Hydrologic Conditions in Florida during Water Year 2007

By Richard Jay Verdi, Stewart A. Tomlinson, Ronald B. Irvin, and David L. Fulcher

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Conversion Factors

Multiply	By	To obtain
inch (in.)	2.54	centimeter
foot (ft)	0.3048	meter
square mile (mi^2)	2.590	square kilometer
cubic foot per second (ft^3/s)	0.02832	cubic meter per second

Vertical coordinate information is referenced to National Geodetic Vertical Datum of 1929 (NGVD 29).

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83).

Elevation, as used in this report, refers to distance above the vertical datum.

Abbreviations and Acronyms

NSIP	National Streamflow Information Program
SKSE	Seasonal Kendall Slope Estimator
SKTT	Seasonal Kendall Trend Test
USGS	U.S. Geological Survey

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Abstract

Record-high and record-low hydrologic conditions occurred during water year 2007 (October 1, 2006 - September 30, 2007) based on analyses of precipitation, surface-water flows, lake elevations, and ground-water levels. For example, the streamgage at Suwannee River at White Springs in northwest Florida recorded an annual streamflow of 103 cubic feet per second during 2007, or about 6 percent of the period-of-record average since monitoring began in 1906. Lake Okeechobee in south Florida reached record-low elevations (8.82 feet on July 2) since monitoring began in 1912. Several wells throughout the State registered period-of-record lowest daily maximum water levels.

Introduction

This report summarizes hydrologic conditions throughout Florida during the 2007 water year—a record-setting year for high and low precipitation, surface-water flows, lake elevations, and ground-water levels. Except for some parts of south Florida, drought conditions (at a level from severe to abnormally dry) characterized the overall hydrologic conditions for Florida in 2007. Water-levels at Lake Okeechobee in south Florida reached record lows in 2007. Although ground-water levels at some sites were above normal during the 2007 water year, most ground-water levels throughout the state were below normal. Record-low annual streamflow conditions were reported at several streamgage locations. Historically, Florida has been divided into four geographic monitoring regions (fig. 1): northwest, northeast, southwest, and south. The locations of the monitoring stations used in this report are identified in figure 2.

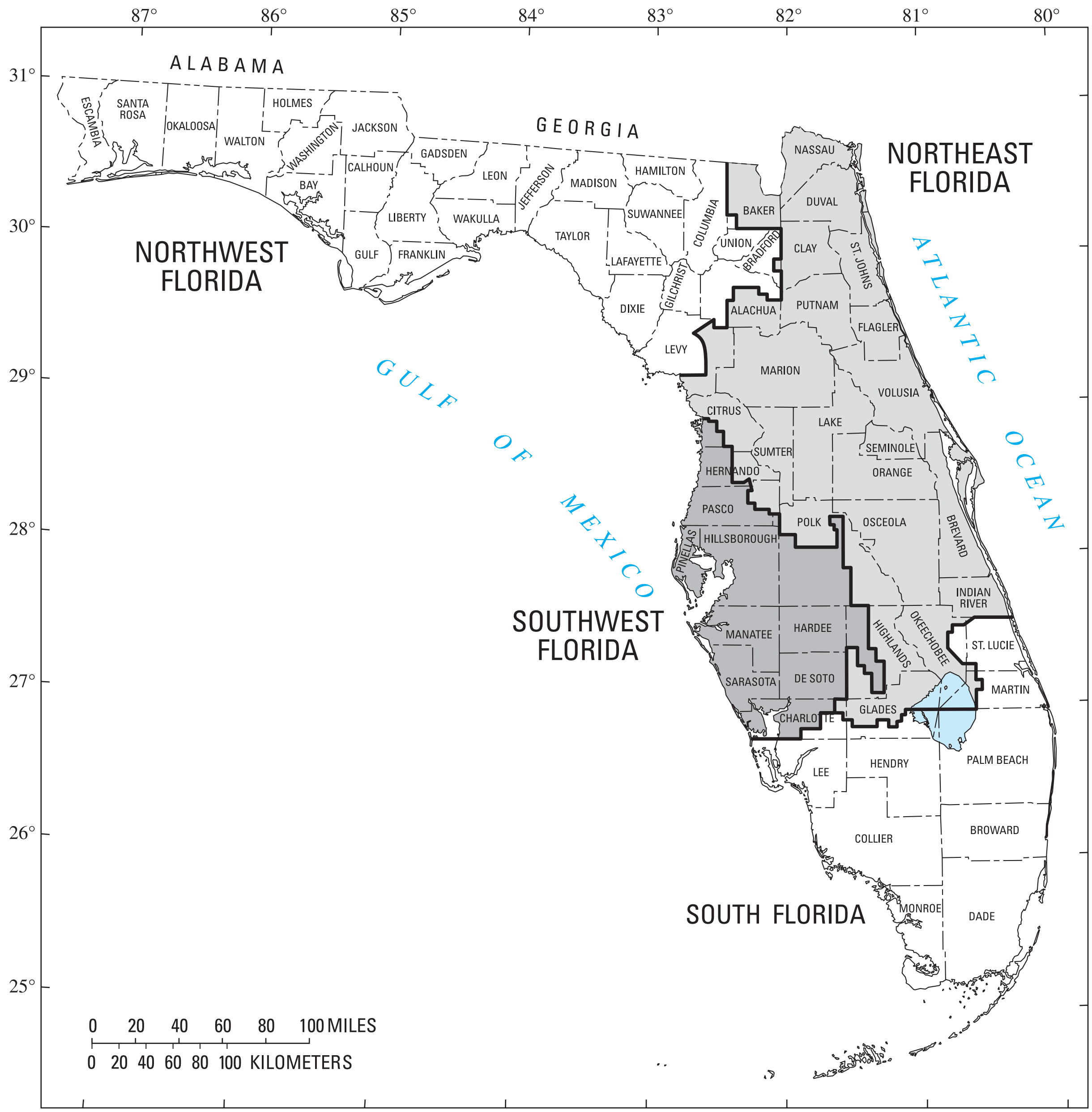
Data Compilation

Prior to 1960, hydrologic data were published in various U.S. Geological Survey (USGS) Water-Supply Papers and included water-related data collected by the USGS during the respective water year (October 1 to September 30). In 1961, a series of annual reports was introduced that published only surface-water data entitled "Water-Resources Data for Florida." In 1964, a companion report series was introduced for the purpose of publishing water-quality data. In 1975, the surface-water and water-quality data reports were merged into a single annual volume and were expanded to include data for ground-water levels. These reports are listed at *http://fl.water.usgs.gov/publications/bibliography/bibliography.html#S* (go to the alphabetical listing of U.S. Geological Survey). Formal publication of the annual report series was discontinued at the end of the 2005 water year upon activation of the online Annual Data Report database website. This website facilitates the retrieval of data by hydrologic units or individual basins that cross State and county boundaries; additional retrieval options are available to obtain data for site locations of particular interest. National data for streamflow, lake and ground-water levels, and water quality for the 2007 water year are accessible to the public on the USGS Annual Data Report website at *http://wdr.water.usgs.gov/*

Current and historical data, which includes site information, daily values, statistics, and field measurements, are available for all monitoring sites on the online National Water Information website at *http://waterdata.usgs.gov/fl/nwis/nwis*. Incremental time-series data are available for many parameters (gage height, discharge, water temperature, specific conductance, and so forth) at many USGS stations. The evolution of electronic data loggers and computer systems has made storage and access to current and historical data possible. Visit the Instantaneous Data Archive at: *http://ida.water.usgs.gov/ida/index_usgs.cfm*

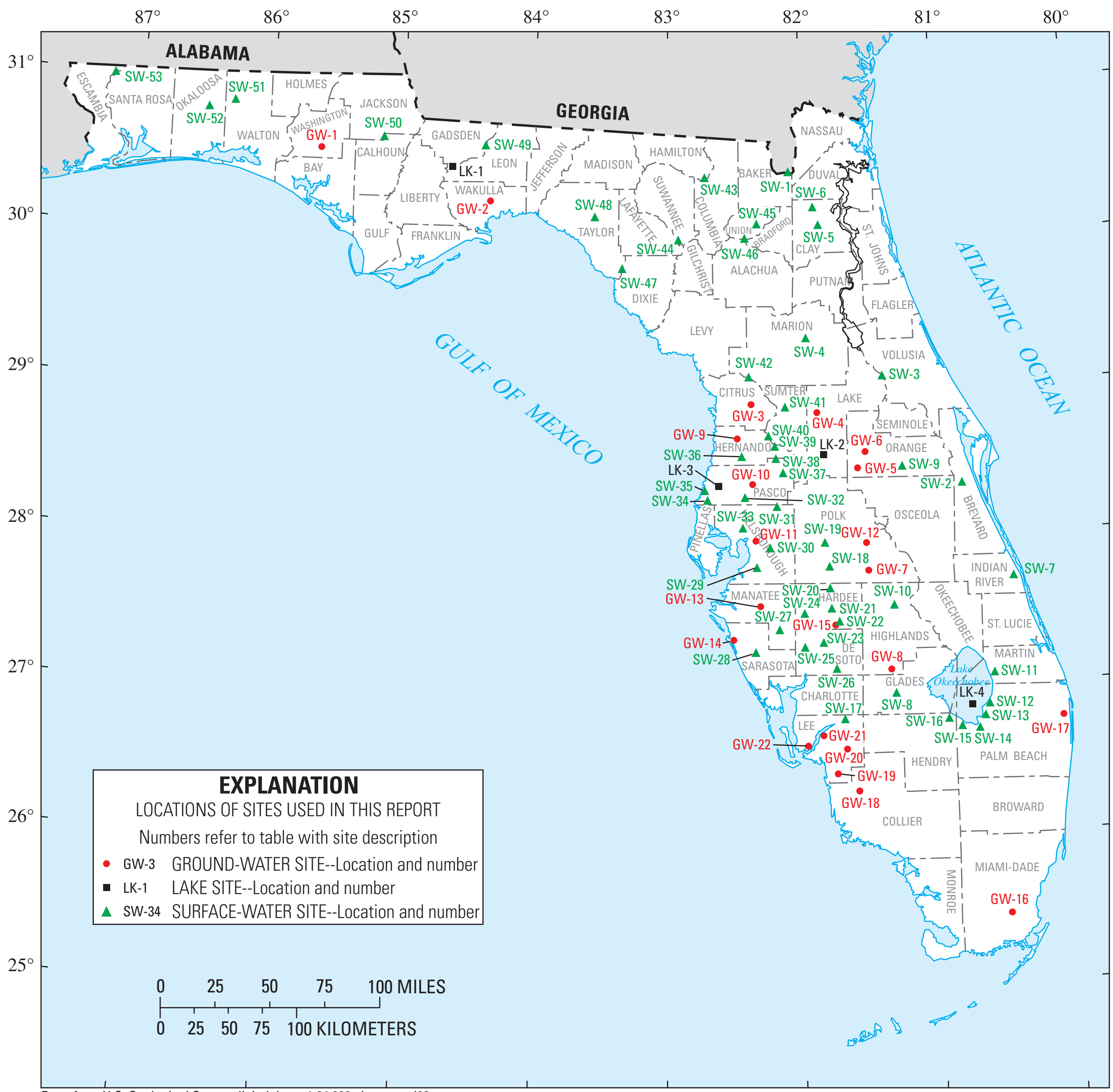
Funding for Data Collection in Florida

Funding to provide hydrologic data to the public primarily comes from three sources: (1) the Federal water cooperative program, where the Federal government and State and local agencies share in the costs of a gage; (2) other Federal agency funds; and (3) the National Streamflow Information Program (NSIP). The NSIP provides some Federal funding for gages with the following critical interests: interstate and international waters, flood forecasts, river-basin outflows, sentinel watersheds, and water quality. The Federal Cooperative Water Program funds the majority of the data-collection stations in Florida through cost-sharing agreements with water-management districts, several State agencies, and many local county and municipal governments.



Base from U.S. Geological Survey digital data,
Universal Transverse Mercator projection, zone 17

Figure 1. Delineation of geographic monitoring regions in Florida.



Base from U.S. Geological Survey digital data, 1:24,000, datum nad83
Albers Equal-Area Conic Projection,
Standard parallels 29°30′ and 45°30′, central meridian -83°00′

Figure 2. Locations of the monitoring stations in Florida.

Ground-Water Sites

GW-1	303025085350501	Well 422A near Greenhead, Washington County, FL
GW-2	300740084293001	Benchmark well near Crawfordville, Wakulla County, FL
GW-3	285102082204001	DOT-41 at Inverness, Citrus County, FL
GW-4	284842081533001	College Street well at Leesburg, Lake County, FL
GW-5	282202081384601	Lake Oliver Deep well near Vineland, Orange County, FL
GW-6	283253081283401	OR-47 at Orlo Vista, Orange County, FL
GW-7	274812081190301	P-49 near Frostproof, Polk County, FL
GW-8	270157081203101	H-15A near Palmdale, Highlands County, FL
GW-9	283201082315601	Weeki Wachee Well near Weeki Wachee, Hernando County, FL
GW-10	281715082164401	HWY 577 Well near San Antonio, Pasco County, FL
GW-11	275627082150801	Turner Well near Brandon, Hillsborough County, FL
GW-12	275411081372001	ROMP 57 well near Lake Wales, Polk County, FL
GW-13	272838082142201	Kibler Deep well 26B near Bethany, Manatee County, FL
GW-14	271938082251801	Sarasota well 9 near Sarasota, Sarasota County, FL
GW-15	272012081482501	Marshall Deep well near Gardner, De Soto County, FL
GW-16	253029080295601	S-196A near Homestead, Miami-Dade County, FL
GW-17	263524080124301	PB-683 near West Palm Beach, Palm Beach County, FL
GW-18	260111081243901	C-496 at Corkscrew Sanctuary, Collier County, FL
GW-19	261957081432201	L-2194 near Bonita Springs, Lee County, FL
GW-20	263335081394301	L-729 near Lehigh Acres, Lee County, FL
GW-21	263251081452801	L-1993 near Fort Myers, Lee County, FL
GW-22	263526082010201	L-2434 near Cape Coral, Lee County, FL

Surface-Water Sites

SW-1	02231000	St. Mary's River near Macclenny, Baker County, FL
SW-2	02232400	St. John's River near Cocoa, Brevard County, FL
SW-3	02236000	St. John's River near De Land, Lake County, FL
SW-4	02240000	Ocklawaha River near Conner, Marion County, FL
SW-5	02245500	South Fork Black Creek near Penney Farms, Clay County, FL
SW-6	02246000	North Fork Black Creek near Middleburg, Clay County, FL
SW-7	02253000	Main Canal at Vero Beach, Indian River County, FL
SW-8	02256500	Fisheating Creek at Palmdale, Glades County, FL
SW-9	02266300	Reedy Creek near Vineland, Osceola County, FL
SW-10	02270500	Arbuckle Creek near De Soto City, Highlands County, FL
SW-11	02276877	St. Lucie Canal below S-308 near Port Mayaca, Martin County, FL
SW-12	02278000	West Palm Beach Canal at S-352 at Canal Point, Palm Beach County, FL
SW-13	02280500	Hillsboro Canal below S-351 near South Bay, Palm Beach County, FL
SW-14	02283500	North New River Canal below S-2 and S-351 near South Bay, Palm Beach County, FL
SW-15	02286400	Miami Canal at S-354 and S-3 at Lake Harbor, Palm Beach County, FL
SW-16	264514080550700	Industrial Canal at Clewiston, Hendry County, FL
SW-17	02292900	Caloosahatchee River at S-79 near Olga, Lee County, FL
SW-18	02294650	Peace River at Bartow, Polk County, FL
SW-19	02294898	Peace River at Fort Meade, Polk County, FL
SW-20	02295420	Payne Creek near Bowling Green, Hardee County, FL
SW-21	02295637	Peace River at Zolfo Springs, Hardee County, FL
SW-22	02296500	Charlie Creek near Gardner, Hardee County, FL
SW-23	02296750	Peace River at Arcadia, De Soto County, FL
SW-24	02297155	Horse Creek near Myakka Head, Hardee County, FL
SW-25	02297310	Horse Creek near Arcadia, De Soto County, FL
SW-26	02298123	Prairie Creek near Fort Ogden, De Soto County, FL
SW-27	02298608	Myakka River at Myakka City, Manatee County, FL
SW-28	02298830	Myakka River near Sarasota, Sarasota County, FL
SW-29	02300700	Bullfrog Creek near Wimauma, Hillsborough County, FL
SW-30	02301500	Alafia River at Lithia, Hillsborough County, FL
SW-31	02303000	Hillsborough River near Zephyrhills, Hillsborough County, FL
SW-32	02303420	Cypress Creek at Worthington Gardens, Pasco County, FL
SW-33	02306000	Sulphur Springs at Sulphur Springs, Hillsborough County, FL
SW-34	02310000	Anclote River near Elfers, Pasco County, FL
SW-35	02310300	Pithlachascotee River near New Port Richey, Pasco County, FL
SW-36	02310525	Weeki Wachee River near Brooksville, Hernando County, FL
SW-37	02310947	Withlacoochee River near Cumpressco, Pasco County, FL
SW-38	02312000	Withlacoochee River at Trilby, Hernando County, FL
SW-39	02312200	Little Withlacoochee River at Rerdell, Hernando County, FL
SW-40	02312500	Withlacoochee River at Croom, Hernando County, FL
SW-41	02312700	Outlet River at Panacoochee Retreats, Sumter County, FL
SW-42	02313000	Withlacoochee River near Holder, Marion County, FL
SW-43	02315500	Suwannee River at White Springs, Columbia County, FL
SW-44	02320500	Suwannee River at Branford, Suwannee County, FL
SW-45	02321000	New River near Lake Butler, Union County, FL
SW-46	02321500	Santa Fe River at Worthington Springs, Alachua County, FL
SW-47	02324000	Steinhatchee River near Cross City, Taylor County, FL
SW-48	02324400	Fenholloway River near Foley, Taylor County, FL
SW-49	02329000	Ochlockonee River near Havana, Leon County, FL
SW-50	02359000	Chipola River near Altha, Calhoun County, FL
SW-51	02368500	Shoal River near Mossy Head, Walton County, FL
SW-52	02369000	Shoal River near Crestview, Okaloosa County, FL
SW-53	02375500	Escambia River near Century, Santa Rosa County, FL

Lake Sites

LK-1	02329900	Lake Talquin near Bloxham, Leon County, FL
LK-2	02236840	Lake Minnehaha at Clermont, Lake County, FL
LK-3	02310290	Moon Lake in Pasco County, FL
LK-4	02276400	Lake Okeechobee, Palm Beach County, FL

Figure 2. Locations of the monitoring stations in Florida.—Continued

For 2007, the above-mentioned programs funded 430 continuous streamflow stations, 230 stage-only stations, 407 continuous ground-water stations, 1,200 periodic ground-water stations, 145 continuous water-quality stations, and water-quality samples at 200 streamflow and 210 ground-water stations. About 75 percent of the continuous record stations have data available in real time; these data are available online at *http://waterdata.usgs.gov/fl/nwis/rt/*

The USGS and agencies in Florida have had cooperative agreements for the collection of water-resources records since 1930. Agencies that had cooperative agreements with the USGS during the 2007 water year are listed below. Funding for water-resources monitoring from the Jacksonville and Mobile Districts, U.S. Army Corps of Engineers, was obtained through a Military Interdepartmental Purchase Request.

Big Cypress Park
Broward County
City of Boca Raton
City of Bradenton
City of Cape Coral
City of Cocoa Utilities
City of Hallandale Beach
City of Hollywood
City of North Port
City of Sanibel
City of Sarasota
City of Tallahassee
City of Tampa
Florida Department of Environmental Protection
Florida Department of Transportation
Florida Keys Aqueduct Authority
Hillsborough County
Jacksonville Electric Authority
Lake County Water Authority
Lee County
Manatee County
Miami-Dade County
Miami-Dade Water and Sewer
Northwest Florida Water Management District
Okaloosa County
Orange County Environmental Protection Division
Peace River Regional Water Supply Authority
Pinellas County
Reedy Creek Improvement District
St. Johns Water Management District
St. Lucie County
Santa Rosa County
Sarasota County
Seminole County
Seminole Tribe
South Florida Water Management District
Southwest Florida Water Management District
Suwannee River Water Management District
Tampa Bay Water
Walton County

Hydrologic Conditions in Florida

This section describes the hydrologic conditions for Florida during the 2007 water year. Analyses of data are made for precipitation, surface-water flows, lake elevations, and ground-water levels.

Precipitation

Precipitation quantity and timing affect the hydrologic conditions in streams, lakes, and aquifers in Florida. Although the USGS collects some meteorological data (primarily for project or operational needs), the National Oceanic and Atmospheric Administration, National Weather Service, combines this information with data collected by many other organizations and provides detailed summaries, including weekly and monthly maps depicting: (1) monthly observed precipitation, (2) monthly percentage of normal precipitation, and (3) weekly drought monitor. Examples of these maps are provided in figures 3 to 5. For this report, the term precipitation refers to rainfall. These summaries of rainfall and drought data were used to provide the narrative of rainfall conditions for the 2007 water year and to serve as background information for understanding the changes in water levels and flow occurring in Florida's streams, lakes, and aquifers.

The drought-intensity categories used in the text and figure 4 reflect input from several indicators with different scales of units. The indices used are Percent of Normal Precipitation, Standardized Precipitation Index, Palmer Drought Severity Index, Crop Moisture Index, Surface Water Supply Index, and the Reclamation Drought Index (Hayes, 2008). Generally, they reflect a system of ranking percentiles to correlate with the different intensities (Fuchs, 2008, National Drought Mitigation Center, written commun.). Abnormally dry reflects indices that mostly fall in the lowest 30 percent. Moderate drought reflects indices mostly in the lowest 20 percent. Severe drought reflects indices mostly in the lowest 10 percent. Extreme drought reflects indices mostly in the lowest 5 percent. Exceptional drought reflects indices mostly in the lowest 1-2 percent.

October 2006—Precipitation in Florida was much lower than normal during October (usually 3 to 5 in.), except in north Florida where 4 to 8 in. were recorded. In Tallahassee, 2.71 in. of rain fell in a 24-hour period on October 27, setting a new daily rainfall record (National Oceanic and Atmospheric Administration, 2008d). Peninsular Florida generally received less than 2 in., which is less than 50 percent of normal. As a result, conditions remained abnormally dry in northwest and central Florida, with moderate drought in north and northeast Florida, but near normal conditions in southwest Florida.

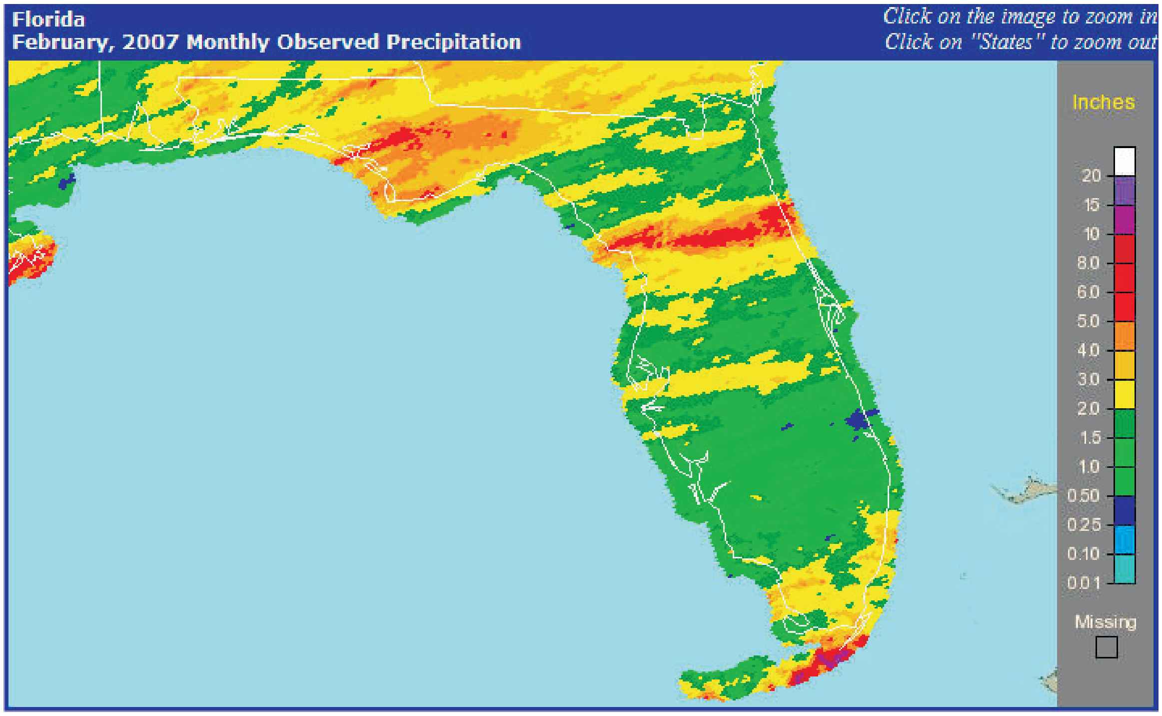


Figure 3. Example of the monthly observed precipitation maps provided by the National Oceanic and Atmospheric Administration, National Weather Service, February 2007.

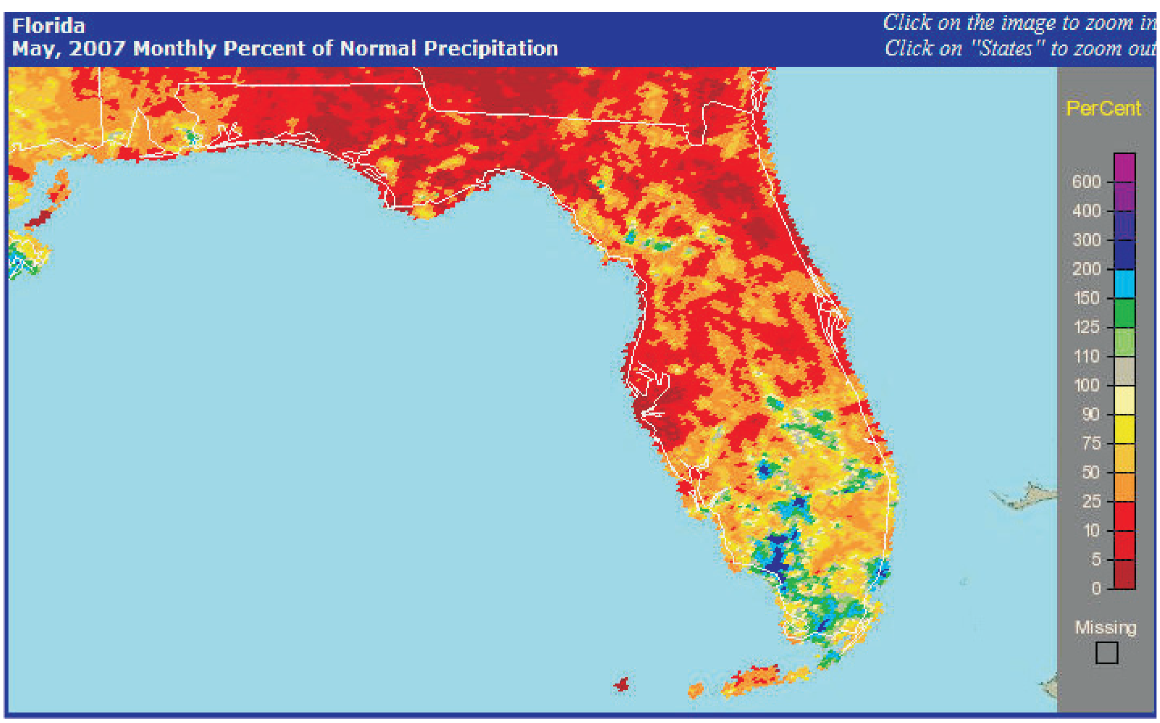


Figure 4. Example of the monthly percentage of normal precipitation maps provided by the National Oceanic and Atmospheric Administration, National Weather Service, May 2007.

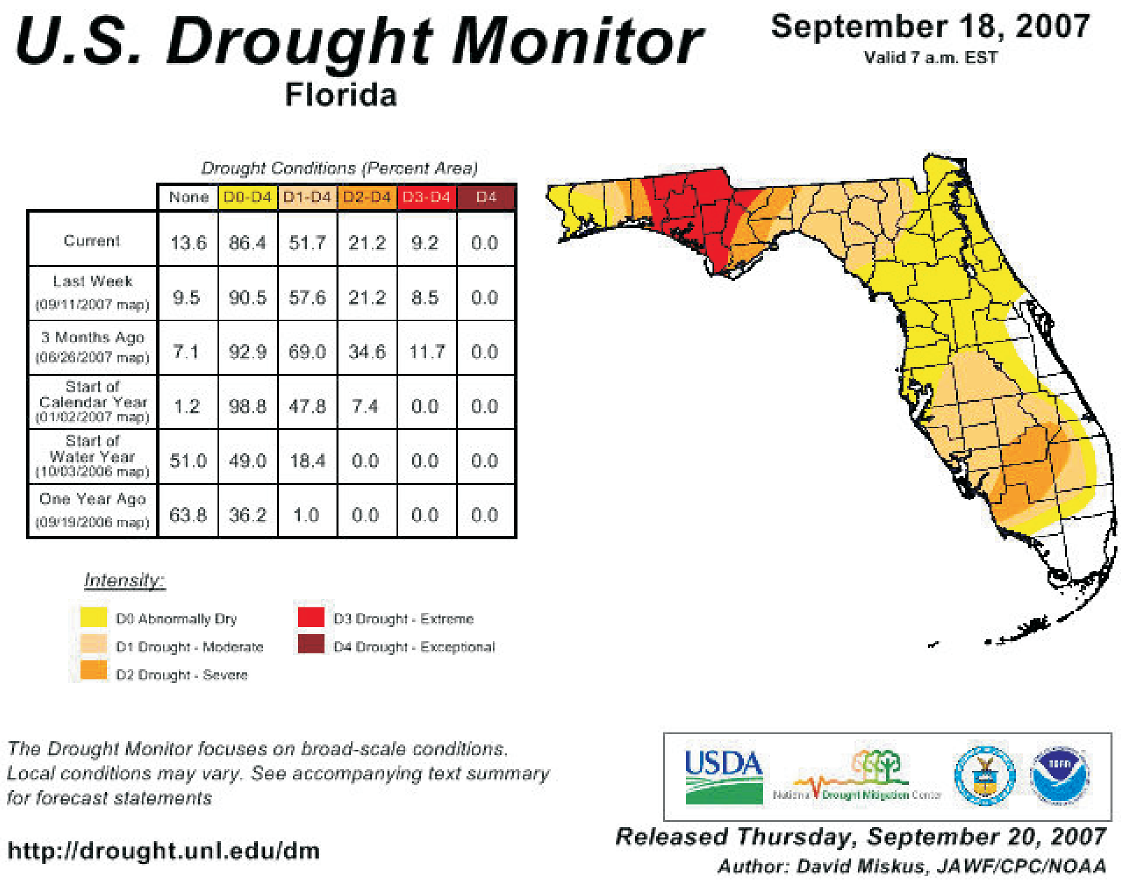


Figure 5. Example of the weekly drought monitor maps provided by the National Oceanic and and Atmospheric Administration, National Weather Service.

November 2006—Although the panhandle received near normal precipitation during November (2 to 5 in.), other areas received less than 0.5 in. (northeast corner of Florida, parts of extreme southwest Florida, and the area around Lake Okeechobee). For areas receiving the lowest precipitation, this was less than 25 percent of the normal rainfall. As a result, drought conditions became severe in northeast Florida, moderate in the northwest quarter, and abnormally dry over the rest of the State.

December 2006—Heavy rainfall occurred during December in parts of the central and eastern panhandle areas of the State, as well as some isolated pockets in east-central Florida, the southeast coast, and western Florida Keys. In Tallahassee, 8.35 in. of rain fell, giving Florida its sixth wettest December on record and preventing calendar year 2006 from being one of the 10 driest years on record. Of this total, 3.72 in. of rain fell in Tallahassee on December 25, so that Florida had its wettest Christmas ever recorded (National Oceanic and Atmospheric Administration, 2008e). Most of the State received 0.5 to 4 in. of precipitation during the month, about 50 to 125 percent of normal. Some areas along the coastal Big Bend region (north-central counties adjacent to the Gulf of Mexico) received more than 6 in. of rainfall, about twice the average. By the end of the month, drought conditions remained severe in northeast Florida, with moderate drought in most of central Florida, and abnormally dry conditions across the remainder of the State.

January 2007—Precipitation was near normal in the Florida Panhandle, but less than 5 percent of normal in the Lake Okeechobee region. Some areas of the western and central panhandle received 5 to 8 in. of rainfall from thunderstorms associated with cold fronts. Most of peninsular Florida received less than 2 in. of rainfall the entire month, generally less than 50 percent of normal. At the end of the month, severe drought conditions predominated in the northeast, whereas drought conditions were moderate from the western panhandle to south-central Florida, and abnormally dry throughout the southern part of the State.

February 2007—Florida experienced variable rainfall amounts across the State as frontal systems brought heavy rainfall to some areas, but little to most of the State. On February 2, a strong series of storms brought 3 to 6 in. of rainfall in a narrow west-east band from Cedar Key to Daytona Beach. Some storms were severe and three tornadoes, as strong as EF-3, caused 21 deaths and damage in Lady Lake, Deland, New Smyrna Beach, and other areas of Lake and Volusia Counties (National Oceanic and Atmospheric Administration, 2008i). Some areas of the central panhandle and north-central Florida Keys received 3 to 6 in. of rainfall, but, most of peninsular Florida received less than 2 in. during the month, and drought conditions lingered. Northeast and central Florida experienced moderate drought, but the remainder of the peninsula was abnormally dry.

March 2007—March was exceptionally dry across the entire State, with only scattered areas receiving 2 to 4 in. of rainfall. In Tallahassee, only 0.9 in. of rain fell, making it the fifth driest March on record (National Oceanic and Atmospheric Administration, 2008f). Most parts of the State received less than 1.5 in., and some areas in south-central and southwest Florida received less than 0.5 in. Most of the State received less than 25 percent of average precipitation. This intensified the drought, and severe drought conditions extended from the south-central Atlantic Coast inland to Lake Okeechobee. The remainder of the peninsula observed moderate drought, but the panhandle was abnormally dry.

April 2007—Significant rainfall occurred only in extreme south Florida and in scattered areas of the panhandle. The remainder of the State received less than 3 in. of rainfall during the month. However, by the end of the month, drought was still characterized as severe in south-central Florida and in the northeast, with abnormally dry conditions in extreme south Florida and the northwestern part of the panhandle.

May 2007—May continued to be mostly dry across the State, with only scattered areas of south Florida receiving as much as 6 in. of precipitation from thunderstorm activity. Much of the panhandle received less than 0.5 in., less than 25 percent of average. In Tallahassee, only 0.2 in. of rain fell, making it the third driest May on record and the driest spring (March 1 to May 31) on record (National Oceanic and Atmospheric Administration, 2008g). Extreme drought extended across the northern part of the State and in south-central Florida, whereas severe to moderate drought extended across the remainder of the State. Only the most southern part of peninsular Florida was considered abnormally dry.

June 2007—Frequent thunderstorm activity occurred during June across the State, but was heaviest in the most southern part of Florida. On June 1-2, parts of central and north Florida received as much as 6 in. of rainfall associated with Tropical Storm Barry. Some areas of south Florida received more than 15 in. of precipitation during the month. However, in central and north Florida, some parts of the central panhandle received less than 2 in. By the end of the month, severe drought conditions extended only across the central part of the panhandle, and severe to moderate drought extended across the northern part of the State and in south-central Florida.

July 2007—Most of the State received 5 to 8 in. of precipitation in July from convective thunderstorms. Scattered areas of south and north-central Florida received 15 in. or more of rainfall, about 150 to 200 percent of average for the month. Extreme drought was characterized only in scattered areas of the Apalachicola River basin, but severe drought extended across the panhandle and in the Lake Okeechobee area. Most of the central and northern peninsula was considered to be in moderate drought or abnormally dry.

August 2007—Precipitation was near normal across most of the State in August, with 3 to 8 in. of rainfall. However, some areas along the east coast and panhandle received less than 25 percent of the average precipitation. By the end of the month, the northern part of the panhandle was considered to be in extreme drought and the southern part of the panhandle was in severe drought. Most of the peninsula varied from moderate drought to abnormally dry.

September 2007—Most of the State received near normal precipitation, except for parts of the central panhandle and scattered parts of the western part of peninsular Florida. Some areas of northeast, southeast, and southwest Florida received over 10 in. of rainfall during the month. In the Jacksonville area on September 17, a stalled cold front and developing low pressure off the Atlantic Coast brought 4 to 8 in. of precipitation to the area in a 12-hour period (National Oceanic and Atmospheric Administration, 2008h). By the end of September (end of the water year), the central part of the panhandle was in extreme drought, the remainder of the panhandle and parts of southwest and south-central Florida were in severe drought, and most of the western and central peninsula was abnormally dry. Because of the rainfall during the month, as well as during July and August, the east coast of Florida experienced near normal conditions and was not affected by drought.

Surface-Water Flows

Extreme hydrologic conditions persisted in Florida throughout the 2007 water year. Annual streamflow varied from well below normal to well above normal in south Florida and well below normal throughout the remainder of the State.

Table 1 provides data from 29 representative streamgages across the State of Florida showing water years 2006 (as a comparison) and 2007 annual mean streamflow and percent of mean for the period of record. Streamflow hydrographs for the representative streams in Florida are shown in figures 6 to 34. The upper graph shows the 2007 water year monthly mean streamflow compared to the maximum, minimum, and mean monthly mean streamflow for the period of record at that site. The lower graph shows the monthly mean streamflow for the 1998-2007 calendar years.

Table 1. Relation of period-of-record mean annual streamflow to mean streamflow for the 2006 and 2007 water years in Florida.

[Streamflow values listed in cubic feet per second]

Station number	Station name	Period of record	Mean annual streamflow	Mean streamflow for the 2006 water year	Percent of mean	Mean streamflow for the 2007 water year	Percent of mean
		Northwest Florida					
02320500	Suwannee River at Branford	1931-2007	6,880	4,840	70	2,110	31
02321500	Santa Fe River at Worthington Springs	1932-2007	414	256	62	3.80	<1
02324000	Steinhatchee River near Cross City	1950-2007	305	69.3	23	25.5	8
02329000	Ochlockonee River near Havana	1926-2007	1,040	433	42	289	28
02359000	Chipola River near Altha	1913-2007	1,480	965	65	682	46
02369000	Shoal River near Crestview	1938-2007	1,110	616	55	502	45
02375500	Escambia River near Century	1934-2007	6,200	3,250	52	2,980	48
		Northeast Florida					
02231000	St. Mary's River near Macclenny	1927-2007	647	400	62	150	23
02232400	St. John's River near Cocoa	1954-2007	1,020	1,050	103	356	35
02236000	St. John's River near De Land	1934-2007	3,050	3,000	98	1,320	43
02240000	Ocklawaha River near Conner	1930-2007	1,040	817	78	565	54
02256500	Fisheating Creek at Palmdale	1931-2007	255	209	82	38.5	15
02266300	Reedy Creek near Vineland	1966-2007	45.5	36.6	80	14.5	32
02270500	Arbuckle Creek near De Soto City	1939-2007	308	293	95	89.7	29
02312000	Withlacoochee River at Trilby	1928-2007	327	147	45	9.57	3
02312200	Little Withlacoochee River at Rerdell	1958-2007	78.1	52.5	67	0.71	<1
02313000	Withlacoochee River near Holder	1928-2007	987	593	60	159	16
		Southwest Florida					
02296750	Peace River at Arcadia	1932-2007	1,080	657	61	184	17
02298830	Myakka River near Sarasota	1937-2007	256	151	59	48.8	19
02301500	Alafia River at Lithia	1933-2007	337	268	80	121	36
02303000	Hillsborough River near Zephyrhills	1940-2007	242	121	50	80.8	33
02310000	Anclote River near Elfers	1947-2007	64	11.7	18	3.19	5
		South Florida					
02276877	St. Lucie Canal below S-308 near Port Mayaca	1931-2007	874	570	65	-25.0	-3
02292900	Caloosahatchee River at S-79 near Olga	1966-2007	1,630	2,850	175	149	9
02278000	West Palm Beach Canal at S-352 at Canal Point	1940-2007	171	152	89	106	62
02280500	Hillsboro Canal below S-351 near South Bay	1957-2007	22.2	71.8	323	133	599
02283500	North New River Canal below S-2 and S-351 near South Bay	1957-2007	118	271	230	126	107
02286400	Miami Canal at S-354 and S-3 at Lake Harbor	1958-2007	81.4	216	265	150	184
264514080550700	Industrial Canal at Clewiston	1976-2007	54.7	13.5	25	14.5	26

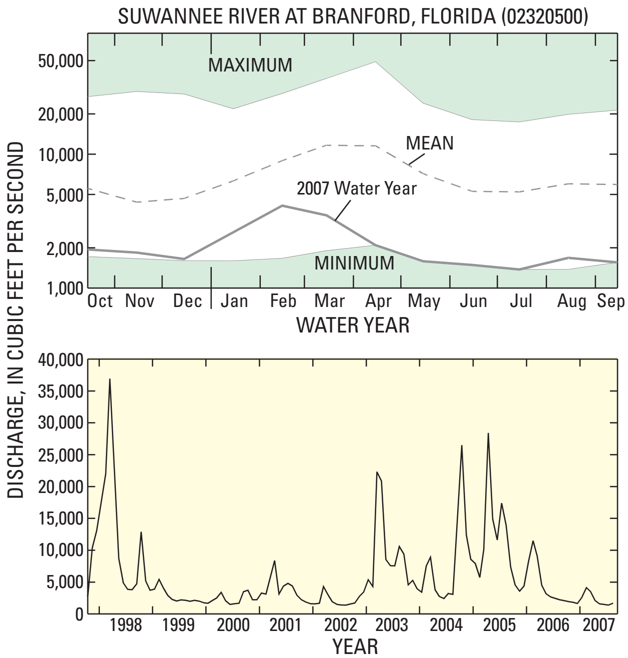


Figure 6. Suwannee River at Branford water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1931-2007, and the monthly mean discharge for the period October 1997 to September 2007.

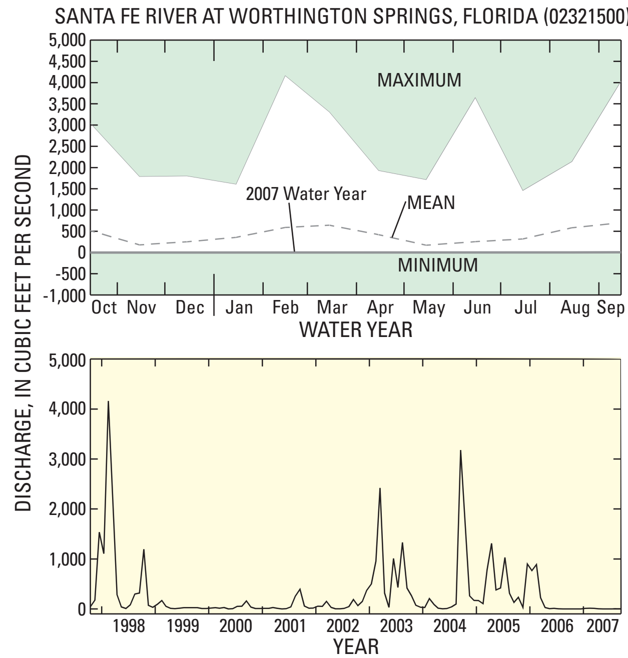


Figure 7. Santa Fe River at Worthington Springs water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1932-2007, and the monthly mean discharge for the period October 1997 to September 2007.

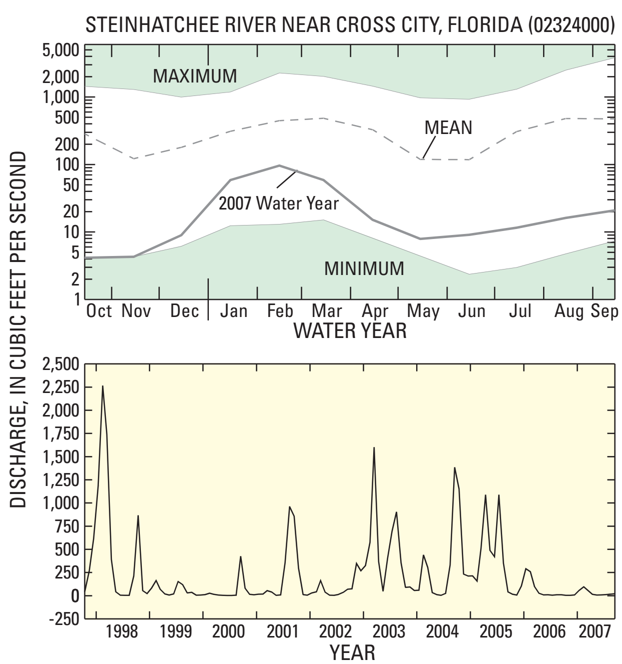


Figure 8. Steinhatchee River near Cross City water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1950-2007, and the monthly mean discharge for the period October 1997 to September 2007.

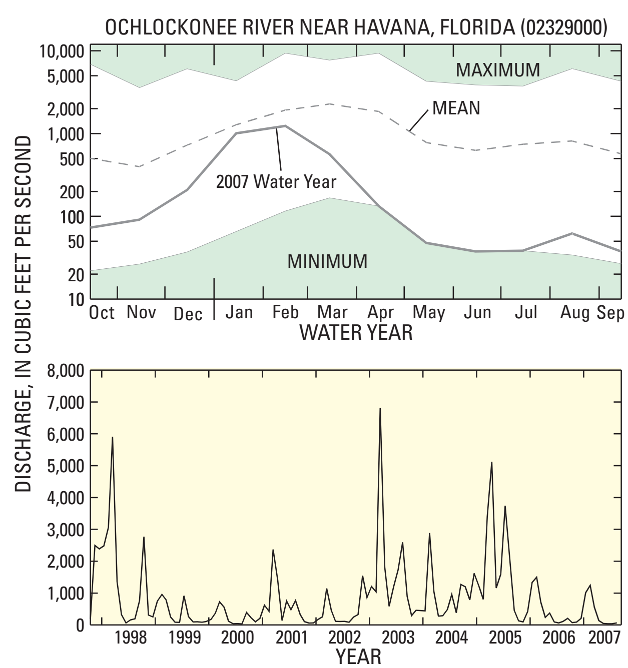


Figure 9. Ochlockonee River near Havana water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1926-2007, and the monthly mean discharge for the period October 1997 to September 2007.

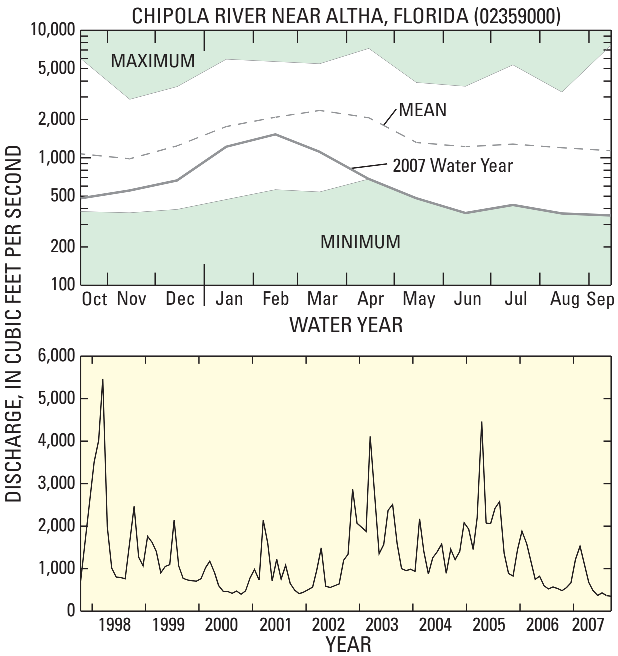


Figure 10. Chipola River near Altha water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1913-2007, and the monthly mean discharge for the period October 1997 to September 2007.

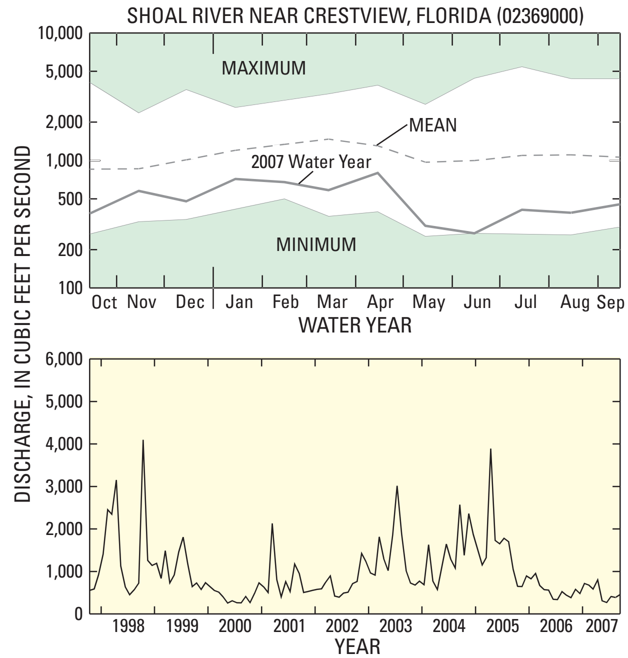


Figure 11. Shoal River near Crestview water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1938-2007, and the monthly mean discharge for the period October 1997 to September 2007.

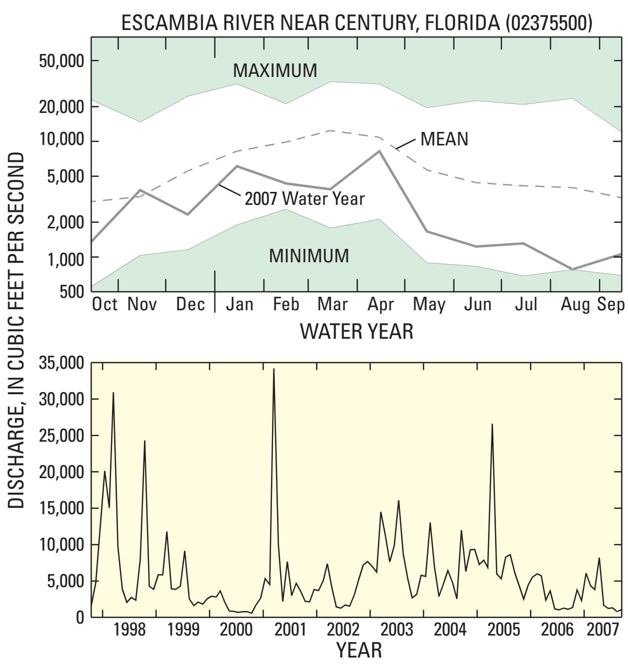


Figure 12. Escambia River near Century water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1934-2007, and the monthly mean discharge for the period October 1997 to September 2007.

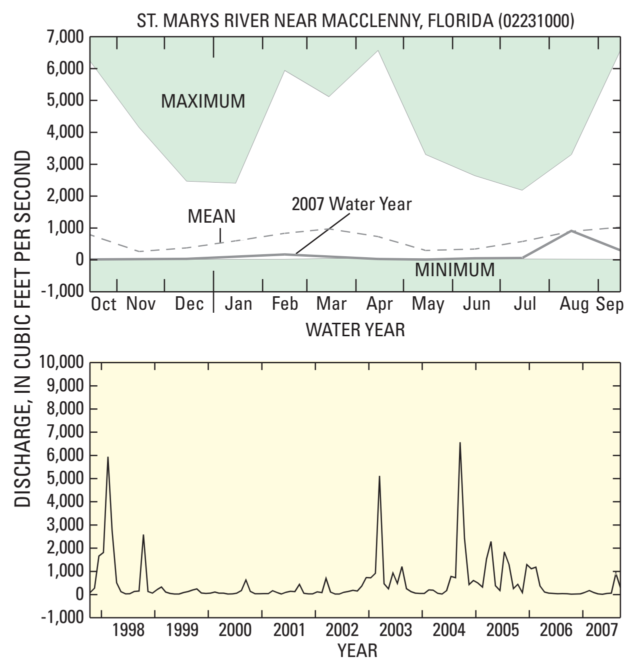


Figure 13. St. Mary's River near Macclenny water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1927-2007, and the monthly mean discharge for the period October 1997 to September 2007.

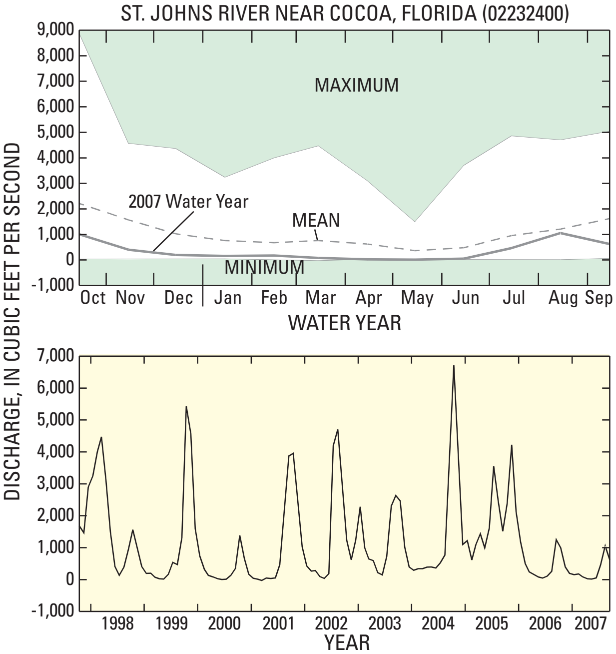


Figure 14. St. John's River near Cocoa water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1954-2007, and the monthly mean discharge for the period October 1997 to September 2007.

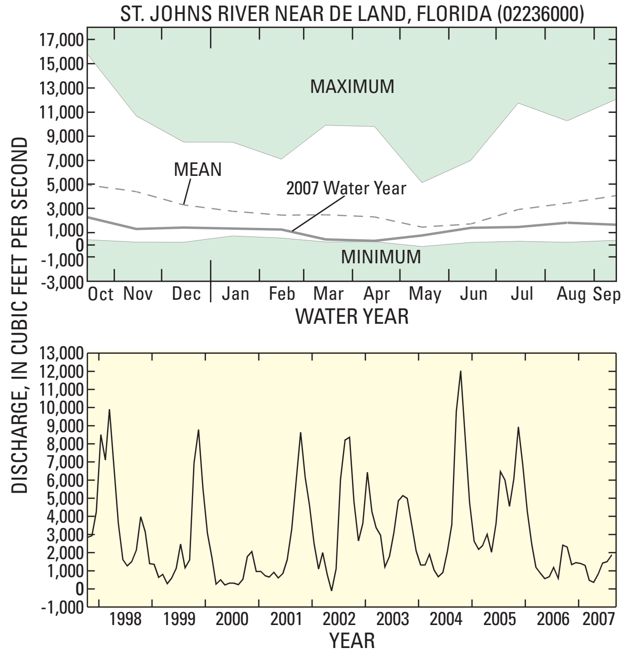


Figure 15. St. John's River near De Land water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1934-2007, and the monthly mean discharge for the period October 1997 to September 2007.

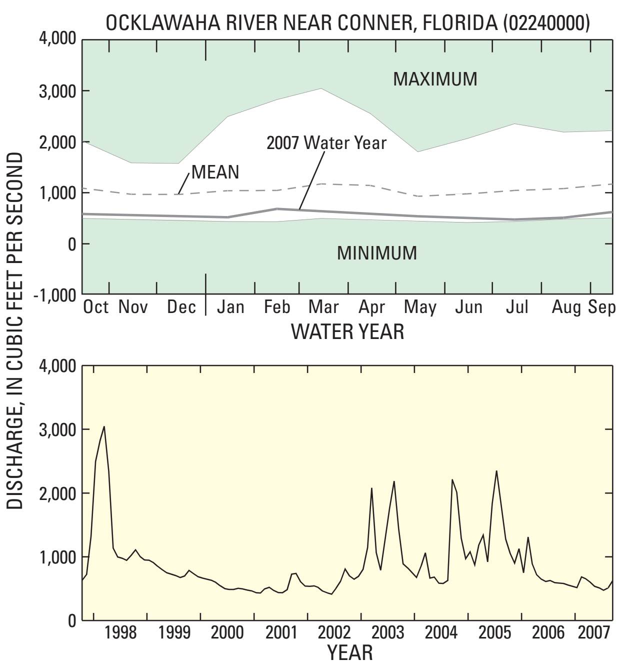


Figure 16. Ocklawaha River near Conner water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1930-2007, and the monthly mean discharge for the period October 1997 to September 2007.

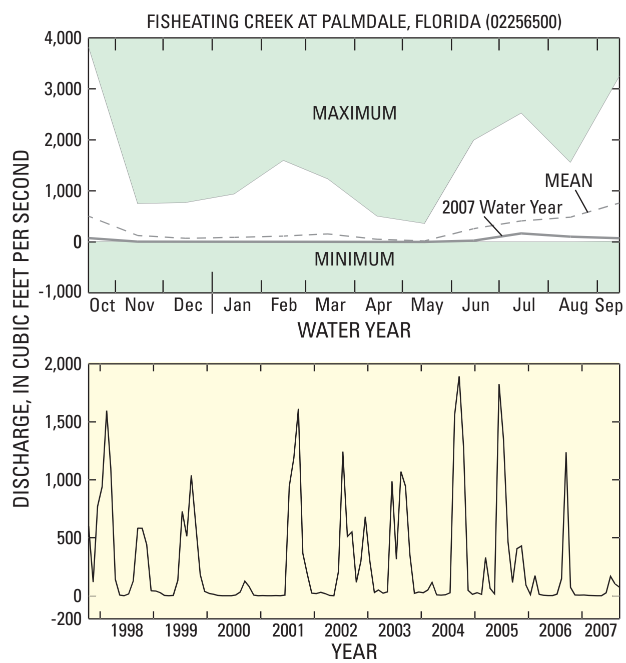


Figure 17. Fisheating Creek at Palmdale water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1931-2007, and the monthly mean discharge for the period October 1997 to September 2007.

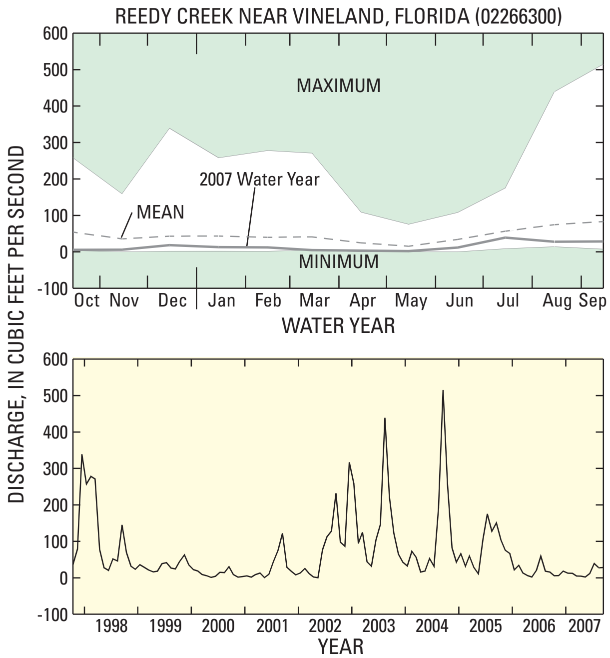


Figure 18. Reedy Creek near Vineland water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1966-2007, and the monthly mean discharge for the period October 1997 to September 2007.

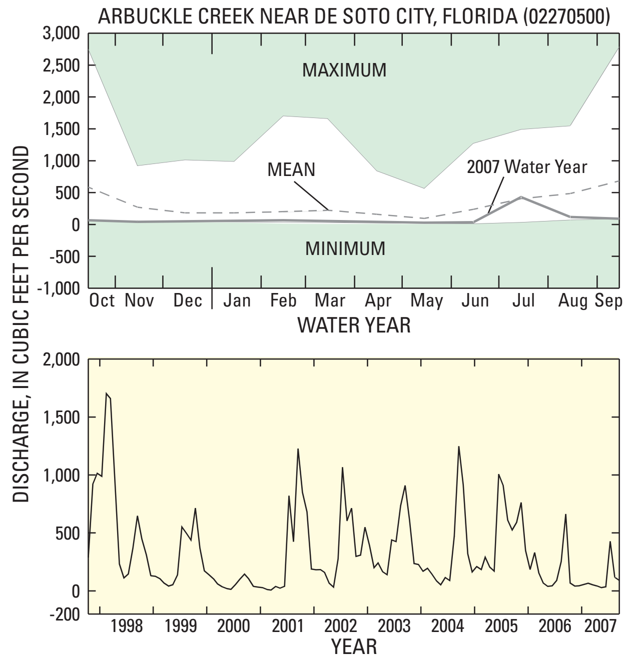


Figure 19. Arbuckle Creek near De Soto City water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1939-2007, and the monthly mean discharge for the period October 1997 to September 2007.

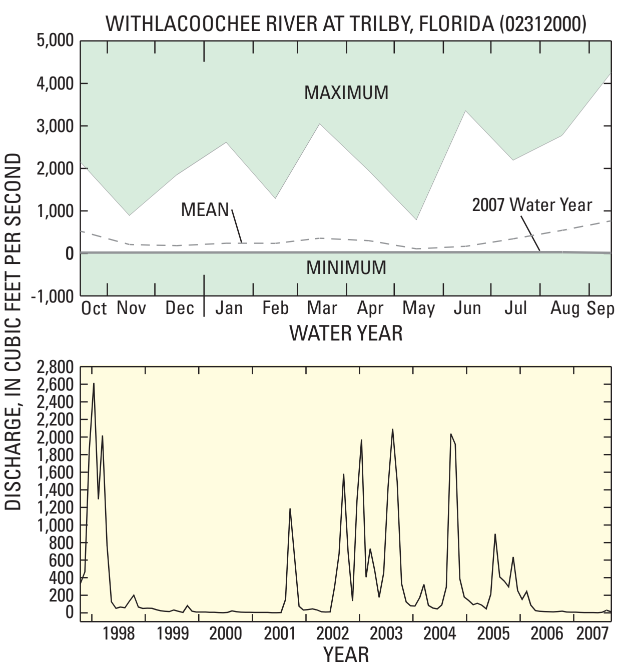


Figure 20. Withlacoochee River at Trilby water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1928-2007, and the monthly mean discharge for the period October 1997 to September 2007.

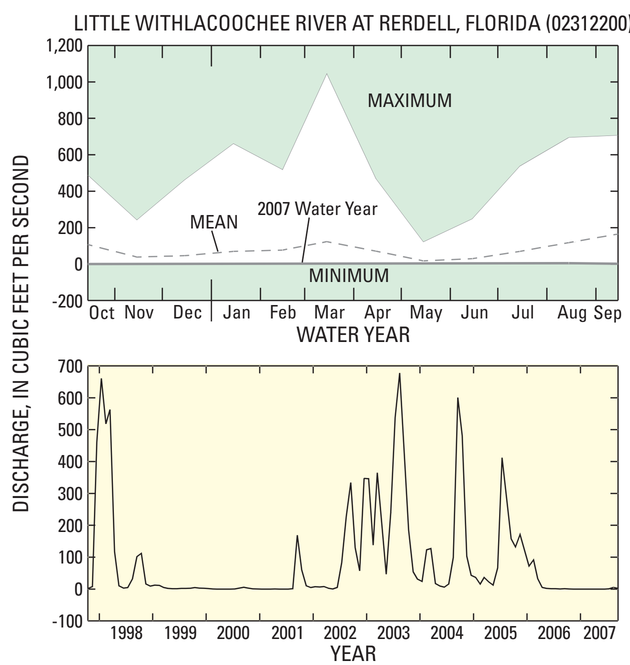


Figure 21. Little Withlacoochee River at Rerdell water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1958-2007, and the monthly mean discharge for the period October 1997 to September 2007.

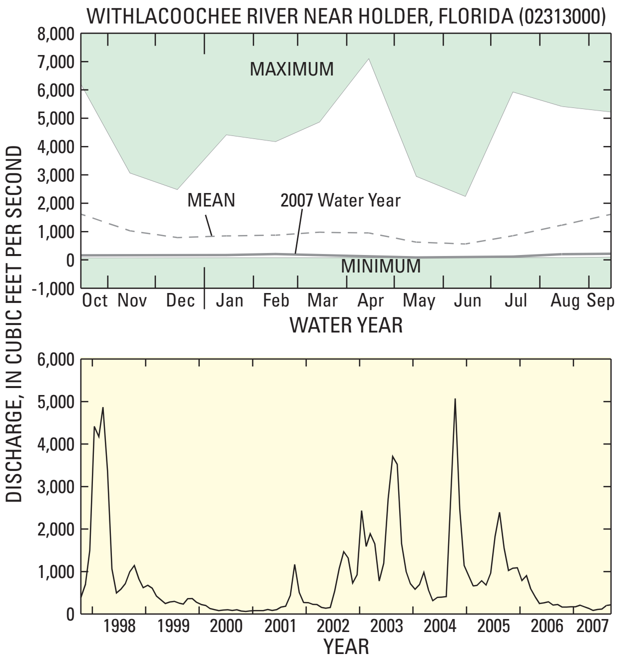


Figure 22. Withlacoochee River near Holder water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1928-2007, and the monthly mean discharge for the period October 1997 to September 2007.

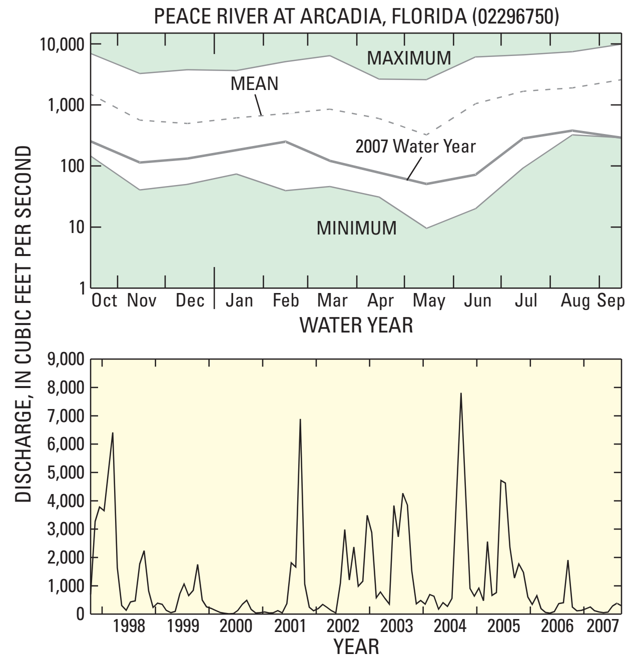


Figure 23. Peace River at Arcadia water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1932-2007, and the monthly mean discharge for the period October 1997 to September 2007.

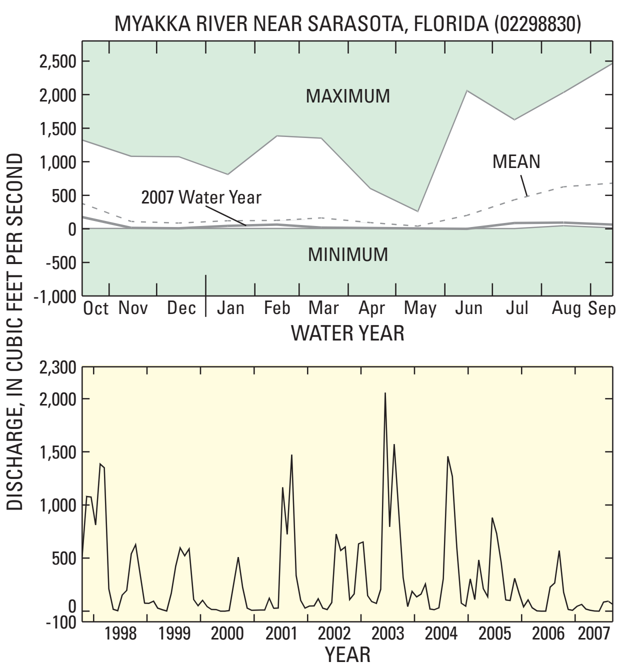


Figure 24. Myakka River near Sarasota water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1937-2007, and the monthly mean discharge for the period October 1997 to September 2007.

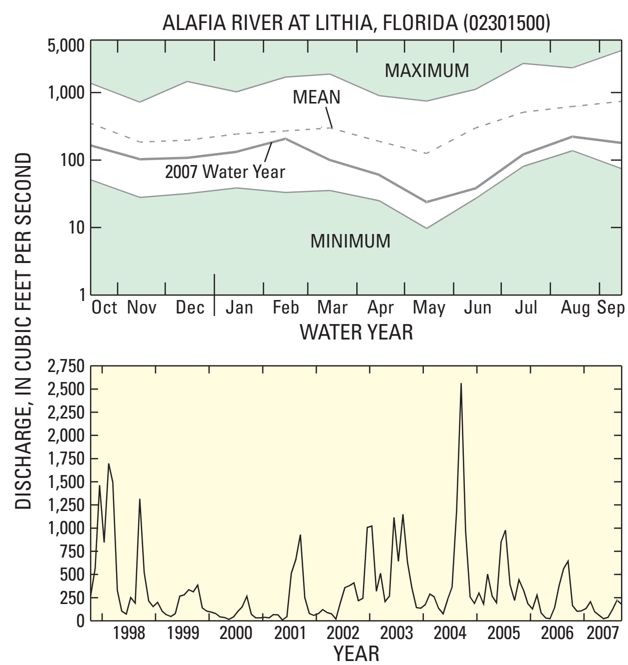


Figure 25. Alafia River at Lithia water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1933-2007, and the monthly mean discharge for the period October 1997 to September 2007.

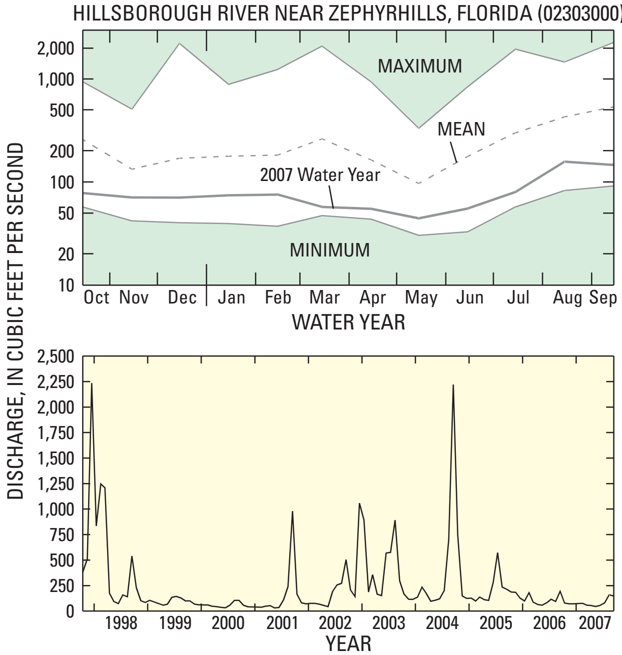


Figure 26. Hillsborough River near Zephyrhills water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1940-2007, and the monthly mean discharge for the period October 1997 to September 2007.

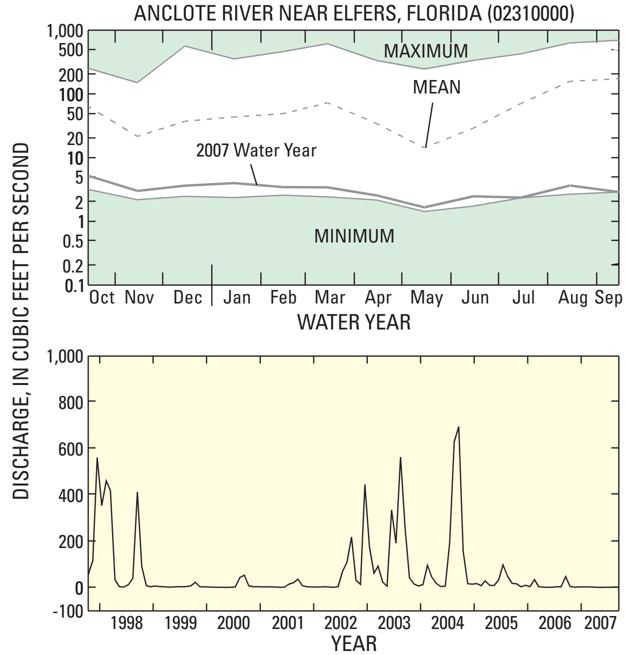


Figure 27. Anclote River near Elfers water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1947-2007, and the monthly mean discharge for the period October 1997 to September 2007.

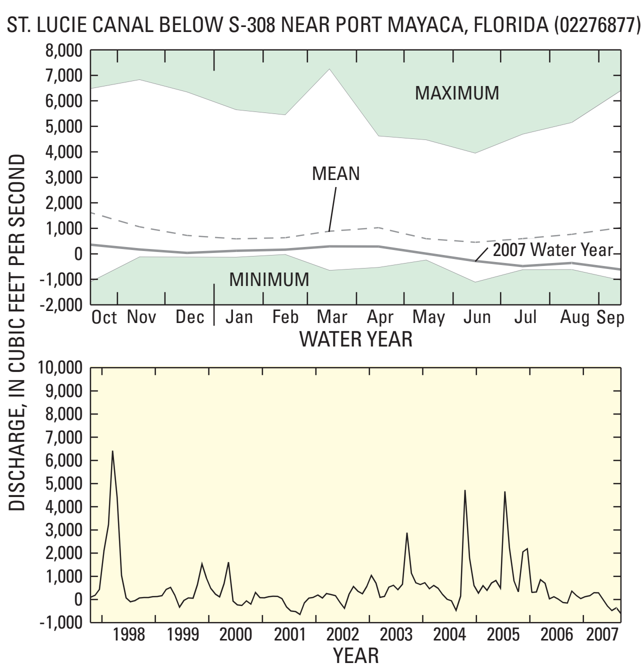


Figure 28. St. Lucie Canal below S-308 near Port Mayaca water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1931-2007, and the monthly mean discharge for the period October 1997 to September 2007.

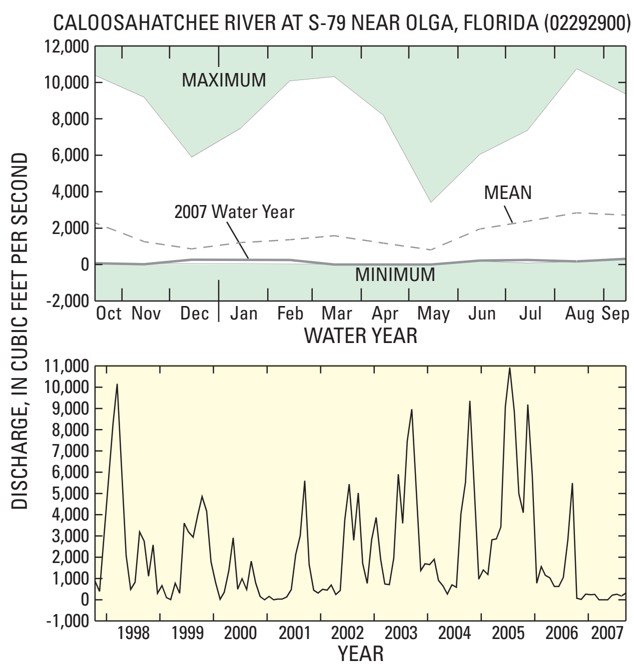


Figure 29. Caloosahatchee River at S-79 near Olga water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1966-2007, and the monthly mean discharge for the period October 1997 to September 2007.

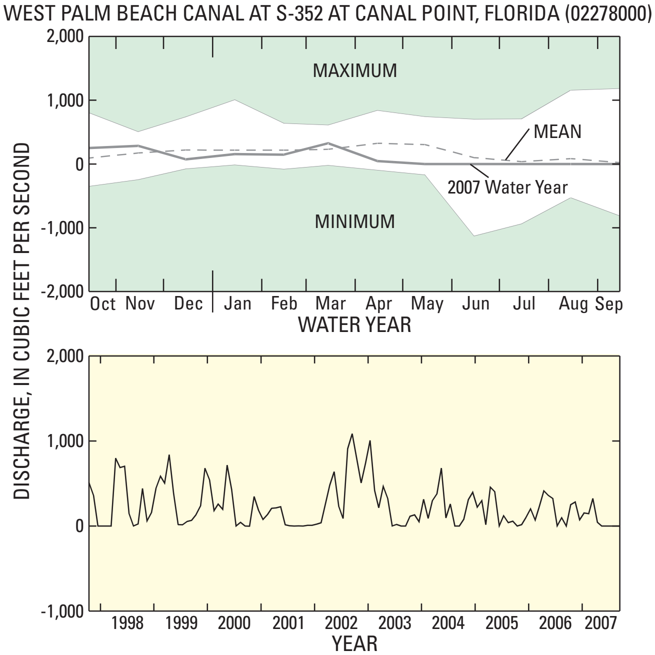


Figure 30. West Palm Beach Canal at S-352 at Canal Point water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1940-2007, and the monthly mean discharge for the period October 1997 to September 2007.

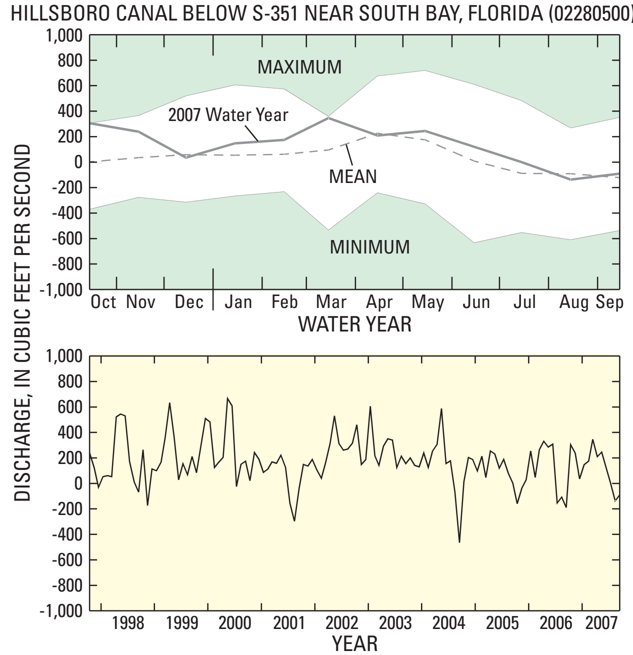


Figure 31. Hillsboro Canal below S-351 near South Bay water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1957-2007, and the monthly mean discharge for the period October 1997 to September 2007.

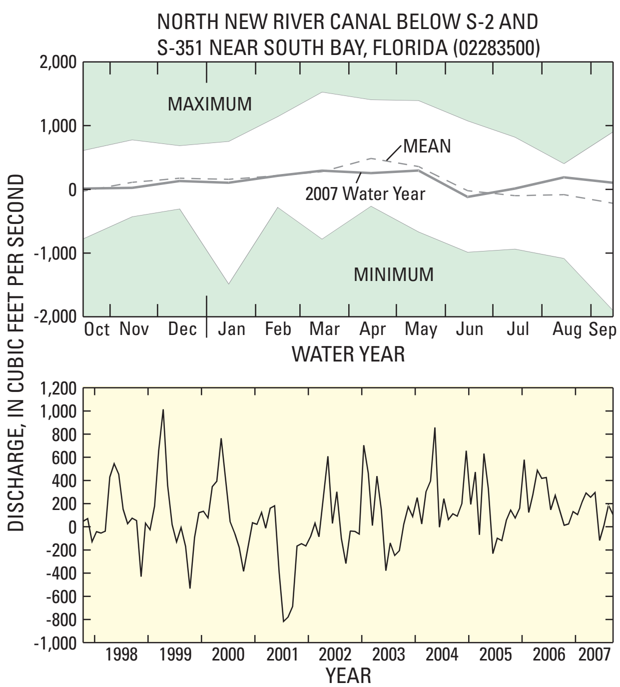


Figure 32. North New River Canal below S-2 and S-351 near South Bay water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1957-2007, and the monthly mean discharge for the period October 1997 to September 2007.

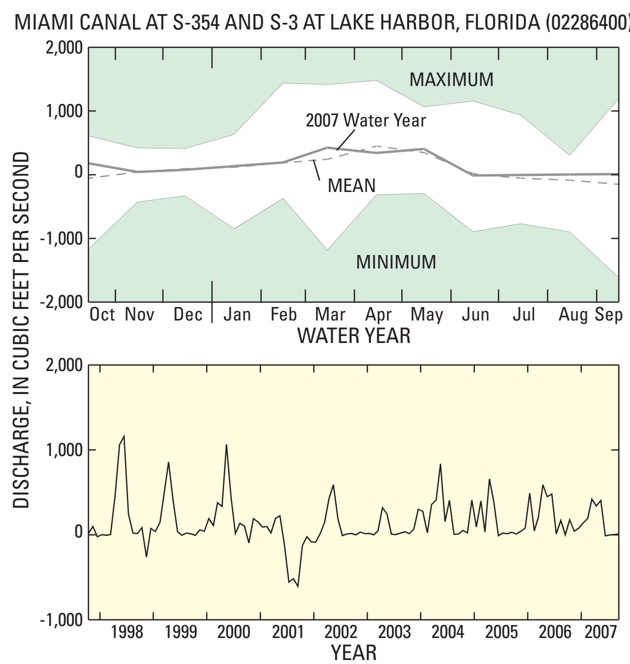


Figure 33. Miami Canal at S-354 and S-3 at Lake Harbor water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1958-2007, and the monthly mean discharge for the period October 1997 to September 2007.

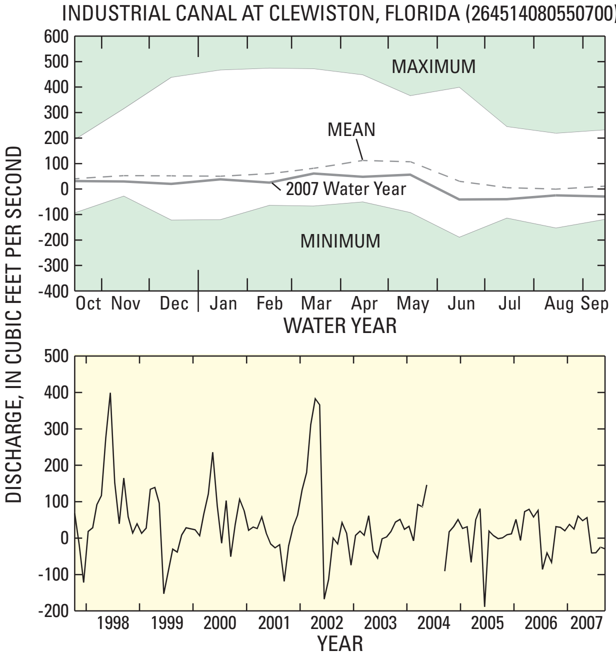


Figure 34. Industrial Canal at Clewiston water year 2007 monthly mean discharge compared to the maximum, minimum, and mean monthly mean discharge for the period 1976-2007, and the monthly mean discharge for the period October 1997 to September 2007.

Northwest Florida

Annual mean streamflow across northwest Florida averaged well below normal during the 2007 water year, and much below the already below normal conditions during the previous year (table 1). Some streamgage locations registered record-low annual streamflows for the year (table 2). For example, streamflow at the Suwannee River at White Springs (02315500) was 103 ft^3/s for the year, about 6 percent of the 1906-08 and 1927-2007 period-of-record average. The previous record of 144 ft^3/s was set in 2000 during the 1998-2002 statewide drought. Streamflow at Steinhatchee River near Cross City (02324000) was 25.5 ft^3/s, or about 8 percent of the 1950-2007 period-of-record average. The previous record of 35.4 ft^3/s was set in 1956 during the 1949-57 drought. Figures 6 to 12 show the seven representative streams in northwest Florida.

Northeast Florida

Annual mean streamflow across northeast Florida averaged well below normal for the 2007 water year (table 2). Several streamgage locations reached record-low streamflows surpassing those reached during the 1998-2002 drought (table 2). For example, Withlacoochee River near Trilby (02312000; period-of-record from 1928-2007) registered an annual streamflow of 9.57 ft^3/s in 2007, only 3 percent of the period-of-record average of 327 ft^3/s. The previous record of 15.8 ft^3/s was set in 2000. In another example, North Fork Black Creek near Middleburg (02246000; period-of-record 1931-2007) recorded an annual streamflow of 30.1 ft^3/s in 2007 (16 percent of the period-of-record average of 188 ft^3/s), surpassing the previous record of 50.4 ft^3/s set in 1955 during the statewide 1949-57 drought. Figures 13 to 22 show the 10 representative streams in northeast Florida.

Southwest Florida

Annual mean streamflow across southwest Florida was well below normal for the 2007 water year (table 1), with many streamgages reaching record-low streamflows for the year (table 2). For example, Peace River at Arcadia (02296750) recorded an annual streamflow of 184 ft^3/s in 2007, which is 17 percent of the 1932-2007 period-of-record average of 1,080 ft^3/s. The previous record was 298 ft^3/s set during the 1981 drought. In a second example, Myakka River near Sarasota (02298830) reached an annual streamflow of 48.8 ft^3/s for the year, or about 19 percent of the 1937-2007 period-of-record average. The previous record was 73.1 ft^3/s in 1956 during the 1949-57 drought. The Alafia River at Lithia (02301500) registered 121 ft^3/s annual streamflow, or about 36 percent of the 1933-2007 period-of-record average of 337 ft^3/s, which tied the previous record set in 2000, during the 1998-2002 drought. Figures 23 to 27 show the five representative streams in southwest Florida.

The Weeki Wachee River near Brooksville (02310525) is used to determine spring flow from Weeki Wachee Springs, a first-order magnitude spring located in western Hernando County. Spring flow is determined by comparing the measured discharge to the elevation of a nearby artesian well. The annual mean discharge for the 2007 water year was 135 ft^3/s, which was 85 percent of the period-of-record (1994-2007) mean flow of 159 ft^3/s. Monthly mean streamflow decreased throughout the 2007 water year, but stayed well above the minimum.

South Florida

Annual mean streamflow in south Florida varied from well above normal to well below normal for the year (table 1). However, the Kissimmee River system above and the drainage system below Lake Okeechobee in south Florida are almost completely controlled by locks and dams, thus making the computation of recurrence intervals and related statistical information difficult to interpret. Streamgages at the St. Lucie Canal below S-308 and the Caloosahatchee River at S-79 monitor the release of water from Lake Okeechobee to the Atlantic Ocean and the Gulf of Mexico, respectively. The streamgages at the West Palm Beach Canal at S-352, Hillsboro Canal below S-351, North New River Canal below S-2 and S-351, Miami Canal at S-354 and S-3, and Industrial Canal at Clewiston monitor the release of water from Lake Okeechobee into the Everglades Agricultural Area. Figures 28 to 34 show the seven representative streams in south Florida.

Table 2. Stations reaching record-low annual mean streamflow during the 2007 water year in Florida and their previous record annual mean.

[Streamflow values listed in cubic feet per second]

Station number	Station name	Period of record	2007 annual mean streamflow	Previous record	Year of occurrence
		Northwest Florida			
02315500	Suwannee River at White Springs	1906-1908; 1927-2007	103	144	2000
02321000	New River near Lake Butler	1950-1971; 1990-2007	0.98	9.66	1962
02321500	Santa Fe River at Worthington Springs	1931-2007	3.80	33.2	2000
02324000	Steinhatchee River near Cross City	1950-2007	25.5	35.4	1956
02324400	Fenholloway River near Foley	1955-2007	1.53	3.90	2002
02368500	Shoal River near Mossy Head	1950-1978; 2000-2007	108	113	2002
		Northeast Florida			
02245500	South Fork Black Creek near Penney Farms	1939-2007	23.3	52.0	1990
02246000	North Fork Black Creek near Middleburg	1931-2007	30.1	50.4	1955
02253000	Main Canal at Vero Beach	1949-2007	38.5	41.8	1950
02266300	Reedy Creek near Vineland	1966-2007	14.5	15.9	1971
02266500	Reedy Creek near Loughman	1939-1959; 1968-2007	2.66	10.6	2000
02310947	Withlacoochee River near Cumpressco	1967-2007	4.81	8.60	1999
02312000	Withlacoochee River near Trilby	1928-2007	9.57	15.8	2000
02312200	Little Withlacoochee River at Rerdell	1958-2007	0.71	1.79	2000
02312500	Withlacoochee River at Croom	1939-2007	10.2	24.9	2000
02312700	Outlet River at Panacoochee Retreats	1962-2007	33.3	38.1	2001
		Southwest Florida			
02294650	Peace River at Bartow	1939-2007	18.5	35.2	1985
02294898	Peace River at Fort Meade	1967-1969; 1974-2007	21.5	43.0	1985
02295420	Payne Creek near Bowling Green	1963-1968; 1979-2007	34.4	36.4	2000
02295637	Peace River at Zolfo Springs	1933-2007	98.6	179	1981
02296500	Charlie Creek near Gardner	1950-2007	33.1	64.5	1981
02296750	Peace River at Arcadia	1931-2007	184	298	1981
02297155	Horse Creek near Myakka Head	1977-2007	3.70	4.56	2000
02297310	Horse Creek near Arcadia	1950-2007	28.1	38.4	1956
02298123	Prairie Creek near Fort Ogden	1963-1968; 1977-2007	67.8	80.6	2000
02298608	Myakka River at Myakka City	1963-1966; 1977-2007	34.2	49.1	1980
02298830	Myakka River near Sarasota	1936-2007	48.8	73.1	1956
02300700	Bullfrog Creek near Wimauma	1956-1958; 1977-2007	17.5	23.8	1985
02301500	Alafia River at Lithia	1932-2007	121	121	2000
02303420	Cypress Creek at Worthington Gardens	1974-2007	1.78	5.75	1990
02306000	Sulphur Springs at Sulphur Springs	1959-2007	15.4	19.4	2001
02310000	Anclote River near Elfers	1946-2007	3.19	8.86	1981
02310300	Pithlachascotee River near New Port Richey	1963-2007	0.423	3.20	2000

Lake Elevations

Lake-water elevations in Florida averaged below normal throughout the year, even setting period-of-record low elevations in south and southwest Florida lakes. The lowest levels for most of the lakes analyzed for this report occurred in July. Figures 35 to 38 show representative lakes in Florida. Water levels presented in this section are in elevation above the National Geodetic Vertical Datum (NGVD 29).

Northwest Florida

Water-level elevations for Lake Talquin are controlled by the C.H. Corn Hydroelectric Dam located on the Ochlockonee River. The dam also regulates the flow into the Ochlockonee River near Bloxham. Levels were relatively stable from October through April and then began declining until the minimum for 2007 was reached on July 30-31. After this date, water levels were on a steady rise through the end of the year (fig. 35). The maximum water level at Lake Talquin near Bloxham (02329900) for the water year occurred on February 1 (68.88 ft). The minimum water level occurred on July 30-31 (66.99 ft). No new extremes were reached during the year.

Northeast Florida

Lake Minnehaha at Clermont (02236840) is a long-term station that best represents lake levels in northeast Florida. Water levels were on a general downward trend from October to June and remained relatively stable from June to September (fig. 36). The maximum water level recorded during the year occurred on October 1 (96.17 ft). The minimum water level recorded occurred on July 19 (93.79 ft). No new extremes were reached during the year.

Southwest Florida

Moon Lake in Pasco County (02310290) is a long-term station used to monitor variation in lake levels in southwest Florida. Lake elevations are determined from instantaneous observer readings. Monthly mean elevations for the 2007 water year were below the mean, and steadily approached the minimum until August and September when new monthly minimum elevations were registered at 34.60 and 34.42 ft, respectively (fig. 37).

South Florida

Lake levels in south Florida are most represented by the 730-mi^2 Lake Okeechobee (02276400), which is managed by the U.S. Army Corps of Engineers. Lake levels have been monitored since 1912 and reached record-low levels during the 2007 water year. Lake Okeechobee water levels were on a steady downward trend from October through the beginning of July when the lowest elevation was reached for the year and period of record. A steady upward trend continued until the end of the year (fig. 38). The maximum elevation during the year occurred on October 1 (13.37 ft). The lowest elevation occurred on July 2 (8.82 ft). The previous low was recorded during the 1998-2002 drought on May 23, 2001 (8.97 ft). (Additional information about this historic drought is available in another USGS publication by Verdi and others (2006) at *http:// http://pubs.usgs.gov/circ/2006/1295/pdf/circ1295.pdf.*)

Ground-Water Levels

Ground-water levels across the State varied throughout the year from well below normal to above normal. Figures 39 to 60 are hydrographs from 22 representative wells throughout Florida showing historical water-level summary and observed daily maximum water levels (top graph) during the 2007 water year and historical daily maximum water levels, annual means of daily maximum water levels, and results of Seasonal Kendall Trend Test (bottom graph). Water levels presented in this section are in elevation above NGVD 29.

The nonparametric Mann-Kendall test (Kendall, 1938) is commonly used for hydrologic data analysis (Hirsch and Slack, 1984; Helsel and Hirsch, 1992). However, a different or modified version of the standard test is required to evaluate water-elevation data in which there is a significant seasonal component. Hirsch and others (1982) developed such a test, referred to as the Seasonal Kendall Trend Test (SKTT).

The initial step in the SKTT requires that the Kendall score be computed separately for each month of the period of record. For this report, a period of 25 years, through water year 2007, was selected. The separate monthly scores are then summed to obtain the test statistic. The variance of the test statistic is obtained by summing the variances of the Kendall score statistic for each month. In this test, the null hypothesis is that the time series is of the form $zt = \mu_m + e_t$ where e_t is white noise error and μ_m represents the mean for period m.

An advantage to using the SKTT is that it is a rank-based procedure especially suitable for non-normally distributed data, censored data, data containing outliers, and non-linear trends. The null hypothesis of randomness H_0 states that the data (x_1, .., x_n) are a sample of n independent and identically distributed random variables. Although the trend test statistic Z is not a direct quantification of trend magnitude, it can be used as a measure of trend magnitude, or of its significance.

Northwest Florida

Ground-water data in northwest Florida are collected from two wells, as part of the Climate Response Network (*http://groundwaterwatch.usgs.gov/*), equipped with data recorders that measure 60-minute interval water elevations. The daily maximum water-level elevations presented in the online annual data reports are derived from these measurements.

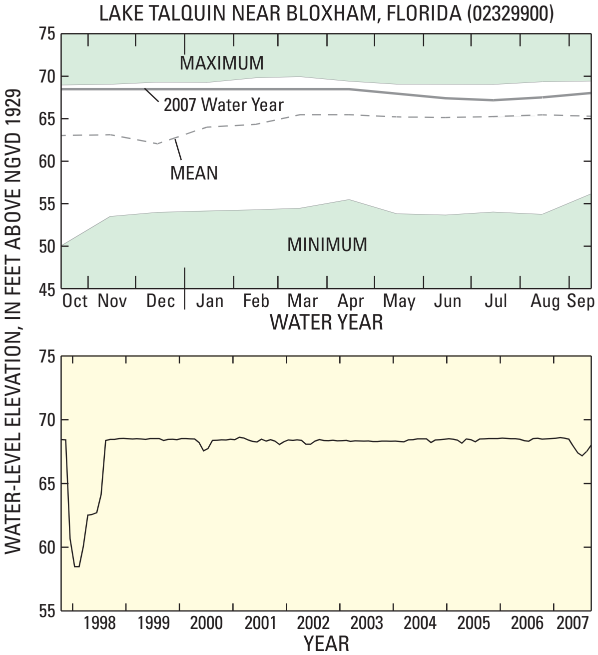


Figure 35. Lake Talquin near Bloxham water year 2007 monthly mean elevation compared to the maximum, minimum, and mean monthly mean elevation for the period 1930-2007, and the monthly mean elevation for the period October 1997 to September 2007.

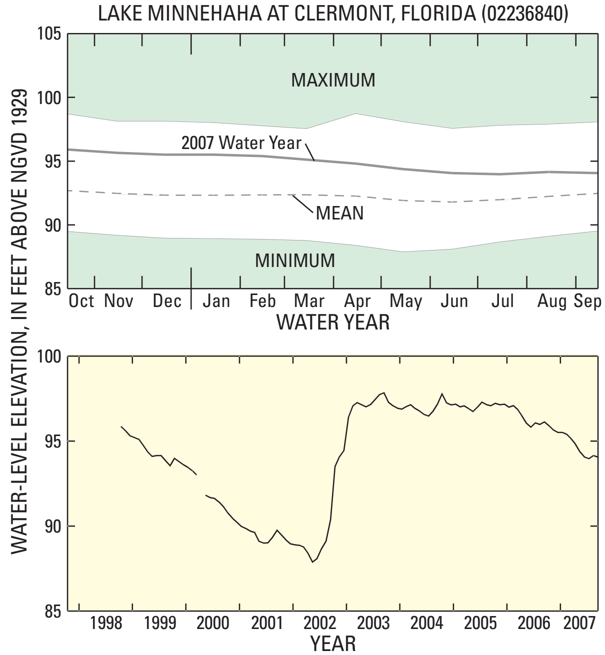


Figure 36. Lake Minnehaha at Clermont water year 2007 monthly mean elevation compared to the maximum, minimum, and mean monthly mean elevation for the period 1947-2007, and the monthly mean elevation for the period October 1997 to September 2007.

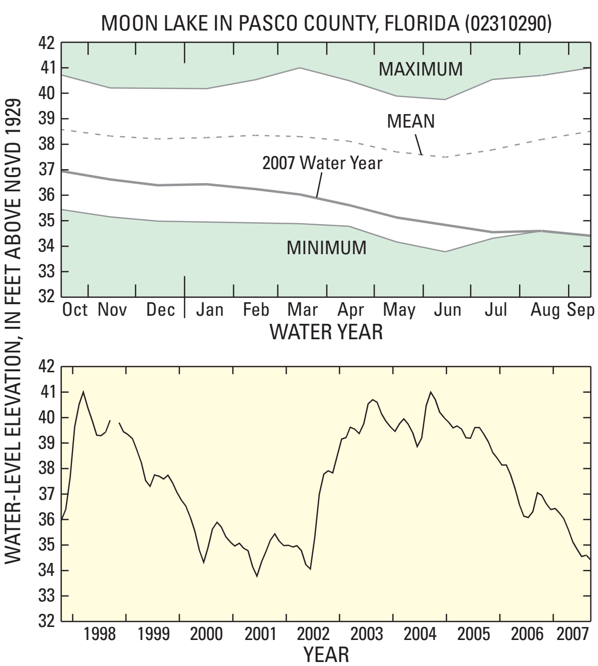


Figure 37. Moon Lake in Pasco County water year 2007 monthly mean elevation compared to the maximum, minimum, and mean monthly mean elevation for the period 1965-2007, and the monthly mean elevation for the period October 1997 to September 2007.

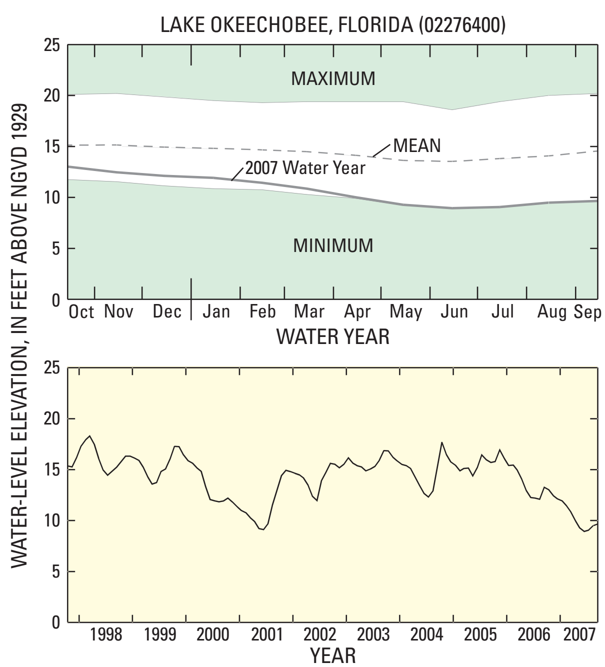


Figure 38. Lake Okeechobee water year 2007 monthly mean elevation compared to the maximum, minimum, and mean monthly mean elevation for the period 1912-2007, and the monthly mean elevation for the period October 1997 to September 2007.

EXPLANATION FOR PLOTS OF SUMMARY STATISTICS AND 2007 WATER YEAR DAILY MAXIMUM WATER LEVELS

Daily maximum water level, recorded during 2007 water year

Monthly mean curve of daily maximum water levels collected, during the month displayed, for the October 1982 to September 2007 period

One standard deviation (above or below) the monthly mean of daily maximum water levels collected, during the month displayed, for the October 1982 to September 2007 period

EXPLANATION FOR PLOTS OF DAILY MAXIMUM WATER LEVELS, ANNUAL MEANS OF DAILY MAXIMUM WATER LEVELS, AND RESULTS OF THE SEASONAL KENDALL TREND TEST

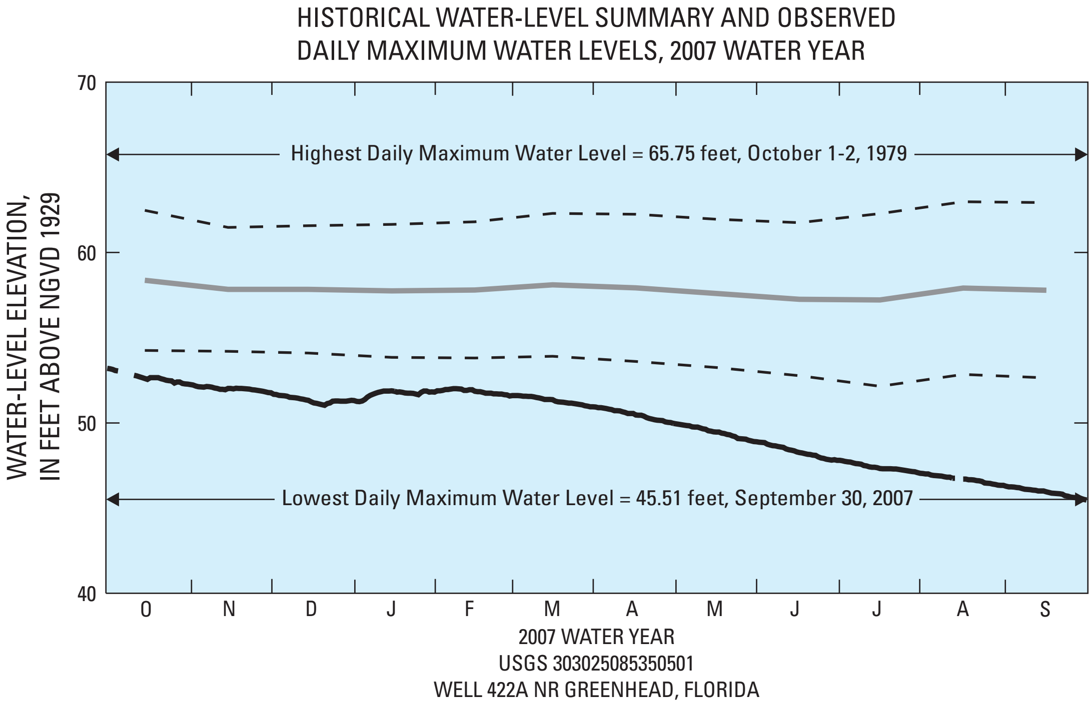
Annual mean of daily maximum water levels collected, during the year displayed, for the October 1982 to September 2007 period, wherein no one month is missing more than 15 days of water level record

Annual mean of daily maximum water levels collected, during the year displayed, for the October 1982 to September 2007 period, wherein one or more months is missing 15 or more days of water level record

Daily maximum water level. Breaks in line represent missing measurements, or measurements that failed quality assurance review

SKSE — The Seasonal Kendall Slope Estimator (SKSE) represents the median slope of the set of slopes obtained by computing the slope, in feet per year, of all unique pairs of monthly mean daily maximum water levels computed for the site shown

p-value — The p-value represents a measure of the significance level of the Seasonal Kendall Trend Test statistic, computed concurrently with the SKSE, used to determine if there is a trend in the data examined. A p-value less than 0.05 indicates a statistically significant trend



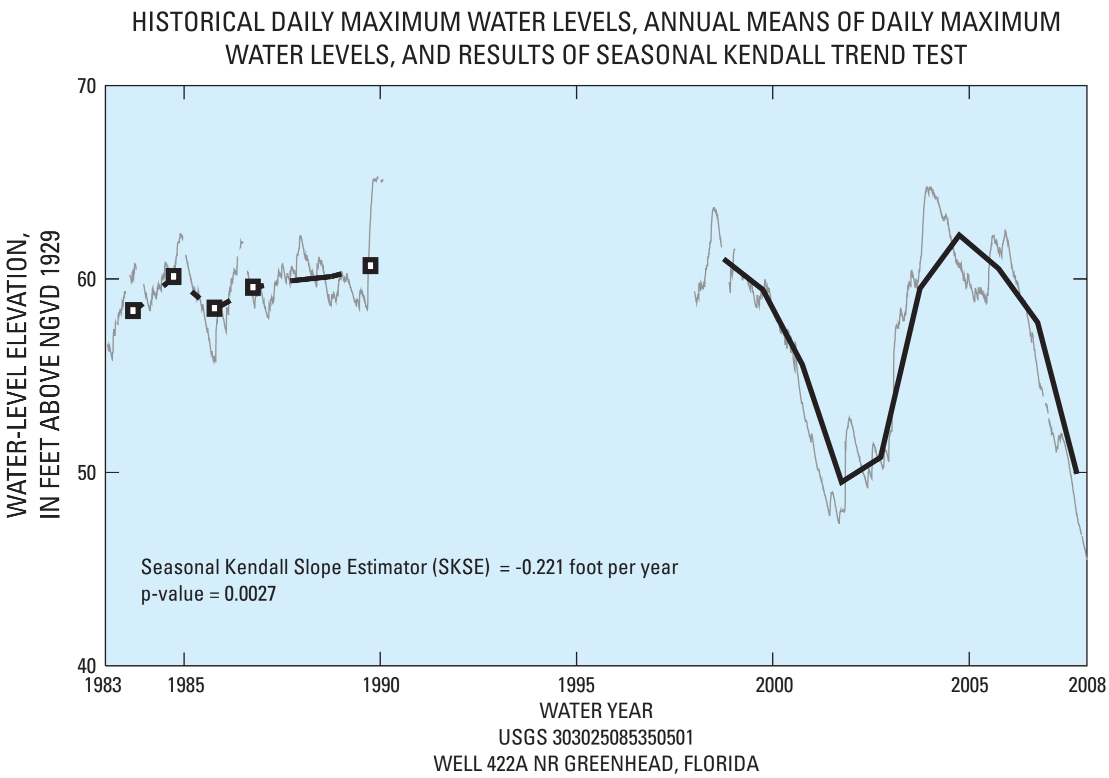
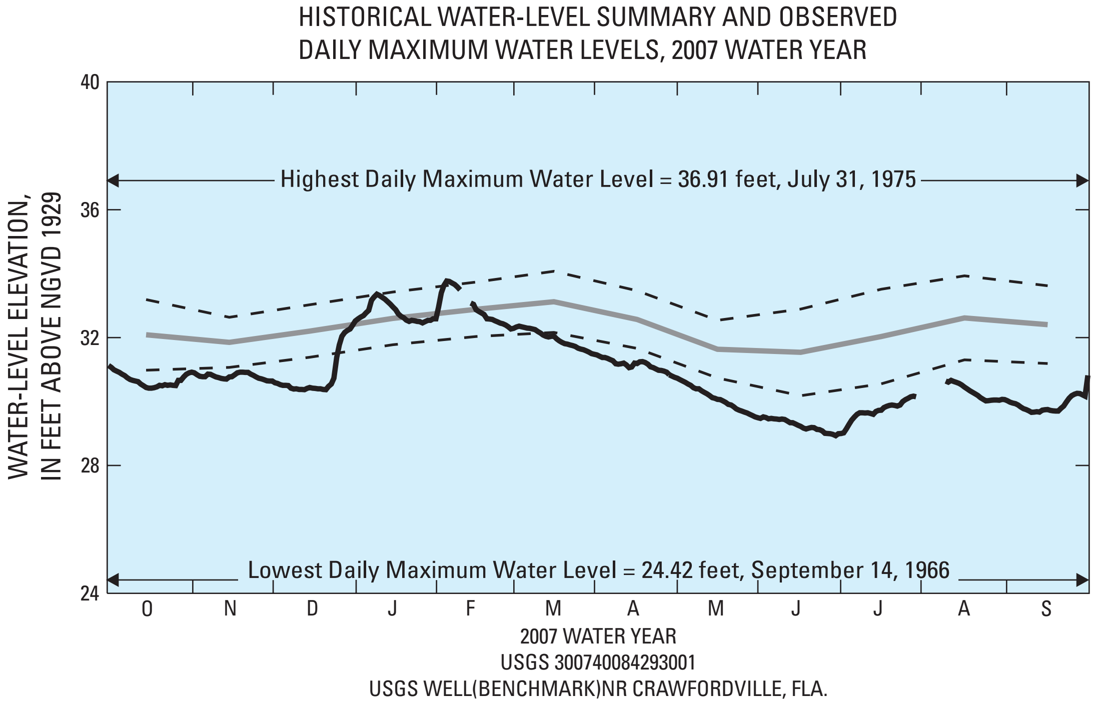


Figure 39. USGS Observation Well 422A near Greenhead water year 2007 daily maximum water level compared to historical water levels for the period October 1982 to September 2007, and the Seasonal Kendall Trend Test for the period October 1982 to September 2007.



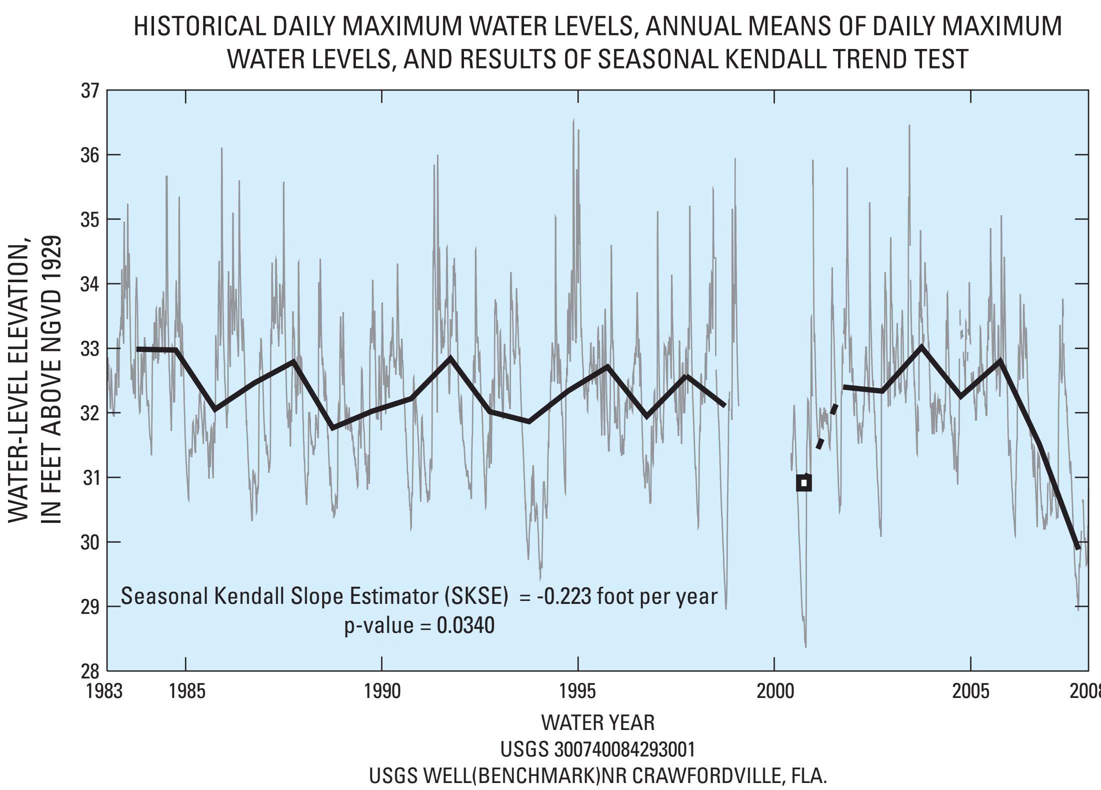
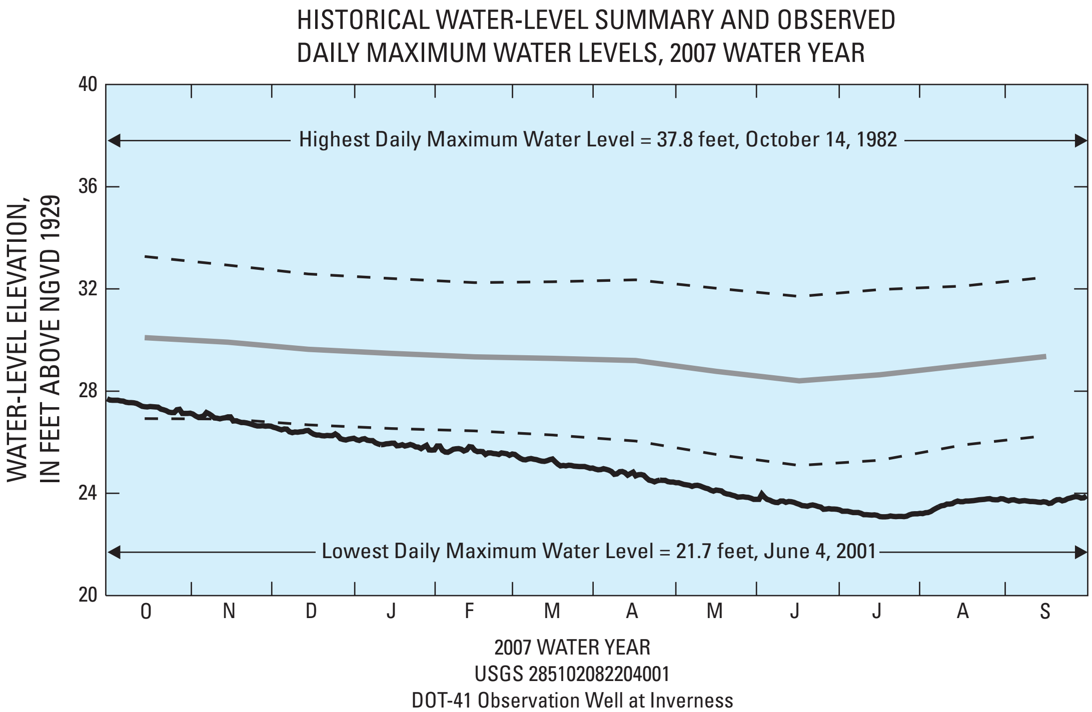


Figure 40. USGS Benchmark Well near Crawfordville water year 2007 daily maximum water level compared to historical water levels for the period October 1982 to September 2007, and the Seasonal Kendall Trend Test for the period October 1982 to September 2007.



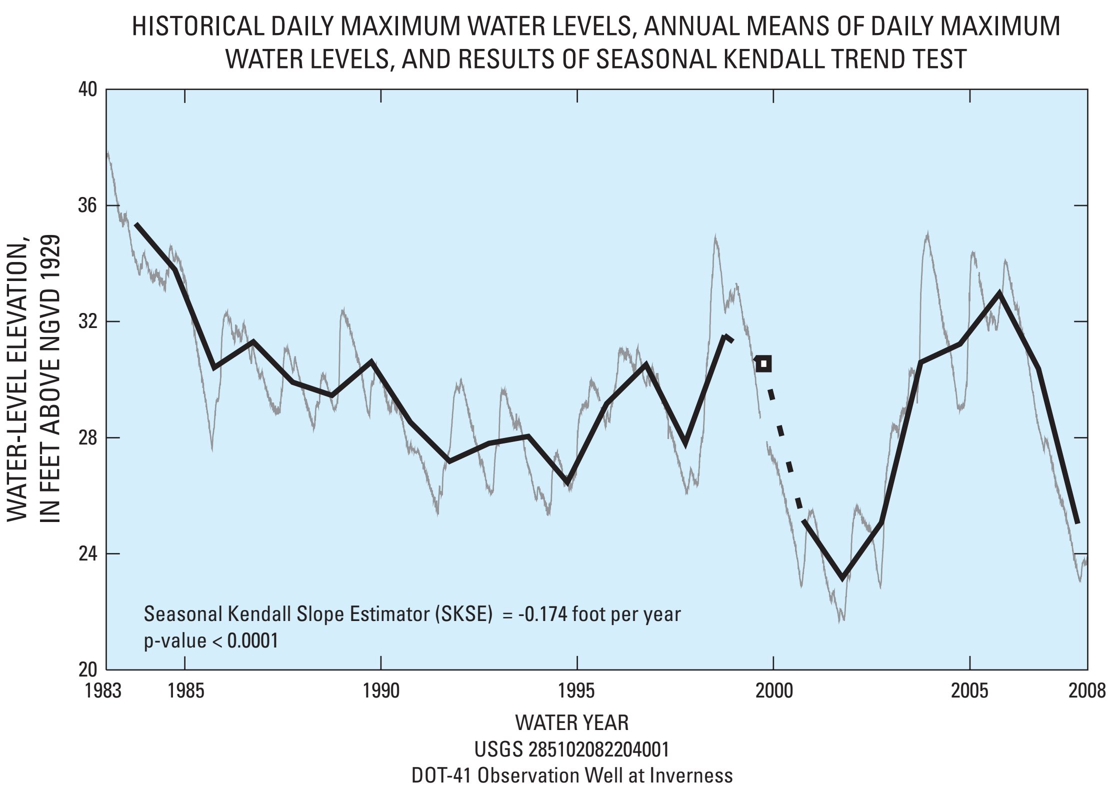
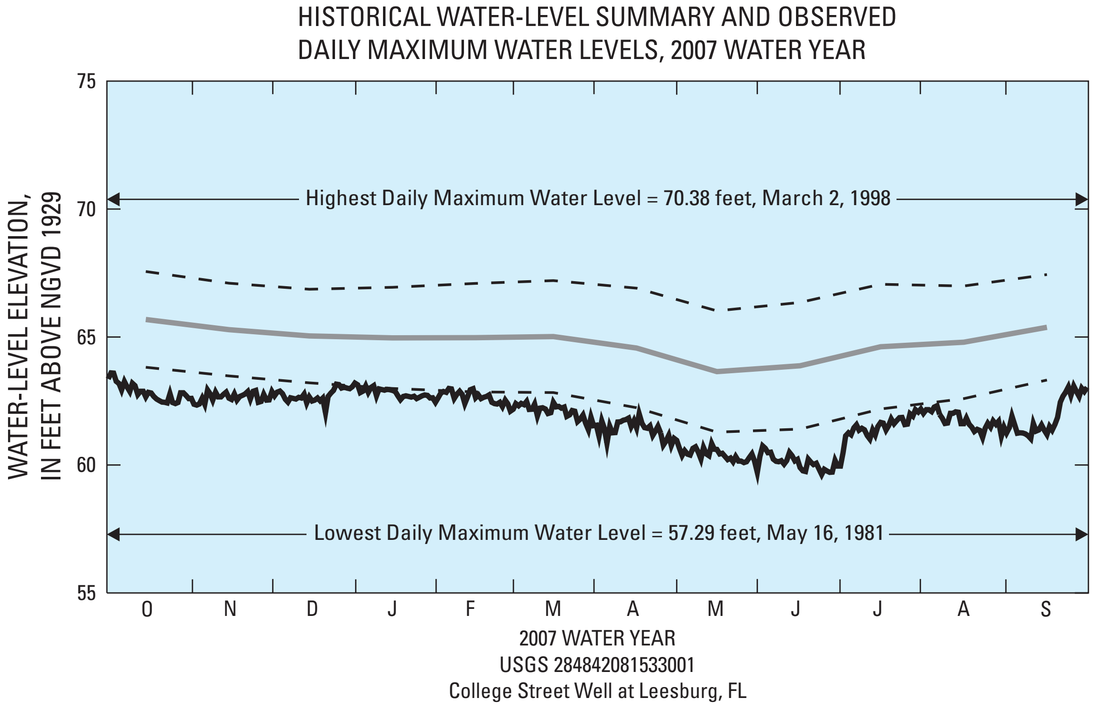


Figure 41. DOT-41 Observation Well at Inverness water year 2007 daily maximum water level compared to historical water levels for the period October 1982 to September 2007, and the Seasonal Kendall Trend Test for the period October 1982 to September 2007.



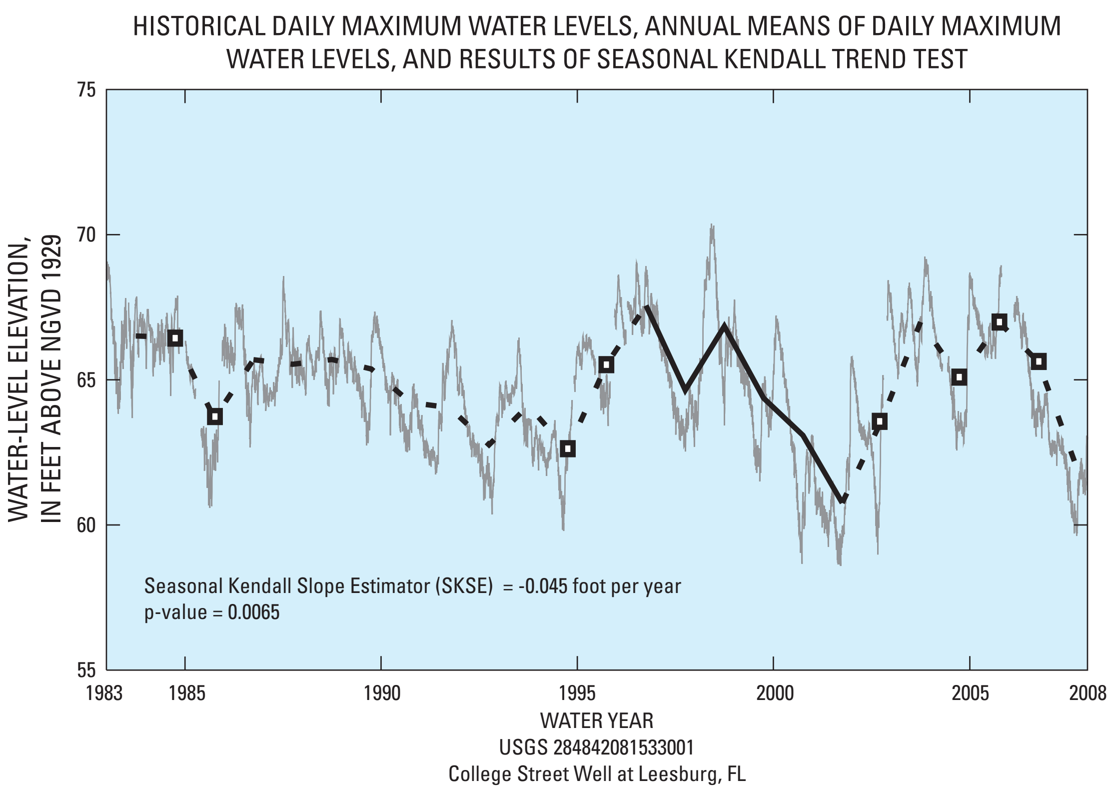
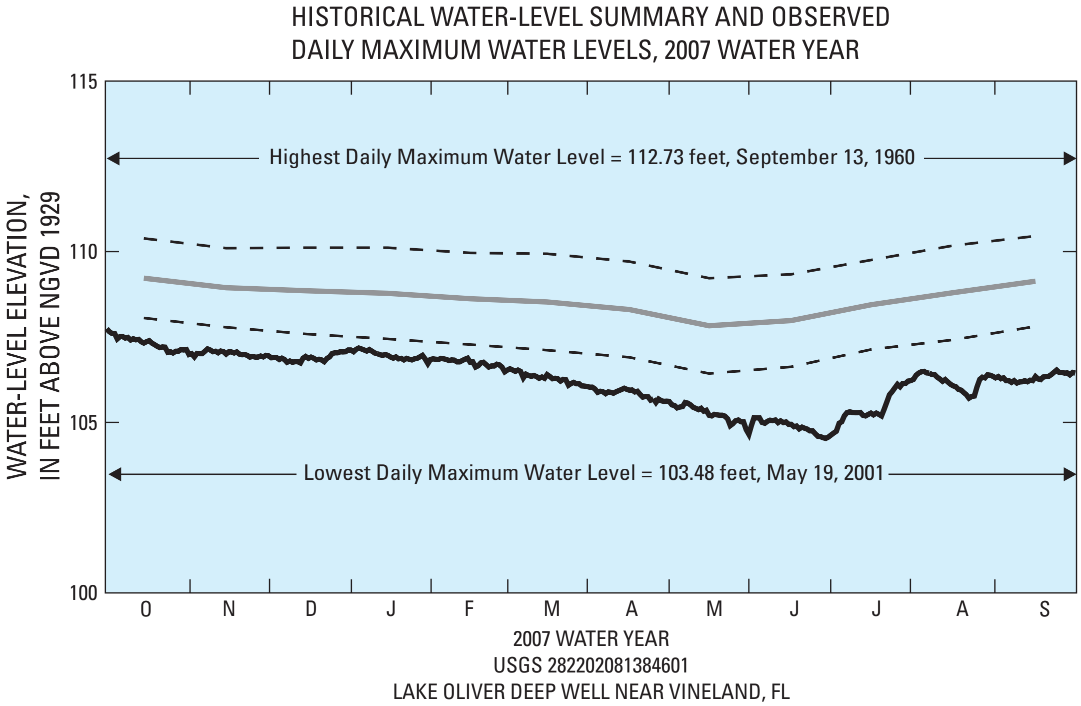


Figure 42. College Street Well at Leesburg water year 2007 daily maximum water level compared to historical water levels for the period October 1982 to September 2007, and the Seasonal Kendall Trend Test for the period October 1982 to September 2007.



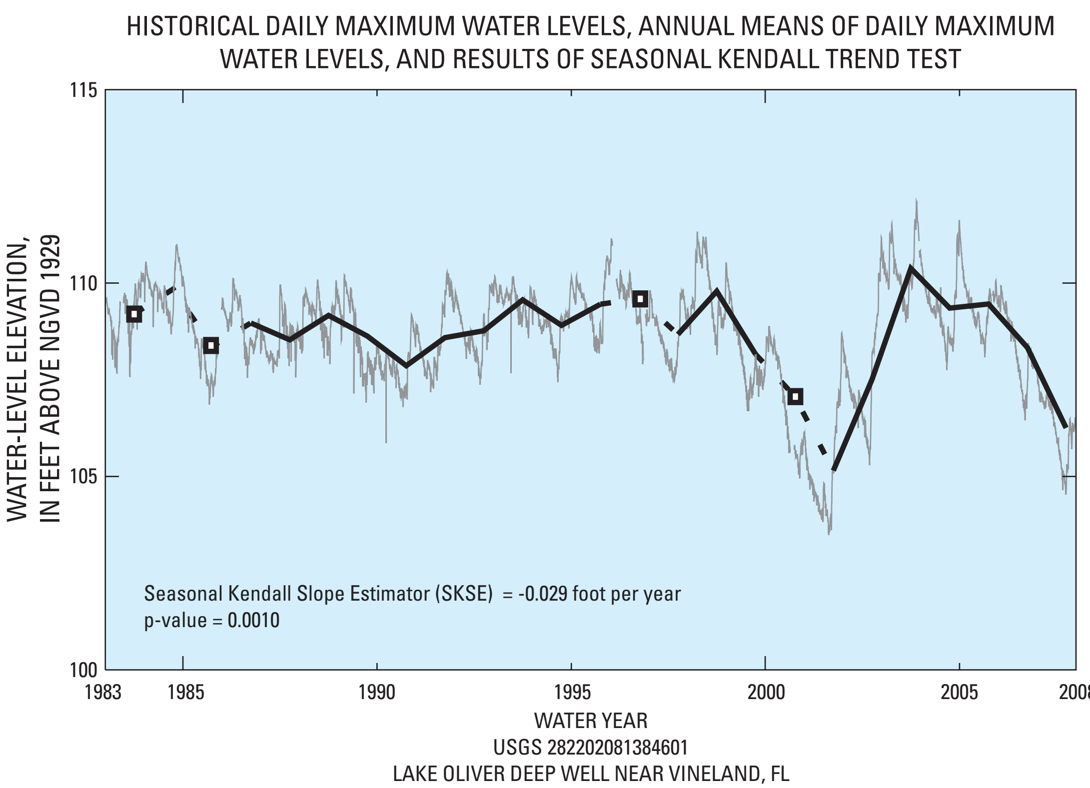
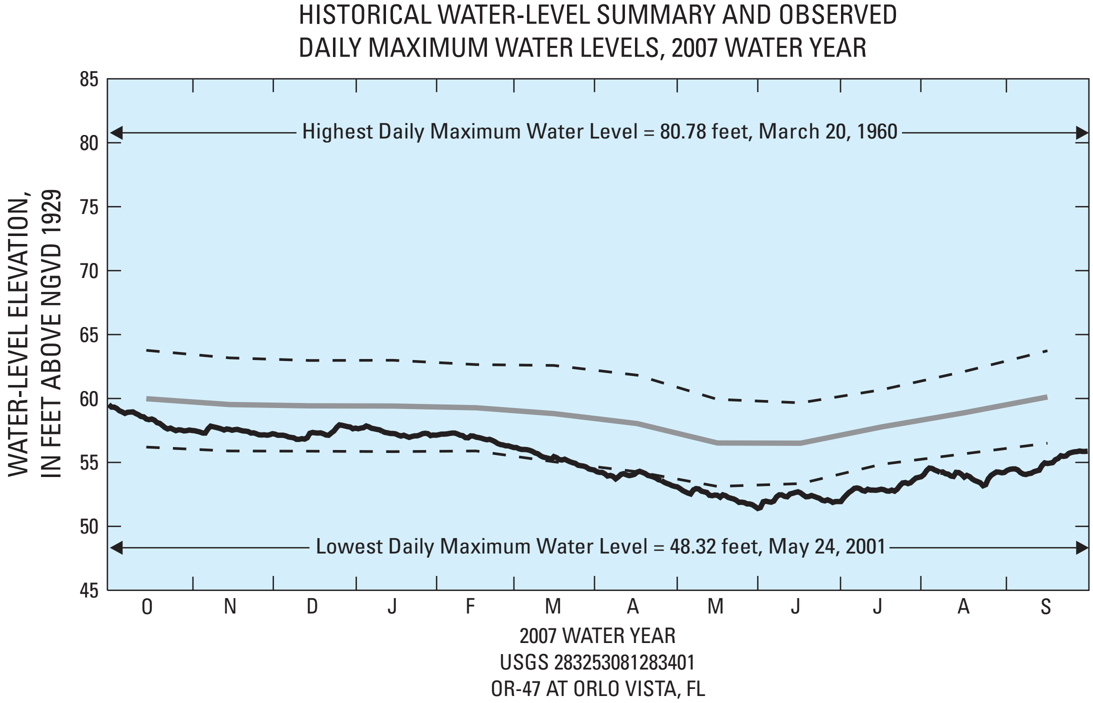


Figure 43. Lake Oliver Deep Well near Vineland water year 2007 daily maximum water level compared to historical water levels for the period October 1982 to September 2007, and the Seasonal Kendall Trend Test for the period October 1982 to September 2007.



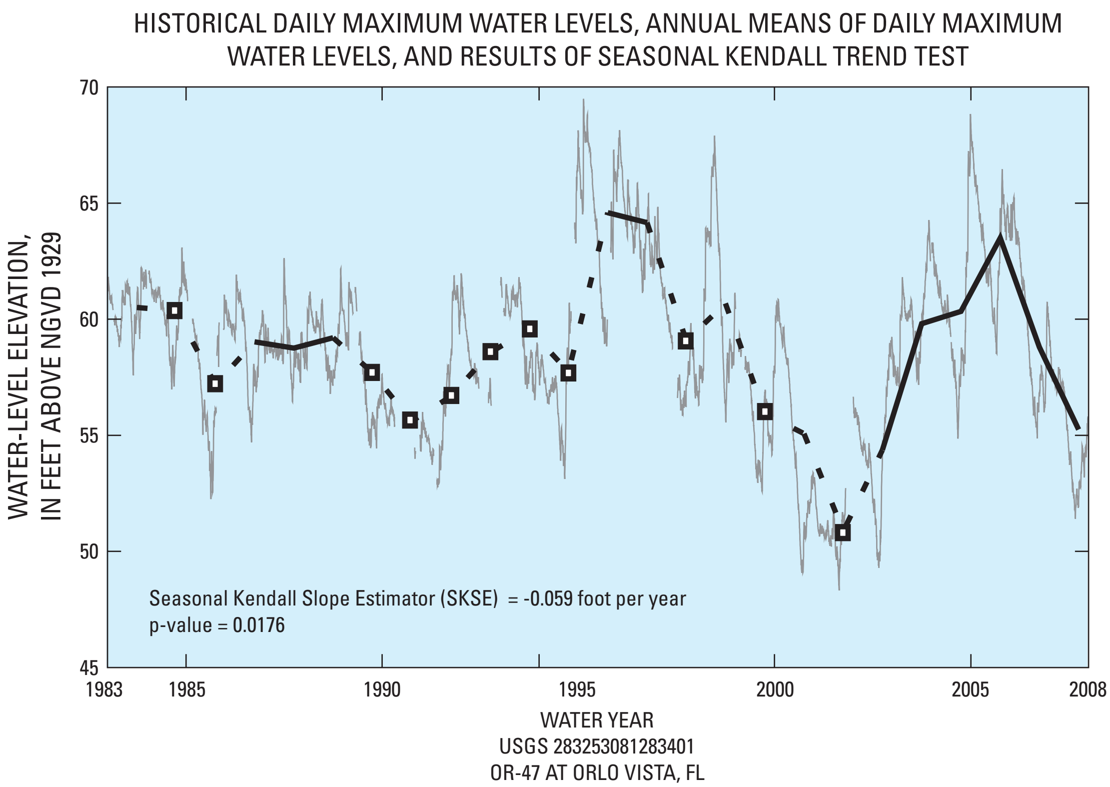
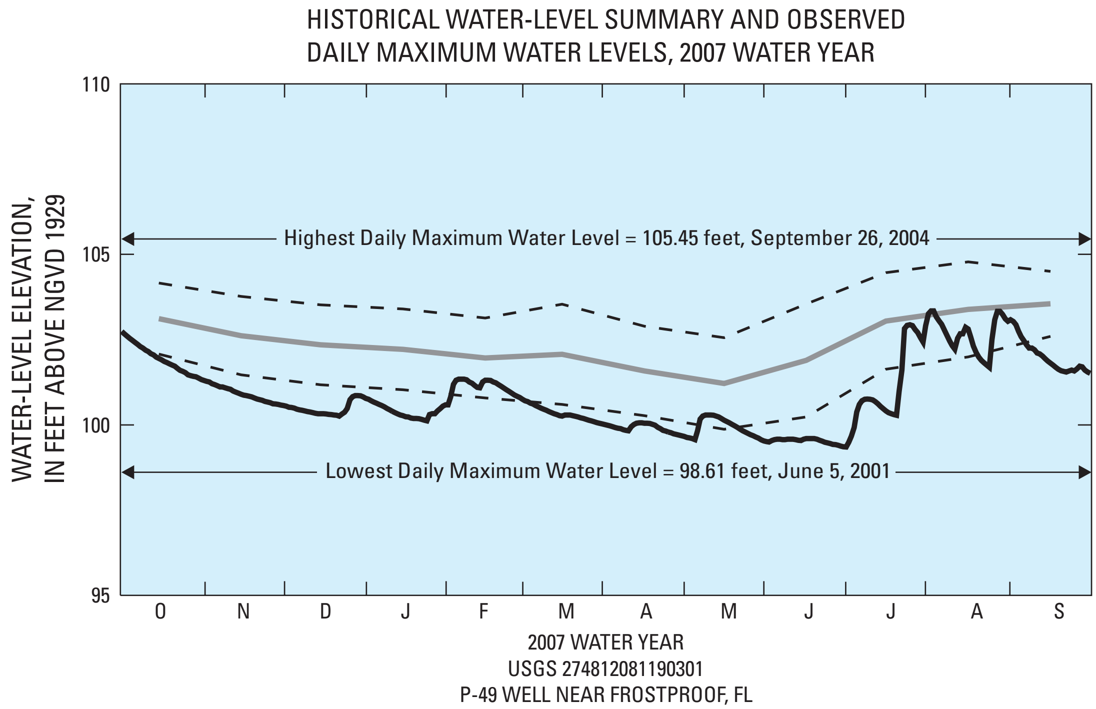


Figure 44. OR-47 at Orlo Vista water year 2007 daily maximum water level compared to historical water levels for the period October 1982 to September 2007, and the Seasonal Kendall Trend Test for the period October 1982 to September 2007.



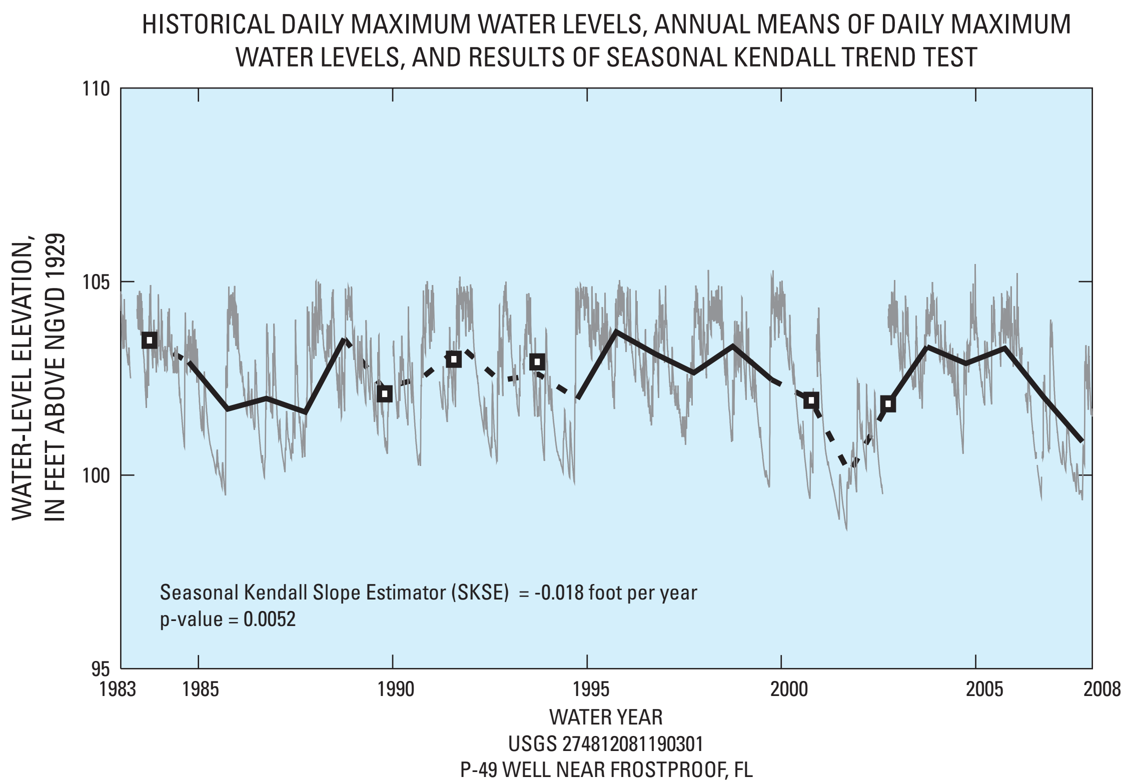
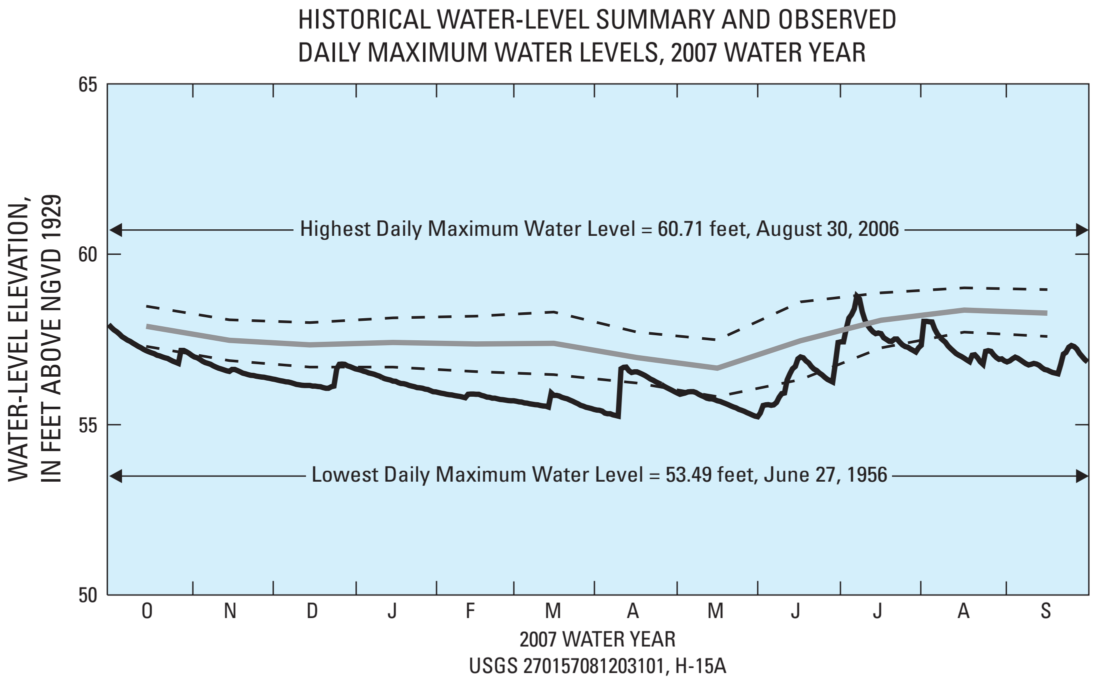


Figure 45. P-49 Well near Frostproof water year 2007 daily maximum water level compared to historical water levels for the period October 1982 to September 2007, and the Seasonal Kendall Trend Test for the period October 1982 to September 2007.



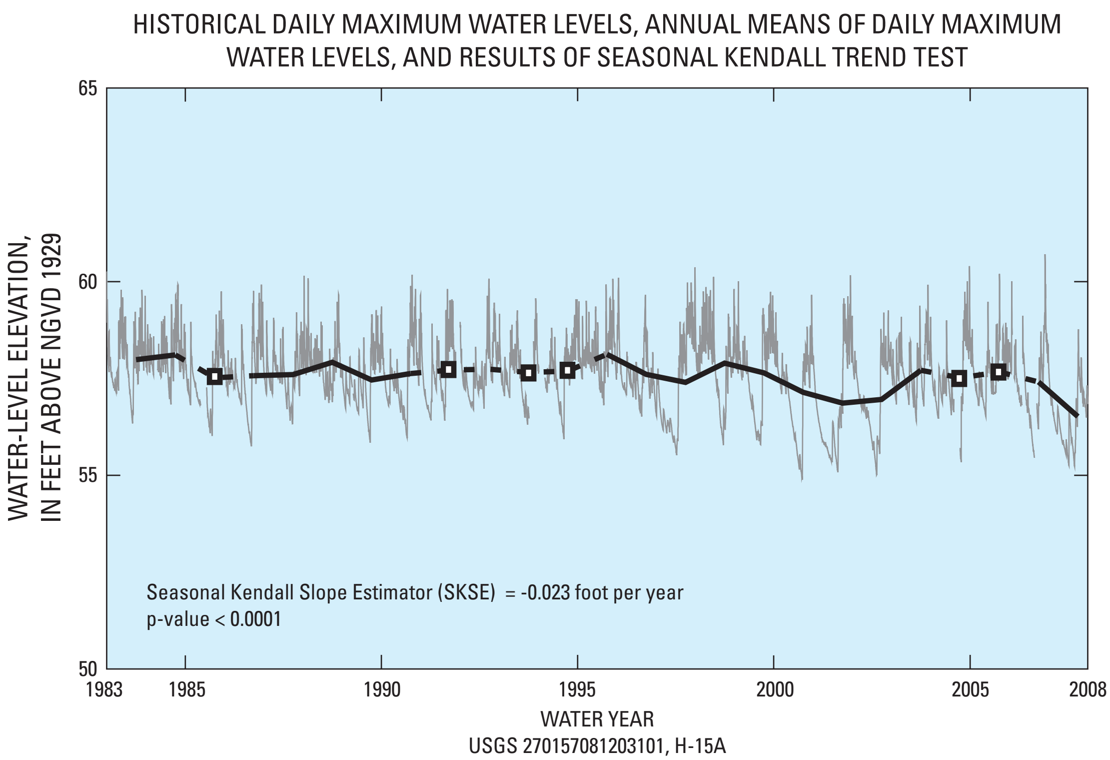
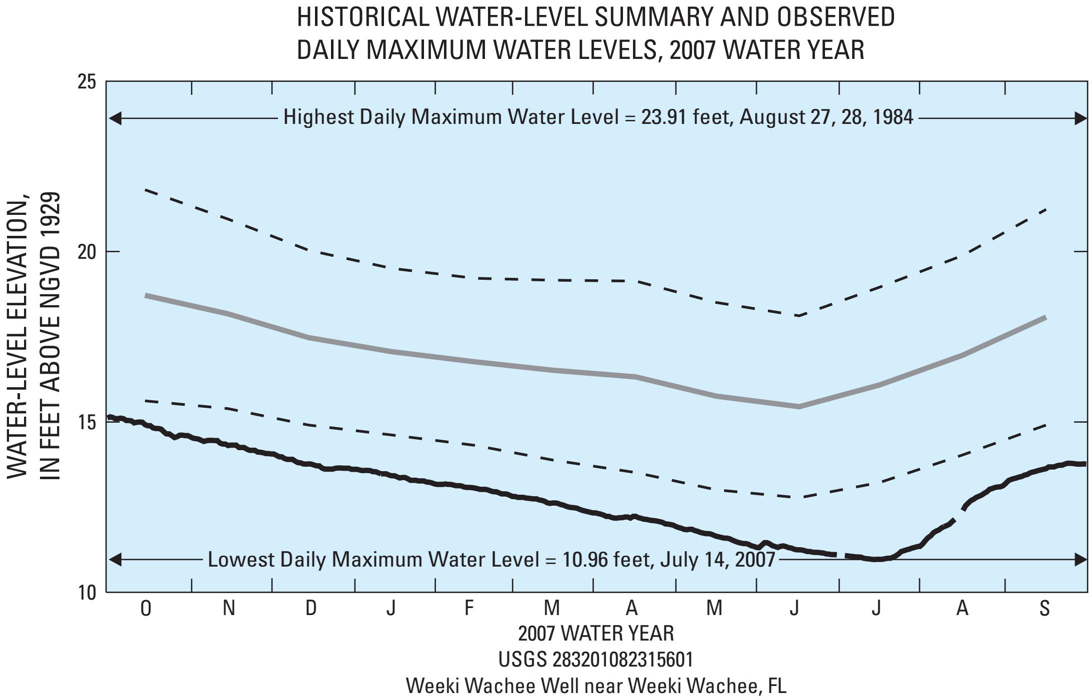


Figure 46. USGS Observation Well H-15A near Palmdale water year 2007 daily maximum water level compared to historical water levels for the period October 1982 to September 2007, and the Seasonal Kendall Trend Test for the period October 1982 to September 2007.



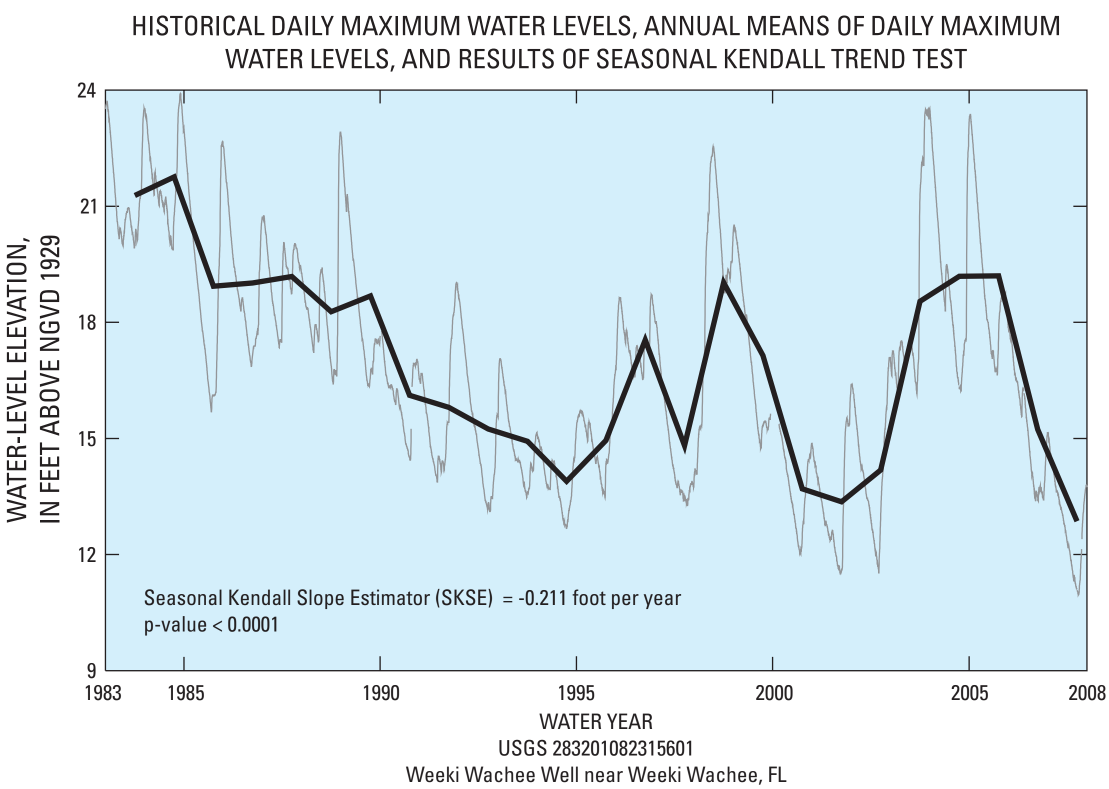
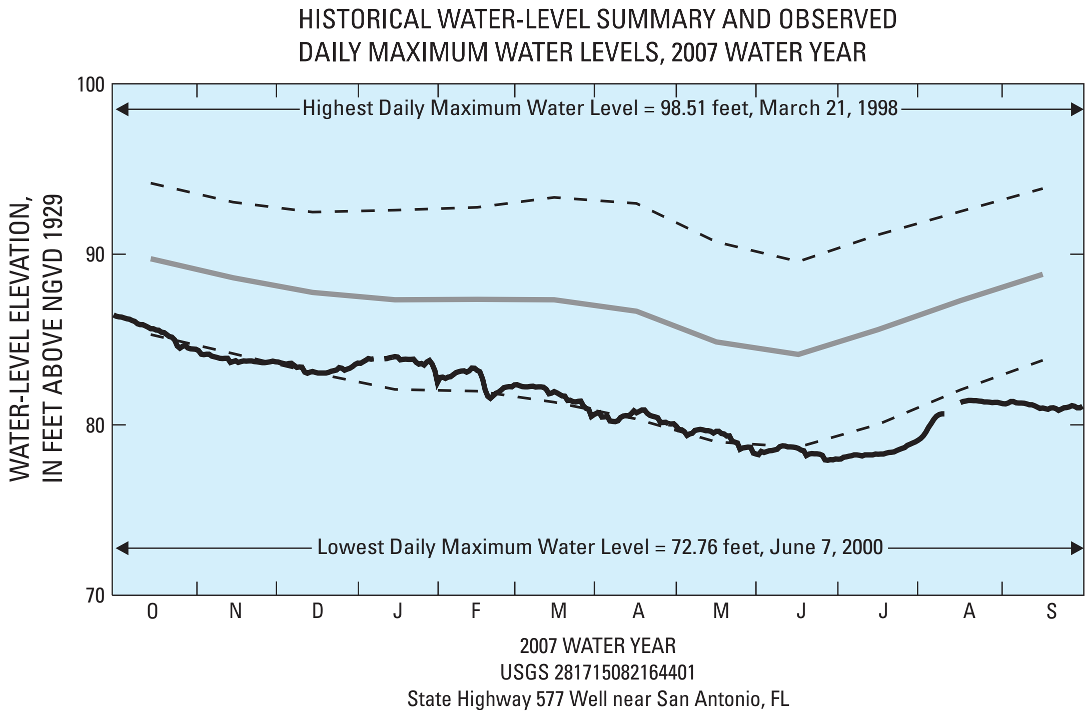


Figure 47. Weeki Wachee Well near Weeki Wachee water year 2007 daily maximum water level compared to historical water levels for the period October 1982 to September 2007, and the Seasonal Kendall Trend Test for the period October 1982 to September 2007.



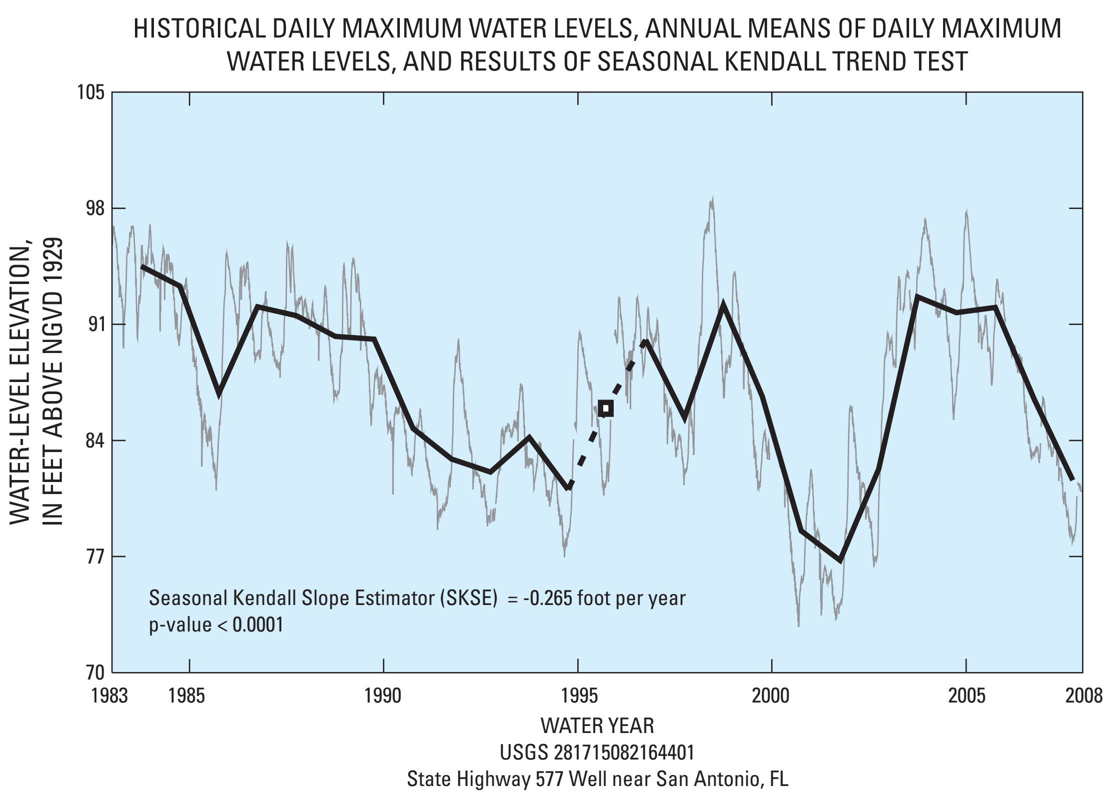
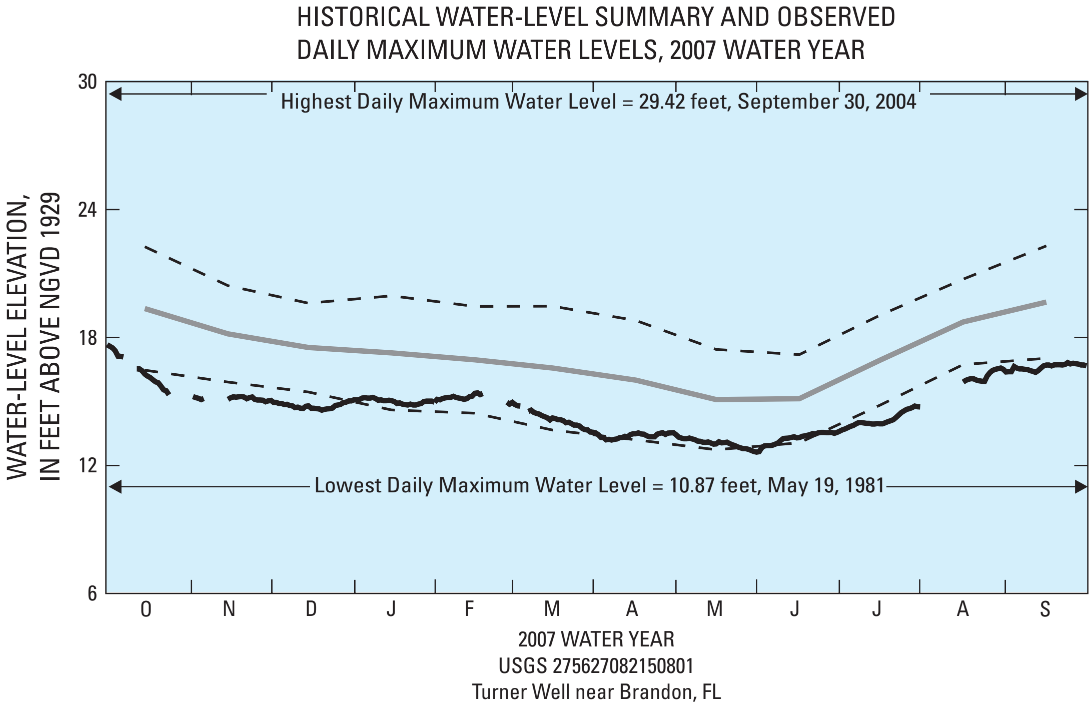


Figure 48. State Highway 577 Well near San Antonio water year 2007 daily maximum water level compared to historical water levels for the period October 1982 to September 2007, and the Seasonal Kendall Trend Test for the period October 1982 to September 2007.



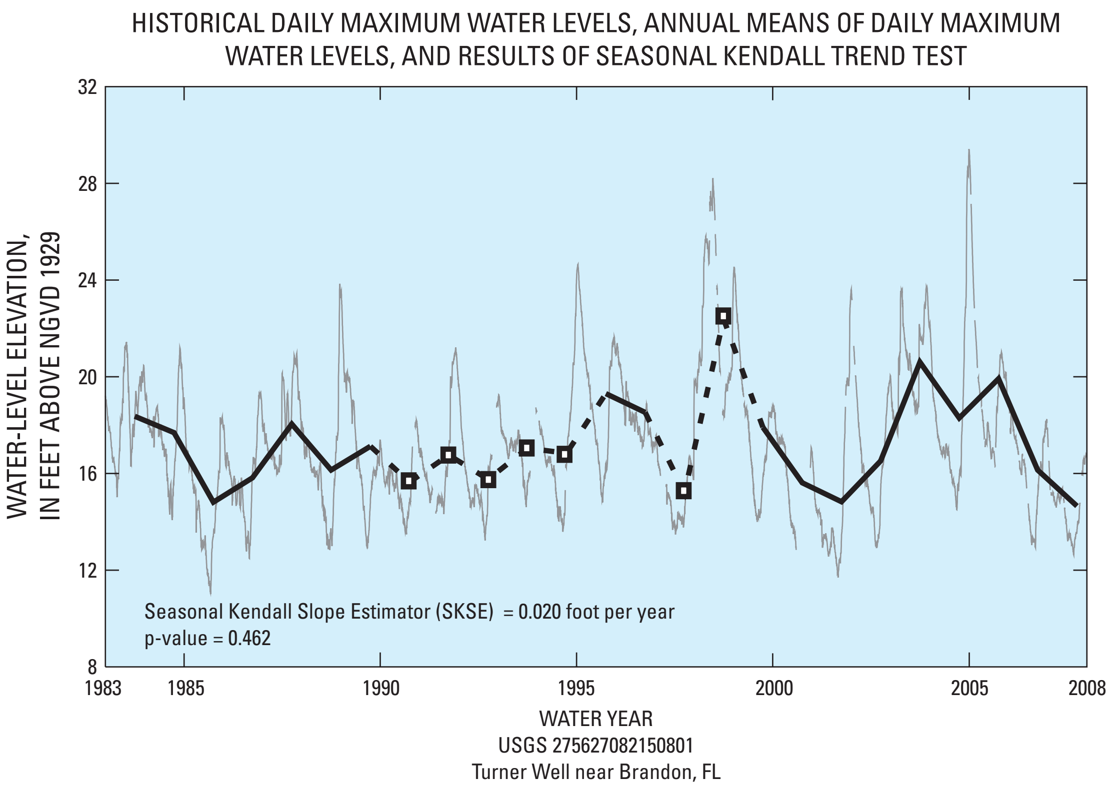
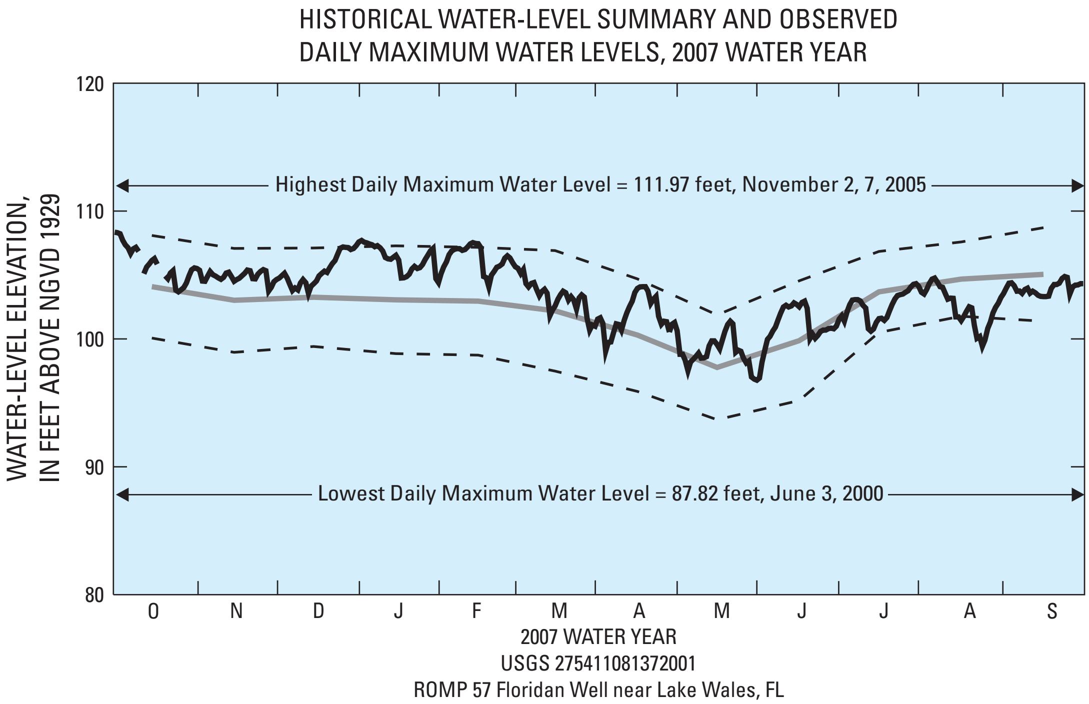


Figure 49. Turner Well near Brandon water year 2007 daily maximum water level compared to historical water levels for the period October 1982 to September 2007, and the Seasonal Kendall Trend Test for the period October 1982 to September 2007.



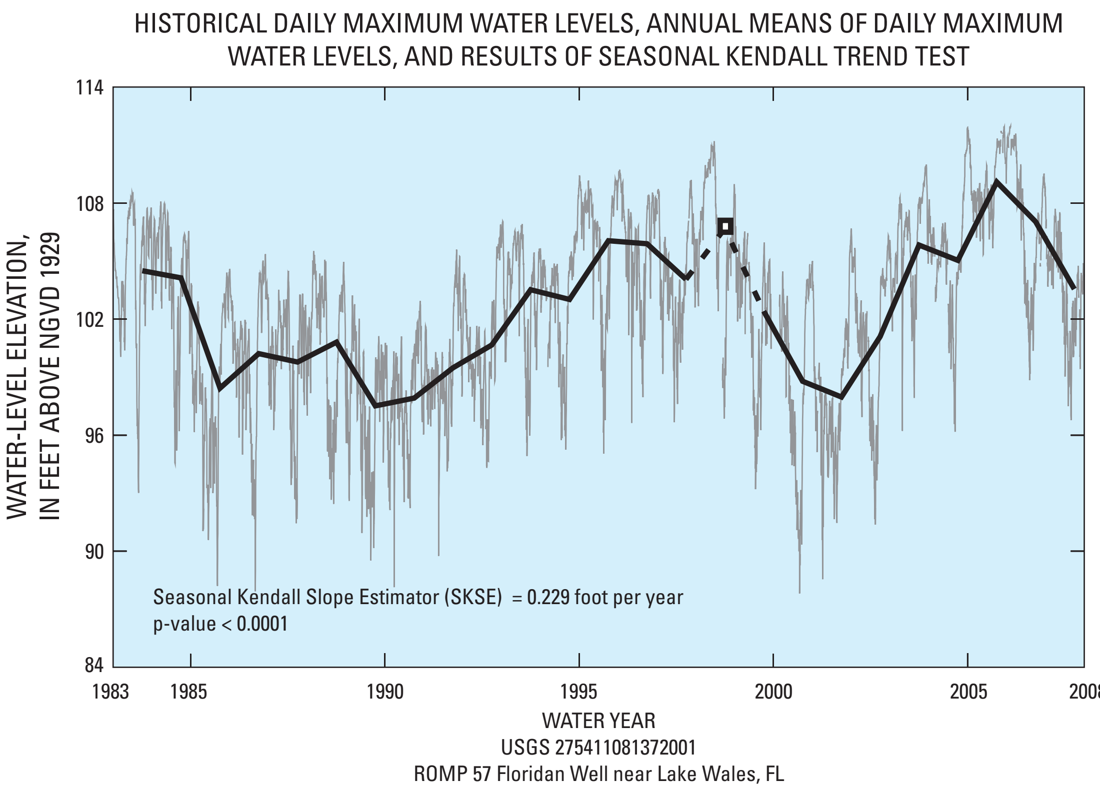
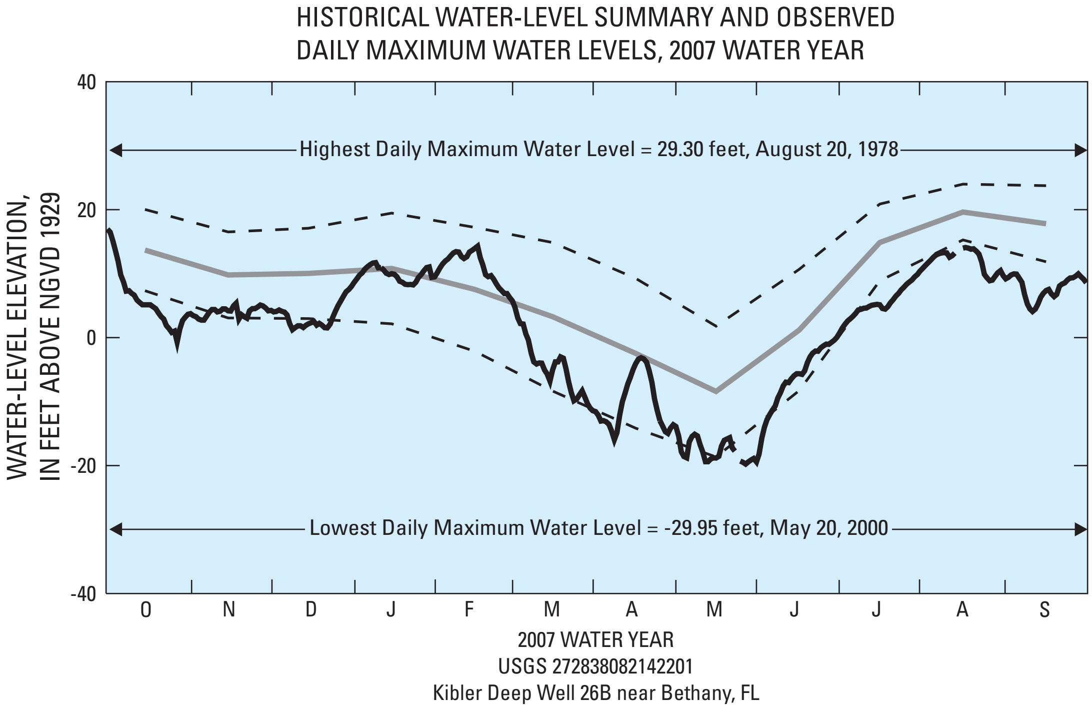


Figure 50. ROMP 57 Floridan Well near Lake Wales water year 2007 daily maximum water level compared to historical water levels for the period October 1982 to September 2007, and the Seasonal Kendall Trend Test for the period October 1982 to September 2007.



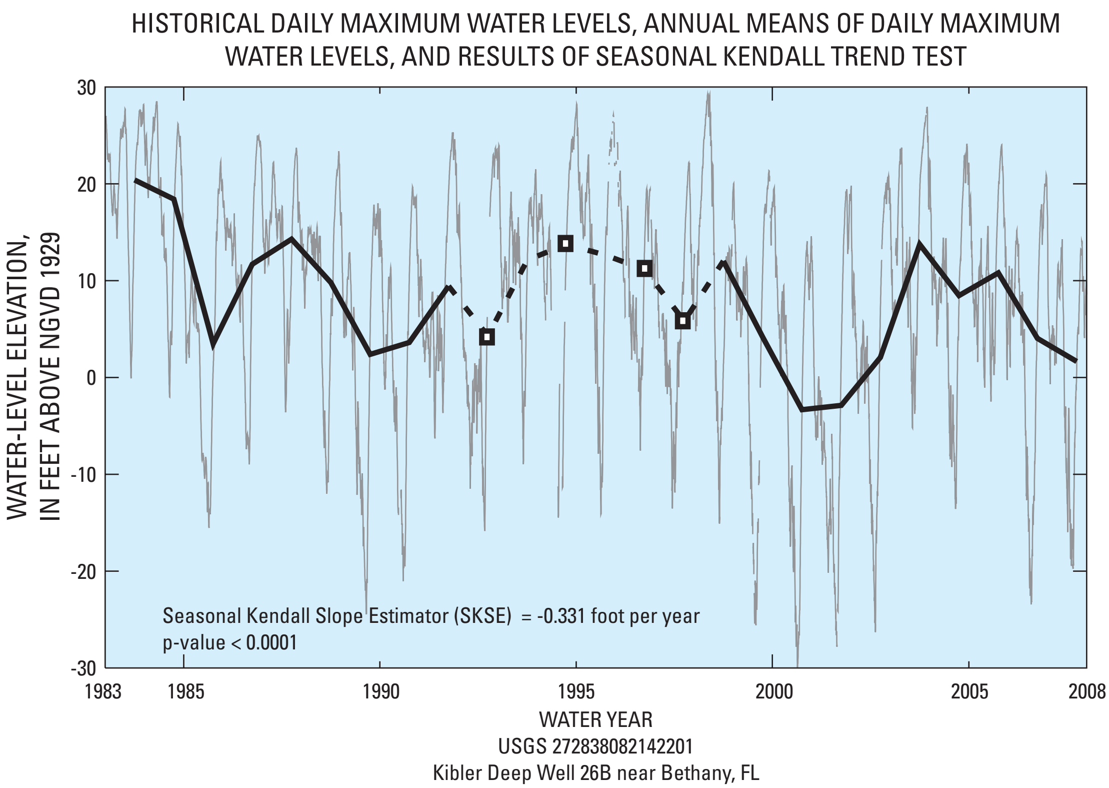
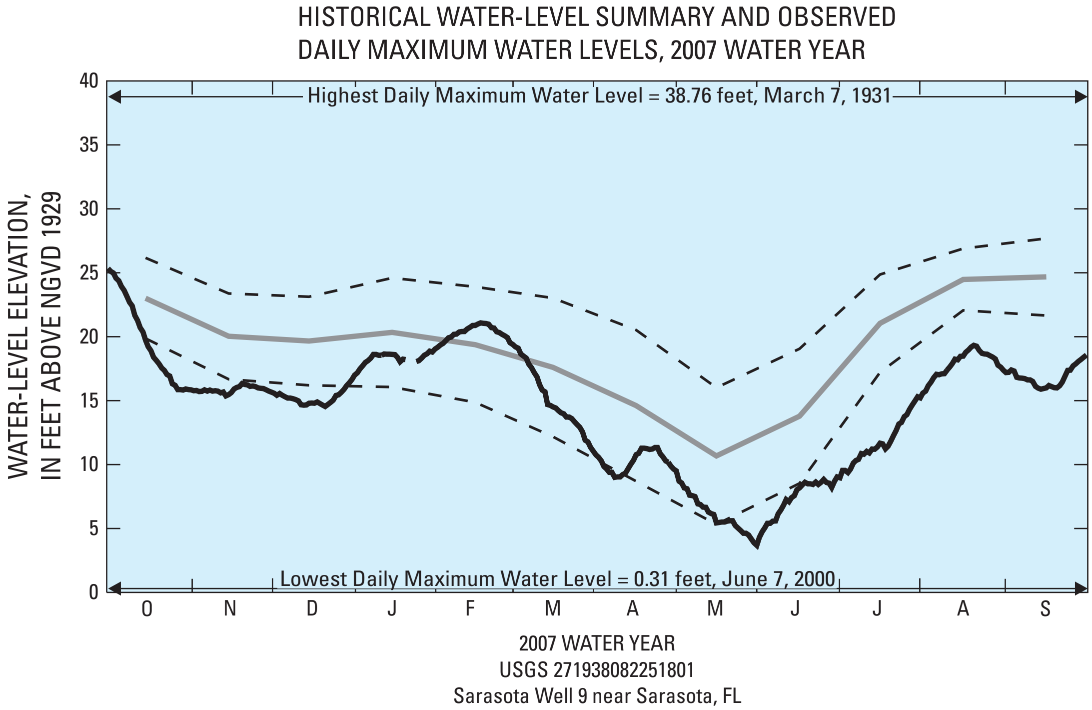


Figure 51. Kibler Deep Well 26B near Bethany water year 2007 daily maximum water level compared to historical water levels for the period October 1982 to September 2007, and the Seasonal Kendall Trend Test for the period October 1982 to September 2007.



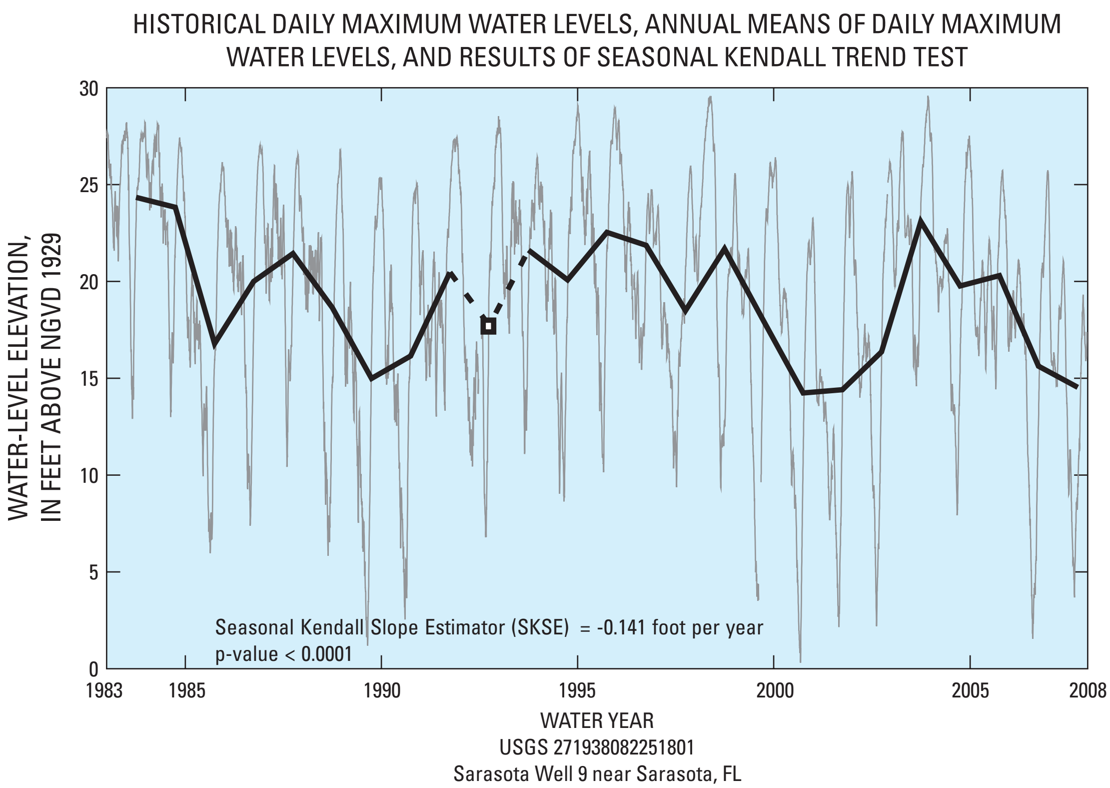
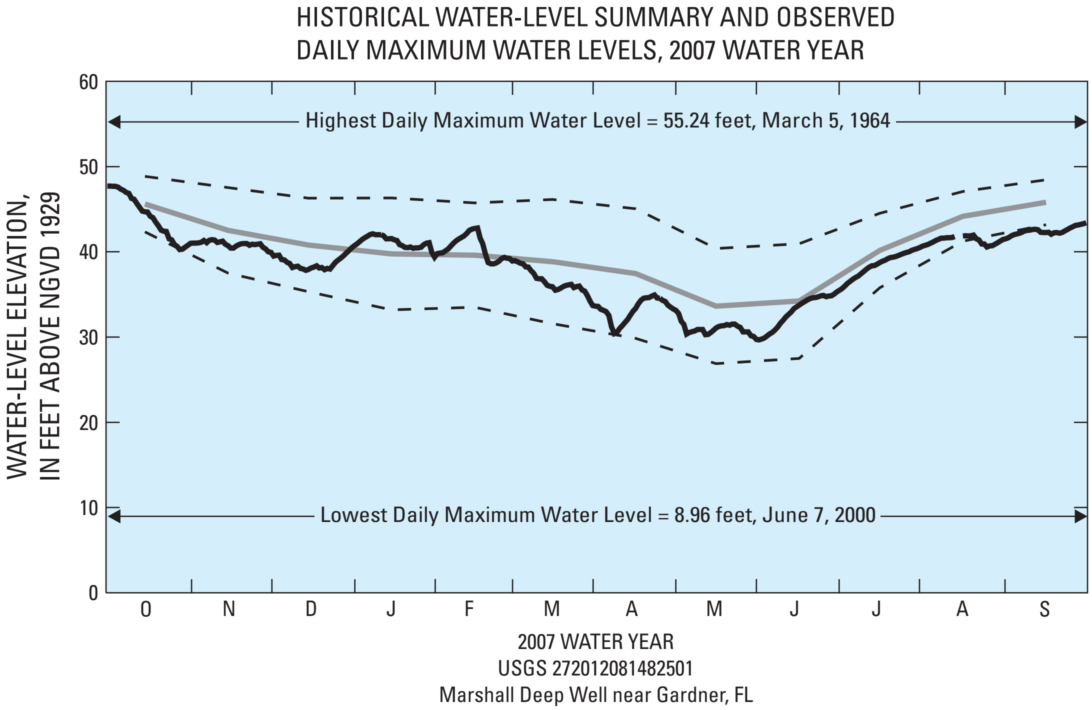


Figure 52. Sarasota Well 9 near Sarasota water year 2007 daily maximum water level compared to historical water levels for the period October 1982 to September 2007, and the Seasonal Kendall Trend Test for the period October 1982 to September 2007.



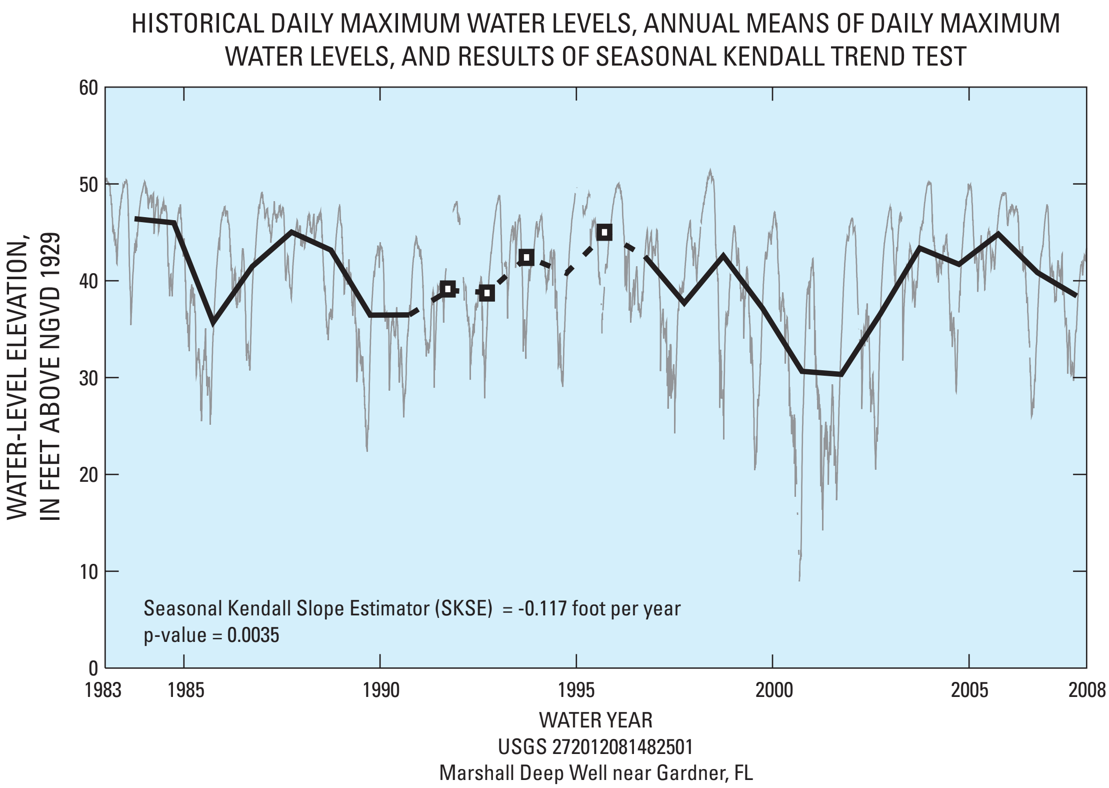
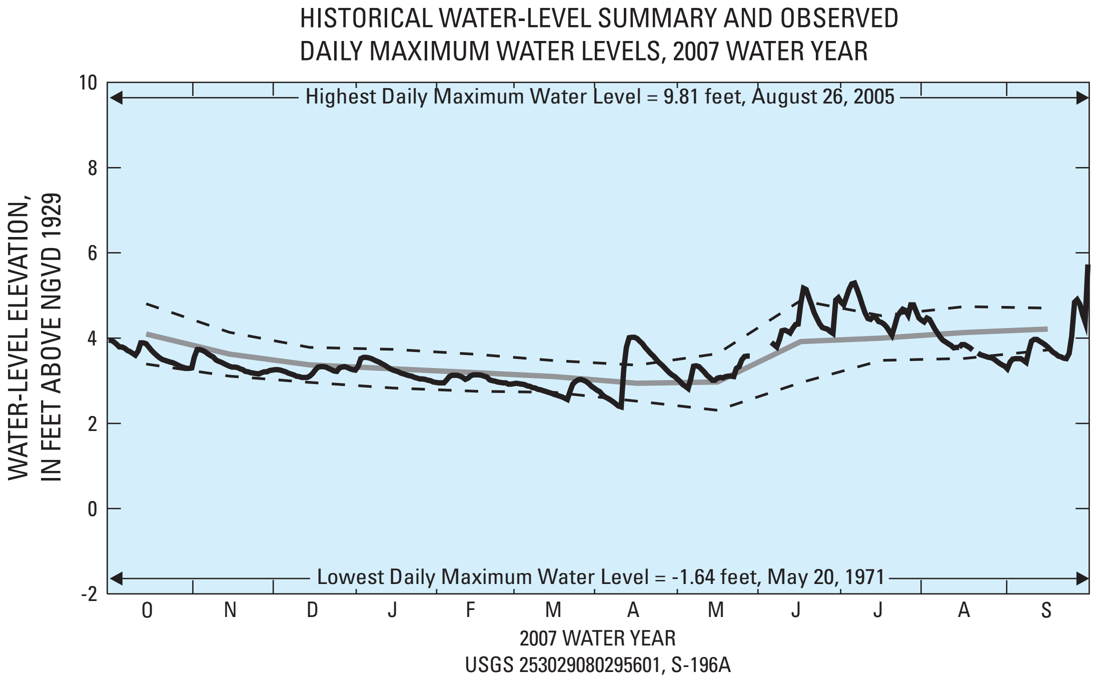


Figure 53. Marshall Deep Well near Gardner water year 2007 daily maximum water level compared to historical water levels for the period October 1982 to September 2007, and the Seasonal Kendall Trend Test for the period October 1982 to September 2007.



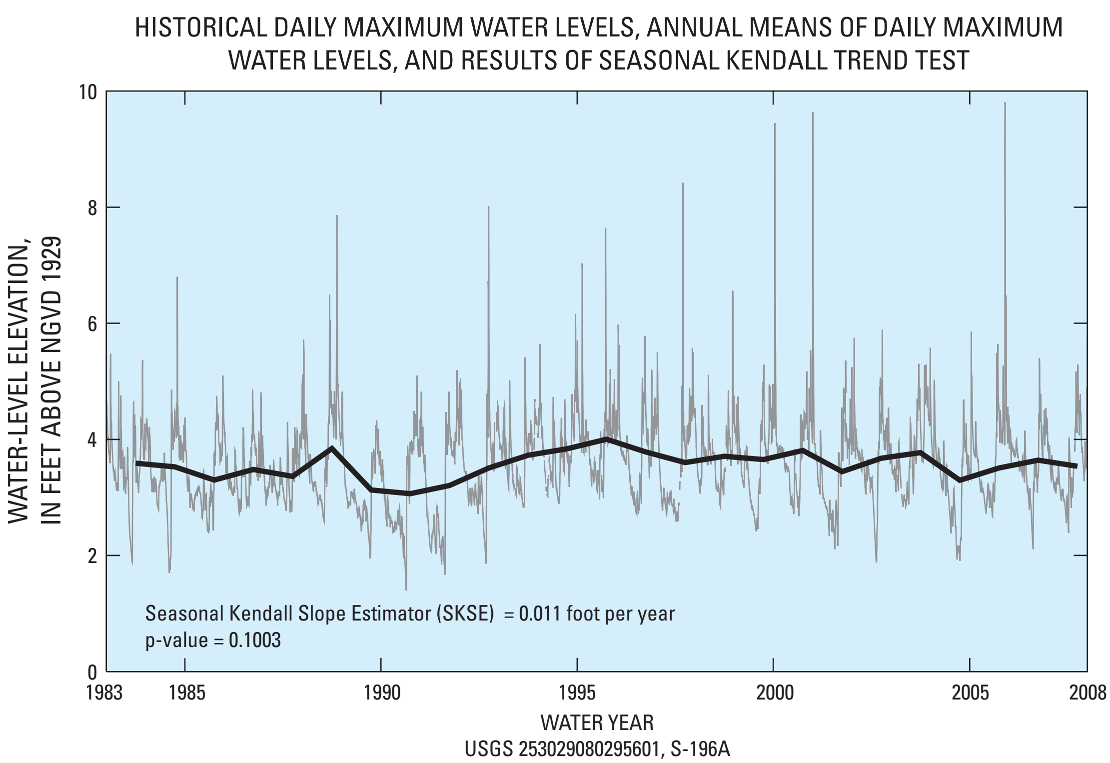
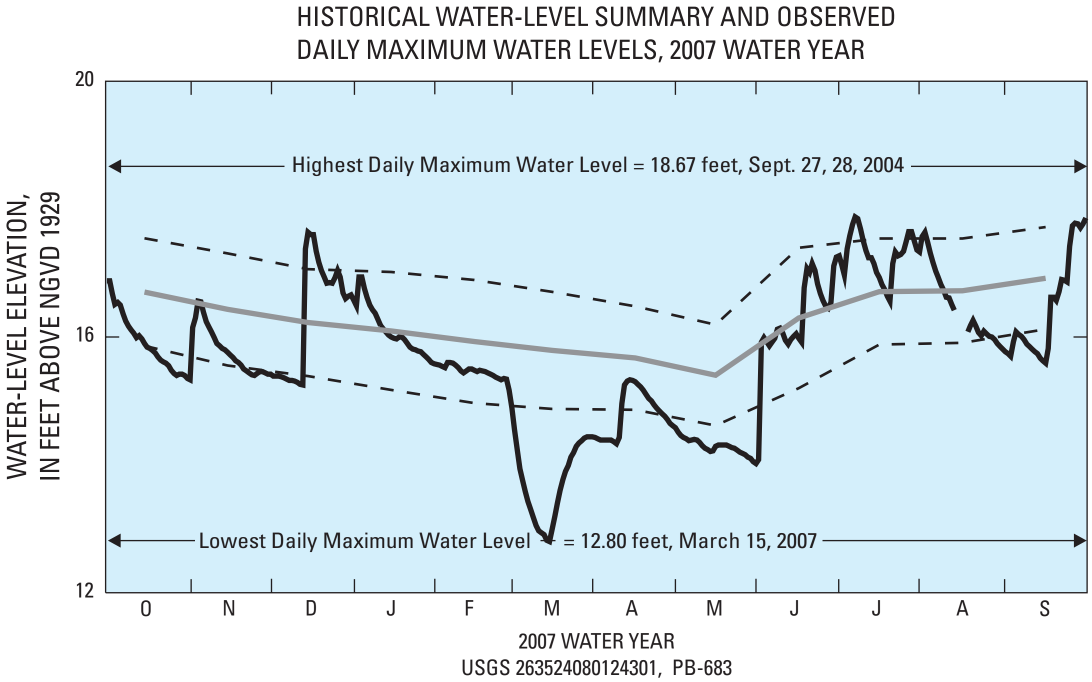


Figure 54. USGS Observation Well S-196A near Homestead water year 2007 daily maximum water level compared to historical water levels for the period October 1982 to September 2007, and the Seasonal Kendall Trend Test for the period October 1982 to September 2007.



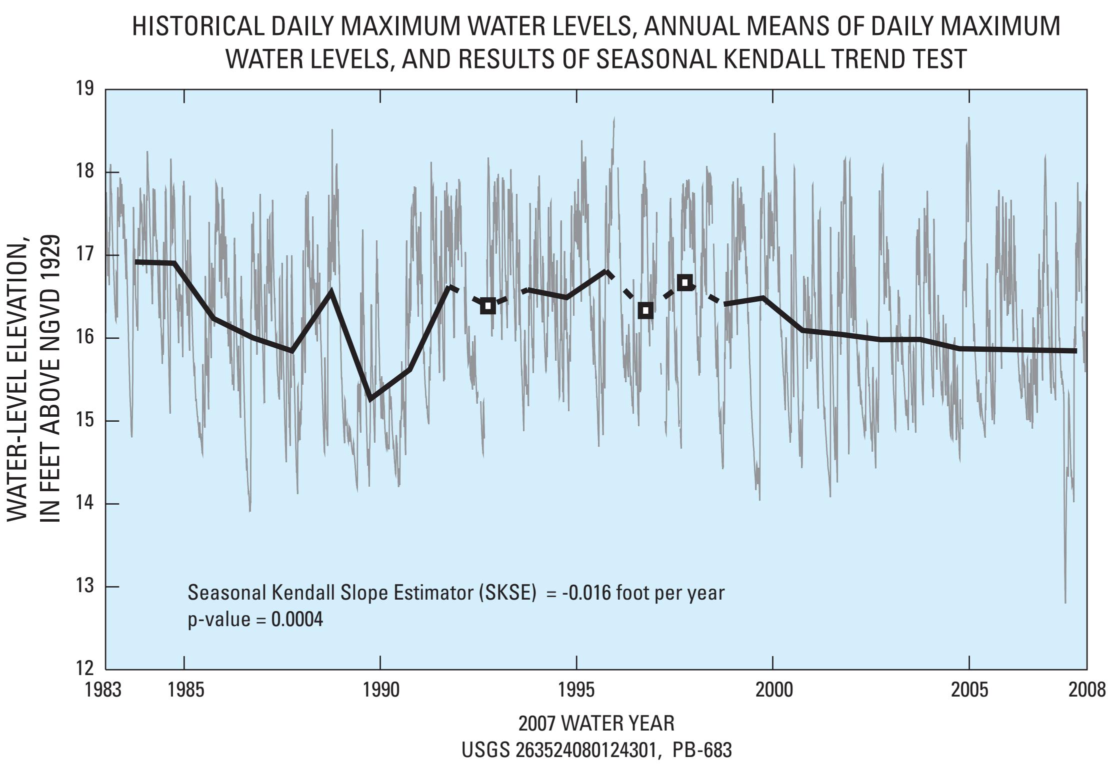
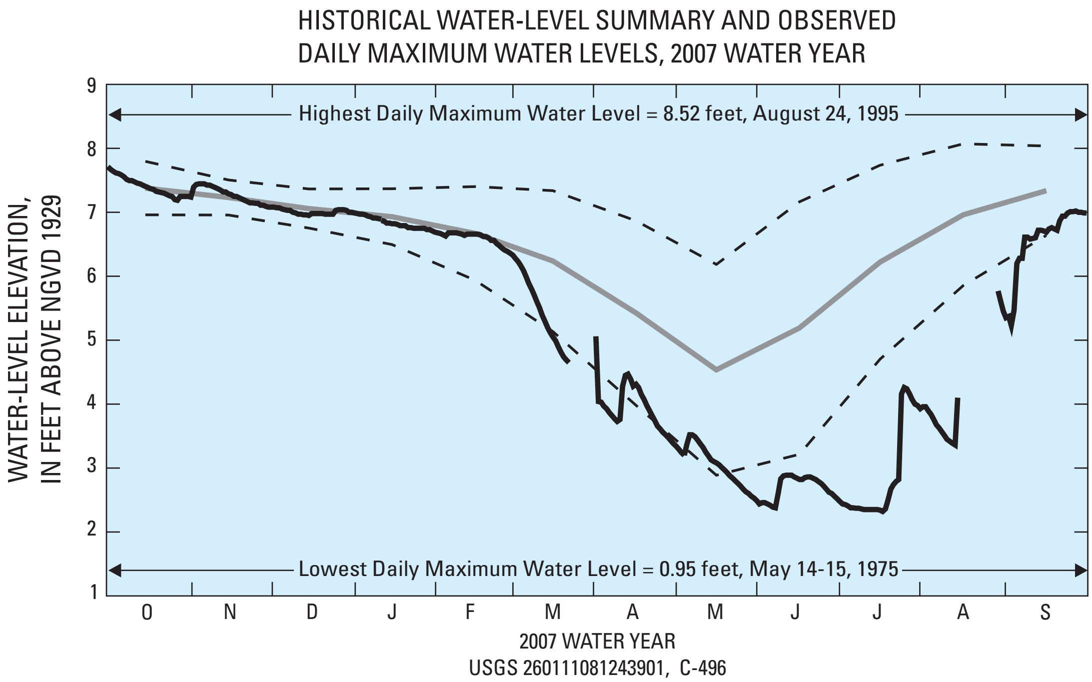


Figure 55. USGS Observation Well PB-683 near West Palm Beach water year 2007 daily maximum water level compared to historical water levels for the period October 1982 to September 2007, and the Seasonal Kendall Trend Test for the period October 1982 to September 2007.



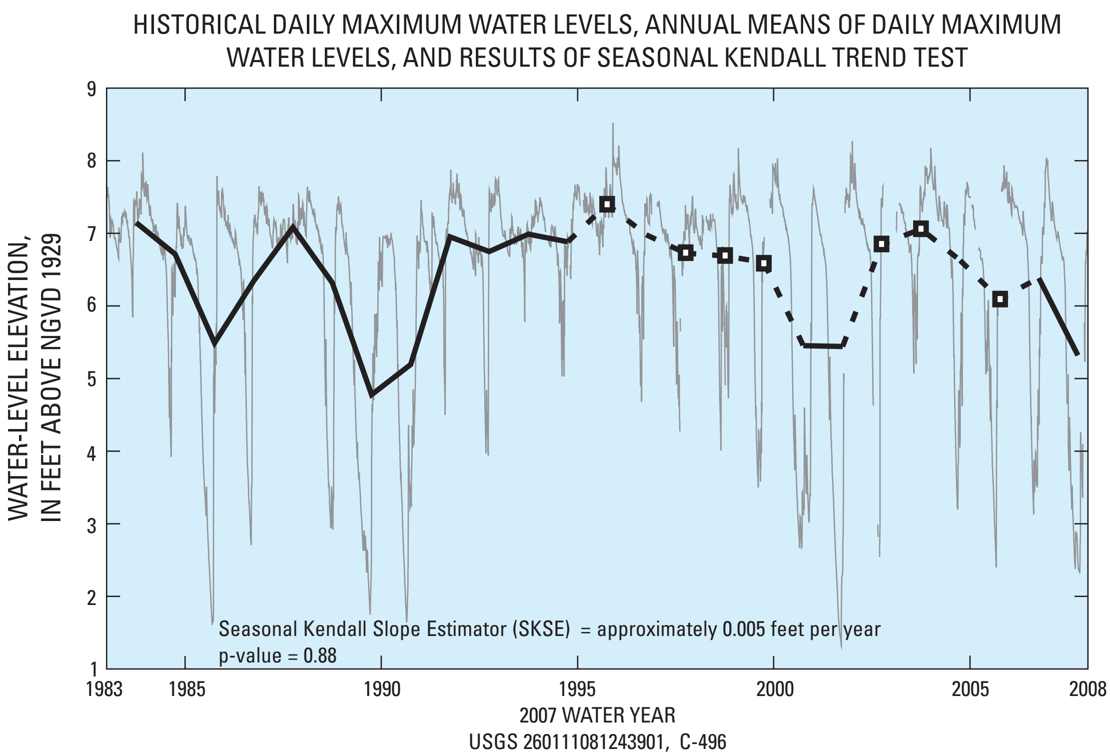
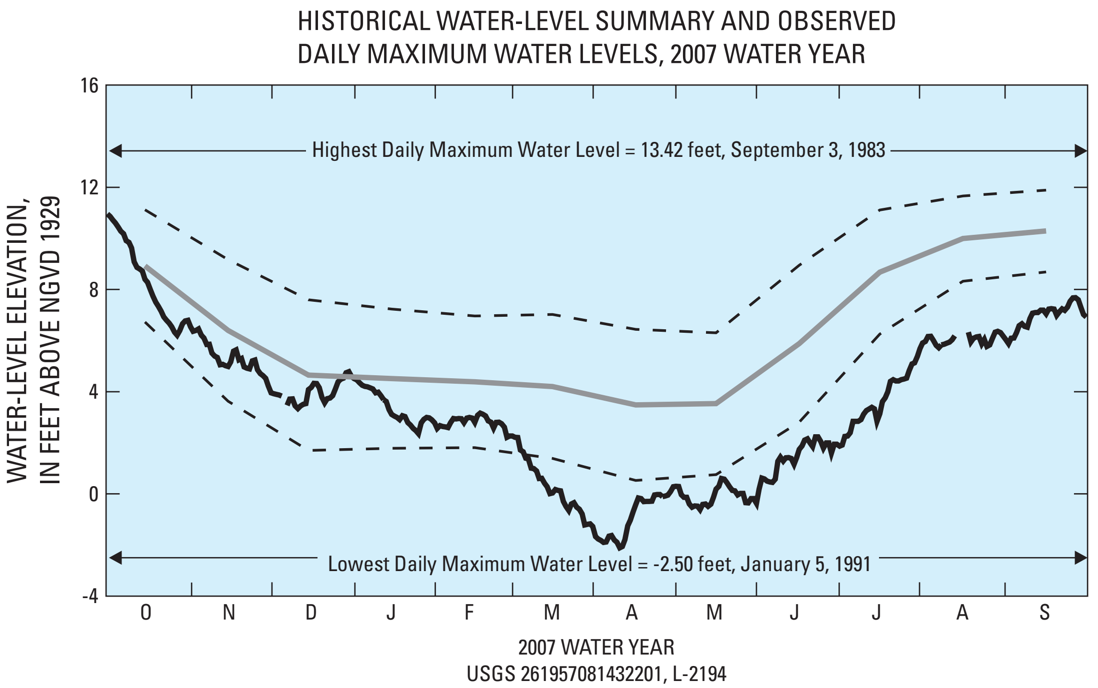


Figure 56. USGS Observation Well C-496 water year 2007 daily maximum water level compared to historical water levels for the period October 1982 to September 2007, and the Seasonal Kendall Trend Test for the period October 1982 to September 2007.



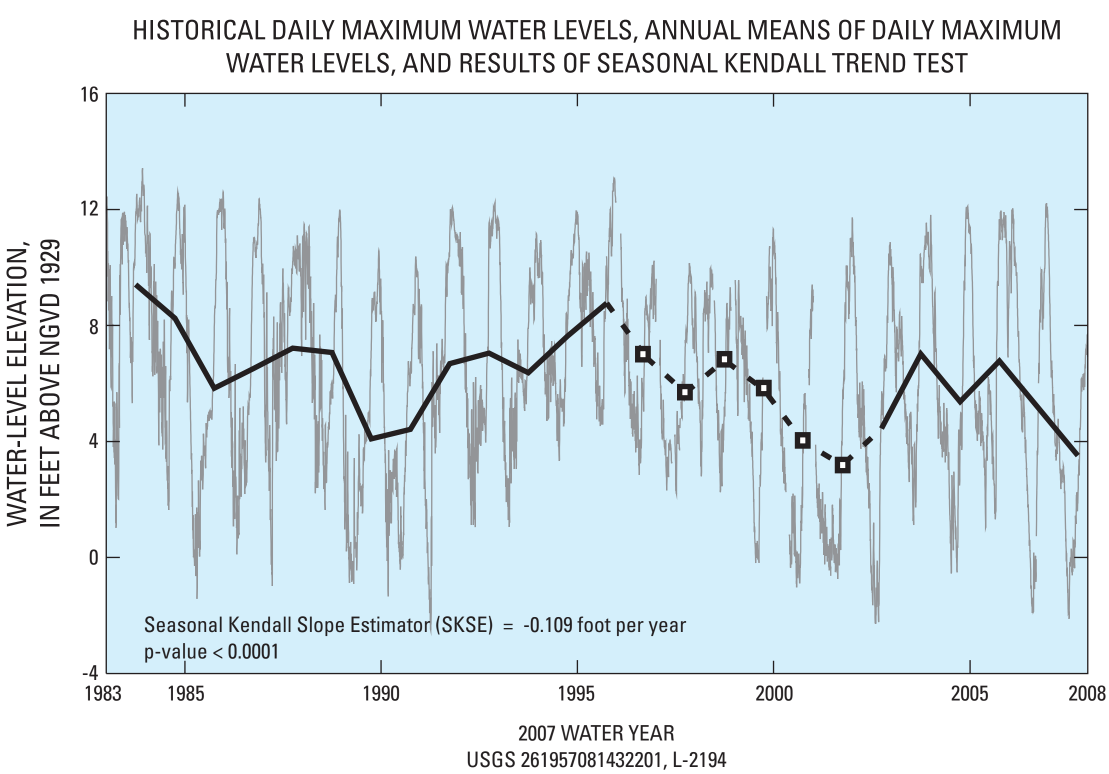
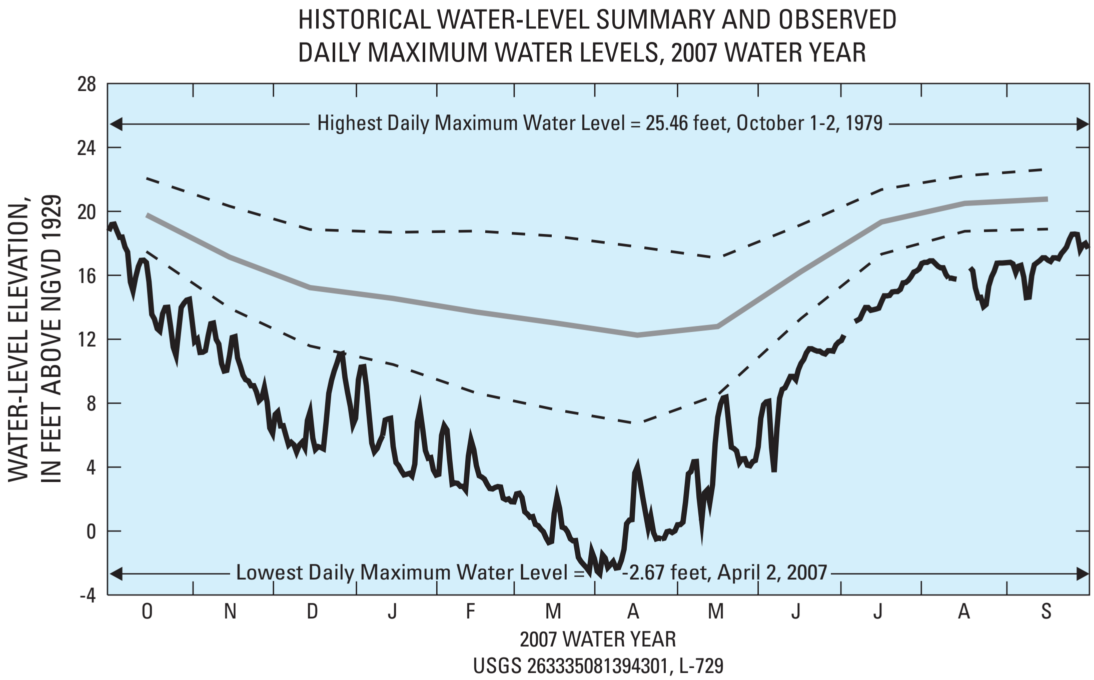


Figure 57. USGS Observation Well L-2194 water year 2007 daily maximum water level compared to historical water levels for the period October 1982 to September 2007, and the Seasonal Kendall Trend Test for the period October 1982 to September 2007.



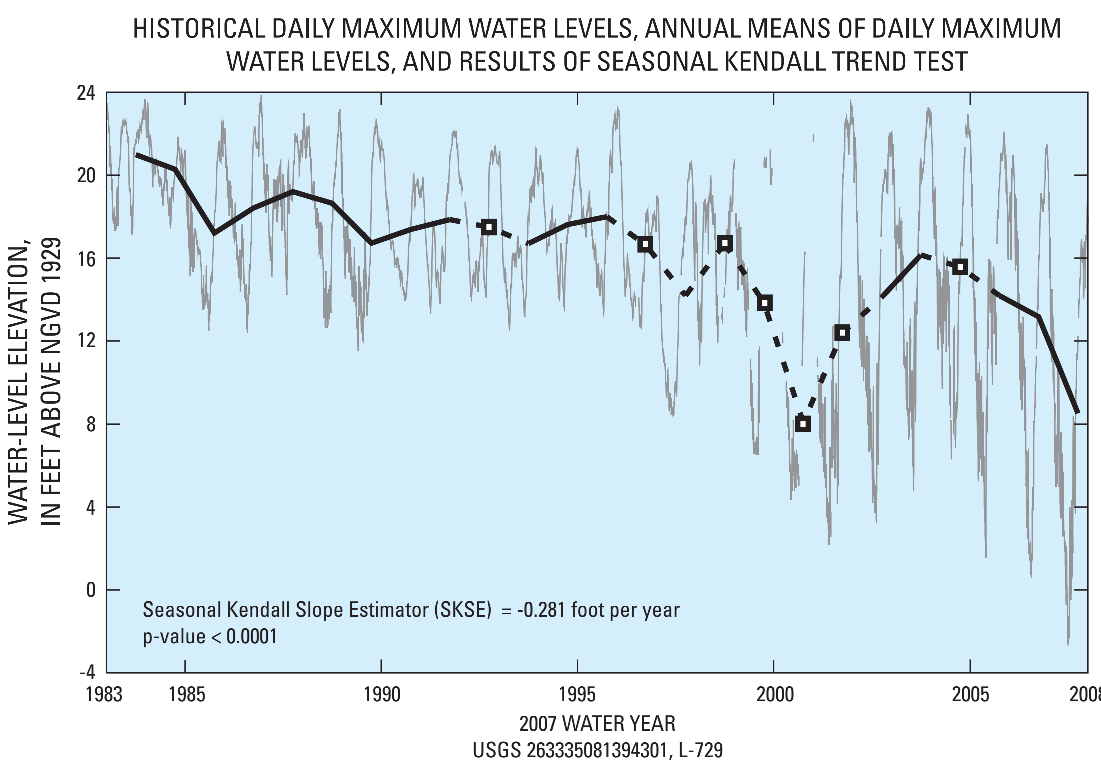
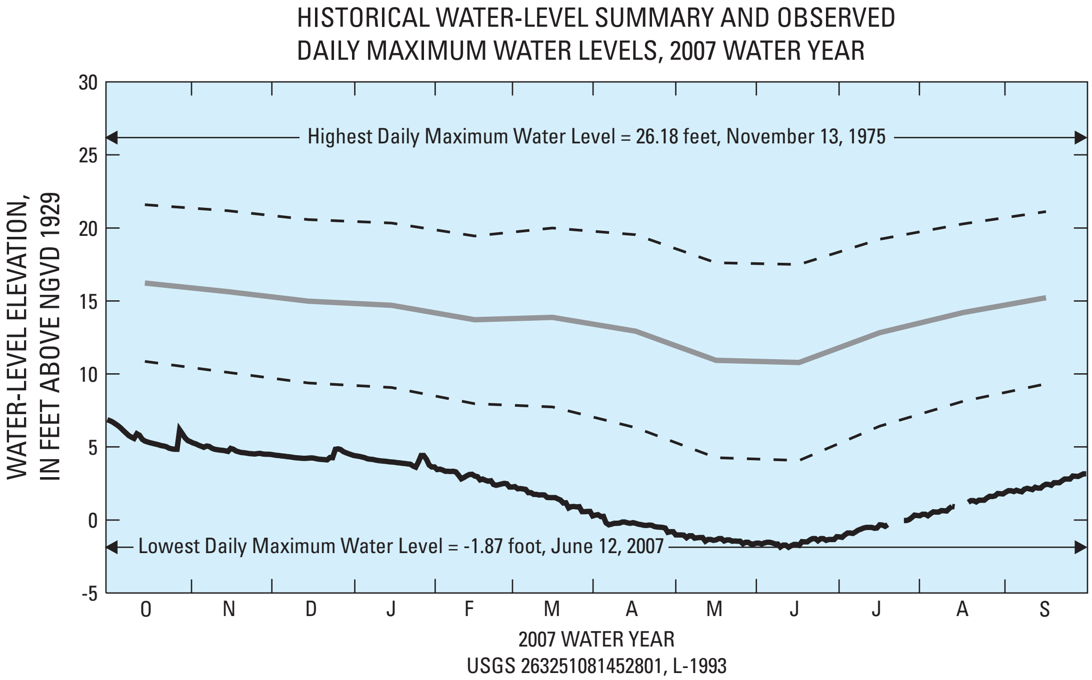


Figure 58. USGS Observation Well L-729 water year 2007 daily maximum water level compared to historical water levels for the period October 1982 to September 2007, and the Seasonal Kendall Trend Test for the period October 1982 to September 2007.



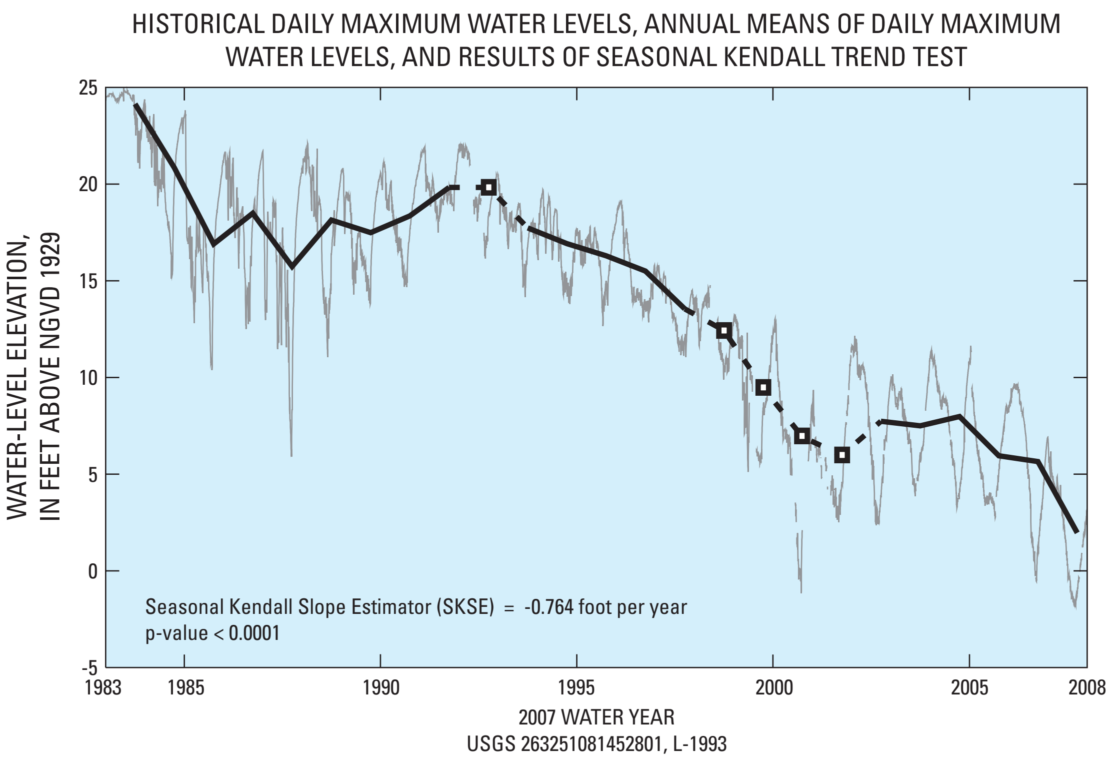
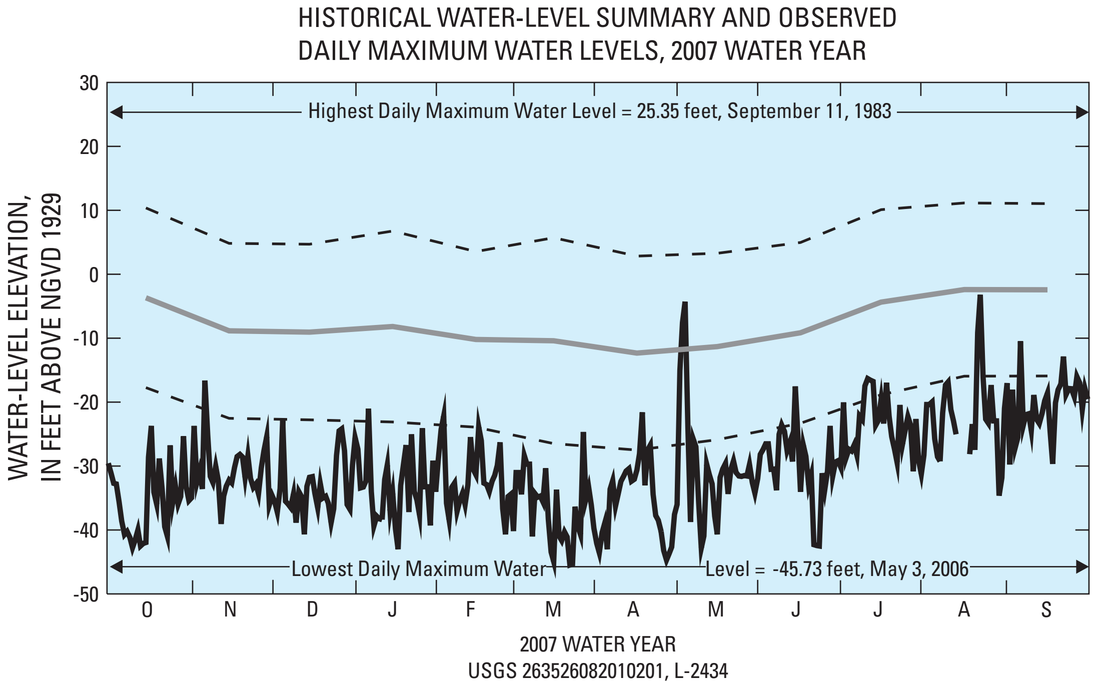


Figure 59. USGS Observation Well L-1993 water year 2007 daily maximum water level compared to historical water levels for the period October 1982 to September 2007, and the Seasonal Kendall Trend Test for the period October 1982 to September 2007.



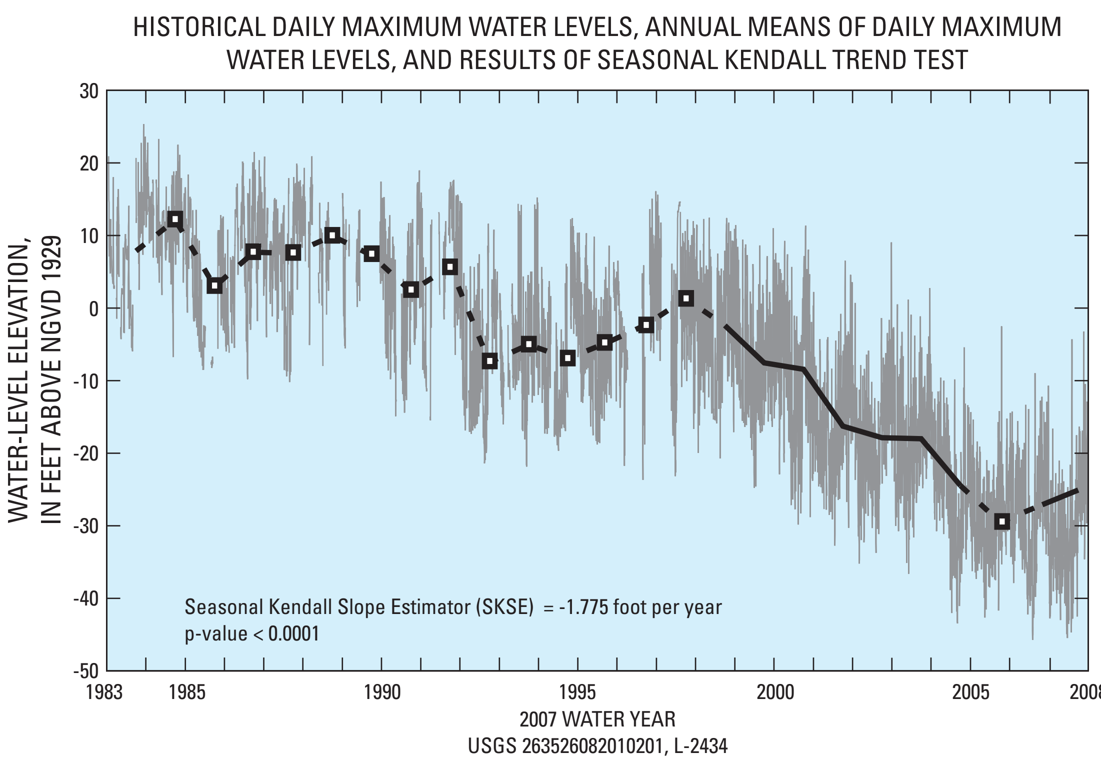


Figure 60. USGS Observation Well L-2434 water year 2007 daily maximum water level compared to historical water levels for the period October 1982 to September 2007, and the Seasonal Kendall Trend Test for the period October 1982 to September 2007.

Water levels in the Floridan aquifer system at USGS observation well 422A near Greenhead (303025085350501; fig. 39) remained well below normal the entire water year, ending with a record-low daily maximum water level on September 30 (45.51 ft). Maximum daily water levels were recorded on October 1 (53.20 ft). Water levels in the Floridan aquifer system at the USGS benchmark well near Crawfordville (300740084293001; fig. 40) varied from slightly above to well below normal during the year. The maximum daily water level was recorded on February 4 (33.77 ft), and the minimum daily water level was recorded on June 29 (28.93 ft).

Northeast Florida

Ground-water levels in northeast Florida averaged below normal for most of the representative sites, although water levels reached about normal status at two sites during the year. The USGS DOT-41 observation well at Inverness (285102082204001; fig. 41), College Street well at Leesburg (284842081533001; fig. 42), Lake Oliver deep well near Vineland (282202081384601; fig. 43), and OR-47 at Orlo Vista (283253081283401; fig. 44), each reporting water levels in the Floridan aquifer system, recorded below normal water levels for the entire water year, although no new extremes were reached. The DOT-41 well (fig. 41) began the year with a maximum water level on October 1 (27.70 ft) and steadily declined to the minimum for the year on July 17-18 (23.08 ft). Water levels in the well increased slightly until the end of the year. The College Street well (fig. 42) recorded a slight downward trend from its maximum on October (63.60 ft) to the minimum for the year on June 24 (59.63 ft), and then progressed on an upward trend until the end of the year. The Lake Oliver well (fig. 43) trended downward from its maximum water level on October 1 (107.74 ft) to its minimum on May 31 (104.53 ft) before beginning an upward trend until September 30. The OR-47 well (fig. 44) recorded its maximum water level on October 1 (59.53 ft) and continued a downward trend until May 31 when the well reached its lowest level for the year (51.41 ft). Afterward, the water levels in this well increased steadily until the end of the year.

Two representative wells, P-49 well near Frostproof (274812081190301; fig. 45) and H-15A well near Palmdale (270157081203101; fig. 46), each reporting water levels in the surficial aquifer system (sand and gravel aquifer), recorded water levels below normal to about normal. Well P-49 (fig. 45) generally trended downward from October 1 to its minimum on July 1 (99.35 ft), and then showed a significant rise to the maximum for the year, bringing water levels to about normal on August 2-3 (103.34 ft). Well H-15A (fig. 46), low for the year, was reported on May 31 (55.23 ft) and then increased to above normal levels to its maximum on July 7 (58.77 ft).

Southwest Florida

Ground-water levels in the representative wells in southwest Florida are monitored in the Floridan aquifer system and ranged from well below normal to above normal during the 2007 water year. Wells in this area were generally at their maximum water levels for the year in early October and continued on a downward trend until their lowest levels for the year in late May, June, and early July.

The well reporting the most below normal levels was the Weeki Wachee well near Weeki Wachee 283201082315601; fig. 47) where a new period-of-record lowest daily maximum was recorded on July 14 (10.96 ft); this well's maximum for the year was recorded on October 2 (15.15 ft).

Two wells, State Highway 577 well near San Antonio (281715082164401; fig. 48) and Turner well near Brandon (275627082150801; fig. 49) each reported water levels below normal. The lowest daily maximum water level at State Highway 577 well (fig. 48) was recorded on June 27 (77.92 ft) and the maximum on October 1 (86.44 ft). Turner well (fig. 49) recorded its maximum water level on October 1 (17.67 ft) and the lowest on May 31 (12.63 ft).

Water levels at ROMP 57 Floridan well near Lake Wales (275411081372001; fig. 50), Kibler deep well 26B near Bethany (27283808082142201; fig. 51), Sarasota well 9 near Sarasota (271938082251801; fig. 52), and Marshall deep well near Gardner (272012081482501; fig. 53) reported water levels below normal to above normal. ROMP 57 (fig. 50) reported about normal levels most of the year with the maximum water level occurring on October 1 (108.35 ft) and the minimum on May 31 (96.78 ft). Kibler deep well (fig. 51) reported slightly below normal levels most of the year, but near normal to slightly above normal during January and February. The maximum water level during the year was recorded on October 1 (16.95 ft) and the lowest on May 27 (19.76 ft). Sarasota well 9 (fig. 52) averaged below normal levels most of the year, but recorded near normal levels throughout January and February. The maximum water level recorded during 2007 was on October 1 (25.33 ft) and the lowest on May 31 (3.68 ft). Marshall deep well (fig. 53) averaged near normal all year. The maximum water level was recorded on October 1-2 (47.70 ft) and the lowest on June 1 (29.67 ft).

South Florida

Ground-water levels across south Florida varied from slightly above normal to well below normal setting new period-of-record lowest daily maximums at some sites (figs. 54-60).

Water levels at well S-196A near Homestead (253029080295601; fig. 54) are monitored in the Biscayne aquifer and were about normal during the 2007 water year. The maximum daily water level for the year was recorded on July 6 (5.29 ft) and the minimum on April 10 (2.39 ft). Water levels in the surficial aquifer system are monitored in well

PB-683 near West Palm Beach (263524080124301; fig. 55). Water levels in this well ranged from above normal (maximum occurred on July 7; 17.88 ft) to a new period-of-record lowest daily maximum water level on March 15 (12.80 ft). Well C-496 (260111081243901; fig. 56), which monitors water levels in the surficial aquifer system, reported about normal levels from October through February and below normal levels the remainder of the year. The maximum daily water level occurred on October 1 (7.70 ft) and the lowest on July 17 (2.32 ft).

Four representative wells, well L-2194 (261957081432201; fig. 57), well L-729 (263335081394301; fig. 58), well L-1993 (263251081452801; fig. 59), and well L-2434 (263526082010201; fig. 60) monitor water levels in various parts of the intermediate aquifer system in south Florida. Well L-2194 (fig. 57), which monitors water levels in the Tamiami Formation, which is the upper unit in the intermediate aquifer system, recorded near normal levels from October through December and below normal levels for the remainder of the year. The maximum daily water level occurred on October 1 (10.96 ft) and the lowest on April 10 (-2.11 ft). Well L-729 (fig. 58), completed in the intermediate aquifer system, recorded levels that were well below normal throughout the year. This well recorded a new period-of-record lowest daily maximum level on April 2 (2.67 ft); the maximum daily level was recorded on October 3 (19.20 ft). Well L-1993 (fig. 59), completed in the Hawthorn Formation, which is the middle unit in the intermediate aquifer system, recorded levels well below normal, even reaching a period-of-record lowest daily maximum on June 12 (1.87); the highest daily water level occurred on October 1 (6.87 ft). Well L-2434 (fig. 60), which records water levels in the limestone aquifer, recorded levels that were well below normal during the year (lowest daily water level was 45.47 ft), except for a brief period in May, when levels spiked slightly above normal, recording the maximum daily water level of 3.22 ft for the year.

Summary

This report describes the record-setting high and low hydrologic conditions in Florida during the 2007 water year, including data analyses for precipitation, surface-water flows, lake elevations, and ground-water levels. Many streams in Florida recorded their lowest annual streamflow for their respective periods of record. For example, the Withlacoochee River near Trilby, a station continuously monitored since 1928, registered an annual streamflow of 9.57 ft^3/s, which was 3 percent of the period-of-record average. Lake Okeechobee reached its all-time record-low levels on July 2 of 8.82 ft. Several wells across the State in various aquifers reached record-low daily maximum water levels. Well 422A near Greenhead in northwest Florida, which monitors the Floridan aquifer system, recorded its lowest daily maximum on September 30 of 45.51 ft.

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