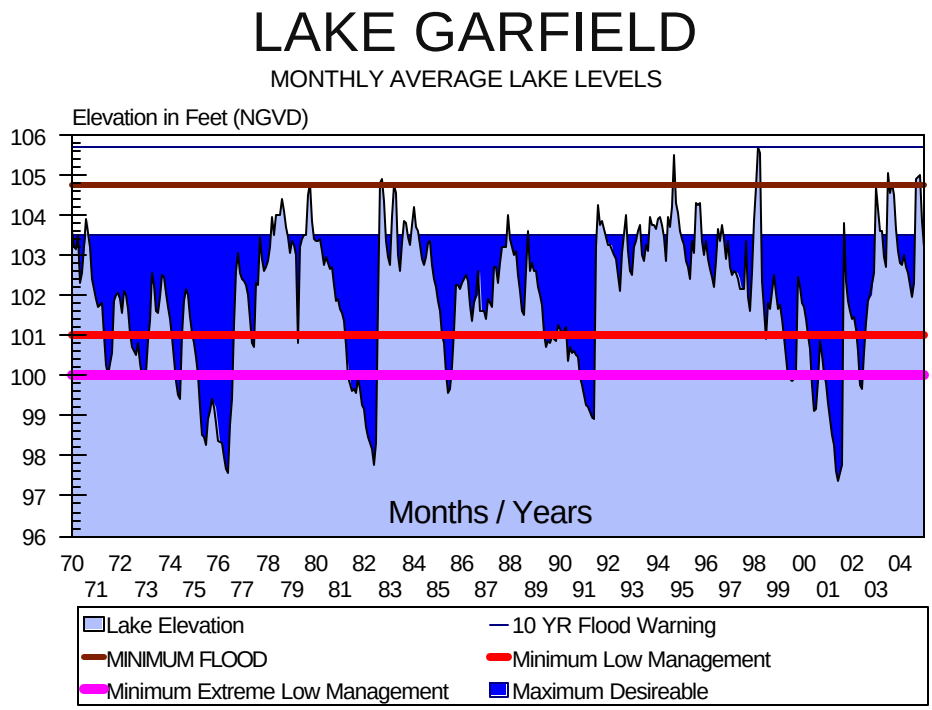


Figure 33

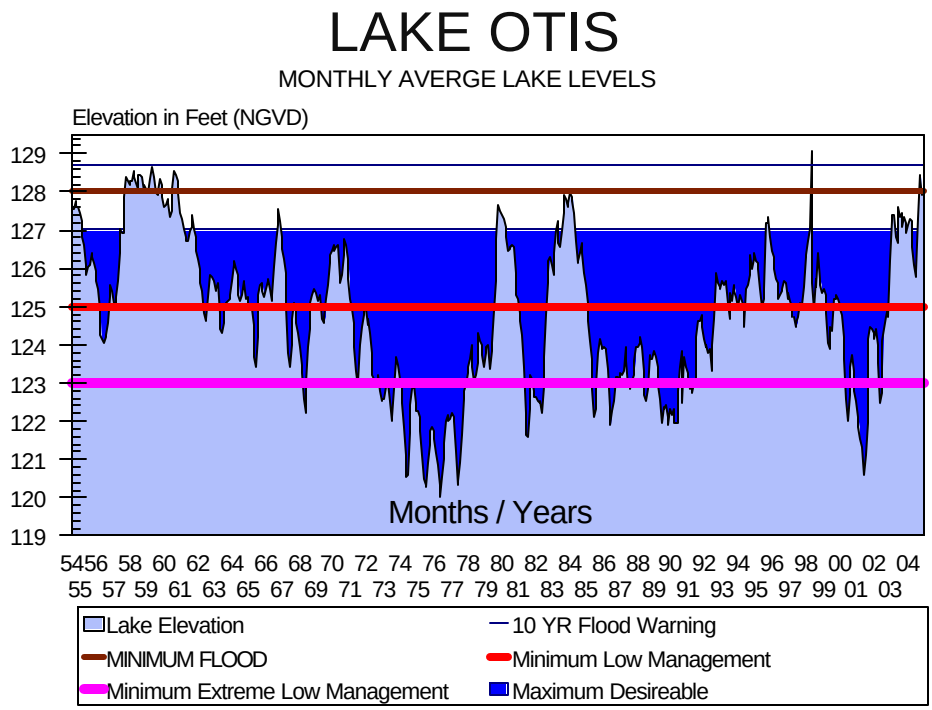


Figure 34

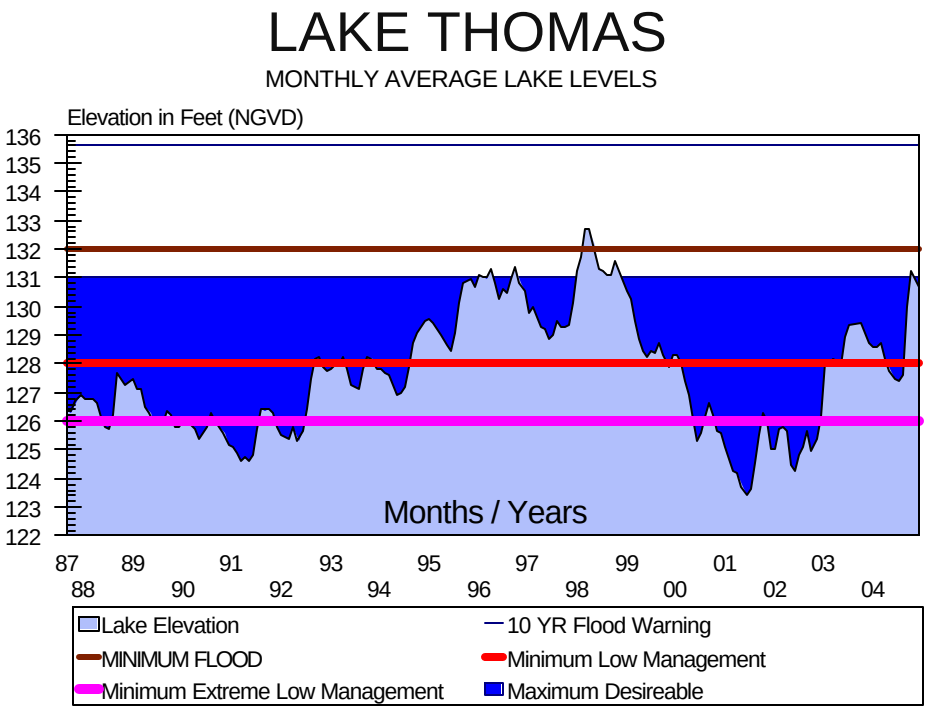
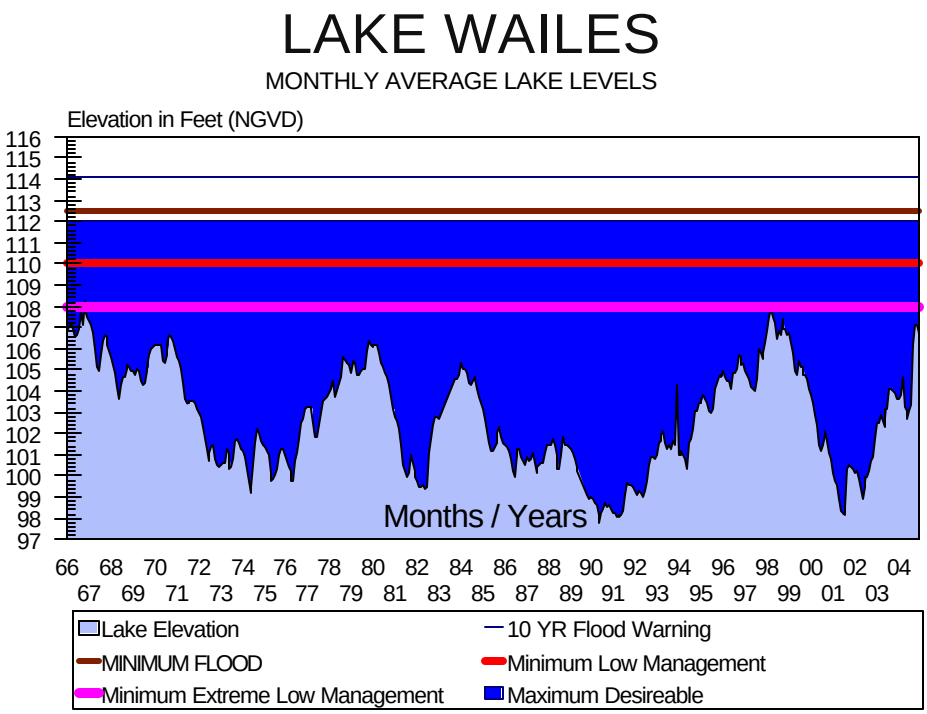


Figure 35



RAINFALL BACKGROUND

Polk County is located at the summit of the "hydrologic hill" of Peninsular Florida. Rivers and streams flow outward in all directions; the center of the potentiometric high of the Floridan Aquifer is located a few miles east of Polk City in the Green Swamp. Thus, water naturally flows outward in all directions from Polk County into the surrounding counties and waterways. Whereas the water resources of surrounding areas are based not only on rainfall, but also on the natural flow of groundwater and surface water into these areas, Polk County must rely solely on rainfall to replenish this resource.

Polk County has nine distinct watersheds/basins also referred to as Hydrologic Units or Drainage Analysis Units, see Figure 27. Generally speaking, rainfall that falls within a "basin" typically stays within that basin. Rainfall is very sporadic; areas of the County could be experiencing flooding from large amounts of rainfall within a short period of time, and other areas will be dry. Lakes that are land locked, or do not have control structures or outfalls, can also become full or actually "spill over" their banks. With this in mind this Division created a volunteer rainfall-monitoring program in 1984 to help determine and record where the rain and flooding actually occurs.

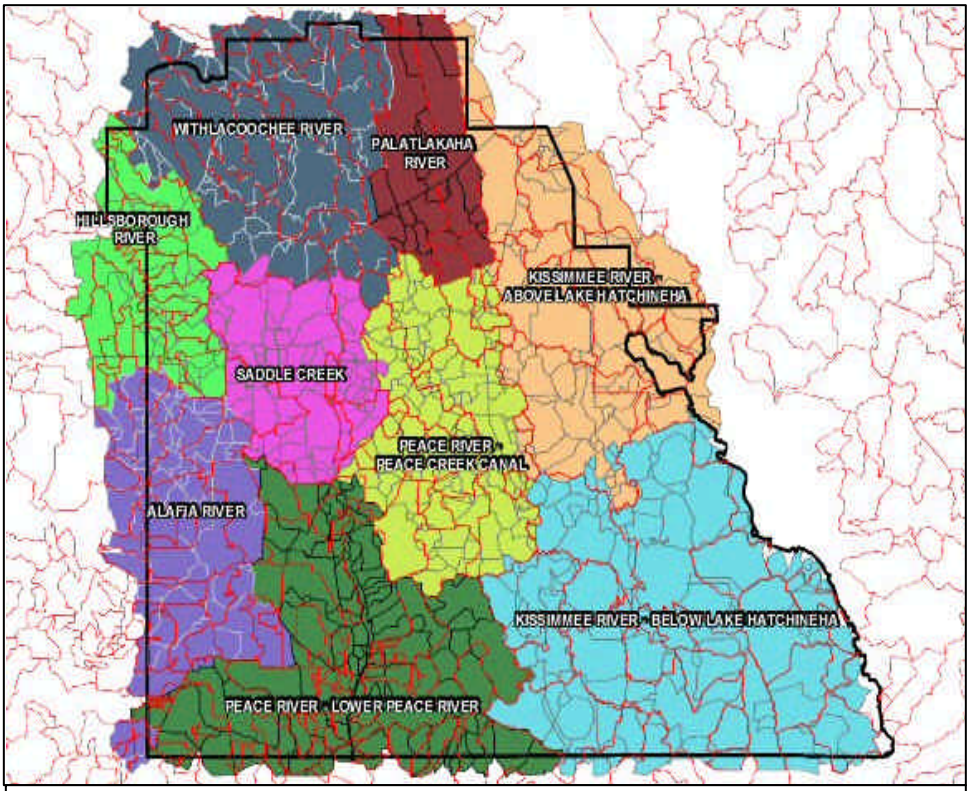


Figure 36 - Watershed Map

The Water Resources section currently monitors approximately 140 rainfall stations throughout the County. This data is collected from many sources including sites from the SWFWMD, government agencies, private companies, and over 50 citizen volunteers. Most stations report daily rainfall and send in monthly reports. The period of records range for less than a year for newly established stations to over 90 years from National Weather Service (NWS) stations.

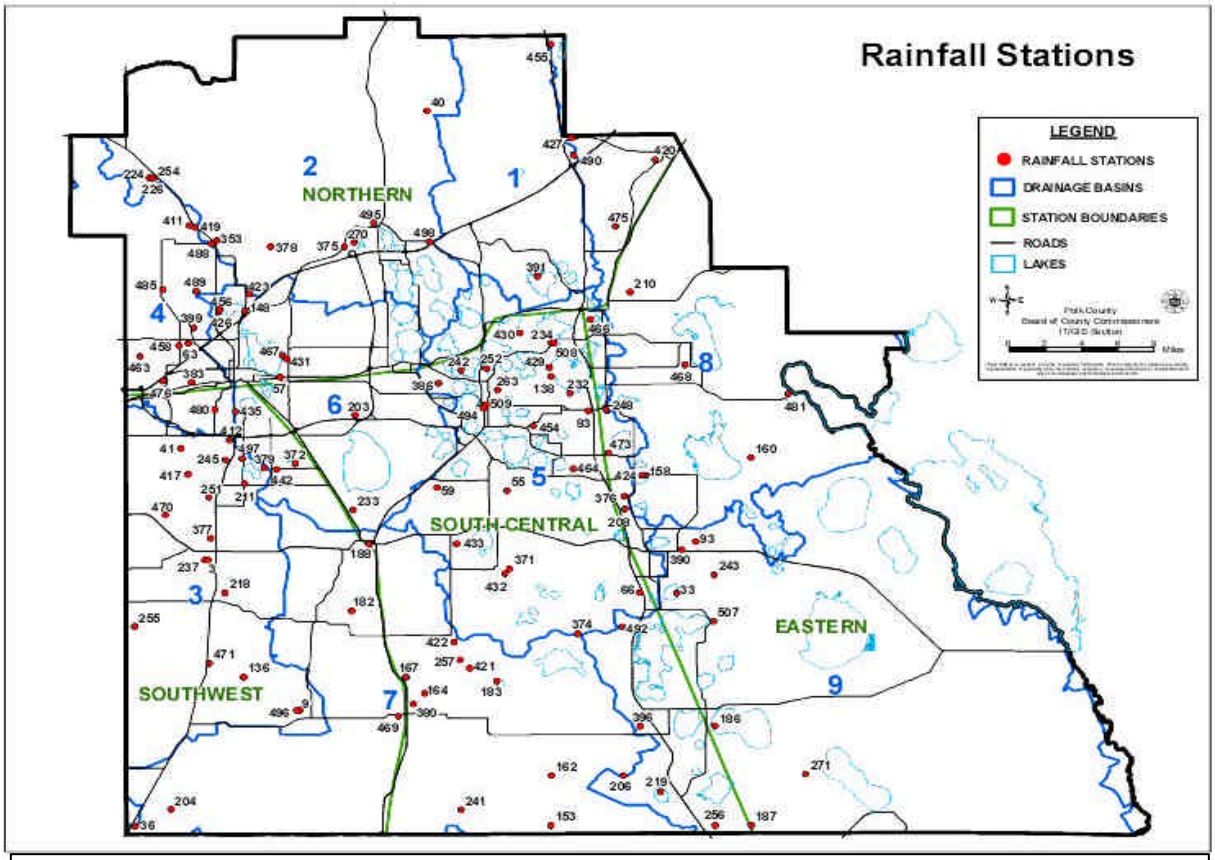


Figure 37 Polk County Rainfall Stations

CURRENT YEAR RAINFALL

The 2004 rainfall year proved to be challenging for everyone. Polk County made history with a record three hurricanes to hit a single area in one season, much less within a month and a half. Since many rain gages were lost during the hurricanes, getting accurate totals for the hurricane events as well as for the months involved was difficult. The 2004 monthly rainfall totals for stations available have been provided in Tables 8 through 11. Stations without totals for the months of August through October were due to lost gages or missing data. Figure 31 shows the averaged monthly rainfall for the past four years with the 27-year average for comparison.

Figure 38

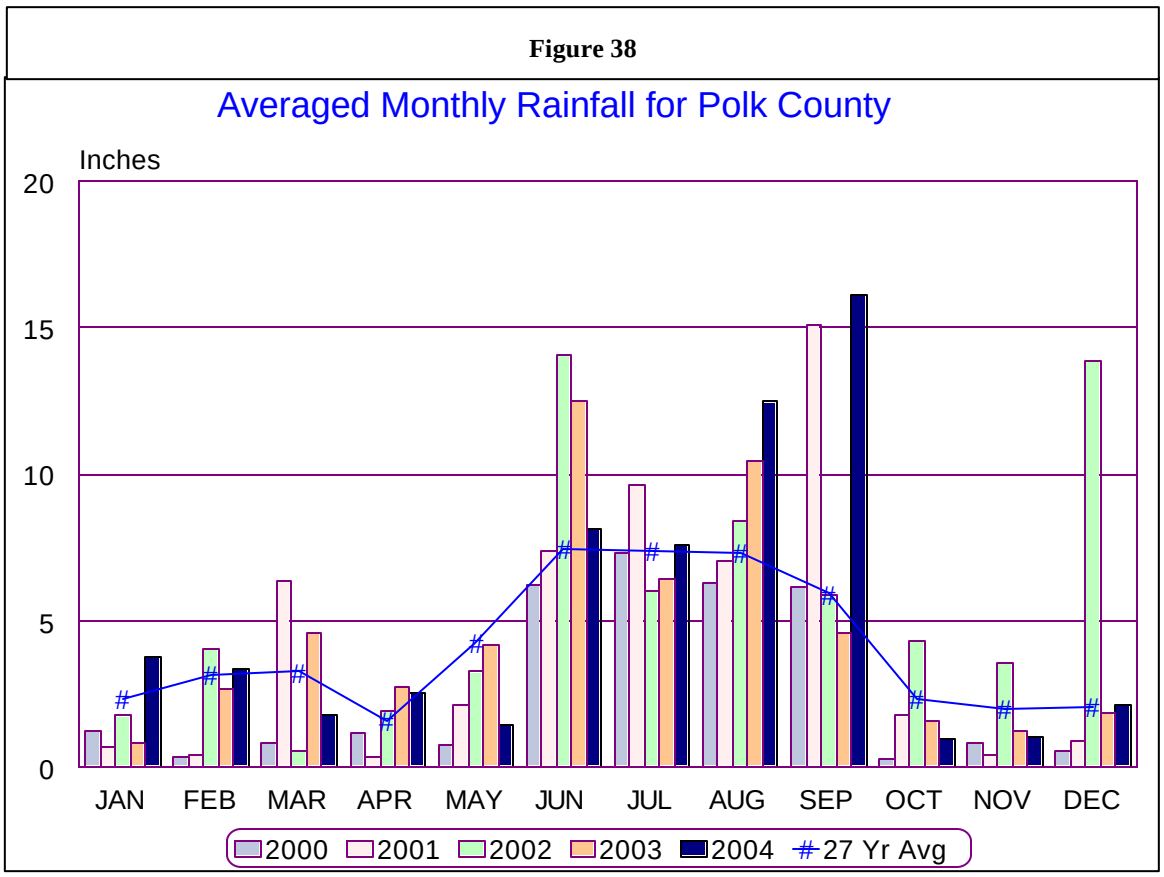


Table 10

Rainfall Stations in the Eastern Section of Polk County

2004

Sta ID	Station Name	Start Date	STR	HUC	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
219	Bereah	01/01/1998	24-32-27	9	2.42	2.41	1.47	1.92	0.66	6.69	7.17	17.11	15.06	1.22	0.49	3.42
160	Catfish Creek Tower	01/01/1992	11-29-28	8	1.80	2.45	1.00	1.80	1.40	5.20	6.05	16.20	16.92	0.70	1.75	3.00
186	Coley	04/01/1987	33-31-28	9	2.36	3.01	1.92	1.86	0.53	8.39	5.32	14.79	14.90	0.97	0.66	3.93
374	Crows Bluff	09/15/2000	31-30-27	9	4.21	2.99	1.90	2.35	1.52	7.55	7.04	11.18	19.71	0.91	0.85	3.26
210	Haines City Disposal	01/01/1984	22-27-27	8	4.31	3.11	1.09	1.25	1.79	6.73	8.24	9.53	14.84	0.33	0.00	0.00
468	Huntley	01/23/2003	7-28-28	8	4.70	3.33	1.67	2.31	4.36	6.21	2.26				1.62	2.02
510	Lake Rosalie	08/05/2004	21-29-29	9									11.09	0.70	0.85	3.21
271	Lake Wales Ridge	01/01/1992	17-32-29	9	0.30	2.10	1.50	1.70	0.80	10.50	1.60		12.50	1.00	0.90	4.10
158	Mabel Lake	01/01/1992	14-29-27	8	3.29	3.79	1.45	1.86	4.68	10.56	5.63	12.51	15.29	0.86	2.04	2.24
390	Orange Park	04/16/2001	6-30-28	9	3.11	2.28	1.30	2.57	0.98	9.62	5.18					
420	Redgrave	09/17/2001	11-27-26	8	4.02	3.10	1.04	2.09	2.83	8.20	7.64	9.56	15.46	0.47	0.86	1.30
475	Ridgewood Lakes	05/16/2003	33-26-27	8	2.60	4.06	1.40	1.80						0.32	0.90	1.78
243	Southeast Landfill	01/01/1984	16-30-28	9	1.05	3.73	1.26	2.10	1.15	9.40	5.47	11.90	8.80	0.30	0.55	3.10
424	Star Lake	01/01/1984	14-29-27	8	4.29	2.72	1.10	2.56	0.00	8.41						
507	Tiger Overlook	06/17/2004	33-30-28	9						1.58	8.10	12.99	13.88	0.42	0.13	
396	West Frostproof	04/01/1986	35-31-27	9	1.95	1.21	0.23	0.27	0.93	6.56	5.79	12.09	16.69	1.06	0.61	4.31
			Max		4.70	4.06	1.92	2.57	4.68	10.56	8.24	17.11	19.71	1.22	2.04	4.31
			Min		0.30	1.21	0.23	0.27	0.00	1.58	1.60	9.53	8.80	0.30	0.00	0.00
			Avg		2.89	2.88	1.31	1.89	1.66	7.54	5.81	12.79	14.60	0.71	0.87	2.74

Table 11

Rainfall Stations in the Northern Section of Polk County

2004

Sta ID	Station Name	Start Date	STR	HUC	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
426	Cassandra	12/01/2001	25-27-23	6	4.70	3.55	1.90	3.30	0.40	6.61	12.90	11.47	7.90	3.40	1.10	1.75
411	Cypress Lakes	07/05/2001	34-26-23	4	4.47	5.21	1.90	2.03	1.84	4.07	7.92	9.99	18.48	0.54	0.86	1.75
455	Davenport North	07/09/2002	1-25-26	8	4.60	4.40	0.90	4.60	1.00	10.45	3.40	14.55		1.20	0.00	3.50
490	Dunson Hills	03/12/2004	7-26-27	8			0.90	2.60	2.10	10.95	14.10	17.70	17.85	0.45	1.40	4.00
431	E Parker	05/10/2002	9-28-24	6	3.60	3.30	2.00	3.01	0.85	9.89	9.28	14.06	19.21	0.92	0.95	1.76
467	E Lake Parker	01/23/2003		6	3.05	3.11	1.81	2.43	0.62	9.06	8.80	12.10	13.38	0.92	0.88	1.61
419	Firestone	09/07/2001	34-26-23	4	5.13	3.91	4.27	0.50	0.93	4.69	7.36	10.00	16.03	0.88	1.42	1.78
456	Fountain	07/18/2002	25-27-23	6	4.76	3.90	1.72	3.43	1.05	4.74	10.61	20.67	15.11	2.80	1.00	0.25
148	Gibson Lake	06/01/1995	30-27-24	6	3.97	3.39	2.09	2.90	0.95	7.49	9.01	12.39	18.79	1.84	1.01	1.62
254	Green Swamp Tower	01/01/1992	17-26-23	2	2.00	4.80	1.40	2.95	2.75	6.20	9.20	9.95	10.85	0.30	1.50	1.45
353	Hall	09/05/2000	1-27-23	2	5.48	5.04		2.65	0.65							
463	Itchepackesassa Creek	10/08/2002	8-28-23	4	4.34	3.30	2.13	3.59	1.50	8.67	7.99	7.93	14.22	1.57	0.76	1.66
485	Kathleen Pines	10/01/2003	21-27-23	2	6.25	3.98	1.64	3.85	2.45	6.52	12.18	10.60	18.50	0.72	0.60	1.75
458	Keuka	09/03/2002	4-28-23	4	3.53	3.42	2.06	3.49	1.31	7.77	8.04	11.84	14.91	1.55	0.91	1.52
391	Lake Lowery	08/01/1985	14-27-26	1	3.72	0.31	0.02	0.22	0.01	6.96	6.28	9.57	15.52	0.73	0.79	1.68
63	Lakeland, NWS	05/01/1915	3-28-23	4	4.28	4.18	2.01	1.49	1.87	8.09	8.22		17.67	0.83	0.97	2.04
427	Loma Del	01/08/2002	6-26-27	8	3.25	4.30	0.73	2.37	1.55	10.86	6.52	11.37	10.32	0.63	0.99	1.53
399	Mission Hill	06/11/2001	34-27-23	4	4.53	3.15	1.95	3.65	1.03	6.19	9.60	11.30	18.86	1.94	0.96	1.65
375	Mudd Lake	10/05/2000	6-27-25	2	4.61	3.67	1.77	3.71	0.91	4.41	7.29	8.19	18.11	1.97	0.87	1.50
270	Polk City Station	01/01/1999	6-27-25	2	2.90	4.30	2.10	1.90	2.00	9.72	9.45	9.55	19.65	1.35	0.40	0.00
226	Providence	09/01/1979	17-26-23	2	4.04	4.08	0.87	4.17	1.22	6.58	6.50	12.24	19.82	0.51	1.51	1.44
495	ROMP 76 Old Polk City	07/28/1998		2	4.91	4.05	1.69	2.95	1.34	5.72	6.29	8.66	17.61	3.11	1.04	1.63
211	Saddle Creek	01/01/1984	22-27-24	2	4.06	3.57	2.59	2.40	0.79	10.15	10.56	11.59	14.94	1.06	1.02	1.67
423	Seagull	11/09/2001	19-27-24	2	4.99	3.53	2.30	2.88	1.05					0.68	1.19	1.68
40	Shinn - Block 6	01/01/1984	26-25-25	2	2.80	4.95	2.25	3.85	1.90	2.50	5.45	11.30	18.65	0.00	1.10	1.75
489	Silver Lake E	02/11/2004	34-27-23	4		0.63	3.21	2.66	2.03	6.76	9.61	9.87	23.22			4.19
378	Slash Pine	01/03/2001	5-27-25	2	5.00	5.96	1.85	3.03	0.92	9.53	13.96	10.17	15.46	1.05		

488 Socrum	01/06/2004	2-27-23	4	6.17	4.70	1.98	2.85	1.32	3.95	4.53	11.44	19.03	0.83	0.91	1.79
412 Villas II	07/06/2001	1-29-23	3	5.90	3.30	1.40	2.20	1.50	13.70	15.40	19.61	14.80	0.60	1.20	2.20
498 White	05/13/2004	2/27/25	1						7.16	5.58	9.14	18.79	1.53	0.99	1.64
		Max		6.25	5.96	4.27	4.60	2.75	13.70	15.40	20.67	23.22	3.40	1.51	4.19
		Min		2.00	0.31	0.02	0.22	0.01	2.50	3.40	7.93	7.90	0.00	0.00	0.00
		Avg		4.33	3.79	1.84	2.82	1.30	7.48	8.79	11.75	16.58	1.21	0.98	1.81

Table 12

Rainfall Stations in the South-Central Section of Polk County

2004

Sta ID	Station Name	Start Date	STR	HUC	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
432	Alturas Star	05/16/2002	16-30-26	5	4.40	2.85	1.75	6.15	1.20	5.45	8.98					3.00
59	Bartow Airbase	01/01/1984	24-29-25	5	4.59	2.89	1.58	1.64	1.31	4.84	9.32	13.13	18.70	0.62	1.52	2.02
421	Brooke	10/08/2001	17-31-26	7	2.50	2.28	2.60	5.53	0.13	8.57	6.94	10.36	12.07	0.49	0.61	1.08
376	Davala	10/15/2000	22-29-27	5	4.41	2.92	1.44	3.29	2.70	12.73	5.22	11.71	12.13	0.30	1.18	2.84
248	District 4, Dundee	01/01/1984	28-28-27	8	4.10	2.79	1.60	3.40	2.25	7.36	7.00	12.60			1.40	2.40
83	Dundee Station	11/01/1997	29-28-27	5	3.10	4.70	1.00	2.00	4.60	8.90	8.00	8.15	18.10	0.00	2.60	0.25
371	Estes	10/15/2000	10-30-26	5	4.06	3.20	1.75	4.53	0.86	4.64		17.62	17.44	0.67	1.15	3.00
422	Ewing	10/16/2001	6-31-26	7	2.80	2.83	1.81	3.87	1.32	8.47	5.72	12.22	10.97	0.55	0.48	2.50
263	Fairfax	07/01/1990	21-28-26	5	7.08	3.87	2.20	2.30	1.05	5.25	9.84	10.41	17.60	1.00	0.89	1.85
430	Four Lakes GC 2	03/25/2002	34-27-26	5	5.45	3.35	1.65	2.10	1.70	6.66	6.95	16.35	18.91	0.91	1.40	1.73
164	Ft Meade ROMP 45	06/01/1995	23-31-25	7	2.90	3.57	2.59	5.61	0.77	9.59	7.55	10.17	13.58	0.22	1.20	4.73
454	Garden Grove West	07/09/2002	35-28-26	5	2.35	3.55	1.60	1.40	1.25	4.15	7.40	10.30	11.35	0.10	0.80	3.00
232	Hamilton Lake	06/01/1995	19-28-27	5	6.30	3.69	1.93	3.90	1.86	6.02	7.98	13.08	16.93	0.41	1.75	1.98
233	Hancock Lake	06/01/1995	30-29-25	6	5.83	3.31	1.94	2.65	1.28	7.28	9.52	13.12	14.54	0.54	1.22	1.68
234	Henry Lake	06/01/1995	1-28-26	5	4.01	3.23	1.84	1.84	0.14	4.57	5.47	12.94	21.84	0.94	1.07	1.83
386	Inman	04/11/2001	13-28-25	5	3.29	2.74	2.13	1.55	1.10	7.63	11.56	9.61	24.30	0.57	0.91	1.89
138	Inwood	07/01/1990	13-28-26	5	7.61	3.57	2.19	1.47	0.30	8.95	11.31	14.07	23.66	0.52	0.75	2.18
464	Lake Bess	11/18/2002	7-29-27	5	4.04	3.00	1.69	2.72	1.88	9.10	5.34			0.22	0.88	2.15
252	Lake Conine	01/01/1984	9-28-26	5	5.84	3.33	1.94	1.87	1.16	6.27	13.49	8.65	13.09	0.32	1.75	2.13
466	Lake Eva	01/01/2003	32-27-27	5	3.84	3.84	1.34	2.05	1.21	6.61	10.31	10.05	15.42	0.45	1.11	1.64

252 Lake Hartridge	04/01/1991	17-28-26	5	4.05	3.35	1.25	1.16	0.48	4.00	7.85	7.92	14.38	0.34	0.81	1.75
183 Lake Hendry	03/24/1998	16-31-26	7	3.10	3.53	2.75	2.80	1.32	9.70	2.92					
509 Lake Howard W	07/12/2004	29-28-26	5							5.70	10.11	12.85	3.14	0.02	1.67
513 Lake Ruby	11/10/2004	12-29-26	5									9.05	0.00	1.50	2.33
512 Lake Shipp	11/06/2004	32-28-26	5											2.56	5.50
57 Lakeland Public Works	09/01/1989	16-28-24	6	4.77	3.29	2.34	3.30	1.11	7.85	7.97	13.20	18.13	0.72	1.07	1.54
508 Lolly Bay	07/05/2004	1-28-26	5										0.75	1.04	1.71
208 Mountain Lake	01/01/1935	27-29-27	5	3.56	3.80	1.45	2.65	4.06	12.65	5.68	12.28	13.96	0.35	1.27	2.92
380 North Nashua	02/14/2001	27-31-25	7	3.45	4.30	2.73	6.29	1.04	7.75	9.88	14.38	11.72	0.66	1.68	3.36
203 Northcentral Landfill	01/01/1984	29-28-25	6	4.00	3.99	1.98	1.72	1.16	7.05	7.19	16.45	15.53	1.20	1.20	1.40
361 Orchid	09/08/2000	7-28-27	5	5.67	2.63	1.58	2.29	1.18							
435 Poinsettia	05/22/2002	30-28-24	6	4.18	2.95	2.21	2.02	0.80	10.90	8.76	12.18	18.90	0.80	1.18	1.56
492 ROMP 44 Warner College	11/29/2000	34-30-27	9	2.54	2.56	1.34	2.25	0.77	8.49	7.34	10.91	20.01	0.81	1.19	3.43
494 ROMP 73 Winter Haven	06/24/1998		5	5.43	3.73	2.37	1.78	0.88	4.16	9.11	12.24	20.38	0.77	1.35	1.87
241 Sunshine Foliage World	03/01/1986	30-32-26	7	2.93	3.53	0.27	0.00	0.00	6.16	6.34	9.66	13.27	0.00	0.76	
433 Vaughn	05/16/2002	6-30-26	5	4.30	2.85	1.10	3.30	1.30	5.00	10.18	16.00	21.32	1.02	2.07	3.16
429 W Lake Hamilton	02/11/2002	12-28-26	5	5.61	2.89	1.63	2.73	0.81	6.72	5.61	16.40		0.61	1.07	1.83
55 Wahneta STP	04/01/1984	21-29-26	5	4.51	2.95	1.11	2.10	1.13	10.98	7.17	13.75	23.22	0.63	1.72	2.06
		Max		7.61	4.70	2.75	6.29	4.60	12.73	13.49	17.62	24.30	3.14	2.60	5.50
		Min		2.35	2.28	0.27	0.00	0.00	4.00	2.92	7.92	9.05	0.00	0.02	0.25
		Avg		4.32	3.29	1.78	2.77	1.30	7.41	7.87	12.26	16.45	0.63	1.23	2.28

Table 13

Rainfall Stations in the South-West Section of Polk County

2003

Sta ID	Station Name	Start Date	STR	HUC	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
372	Banana South	10/05/2000	10-29-24	6	4.46	3.44	2.25	0.91	2.67	9.33	7.35	8.54	20.91	1.37	0.84	1.49
471	Bradley	03/25/2003	11-31-23	3				1.93	2.51	8.49						1.70
41	Clay	01/01/1992	3-29-23	3	3.60	4.01	2.45	2.81	1.75	11.83	9.29	18.17		0.75	0.62	1.80
417	Deer Brooke	08/16/2001	15-29-23	3	4.13	2.88	2.12	1.77	1.17	12.09	9.38	11.77	13.51	0.80	1.18	1.54
36	Four Corners ROMP 40	06/01/1995	31-32-23	7	2.05	4.08	1.72	4.00	0.53	5.23	10.90	16.05	11.85	1.10	1.65	2.77
476	Harvey	05/16/2003	16-28-23	4	3.62	3.70	1.95	3.86	1.16	9.06		10.97		1.05	0.95	1.50
480	Heatherwood	06/06/2003	25-28-23	4	3.96	3.05	1.00	1.29	2.25	11.50			11.50	5.00	0.00	0.80
383	Imperial E	03/01/2001	15-28-23	4	3.60	3.83	2.60	4.02	2.18	7.83	8.26	16.22	19.76	1.09	1.10	1.66
377	Lake Pointe	12/13/2000	2-30-23	3	4.71	3.42	2.60	3.08	1.58	10.12	6.66	11.41	17.60	0.85	1.42	1.99
245	Lakeland Tower	08/01/1985	12-29-23	3	2.18	3.90	2.48	1.43	1.85	16.68	5.90	11.75	23.53	0.32	1.02	1.42
237	Mulberry	01/01/1983	11-30-23	3	5.03	4.71	3.00	3.92	0.00	11.54	7.16	11.75	18.19	1.23	1.49	2.04
3	Mulberry ROMP 60	06/01/1995	11-30-23	3	4.75	3.52	2.61	3.80	1.62	8.95	6.21	10.07	14.23	1.48	1.23	0.04
255	New Wales	01/01/1984	31-30-23	3	6.00	3.50	3.20	2.40	1.50	8.67	7.12	13.74	16.14	1.94	1.96	2.93
379	Sandra Heights	02/14/2001	8-29-24	3	5.64	3.32	3.77	0.95	2.48	10.21	5.94	14.89	14.48	0.26	1.08	1.83
459	St Paul	09/16/2002	1-29-23	3	1.54	3.75										
251	Taylor	11/01/1993	22-29-23	3	0.00	2.85	2.46	2.12	1.55	15.91	9.23	13.84	23.19	3.53	1.22	1.55
496	Welcome Tower NOVA	02/01/1995	27-31-24	3	0.53	0.01	1.18	3.97	1.82	6.51	8.90	14.13	13.44	1.21	1.14	2.70
			Max		6.00	4.71	3.77	4.02	2.67	16.68	10.90	18.17	23.53	5.00	1.96	2.93
			Min		0.00	0.01	1.00	0.91	0.00	5.23	5.90	8.54	11.50	0.26	0.00	0.04
			Avg		3.53	3.37	2.36	2.64	1.66	10.25	7.87	13.09	16.79	1.47	1.13	1.74

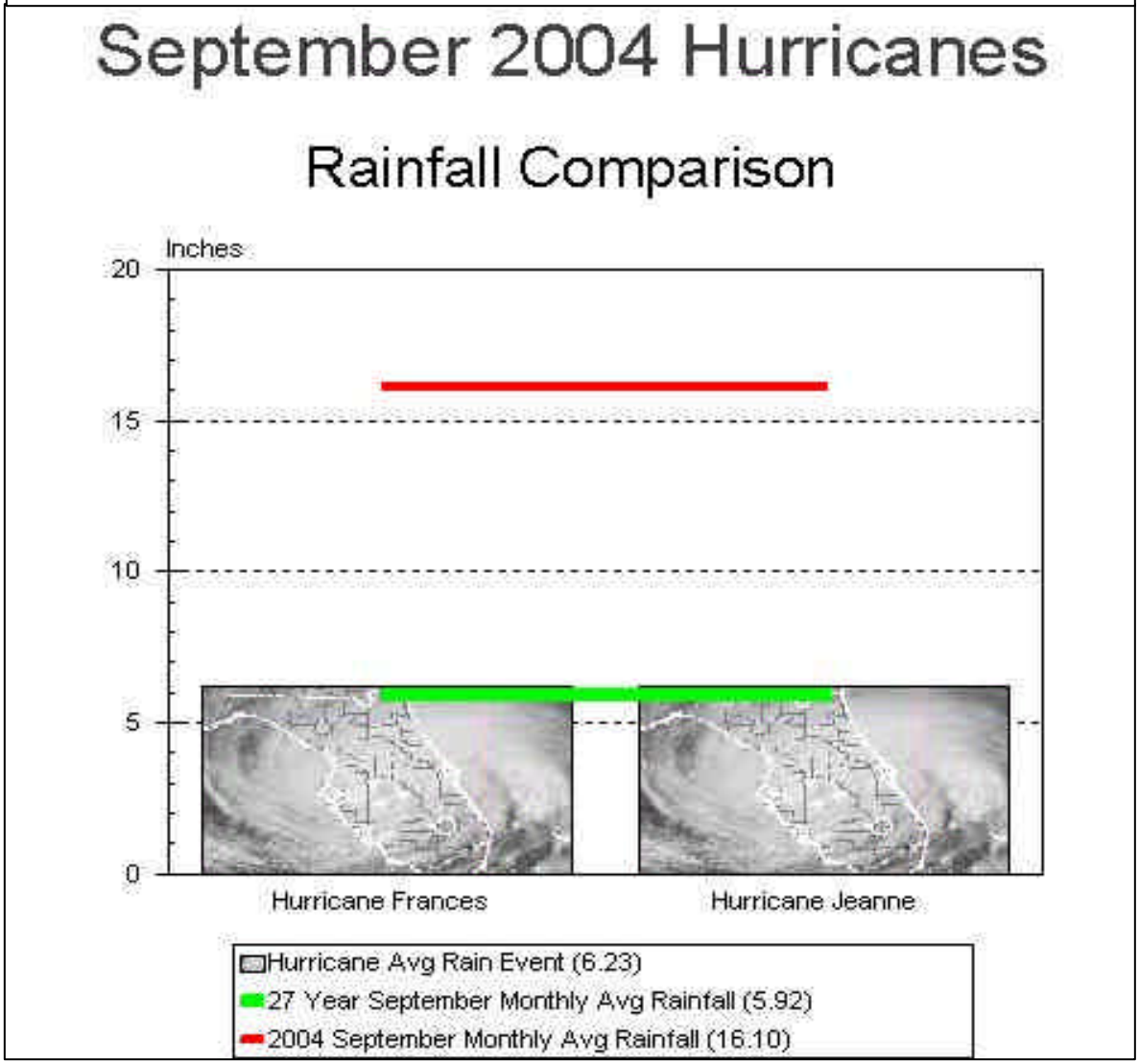
Table 14
Monthly Average Rainfall for Polk County

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2000												
Section												
Eastern	1.01	0.34	0.83	1.00	0.66	6.99	8.02	6.17	6.52	0.40	0.46	0.45
South-Central	1.19	0.33	0.86	1.08	0.60	5.79	8.41	7.61	5.79	0.46	0.72	0.47
South-West	1.34	0.38	1.09	1.60	1.18	7.87	6.92	6.34	7.03	0.10	0.91	0.50
Northern	1.40	0.43	0.64	1.05	0.57	5.72	6.73	6.38	6.07	0.09	1.25	0.87
Max	1.40	0.43	1.09	1.60	1.18	7.87	8.41	7.61	7.03	0.46	1.25	0.87
Min	1.01	0.33	0.64	1.00	0.57	5.72	6.73	6.17	5.79	0.09	0.46	0.45
Avg	1.23	0.37	0.85	1.18	0.75	6.59	7.52	6.63	6.35	0.26	0.83	0.57
2001												
Section												
Eastern	0.73	0.54	5.24	0.84	2.58	7.81	8.24	7.18	15.72	2.91	0.49	0.79
South-Central	0.71	0.39	5.44	0.38	2.62	7.26	9.76	6.07	17.40	1.77	0.41	1.03
South-West	0.64	0.26	6.77	0.22	1.22	8.94	10.97	7.11	12.37	1.09	0.23	1.00
Northern	0.72	0.58	7.95	0.13	2.08	6.75	9.85	7.74	14.92	1.28	0.49	0.81
Max	0.73	0.58	7.95	0.84	2.62	8.94	10.97	7.74	17.40	2.91	0.49	1.03
Min	0.64	0.26	5.24	0.13	1.22	6.75	8.24	6.07	12.37	1.09	0.23	0.79
Avg	0.70	0.44	6.35	0.39	2.13	7.69	9.71	7.02	15.10	1.76	0.40	0.90
2002												
Section												
Eastern	2.01	4.44	0.39	1.74	2.74	15.08	6.19	7.14	5.17	4.59	3.78	11.93
South-Central	1.78	4.11	0.33	1.64	2.87	13.20	6.66	7.44	5.50	5.08	3.82	13.35
South-West	1.51	4.32	0.61	2.46	3.62	15.12	6.26	10.00	6.36	4.52	4.03	14.89
Northern	1.75	3.48	0.93	1.93	3.81	12.87	5.17	9.09	6.48	2.97	2.65	15.43
Max	2.01	4.44	0.93	2.46	3.81	15.12	6.66	10.00	6.48	5.08	4.03	15.43
Min	1.51	3.48	0.33	1.64	2.74	12.87	5.17	7.14	5.17	2.97	2.65	11.93
Avg	1.76	4.09	0.56	1.94	3.26	14.07	6.07	8.41	5.88	4.29	3.57	13.90

Monthly Average Rainfall for Polk County

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2003												
Section												
Eastern	0.95	2.29	3.85	2.53	3.06	11.33	6.64	12.28	4.94	0.86	1.76	2.02
South-Central	0.69	2.57	4.39	2.43	4.34	12.40	6.99	10.45	4.26	1.39	1.33	2.02
South-West	0.65	2.83	5.29	3.49	5.11	14.49	5.51	10.92	5.21	2.21	0.74	1.59
Northern	0.99	2.98	4.96	2.56	4.24	11.75	6.90	8.88	4.09	1.84	1.28	1.88
Max	0.99	2.98	5.29	3.49	5.11	14.49	6.99	12.28	5.21	2.21	1.76	2.02
Min	0.65	2.29	3.85	2.43	3.06	11.33	5.51	8.88	4.09	0.86	0.74	1.59
Avg	0.82	2.66	4.62	2.75	4.19	12.49	6.51	10.63	4.62	1.57	1.28	1.88
2004												
Section												
Eastern	2.89	2.88	1.31	1.89	1.66	7.54	5.81	12.79	14.60	0.71	0.87	2.74
South-Central	4.32	3.29	1.78	2.77	1.30	7.41	7.87	12.26	16.45	0.63	1.23	2.28
South-West	3.53	3.37	2.36	2.64	1.66	10.25	7.87	13.09	16.79	1.47	1.13	1.74
Northern	4.33	3.79	1.84	2.82	1.30	7.48	8.79	11.75	16.58	1.21	0.98	1.81
Max	4.33	3.79	2.36	2.82	1.66	10.25	8.79	13.09	16.79	1.47	1.23	2.74
Min	2.89	2.88	1.31	1.89	1.30	7.41	5.81	11.75	14.60	0.63	0.87	1.74
Avg	3.77	3.33	1.82	2.53	1.48	8.17	7.58	12.47	16.10	1.00	1.05	2.14

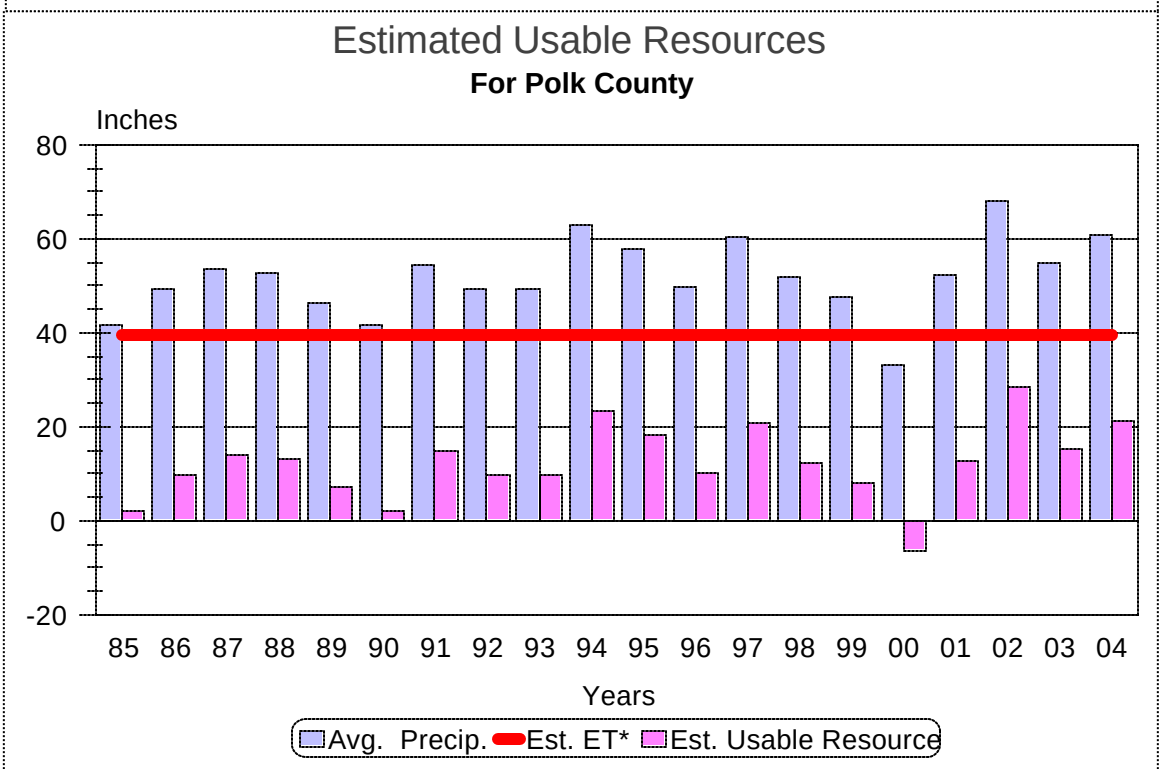
Figure 39



The 2004-year fell just below the 27-year "high normal/wet" level of 62.32 inches with an average of 60.85 for the entire county. In September alone Polk County had 16.10 inches of rainfall which is 10.18 inches higher than the 27-year average. In September, rainfall from Hurricanes Frances and Jeanne averaged 6.23 inches for each event (See Figure 30), totaling 12.46 inches. Just 3.64 inches fell during the rest of the month.

Each year it is estimated that 39.50 inches of the rainfall that Polk County receives evaporates leaving only a small portion which is available for maintenance of stream flow and wetlands, lake replenishment and aquifer recharge. As shown in Figure 30, the usable resources have primarily been positive from 1985 to 2004.

Figure 40



Avg. Precip. - Average precipitation for each year
Est. ET* - Estimated evapotranspiration during the year
Estimated Usable Resource - the usable portion of precipitation available for maintenance of stream flow and wetlands, lake replenishment and aquifer recharge.

All stations have been added together and averaged for the entire County on an annual basis. Figure 32 graphically shows the annual averages for Polk County since 1985. Figures 33 through 36 depict how the rain was distributed monthly throughout the years from 2001 to 2004.

Figure 41

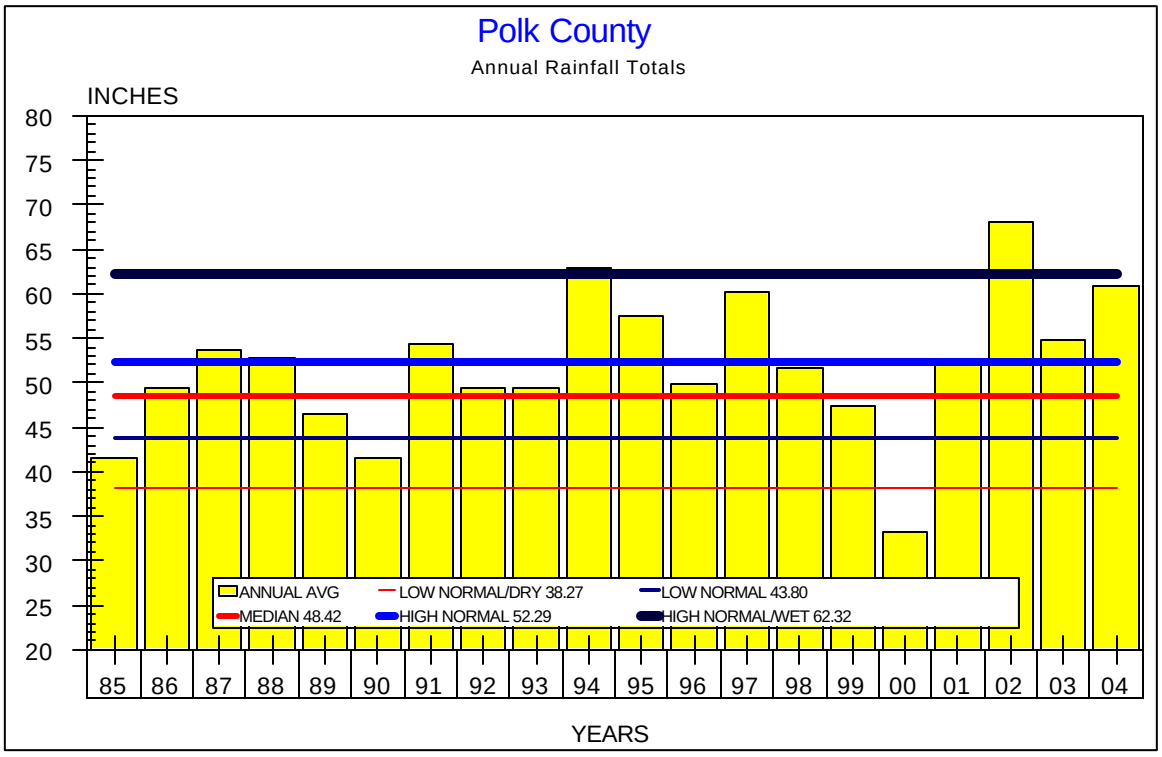


Figure 42

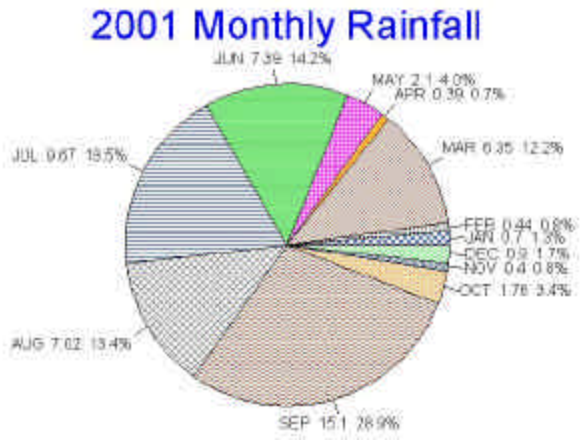


Figure 43

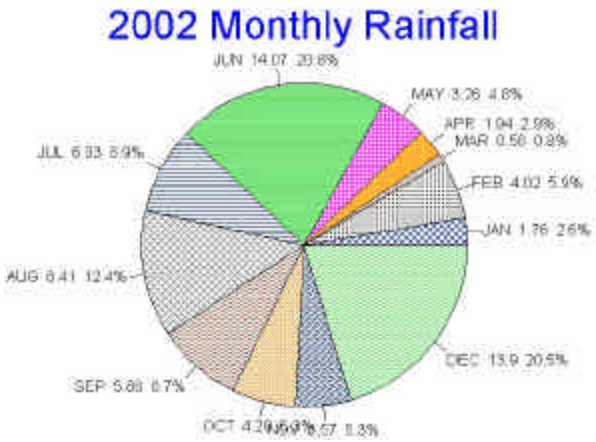


Figure 44

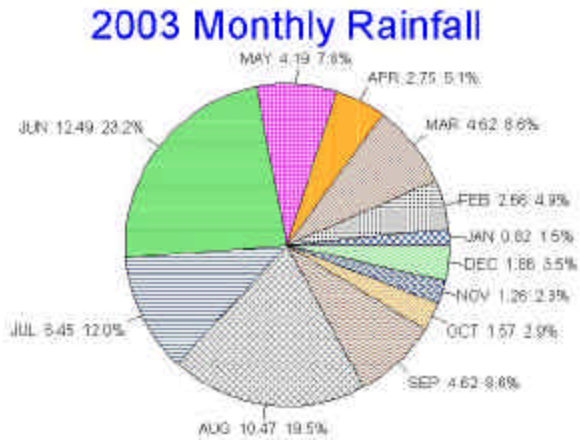
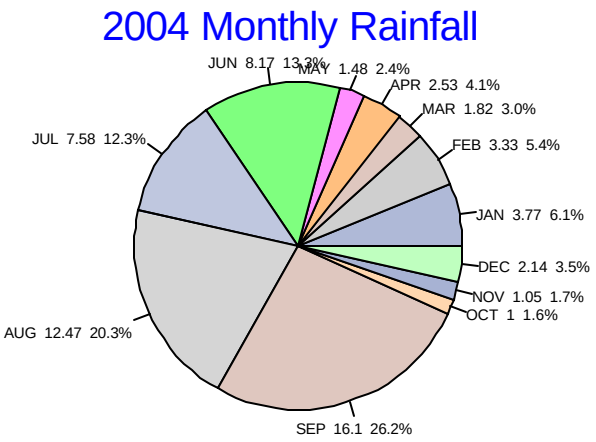


Figure 45



HURRICANE SEASON 2004

As the cover of this report depicts, three of the four hurricanes that hit Florida last year crossed Polk County. The 2004 hurricanes took their toll on everyone and everything they hit. In this section are photos taken of the 2004 hurricane season. It is not the purpose of this section to depict the damage and costly destruction that these hurricanes caused, but to show the flooding that occurred.

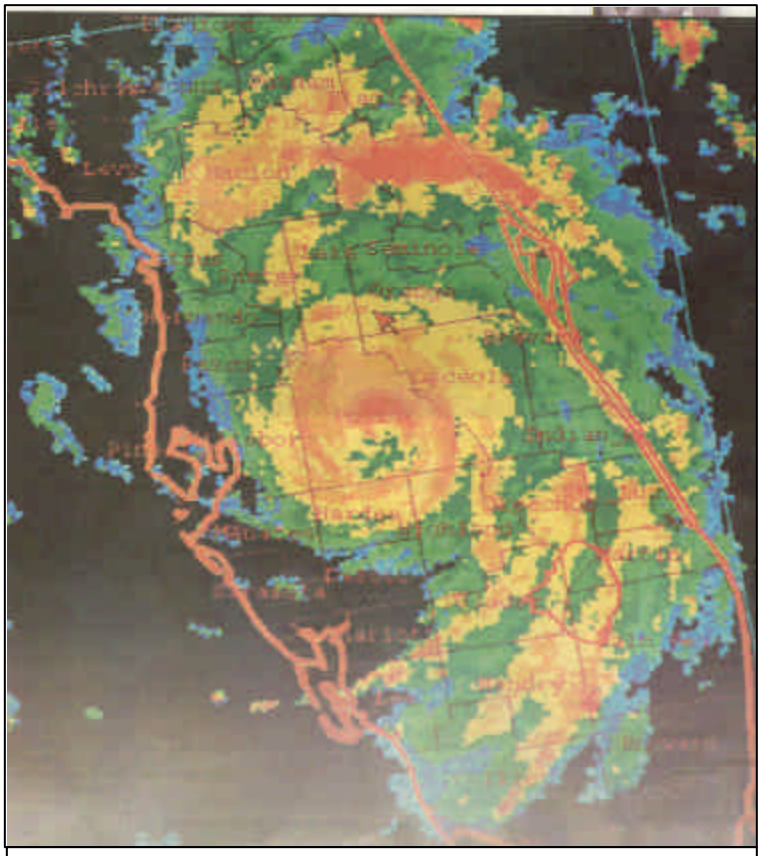


Figure 46 Hurricane Charley

Hurricane Charley, Figure 40, was a Category 3 hurricane when it hit Polk County on August 13. Hurricane Charley was moving so fast that Polk County did not receive the amounts of rainfall that were projected. Hurricane Charley produced a lot of wind damage. The September storms would soon make up for that. About two weeks later Hurricane Frances hit Polk County as a Category 1 storm, Figure 41. Needless to say, Polk County barely had time to recover from Charley. Hurricane Frances was a slow moving storm which gave us over six inches of rainfall throughout Polk County. To add

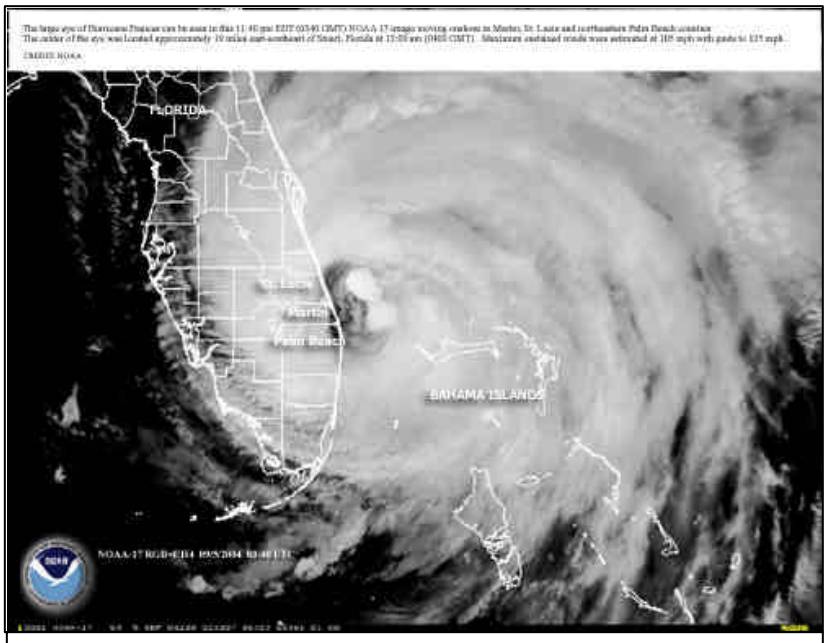


Figure 47 Hurricane Frances

insult to injury about two and a half weeks later Hurricane Jeanne, Figure 43, came to visit Polk County. Hurricane Jeanne was like a hybrid of Hurricanes Charley and Frances. She was a category 2 storm when she entered Polk County; big and slow moving like Frances, but strong like Charley.

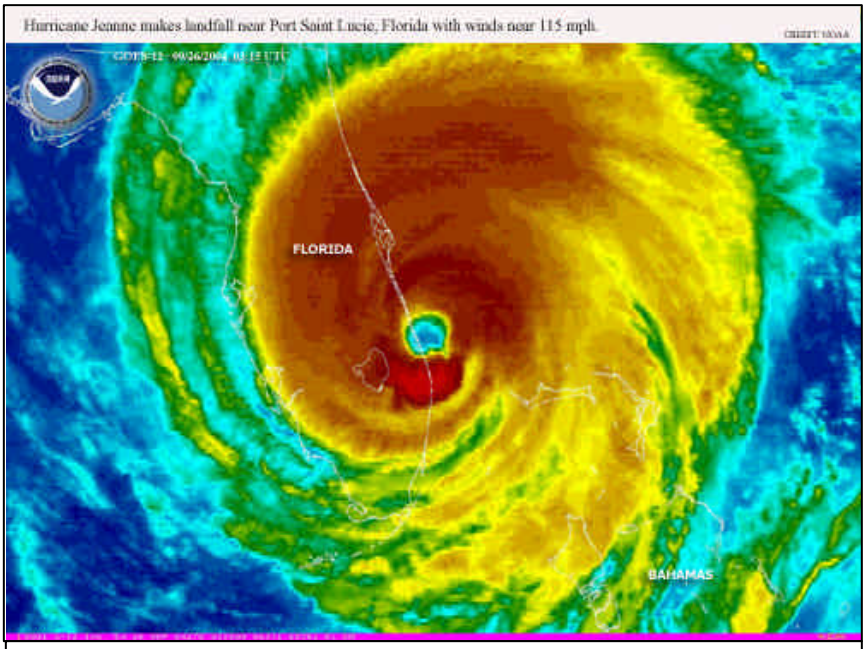


Figure 48 Hurricane Jeanne

Figure 49 Peace Creek at 91Mine Road

With three hurricanes back to back it was inevitable for creeks and rivers as well as lakes to start to overflow. Flooding occurred in many areas throughout Polk County, but the most flooding occurred on the Peace Creek and Peace River.

Figure 50 Peace Creek at Highway 60

Figures 49 through 57 are of the Peace Creek and Peace River systems as well as the Saddle Creek. As these photos depict, the creeks and rivers almost turned into giant lakes.

Figure 51 Peace River Park parking lot off of Highway 60 - Bartow

Figure 52 Canoe launching ramp at Peace River Park

Figure 53 Peace River overflowing

Figure 54 Saddle Creek south of Lake Hancock on the Bartow Eagle Lake Loop Rd

Figure 55 Saddle Creek at Bartow Eagle Loop Rd. SWFWMD trying to clear debris that has washed down the creek.

Figure 56 Saddle Creek at Highway 540

Figure 57 Lake Howard Dr washed out by the lake crashing over the road

Figure 58 Crooked Lake at Bob's Landing before hurricanes

Figures 58 through 63 show before and after conditions of boat ramps at some local lakes. Photos of public boat ramps were taken in May and June of 2004 to be included in the updated Boat Access Lake Directory; some of those lakes were revisited to show differences after the hurricanes.

Figure 59 Crooked Lake at Bob's Landing after hurricanes

Figure 60 Ramp at Lake Menzie before hurricanes

Figure 61 Ramp at Lake Menzie after hurricanes

Figure 62 Lake Howard ramp on west side before hurricanes

Figure 63 Lake Howard ramp on west side after hurricanes

APPENDIX C

Glossary

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10 YEAR FLOOD LEVEL
That elevation, in feet above mean sea level, which approximates the level of flooding expected on a frequency of not less than a ten (10) year recurring intervals, or on a frequency of not greater than a ten percent (10%) probability of occurrence in any given year, as determined from analysis of best available data.

100 YEAR FLOOD LEVEL
That elevation, in feet above mean sea level, which approximates the level of flooding expected on a frequency of not less than one hundred (100) year recurring intervals, or on a frequency of not greater than a one percent (1%) probability of occurrence in any given year, as determined from analysis of best available data.

AQUATIC MACROPHYTES (VEGETATION)
Plants visible to the naked eye (not microscopic) that live along the wet shoreline, or in water.

AQUIFER
An underground geological formation which contains water and may be composed of sand, gravel or porous stone.

BACTERIA
Microscopic, primitive one celled organism without cell organelles. Many are beneficial, but a few are harmful. Aerobes need oxygen and anaerobes can live without oxygen (oxygen may be harmful). "Blue-green algae" are related organisms, and not true algae. See Cyanobacteria.

BATHYMETRIC MAP
A map which shows the bottom contour of the lake as measured in feet or meters.

BENTHIC MACROINVERTEBRATES
Organisms without backbones living at least part of their life cycle on or in the bottom substrate of rivers, streams, and lakes. Examples include: insects, worms, mollusks, and crustacean.

BIOCHEMICAL OXYGEN DEMAND
B.O.D. - an indirect measurement of the amount of oxygen used in the biochemical oxidation of organic matter in water. Used to indirectly indicate the level of contamination in water or contamination potential of material that can stimulate respiration.

BIOTA
The plant and animal life in a particular region, or a natural occurring system of organisms interacting as a community.

CHEMICAL OXYGEN DEMAND
C.O.D. - a measure of the oxygen consuming capacity of inorganic and organic matter present in water. It is expressed as the amount of oxygen consumed from a chemical oxidant in a specific test. COD does not necessarily correlate with B.O.D.

CHLOROPHYLL- a
A green pigment found in plants and blue-green algae and an essential component in the process of converting light energy into chemical energy. Chlorophyll a in water samples are a useful indicator of phytoplankton biomass, especially when used in conjunction with analysis concerning algal growth potential and species abundance. A value greater than 40 ug/L indicates an algal bloom condition, and values greater than 90 ug/L represent a threat to the ecological health of the waterbody. 1ug/L = 1mg/m^3

COLOR- TRUE
The sample is filtered and only the color of the dissolved portion is considered. The color of water is compared to an artificial color scale (CPU). Apparent color can be a factor of the natural decomposition of organic matter that is dissolved in the water and suspended matter in the water column. Industrial discharges may also change water color. Tannic acid from plant material gives water a brown color.

CONTAMINANTS
Impurities, pollutants, pathogens or debris that makes water unhealthy for living things.

CONTROL STRUCTURE
As used in this report, a manmade structure located at the outfall or downstream of the outfall of the lake that is used to regulate the water level of the lake.

CPU
Chloroplatinate Units, color units.

DISSOLVED OXYGEN
D.O. - the amount of oxygen dissolved in water, an essential component of the aquatic environment, low levels of dissolved oxygen creates fish kills. High and low oxygen concentrations can also cause stress for certain biota. For some microorganisms (anaerobes), dissolved oxygen can be lethal.

DIVERSITY INDEX
Statistical method which produces a single number summary describing the ecological health of a biotic community. Good diversity includes many species with a relative even abundance spread over the species present. One dominate species within a small community indicates poor diversity.

DOMINANT VEGETATION
The most prominent macrophytic population established in a lake or stream.

DRAINAGE BASIN AREA
The area of land enclosed by a topographic divide within which direct surface runoff from precipitation normally drains by gravity into a body of water. Drainage areas herein include all closed basins or noncontributing areas.

DRAINAGE BASIN
Refers to which hydrologic watershed the lake lies within and should not be confused with the politically established water basins.

DROUGHT
An extended period of time with rainfall well below the yearly mean value.

ELEVATION
The elevation of the lake's water surface, in feet above mean sea level, as shown on the USGS Topographic Maps. Most lakes fluctuate naturally through a range of several feet. Current levels probably differ from listed levels.

EROSION (WATER)
The action of cutting into or washing away soil by flowing water.

ENTEROCOCCI BACTERIA
A harmless subgroup of streptococci bacteria that live in the gut of warm-blooded animals. This bacterium is a good indicator for tracking human pathogenic viruses.

EUTROPHIC
A descriptive term for lakes with high nutrient concentrations, poor biotic diversity, and increasing organic sedimentation. Overall biotic productivity is high, but lacks a healthy diversity. An older or dying lake. Also, see Hypereutrophic.

EVAPORATION
When water changes from a liquid to a vapor (gas).

EXOTIC VEGETATION
Plants which are not native to an area, usually imported or escaped. They can out-compete native plants and become a monotypic culture.

FECAL COLIFORM BACTERIA TEST
A method used to determine the presence of fecal coliform in the water column. Fecal coliform is produced by all warm blooded animals and eliminated through the digestive tract.

FLOOD
Too much rain water at one time so the water is unable to percolate into the ground.

FLOODPLAIN
Flatlands periodically covered by flood waters.

FLORIDAN AQUIFER
The main source of ground water for most of the state of Florida; this aquifer is composed mostly of limestone that is very permeable.

GROUNDWATER
A body of water which exists within the internal passageways of aquifers and which flows in response to gravitational forces.

HAZARDOUS WASTES
Chemical and biological products, such as insecticides, pesticides, bacteria, oils, paints, petroleum, biotoxins, and manufacturing process waters which can harm or kill living things.

HEAVY METALS
Metals such as arsenic, cadmium, copper, chromium, iron, lead, nickel, and zinc which can cause harm to aquatic life in small concentrations, when they become dissolved in water and bio-accumulated.

HERBICIDES
Chemical compounds used to eliminate unwanted plants.

HOLDING POND
A pond or reservoir usually made of earth and built to store stormwater runoff or effluent such as industrial wastewater.

HYDROLOGIC CYCLE
The movement of water from the atmosphere (precipitation) to the land surface, and back again (evaporation) to the air. Also, includes the movement of water from the surface to and from the ground.

HYDROLOGIC RECORD
The period of time during which information exists on surface water levels (stage), and the amount of precipitation using a time scale.

HYPEREUTROPHIC
An extreme, environmentally threatening lake condition that is usually characterized by nutrient enriched sediments that will recycle nutrients between the sediments and the water column, high primary productivity usually associated with cyanobacteria and/or monotypic invasive macrophytes, elevated chlorophyll concentrations, and sporadic algal blooms that may die-off and produce fish kills by suffocation. In many examples overall species diversity of the ecosystem is greatly reduced.

IMPERMEABLE
Water cannot penetrate in measurable quantities, such as water through concrete or clay.

IMPAIRED WATERS
Impaired waters are those that do not meet the designated uses as defined by rule. The Federal Clean Waters Act (CWA) describes "Impaired Waters" in section 403.067, F.S., and subsection 303(d). The list is known as the 303(d) list.

IONS
Ions (chloride, sulfate, sodium, potassium, calcium, and magnesium) are atoms or groups of atoms which have a positive or negative charge. Ions in the proper ratio are necessary for many biological functions within an organism. They are dissolved from rocks and soils in contact with the lake or inflowing waters. Some ions may also be carried in the air and be deposited by rainfall or stormwater runoff. Calcium and magnesium are the cause of most of the hardness measured in waters.

LAKE TYPE
Type of lake as follows: Has streams flowing in; Has streams flowing out; Has streams flowing in and out; or landlocked.

LAKE VOLUME
The volume of water (measured in acre-feet) in the lake determined from the most recent Bathymetric map. Values will vary with changing water levels.

LAND USE
Prevalent land use within the drainage basin of the lake. In general, land use is categorized into urban (residential and commercial), forest, agriculture, water, and wetlands.

LITTORAL ZONE
The lakeshore area where rooted emergent vegetation typically flourishes and sunlight can penetrate to the bottom. It functions as an important breeding and/or nursery area for many aquatic species especially fish.

LOCATION
The location of the approximate center of the lake is identified by section number, township, and range. All lakes are located in or adjacent to Polk County, Florida.

m
Meters, 1 meter = 3.281 feet.

MAXIMUM DEPTH
Maximum lake depth observed during the development of the most recent Bathymetric map.

MEAN DEPTH
Calculated value obtained by dividing the lake volume by the lake surface area. Final increments are in feet.

MEANDERED
Lakes were meandered in the original land survey of Florida. If a lake was navigable, under Federal law at the time statehood was granted, title to bed was vested in the State (as 'sovereignty lands'). However, the fact that a lake was not meandered does not determine navigability or state sovereignty. Excerpted from Hydrologic Almanac of Florida, Open File Report 81-1107 U.S. Geological Survey (USGS).

MESOTROPHIC
A descriptive term relating to a lake with a moderate nutrient and biological productivity level. The nutrient and sediment deposition increases, algal blooms start to occur, terrestrial plants begin to flourish along the shore and the littoral zone widens. Species diversity is approaching optimum.

MILLIGRAMS PER LITER (mg/L)
A unit of concentration indicating the number of milligrams of a solute in one liter of solution. Also can be expressed as parts per million (ppm).

mg/m^3
milligrams per cubic meter, equivalent to mg/l

NATIVE VEGETATION
Plants which historically occur in a given geographic location.

NITROGEN
One of the primary nutrients which is necessary for the growth of algae and aquatic plants in lakes. In most lakes it may limit the growth of algae, and in abundance it can cause accelerated eutrophication of a lake. When the concentrations consistently exceed the natural levels, undesirable changes in the aquatic community may occur.

N/P RATIO
The ratio of nitrogen to phosphorus. See Nutrient Limiting.

NUISANCE VEGETATION
A term usually applied to native vegetation that establishes itself and overruns the local vegetation. Nuisance vegetation will become the dominant species by out-completing the local species.

NTU
Nephelometric Turbidity Unit.

NUTRIENT LIMITING
Carbon, Phosphorus and Nitrogen are basic elements for plant growth. In general N or P are in short supply and can limit the growth of plants in a lake. The ratio of N or P determines which is the key limiting element. This is an important factor because to reduce plant productivity or improve water clarity in lake restoration, activities generally target limiting nutrients.

NLL = Nitrogen limited lakes
PLL = Phosphorus limited lakes
NBL = Nutrient balanced lakes

NUTRIENTS
Substances that provide the chemical building blocks, as a food source, for living plants and animals. The three major nutrients are phosphorus, nitrogen, and carbon.

OLIGOTROPHIC
A descriptive term referring to a water body (usually a lake) which is low in nutrient concentrations. The oligotrophic lakes are generally associated with good water quality. They have low levels of phosphorus, nitrogen, and chlorophyll a and have very little sediment deposition. They are also known to have none or very narrow zones of shoreline vegetation (littoral zone) and a sparse fish population.

PESTICIDES
Chemicals used to eliminate undesirable organisms.

pH
An expression which denotes the hydrogen ion activity, based on the negative logarithm of hydrogen ion concentration. The scale runs from 0 to 14. pH below 7 are acidic; pH 7 is neutral; pH above 7 is basic.

PHOSPHORUS
One of the primary nutrients which is necessary for the growth of algae and aquatic plants in lakes. In many lakes it may limit the growth of algae, and in abundance it can cause accelerated eutrophication of the lake. When the concentrations consistently exceed the natural levels, undesirable changes in the aquatic community may occur.

PHYSIOGRAPHIC UNIT
Physiographic subdivision in which the lake lies as identified by the Physiographic Map of Polk County (PCNRD, 1985).

PRECIPITATION
Water droplets or ice particles condensed from atomospheric water vapor and sufficiently massive to fall to the earth's surface.

PRODUCTIVITY
The rate of formation of new organic matter (living) by biological process over a defined period of time.

PUBLIC ACCESS
A waterbody that has access for the general public. Example, boat ramp.

RECHARGE
The act of water seeping through soils to replenish water in an aquifer.

RECORD HIGH
The highest level (measured in feet above mean sea level) the lake surface has reached during the period of record.

RECORD LOW
The lowest level (measured in feet above mean sea level) the lake surface has reached during the period of record.

RESTORATION
As used in this report, restoration for water bodies means to clean up damaged or polluted water bodies.

SECCHI DEPTH
Measurement of water clarity by recording the depth at which a black and white disc becomes indistinguishable when viewed from the water's surface. A surrogate measurement for light penetration.

SECCHI DISK
A black and white disk used to measure water clarity by lowering it into the water and recording the depth it disappears.

SEDIMENT
Organic and inorganic solids which have settled to the bottom of a body of water.

SHORELINE LENGTH
The length of the lake shoreline, measured in miles. Measurements were obtained from the bathymetric map, if available, or recent aerial photographs. Shoreline lengths do not include islands. Shoreline length varies as lake levels and surface areas fluctuate.

SINKHOLE
A land surface feature that usually develops during times of low groundwater levels; occurs when the weight of sediments above an empty cavern causes the cavern's ceiling to collapse, creating a depression in the land or a hole in the bottom of a lake or other surface water body.

SPECIFIC CONDUCTANCE
A measurement of the ability of water to conduct an electrical current, corrected to 25^{o}C. Measured in units of umhos/cm.

STEP CHANGE
The relative short term change, e.g., water quality, that is usually brought about by a treatment to the water body. Differs from Trend.

STORMWATER RUNOFF
The water flowing over the land during and immediately after a heavy rainfall that is usually full of pollutants, sediments, and nutrients.

SURFACE AREA
Taken from the Florida Gazetteer of Lakes, published in 1969 by the Florida Board of Conservation. Area is recorded in acres. Marsh areas adjacent to the lakes were included in the lake area measurements. Surface areas expand and contract as the lake level rises and falls. The current surface area will therefore probably differ from the listed value.

SURFACE WATER
The water on the surface of the land in lakes, streams, rivers, oceans, puddles, etc.

TEMPERATURE
An important factor in controlling chemical interactions and reactivity in the water column; also it affects biological activity, since many aquatic organisms have strict temperature requirements Measured in ^{o}C.

TOTAL ALKALINITY
The capacity of water to neutralize acids, a property impaired by the water's content of carbonates, bicarbonates, hydroxides, and occasionally borates, silicates, phosphates. It is expressed in milligrams per liter of equivalent calcium carbonate.

TOTAL COLIFORM BACTERIA
Facultative anaerobic, gram negative, rod-shaped bacteria. The majority live in soils and most are beneficial. A poor indicator of water quality.

TOTAL DISSOLVED SOLIDS
T.D.S. - is the mass of nonvolatile dissolved salts in a solution.

TOTAL KJELDAHL NITROGEN
TKN - the measure of the organic nitrogen plus ammonia nitrogen.

TOTAL NITROGEN
Total N - combined measurements of nitrate, nitrite, ammonia and organic nitrogen found in water.

TOTAL ORGANIC CARBON
T.O.C. - a measurement of the concentration of carbon found associated with organic (living) compounds and carbon dissolved in the water.

TOTAL SUSPENDED SOLIDS
T.S.S. - solids that are in suspension in the water column.

TROPHIC STATE INDEX - TSI
A single numeric value calculated from the concentrations of total nitrogen, total phosphorus, and chlorophyll-a used to measure water quality in lake assessments. Scale is: 0 to 59 = good, 60 to 69 = fair, 70 to 80 = poor, 80+ = extremely poor water quality. This is a relative scale.

TREND (water quality)
The gradual tendency over a period of time that indicates water quality is improving or declining. Trends differ from “step changes” by their gradual change over a long period.

TURBIDITY
A physical characteristic of water that reduces light penetration. The condition is caused by the presence of suspended solids. Measured in Nephelometric Turbidity Unit (NTU).

WATER POLLUTION
The contamination of any waterbody which will create or is likely to create a nuisance or to render such waters harmful, detrimental or injurious to public health, livestock, aquatic life, or other animals, including but not limited to contamination by alteration of the physical, chemical or biological properties of such waters, or detrimental changes in temperature, taste, color, or odor.

WATER QUALITY
A summary of the most recent water quality data with regards to the degree of eutrophication and information on recent water quality trends, if available.

WATER QUALITY INDEX - WQI (Specific for Polk County)
The Water Quality Index is a numerical index using the reported water chemistry values in a linear, and parameter weighted formula. The index baseline closely approaches Florida Class III water quality standards. The WQI compares the water quality of the lake or stream to the baseline. Above the baseline, Class III standards are not being met.

WATER RESTRICTION
Rules devised to limit water use as a means of conservation during periods of drought or shortages.

WATER TABLE
The upper surface of the zone of saturation in an unconfined aquifer at which the pressure is equal to atmospheric pressure.

WETLAND
An area where fresh or salt water covers or soaks the ground for a period of time. Wetlands generally include swamps, marshes, bogs, and similar areas. There is no universal definition, but most include the types of plants found in wetlands, the hydro period, and the type of soils necessary for wetlands maintenance.

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