

Summary Statistics of Rainfall Data for Sites in West-Central Florida



Hurricane Irma (September 2017)

By Cortney Cameron, Marty Kelly, PhD, and Ron Basso, P.G

Original January 2010 - Revised April 2018

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1.0 A Simple Conceptualized Rainfall/Discharge Relationship

This document, originally authored by Marty Kelly circa 2010, has been updated to include 1) rainfall data through the end of 2016, 2) slightly modified methods, 3) nine additional stations (Avon Park, Bushnell, Crescent City, Desoto City, La Belle, Lake Alfred, Orlando International, Tarpon Springs, Venice), 4) District-wide averages and summary maps, 5) ENSO and cyclone activity analyses, and 6) document bookmarks for ease of navigation.

Stream or river flows are, of course, integrally associated with rainfall. In his 1974 book, *Water: A Primer*, Luna B. Leopold notes that “[s]treamflow is what is left over after precipitation has supplied the demands of vegetation and the process of evaporation. Leftovers or differences tend to vary greatly with time. For example, suppose the rainfall in one year is 40 inches and that evaporation and plant transpiration 20 inches. This leaves 20 inches to be carried off by the streams. Suppose that in the next year rainfall is 30 inches, 25 percent less than the year before. If evaporation and transpiration were the same, which is quite possible, streamflow would be only 10 inches, 50 percent less than in the year before. Thus, a 25 percent change in rainfall becomes a 50 percent change in runoff. This means that the flow of streams is highly variable and sensitive to changes in rainfall.”

In the Southwest Florida Water Management District (“District”), average annual rainfall at most sites is approximately 50 to 52 inches per year. Evapotranspiration is generally assumed to be about 38 inches per year and does not vary much from year to year due to rainfall variation. This is supported by field measurements of ET and rainfall at the Starkey site in southwest Pasco County. Sumner et al. (2017) found that annual ET varied from 28 inches to 34 inches per year when rainfall varied from 34 to 63 inches per year, respectively. This means that water available for runoff and recharge ranged from 6 inches per year during extreme drought conditions to over 31 inches per year during very wet periods. While rainfall varied by almost 30 inches per year over the period measured, ET changed by only 6 inches per year or about a sixth as much.

Using Leopold’s simplified equation, one might expect streamflow (in the absence of withdrawals or discharges, no changes in storage, and without significant gains or losses to/from groundwater) to average about 12 inches per year (i.e., $50 - 38 = 12$). Note that this assumption would be most applicable in the south half of the District, where the water table is shallow and the system is well-confined. In other areas where

the water table is deep and the system is leaky or unconfined, runoff is much less, and recharge to the surficial or Upper Floridan aquifer would constitute a much larger component than runoff in Leopold's equation.

2.0 Peninsular Florida Rainfall Characteristics with AMO and ENSO

For southwest Florida (and peninsular Florida in general, as discussed by Kelly [2004]), wet season rainfall occurs during the summer rainy season, defined in this paper as the months of June through October, with remaining months considered "dry season" months. Coincident with the wet season is the tropical storm and hurricane season, which is generally defined as extending from June to November, although most activity occurs between August and the first half of October. This increased tropical activity leads to greater rainfall totals during the summer and early fall.

As explained by Enfield et al. (2001) – and the premise of work done by Kelly (2004) and Kelly and Gore (2008) – warmer North Atlantic Sea Surface Temperatures (SST) lead to increased summer rainfall on the Florida peninsula that results in higher river and spring flow. Conversely, cooler North Atlantic SST are associated with decreased summer rainfall and tropical cyclonic activity for peninsular Florida – and therefore, lower river and spring flows. North Atlantic SST have fluctuated between "warm" and "cool" phases at 20 to 50-year intervals, a long-term decadal cycle that has been termed the Atlantic Multidecadal Oscillation or AMO (Kerr, 2000; Enfield et al., 2001; Knudsen et al., 2011). As measured by the AMO, long-term periods of above-average or warm North Atlantic SSTs are referred to as "warm" or "positive" AMO phases, while long-term periods with below-average SSTs are "cool" or "negative." phases.

Although the actual deterministic mechanisms of the AMO remain poorly understood, warm phases are associated with a stronger thermohaline circulation in the Atlantic Ocean and cool phases with weaker thermohaline circulation. This thermohaline circulation is a global deep ocean current often described as a "conveyor belt" that transports warmer equatorial water in the south Atlantic Ocean northward to the North Atlantic region south of Greenland. Research from proxy data such as tree rings and ice cores suggests that the AMO has existed for most of the Holocene (11,700 years ago to present). More recently, cool phases have been identified from 1900 to 1925 and 1970 to 1995, with warm phases from around 1925 to 1969 and from 1995 to the present. These phases have been identified by NOAA and are based on recorded North Atlantic sea surface temperature anomalies ([Figure 1](#)). Most long-term rainfall stations include these two warm and cool phases that start around the turn-of-the-century. However, most continuous daily flow measurements for rivers and springs in Florida were initiated by the USGS around 1930 and therefore miss the early cool phase from 1900-1925.

Superimposed on the long-term fluctuations of the AMO are the shorter-term El Niño–Southern Oscillation (ENSO), a largely Pacific Ocean phenomenon that nevertheless has important implications for US climate. While the AMO largely affects wet season rainfall, ENSO largely impacts dry season precipitation during the winter–early spring. Specifically, El Niño events in Florida are associated with increased dry season rainfall and La Niña events with lower than average precipitation. During El Niño, easterly trade winds in the Pacific Ocean weaken, allowing warmer oceanic waters to migrate from the west to east which suppresses the upwelling of cool seawater along the western South American coast. In winter and early spring, this situation allows the jet stream to migrate southward in the Pacific Ocean and across the southern US and Florida, bringing with it wet winter and early spring weather. During La Niña, the easterlies strengthen, increasing upwelling along the western South American coast which causes the jet stream to be displaced northward. During “neutral months,” an intermediate state exists. Typically, an El Niño or La Niña event will last several months, recurring every 2 to 7 years as the intensity varies. Thus, the AMO and ENSO differ in their duration, frequency, and the seasons for which they most impact precipitation (Table 1).

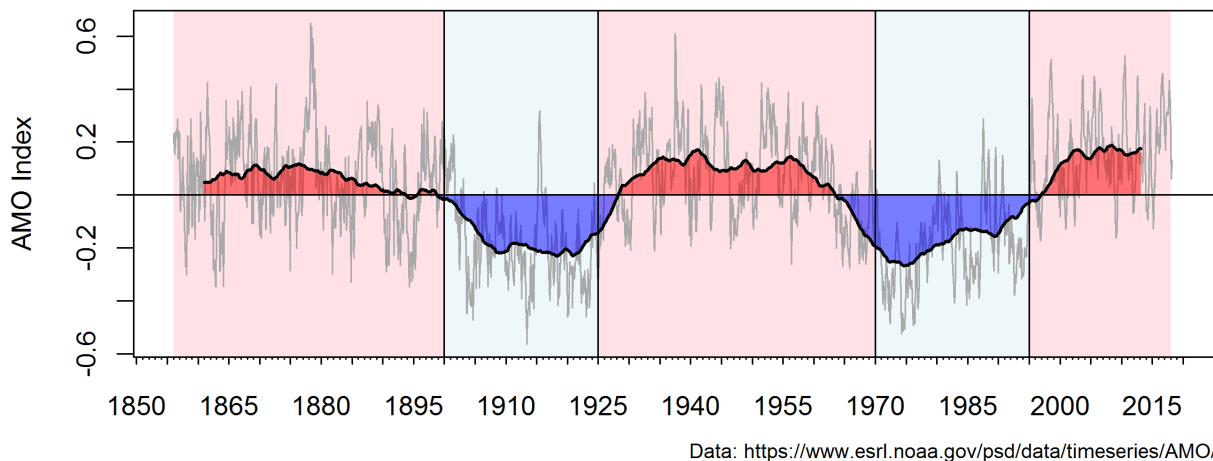


Figure 1. AMO index from 1856 to 2017, smoothed (121 months; black line) and unsmoothed (gray line), from NOAA. Vertical lines indicate shifts between AMO phases (warm in red; cool in blue) defined after Enfield et al. (2001).

As noted by Enfield (2001), Basso and Schultz (2003), Kelly (2004), and Kelly and Gore (2008), greater mean annual rainfall totals for the period 1940 to 1969 and lower rainfall totals for the period 1970 to 1994 are explained partially by the increase and decrease, respectively, in tropical cyclone activity of the two periods. In addition to changes in tropical cyclone activity, other atmospheric pattern changes contribute to enhanced summer rainfall on the Florida peninsula during warm AMO phases. Basso and Schultz (2003) found that tropical cyclone activity accounted for about one-third of changes in

wet season rainfall over the long-term period of an AMO cycle in their study of west-central Florida.

While the AMO affects long-term patterns in wet season rainfall, the potential impacts of ENSO on dry season rainfall have been poorly understood. This paper examines the impact of ENSO during the AMO periods to determine if there have been changes in dry season rainfall over the last 80 years and how that has affected annual rainfall totals.

Table 1. Characteristics of AMO and ENSO and their impacts on peninsular Florida.

Climate Phase	Duration	Return Period (Yr)	Drivers	Rainfall Changes
AMO Warm	Decades	20-50	Atlantic Thermohaline Circulation (Strong)	Wet Season Higher
AMO Cool	Decades	20-50	Atlantic Thermohaline Circulation (Weak)	Wet Season Lower
ENSO El Nino	Months	2-7	Pacific Easterly Winds (Weak)	Winter/Spring Higher
ENSO La Nina	Months	2-7	Pacific Easterly Winds (Strong)	Winter/Spring Lower

3.0 Methods

3.1.1 Rainfall

To characterize regional rainfall variability in the different AMO phases, rainfall data was examined at a number of sites in and around the District (Figure 2). For this effort, the analysis was restricted to those sites with relatively long rainfall records (Figure 3) that coincide with warm and cool cycles of the AMO (see Enfield et al. 2001; Knudsen et al. 2011). Due to poor data availability and concerns about data quality before 1940, that year was used as the starting year for the 1925-1969 warm phase for data analyses.

Stations in the District’s database with at least 20,000 daily values (e.g. at least ~55 combined years of data) were selected for analyses, resulting in 36 stations (see notes on modifications to the Brooksville and Gainesville stations under “Individual Station Data”). For each station with missing daily values each month with at least 20 values, the monthly mean (inches per day) was multiplied by the number of missing days in the month (e.g. 28 for February; 31 for October), resulting in a rainfall total for that month. It was assumed that the monthly mean was representative of rainfall on missing days in a month, with the constraint that no more than 8 to 11 (depending on the month, e.g. 8 or 9 for February; 11 for October) daily values could be approximated per month; otherwise, that month (and later, that year) was discarded from the analysis.

Total annual rainfall was calculated by summing these monthly values. Since about 60% of annual rainfall typically occurs during the wet season, the annual total could be significantly underestimated if even one month from the wet season was not included or overestimated if missing a month from the dry season. Therefore, if a year lacked data for one or more months (e.g. if any month had fewer than 20 daily values), that year was excluded from the annual analyses.

Summary maps are shown that compare annual, wet season, and dry season rainfall among the various AMO periods in Figures 4 through 9.

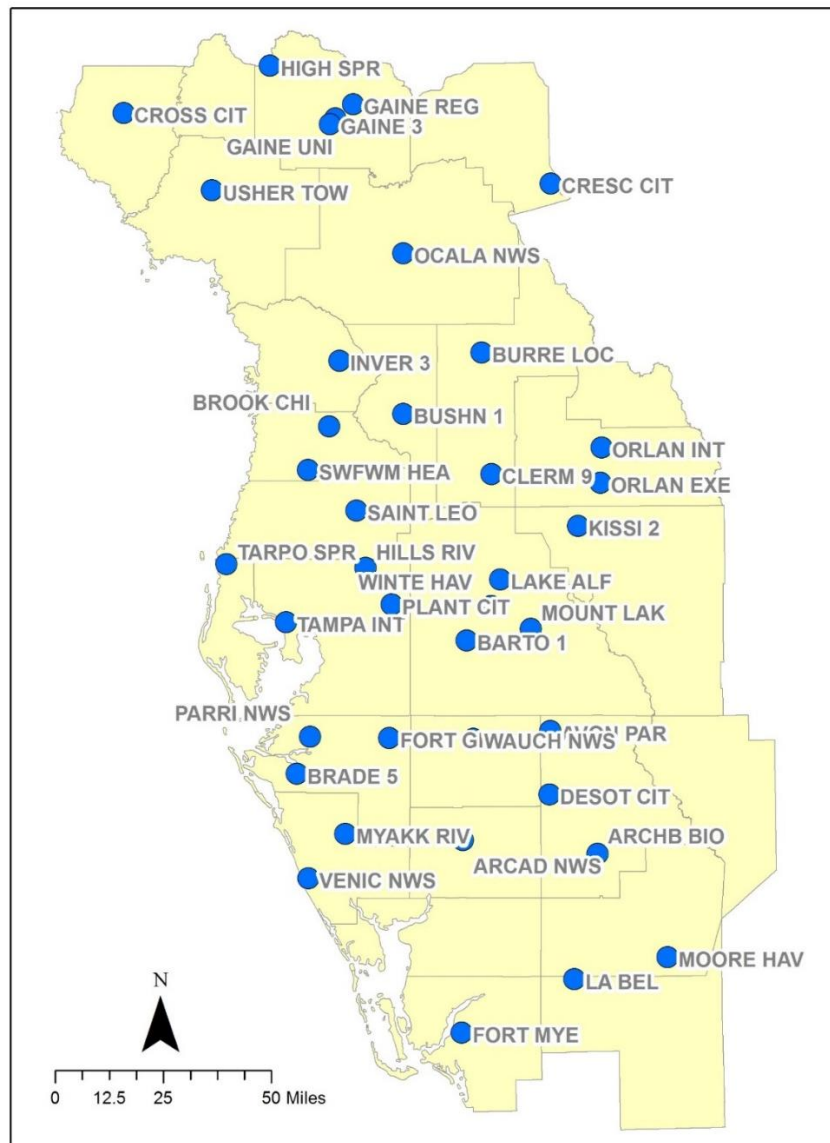


Figure 2. Locations of rainfall gaging stations (including the sites used to develop the BIO_AVG and District-wide data sets) used for analyses of rainfall variation in west-central Florida.

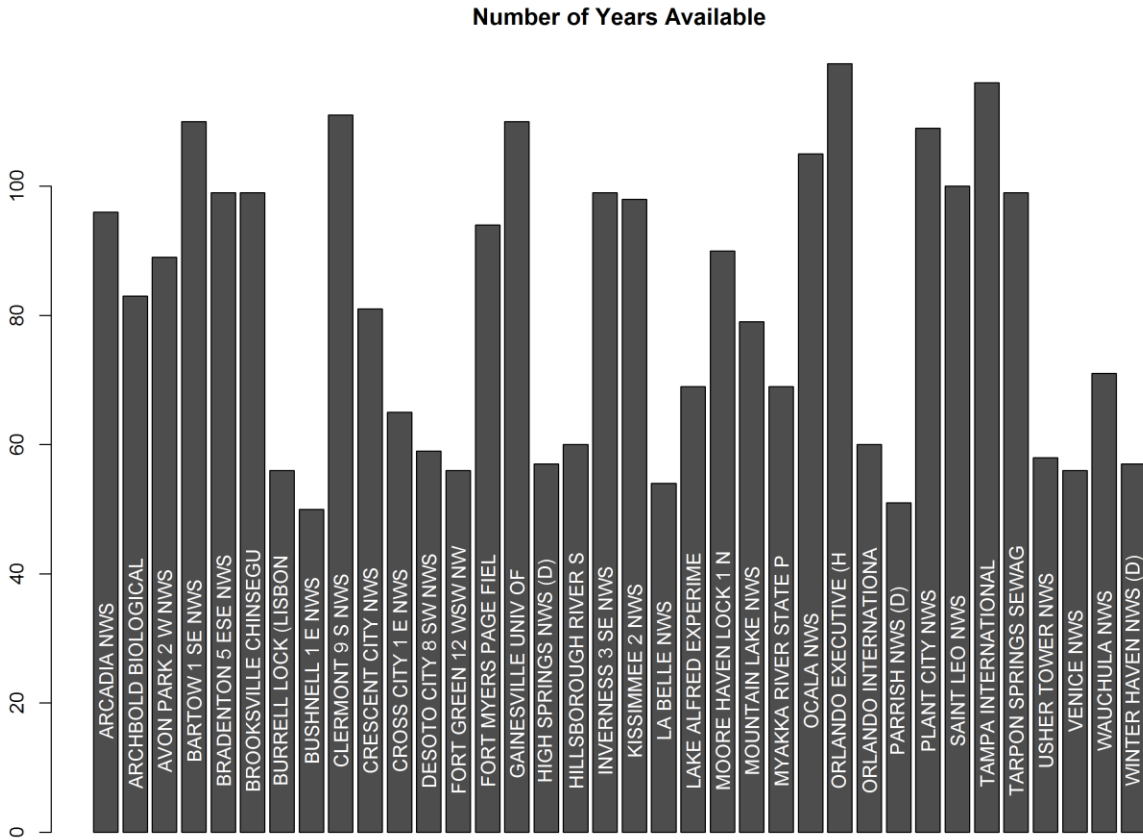


Figure 3. Number of years of data available at 36 stations with at least 20,000 daily observations each. See note on Brooksville and Gainesville stations.

Summary Maps: Current vs. Last Warm AMO Phases

Annual Rainfall Difference, Warm 2 (1995-2016) less Warm 1 (1940-1969)

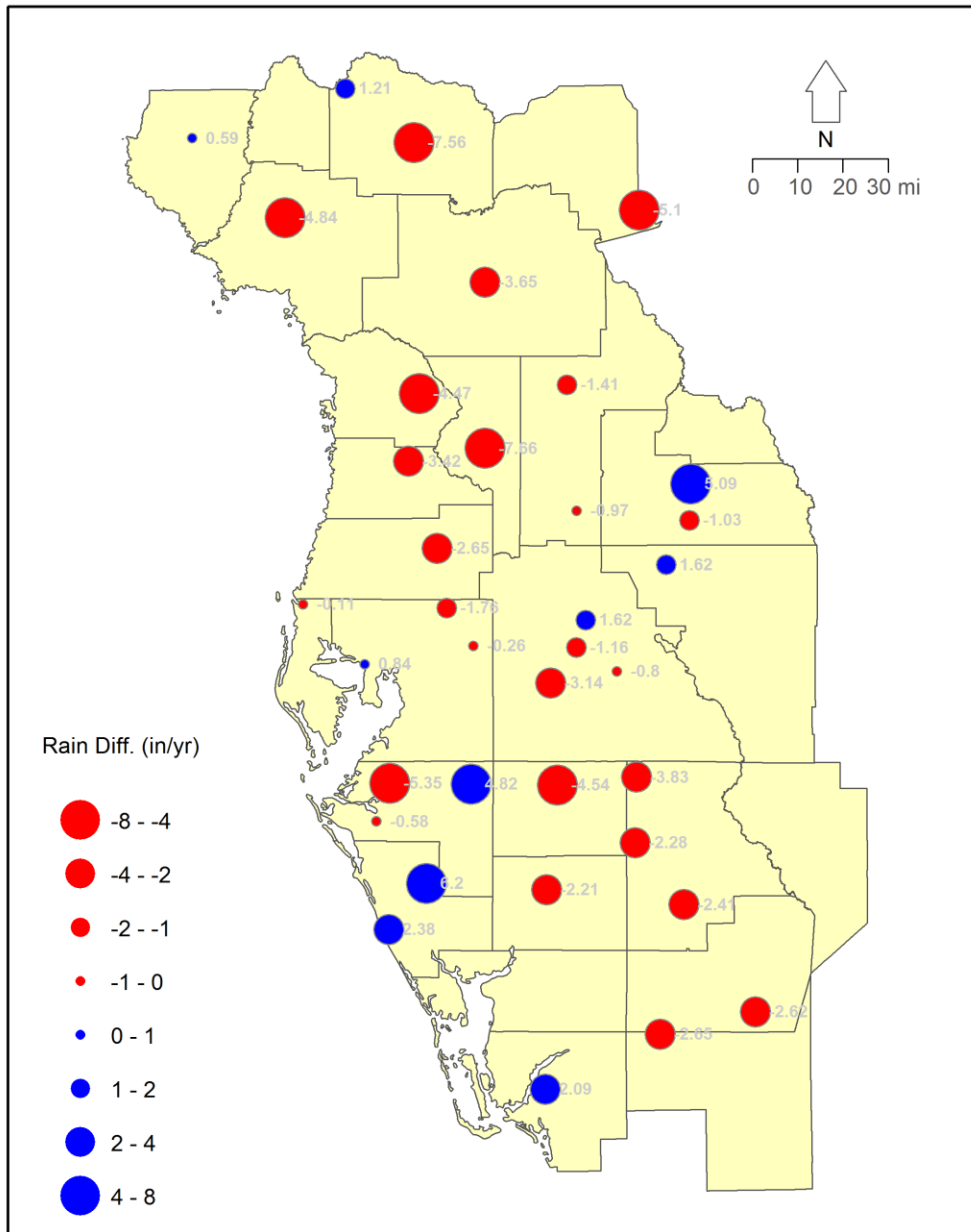


Figure 4. Difference in average annual rainfall for the last two warm AMO phases (1995-2016 minus 1940-1969) at 36 stations. Most stations (26/36) have not reached average 1940-1969 levels.

Dry Season Rainfall Difference, Warm 2 (1995-2016) less Warm 1 (1940-1969)

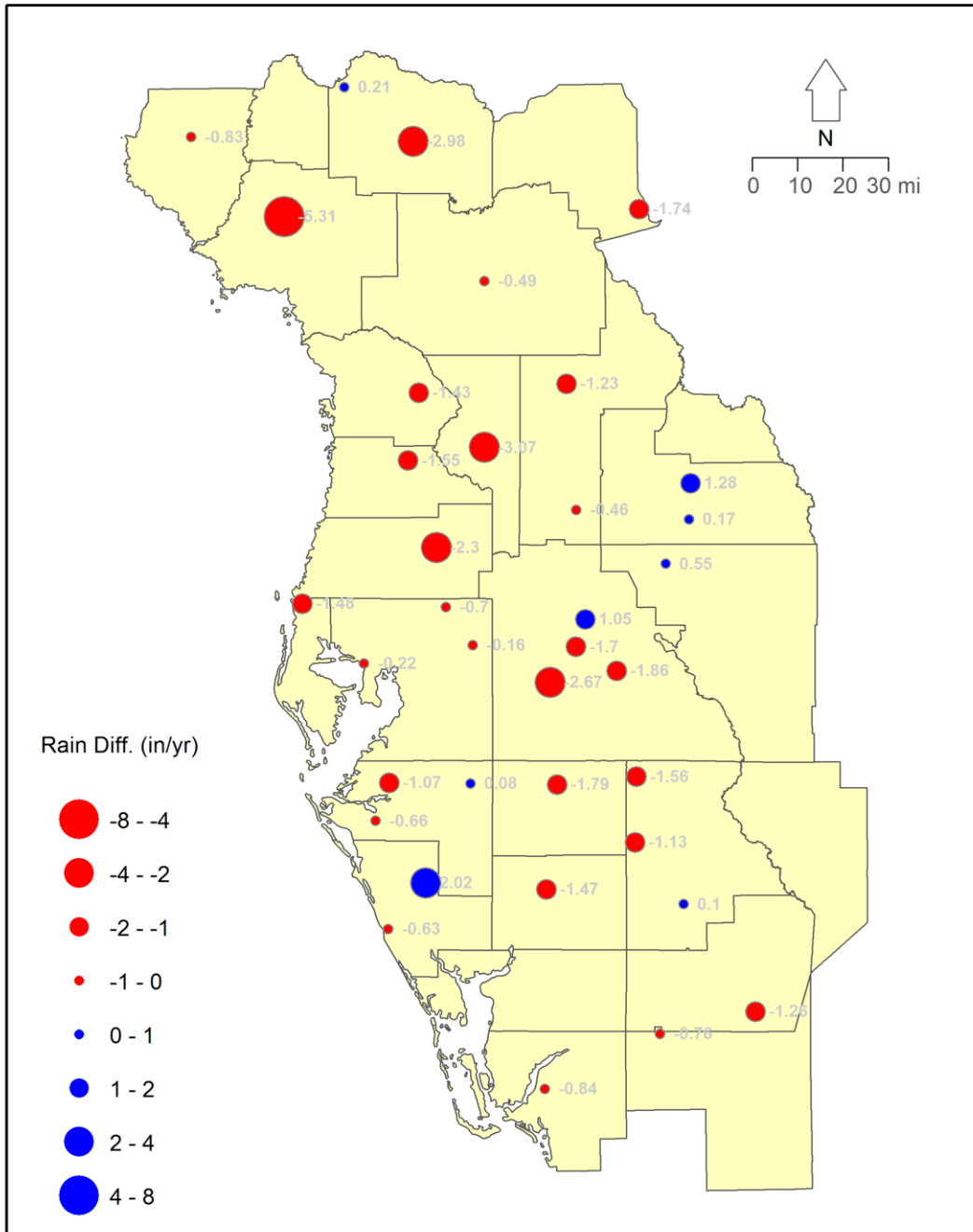


Figure 5. Difference in average dry season rainfall for the last two warm AMO phases (1995-2016 minus 1940-1969) at 36 stations. Most stations (28/36) have experienced lower dry season rainfall during the latest warm phase compared to the previous warm phase.

Wet Season Rainfall Difference, Warm 2 (1995-2016) less Warm 1 (1940-1969)

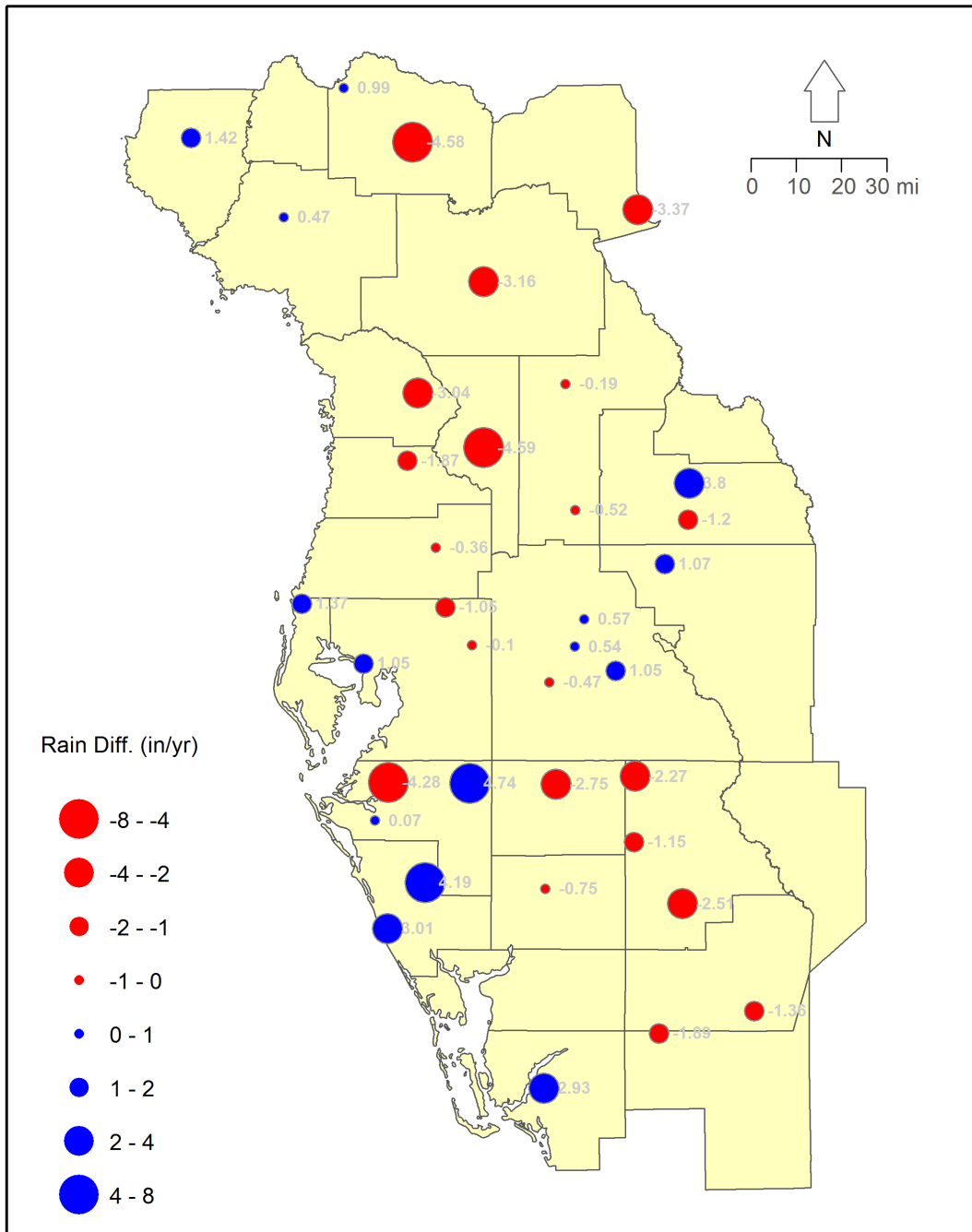


Figure 6. Difference in average wet season rainfall for the last two warm AMO phases (1995-2016 minus 1940-1969) at 36 stations. Over half of stations (21/36) have experienced decreased wet season rainfall during the latest warm phase compared to the previous warm phase.

Summary Maps: Current Warm vs. Preceding Cool AMO Phase

Annual Rainfall Difference, Warm 2 (1995-2016) less Cool (1970-1994)

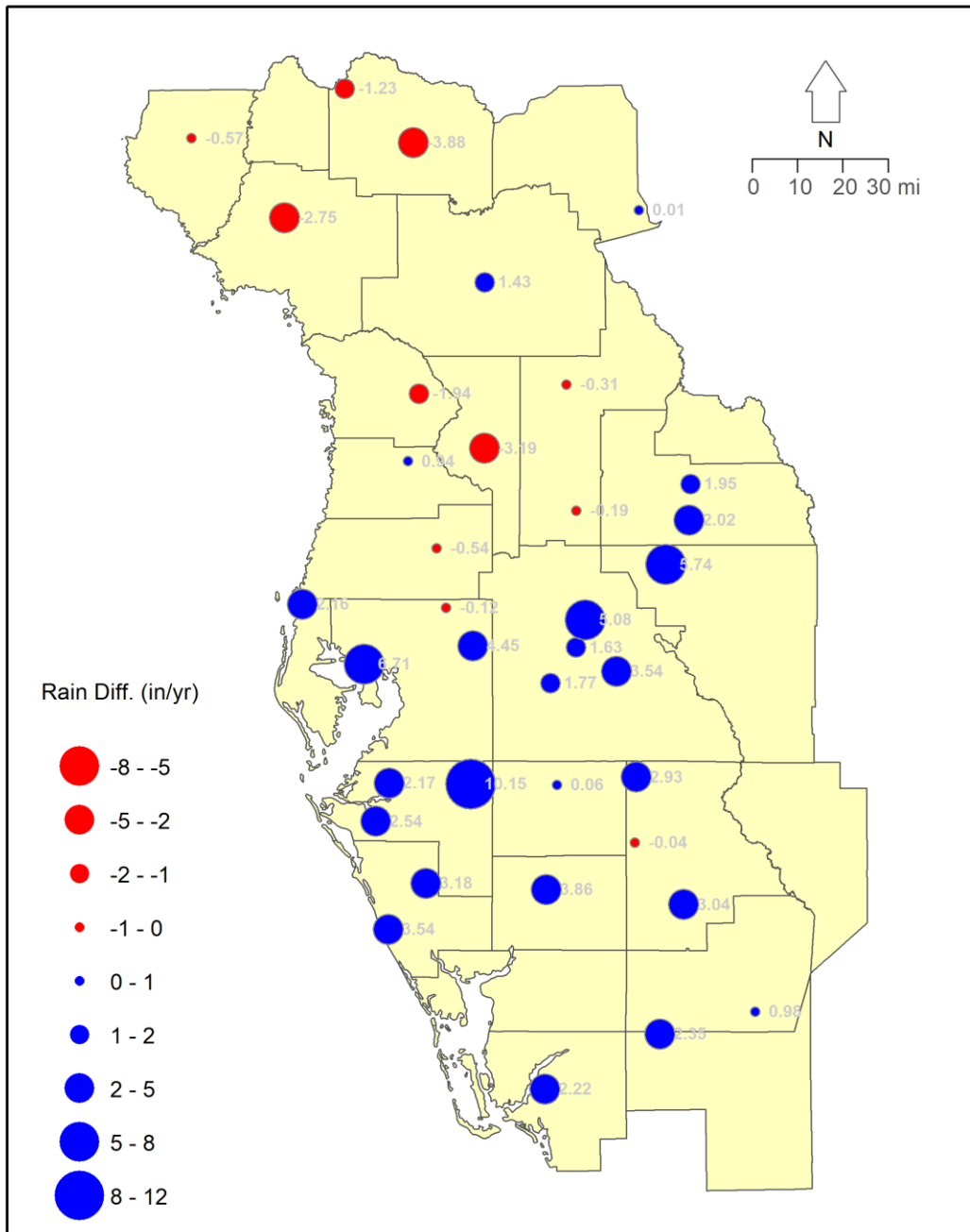


Figure 7. Difference in average annual rainfall for the last warm (1995-2016) and cool (1970-1994) AMO phases at 36 stations. Overall, 25 stations, mostly in the south, have experienced increased rainfall during the latest warm phase compared to the cool phase, while 11, mostly in the north, have not.

Dry Season Rainfall Difference, Warm 2 (1995-2016) less Cool (1970-1994)

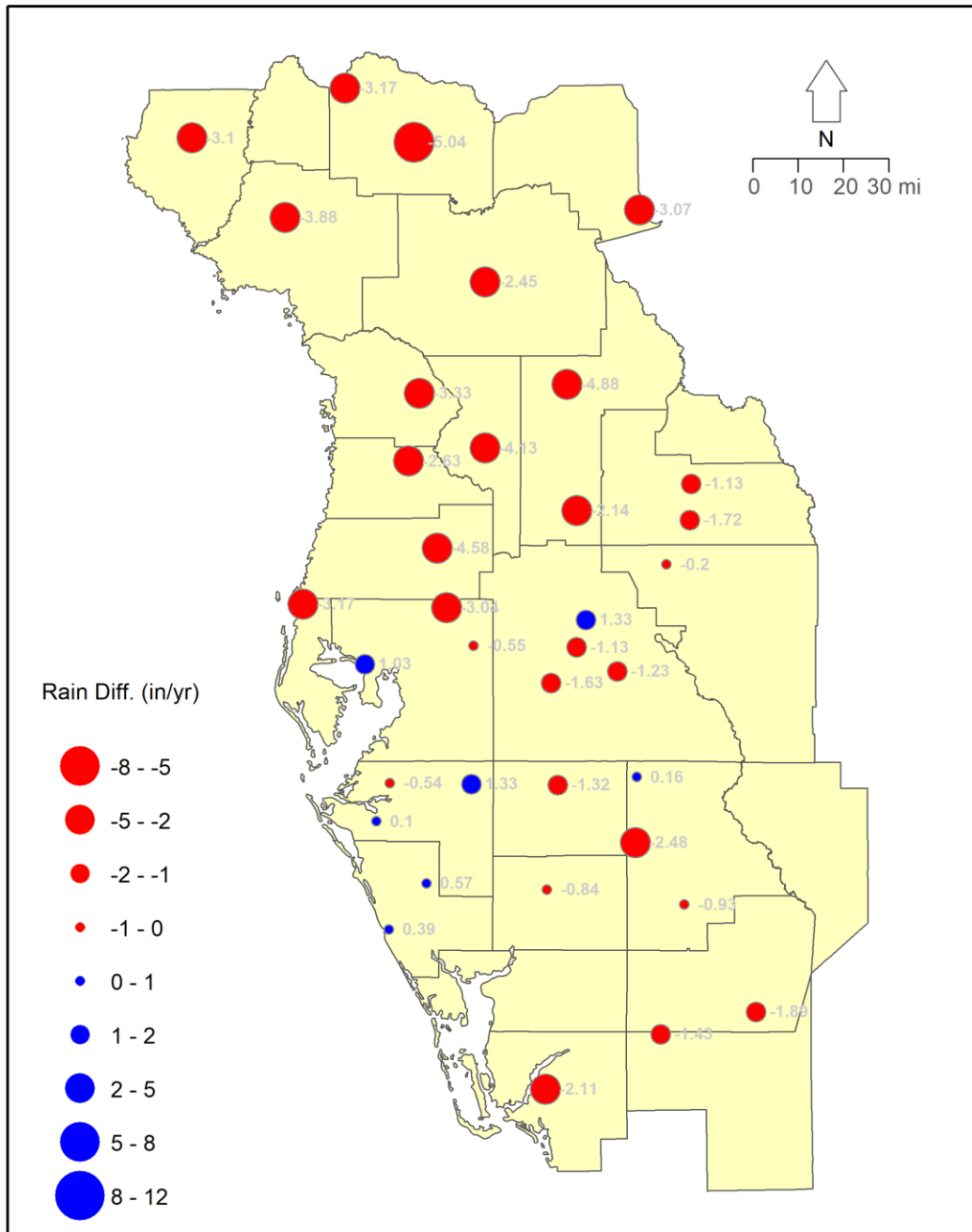


Figure 8. Difference in average dry season rainfall for the last warm (1995-2016) and cool (1970-1994) AMO phases at 36 stations. Most stations (29/36) have experienced lower dry season rainfall during the latest warm phase compared to the cool phase, with the greatest decrease in the north half.

3.2 BIO_AVG Data Set

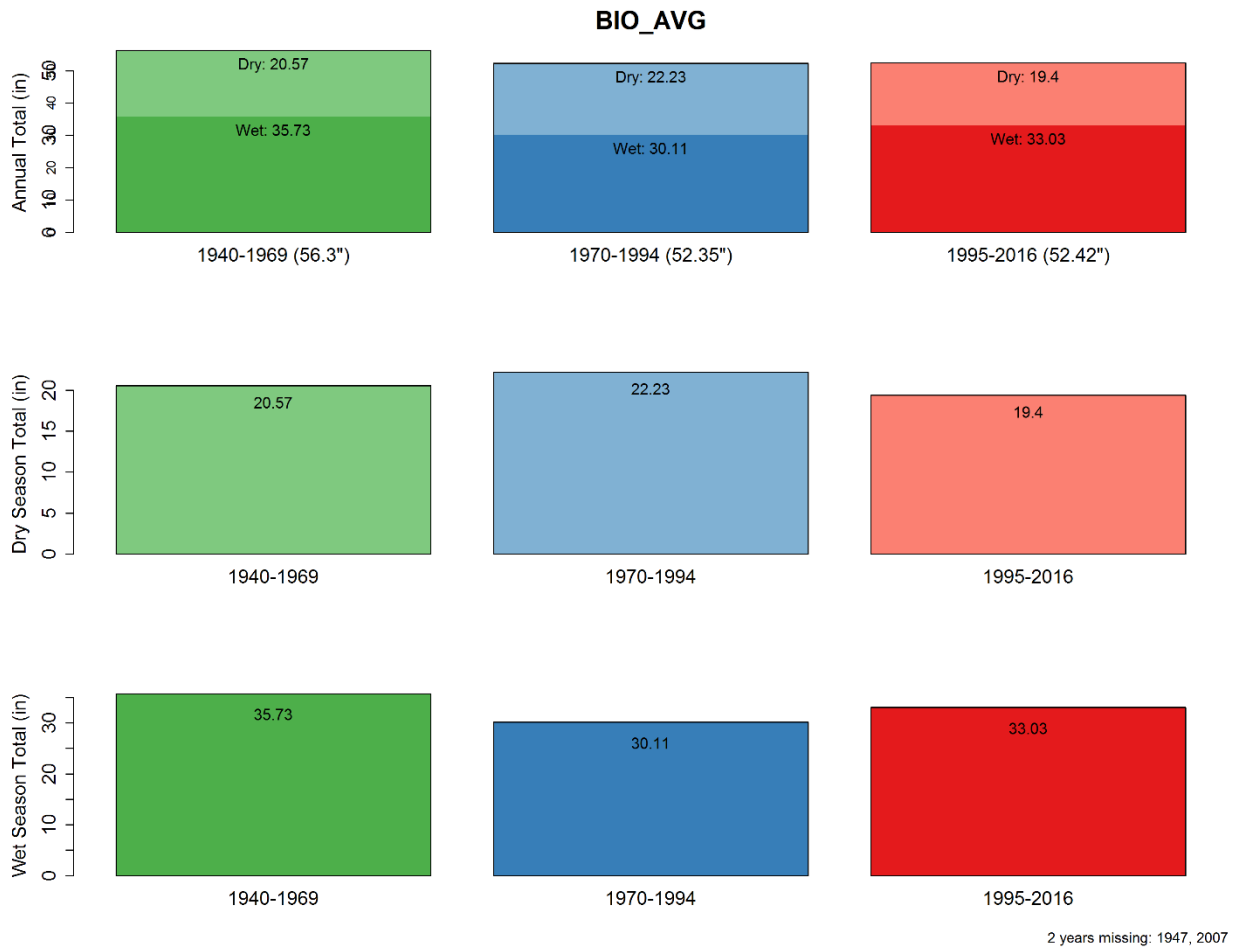
To illustrate the approach, graphical and tabular summary results are presented here for a rainfall data set created from reported daily rainfall at three long term National Weather Service (NWS) sites. The average-site data set is referred to as the BIO_AVG and was based on records collected at the Brooksville Chinsegut Hill NWS, Inverness 3 SE NWS, and Ocala NWS sites (Figure 2). These sites were averaged at the daily level then aggregated by month and year as described in “Methods.” The Brooksville site was discontinued in 2012; therefore, data for this site was averaged or extended from 2012 using data from SWFWMD Headquarters (SWFWMD Station ID 20882), located approximately 11 miles south-southwest of the original (Figure 2).

The BIO_AVG data set was developed to represent long-term average rainfall conditions across the Northern Planning Region of the District, and because when missing data occurred at any one of the NWS sites, a mean could be calculated using the other two. This approach resulted in a fairly complete rainfall record that contained no missing yearly, seasonal or monthly totals.

Figure 10 and its accompanying table provide the mean annual, dry season (November through May) and wet season (June through October) rainfall for two warm AMO periods (1940-1969 and 1994-2016) and a single cool AMO period (1970-1994). The table further contains the means for the period of record (POR).

Figure 11 provides the cumulative annual deviation from the POR mean annual rainfall. The table provides mean multi-year rainfall totals for the driest and wettest periods. The cumulative deficit plot is useful for identifying periods of above average rainfall (upward sloping line) or below average rainfall (downward sloping line) with the extent or length of the downward or upward sloping segment indicative of the cumulative effect of wet or dry periods.

Figure 12 and its accompanying table provide the mean monthly rainfall totals for three AMO periods. The table further contains the monthly means for the POR.



	1940-1969	1970-1994	1995-2016	1892-2016 (POR)
<i>Wet</i>	35.73	30.11	33.03	33.77
<i>Dry</i>	20.57	22.23	19.4	20.48
<i>Total</i>	56.3	52.35	52.42	54.25

Figure 10. Summary information on mean annual, dry season and wet season rainfall for the BIO_AVG data set for three AMO periods.

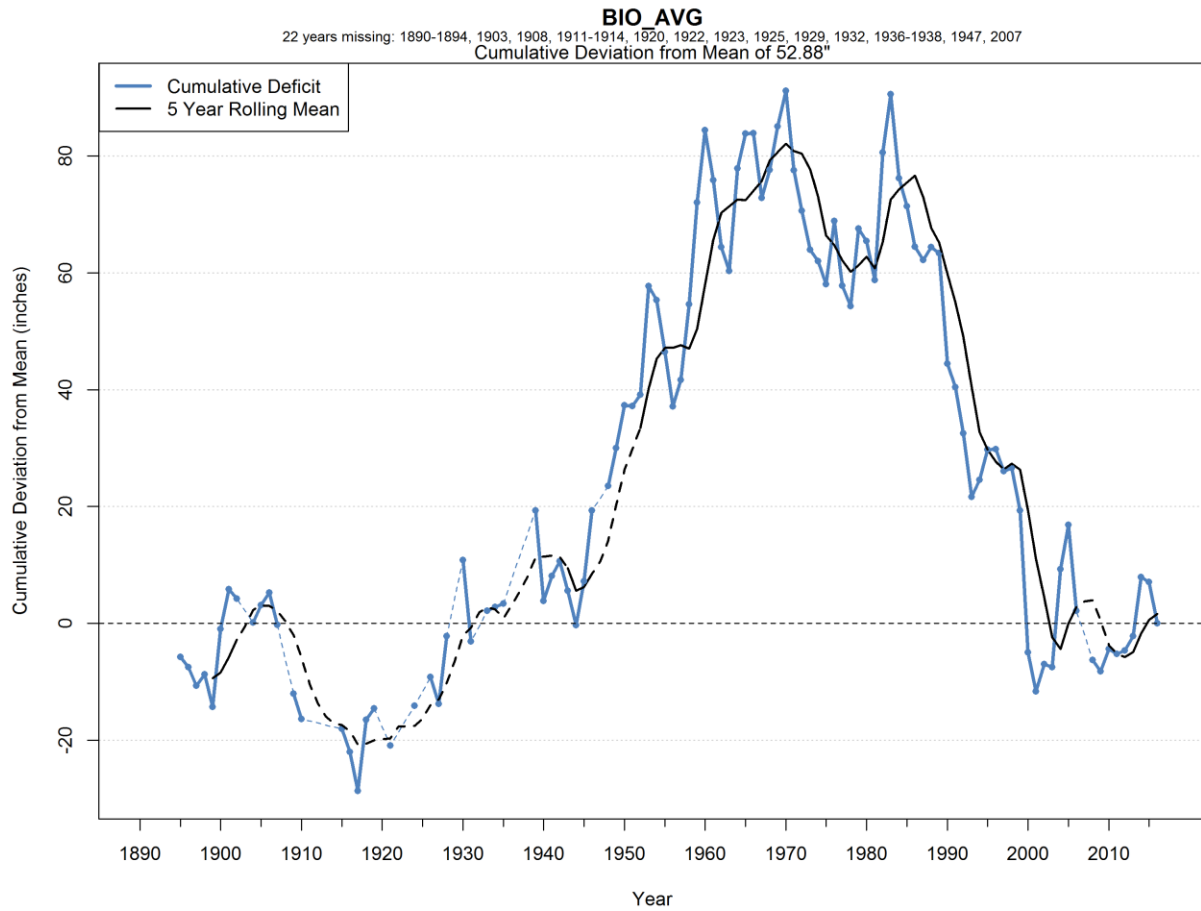


Figure 11. Average multi-year rainfall totals for the driest and wettest periods (table) and cumulative annual deviation (blue line) from period of record mean annual rainfall for the BIO_AVG data set. The black line is the 5-year moving average of the cumulative deviations.

	Annual Mean	Year Ending
<i>Driest 2 Year</i>	37.1	2000
<i>Driest 3 Year</i>	40.14	2001
<i>Driest 4 Year</i>	42.44	1993
<i>Driest 5 Year</i>	44.33	1993
<i>Driest 10 Year</i>	45.99	1993
<i>Wettest 2 Year</i>	68.81	1983
<i>Wettest 3 Year</i>	67.13	1960
<i>Wettest 4 Year</i>	64.7	1960
<i>Wettest 5 Year</i>	60.63	1961
<i>Wettest 10 Year</i>	57.59	1960
<i>Period of Record</i>	52.88	2016

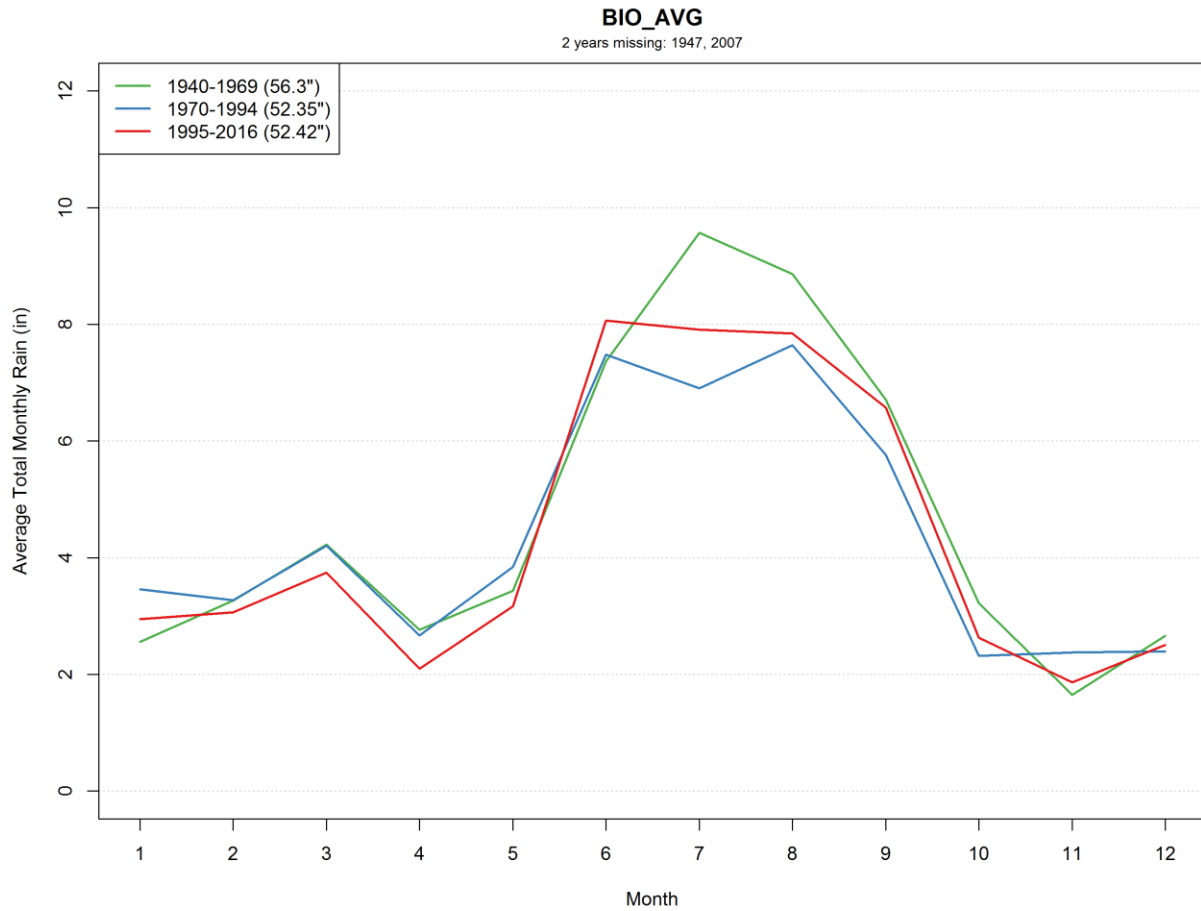


Figure 12. Mean monthly rainfall totals for three AMO periods (line chart and table) for the BIO_AVG data set.

	1940-1969	1970-1994	1995-2016	1892-2016 (POR)
Jan	2.56	3.46	2.95	2.82
Feb	3.27	3.27	3.06	3.09
Mar	4.23	4.21	3.75	3.68
Apr	2.77	2.67	2.1	2.62
May	3.44	3.84	3.17	3.76
June	7.36	7.48	8.07	7.71
July	9.57	6.91	7.91	8.52
Aug	8.87	7.64	7.85	8.18
Sep	6.71	5.77	6.57	6.46
Oct	3.22	2.32	2.63	2.9
Nov	1.65	2.38	1.87	1.91
Dec	2.67	2.39	2.51	2.6

3.3 District-wide Data Set

As a follow-up to the BIO_AVG data set, a District-wide average data set was created by averaging the aggregated monthly and yearly values (see “Methods”) for the stations shown in Figure 2 ($n = 36$). Not all stations were available for each year, so certain years are less representative of District-wide conditions as a result of poor station coverage, especially early in the data set (Figure 13). See “Appendix A: Individual Station Data” for a list of years missing for each station. Additionally, the stations are not evenly spatially distributed throughout the district (Figure 2), so even during years with good coverage, certain regions will be weighted more heavily than others.

Figure 14 shows the rainfall time series for the District-wide dataset from 1892 to 2016, while Figures 15 through 17 follow the format described for BIO_AVG.

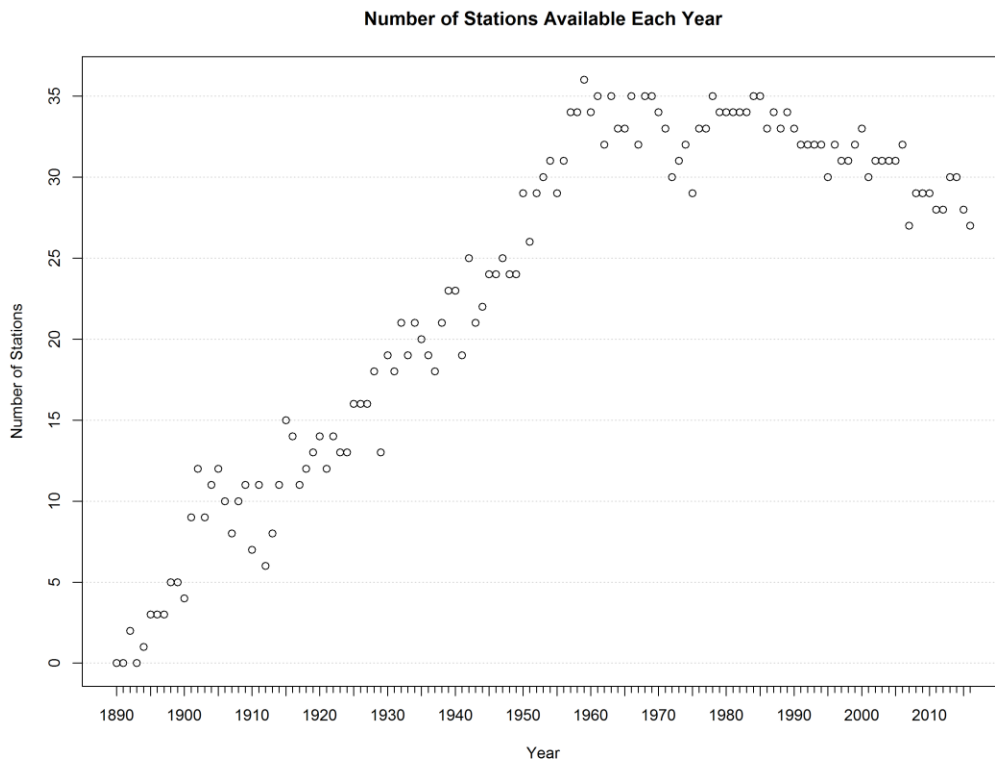


Figure 13. Number of stations with data available for each year from the set of stations with at least 20,000 daily observations each; maximum possible is 36. See “Individual Station Data” for a list of years missing for each station.

Average Annual Rainfall of Stations w/ >2E4 Observations

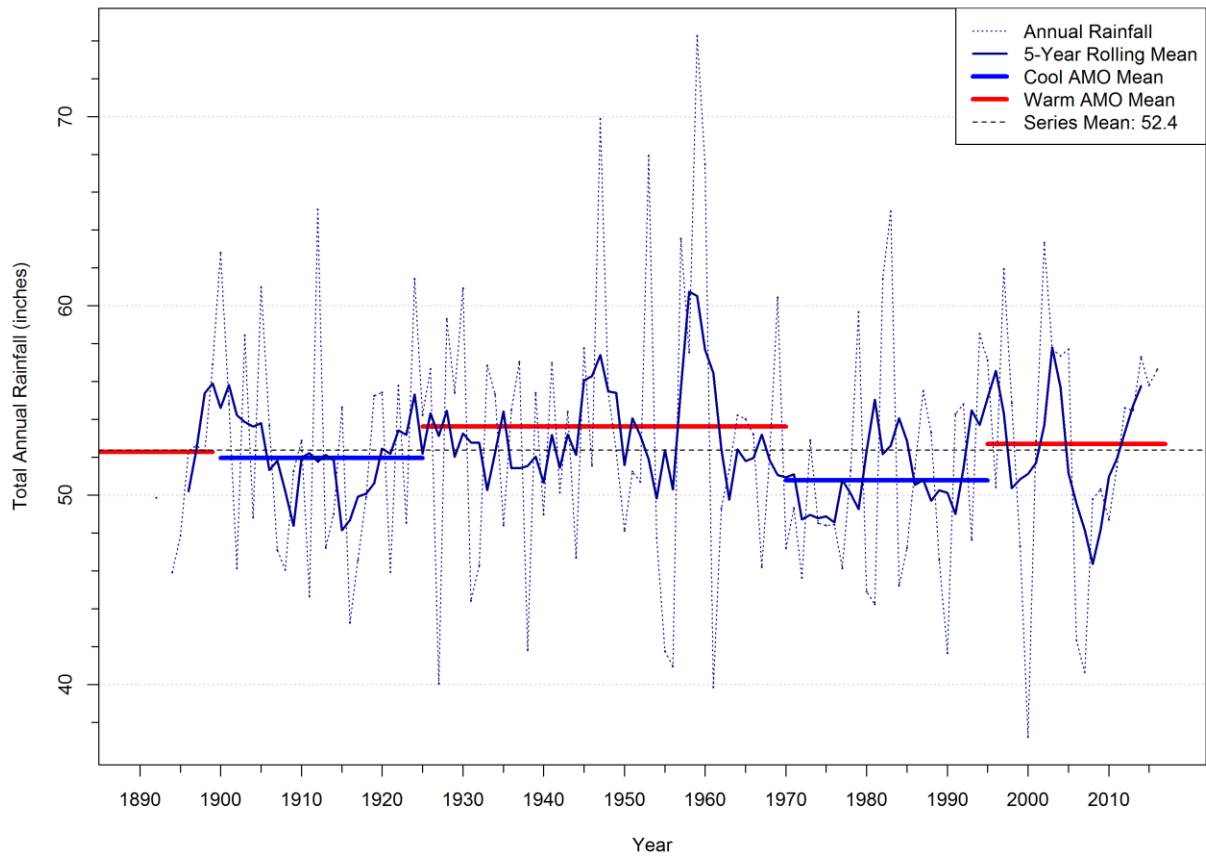
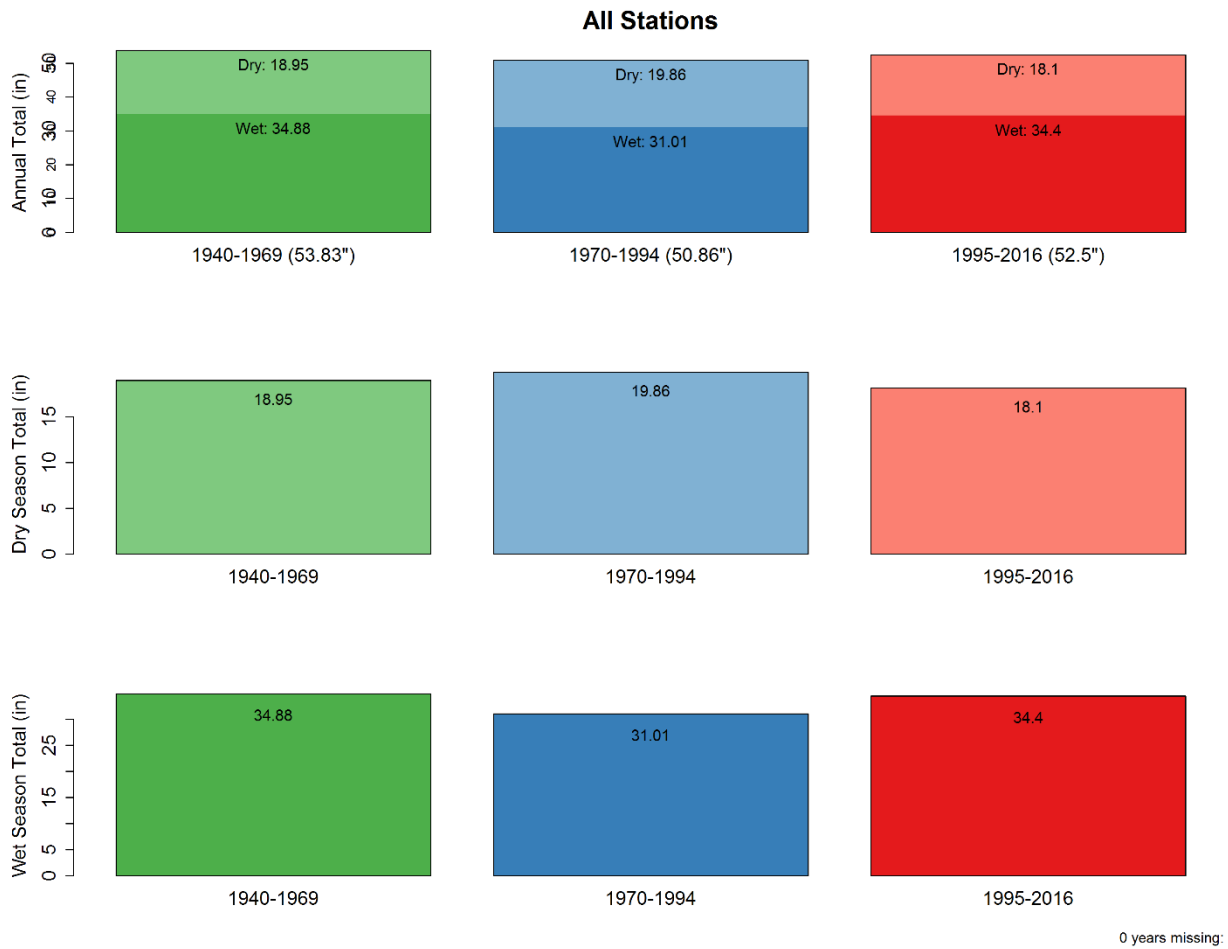


Figure 14. Average annual rainfall of the 36 stations. Not all stations were available for each year. Thick horizontal lines indicate the means for the cool (blue) or warm (red) AMO phase spanned by the line. Dashed horizontal line represents the mean for the period of record.



	1940-1969	1970-1994	1995-2016	1890-2016 (POR)
<i>Wet</i>	34.88	31.01	34.4	33.81
<i>Dry</i>	18.95	19.86	18.1	18.69
<i>Total</i>	53.83	50.86	52.5	52.49

Figure 15. Summary information on mean annual, dry season and wet season rainfall for the District-wide data set for three AMO periods.

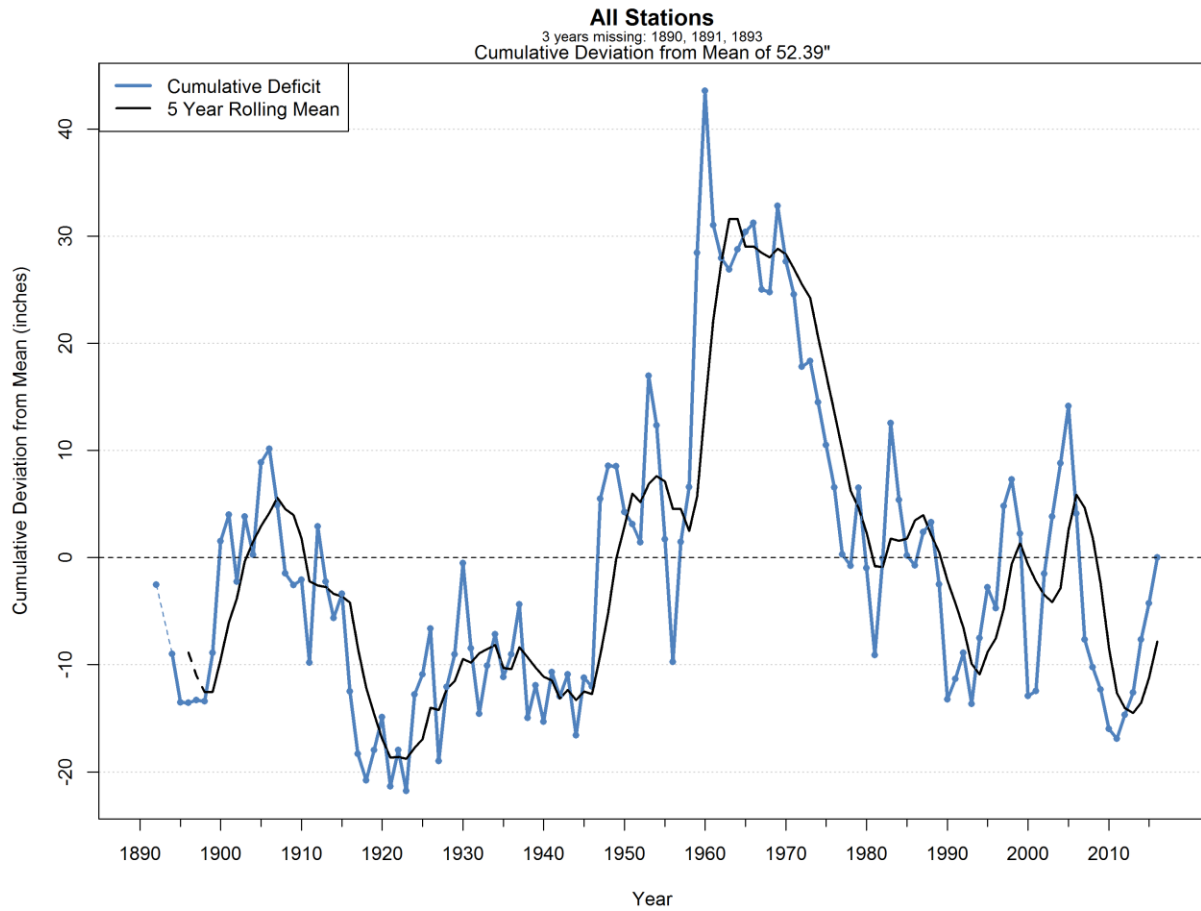


Figure 16. Average multi-year rainfall totals for the driest and wettest periods (table) and cumulative annual deviation (blue line) from period of record mean annual rainfall for the District-wide data set. The black line is the 5-year moving average of the cumulative deviations.

	Annual Mean	Year Ending
<i>Driest 2 Year</i>	41.36	1956
<i>Driest 3 Year</i>	43.49	1956
<i>Driest 4 Year</i>	45.77	2009
<i>Driest 5 Year</i>	46.36	2010
<i>Driest 10 Year</i>	49.02	1981
<i>Wettest 2 Year</i>	70.86	1960
<i>Wettest 3 Year</i>	66.42	1960
<i>Wettest 4 Year</i>	65.7	1960
<i>Wettest 5 Year</i>	60.75	1960
<i>Wettest 10 Year</i>	56.48	1966
<i>Period of Record</i>	52.39	2016

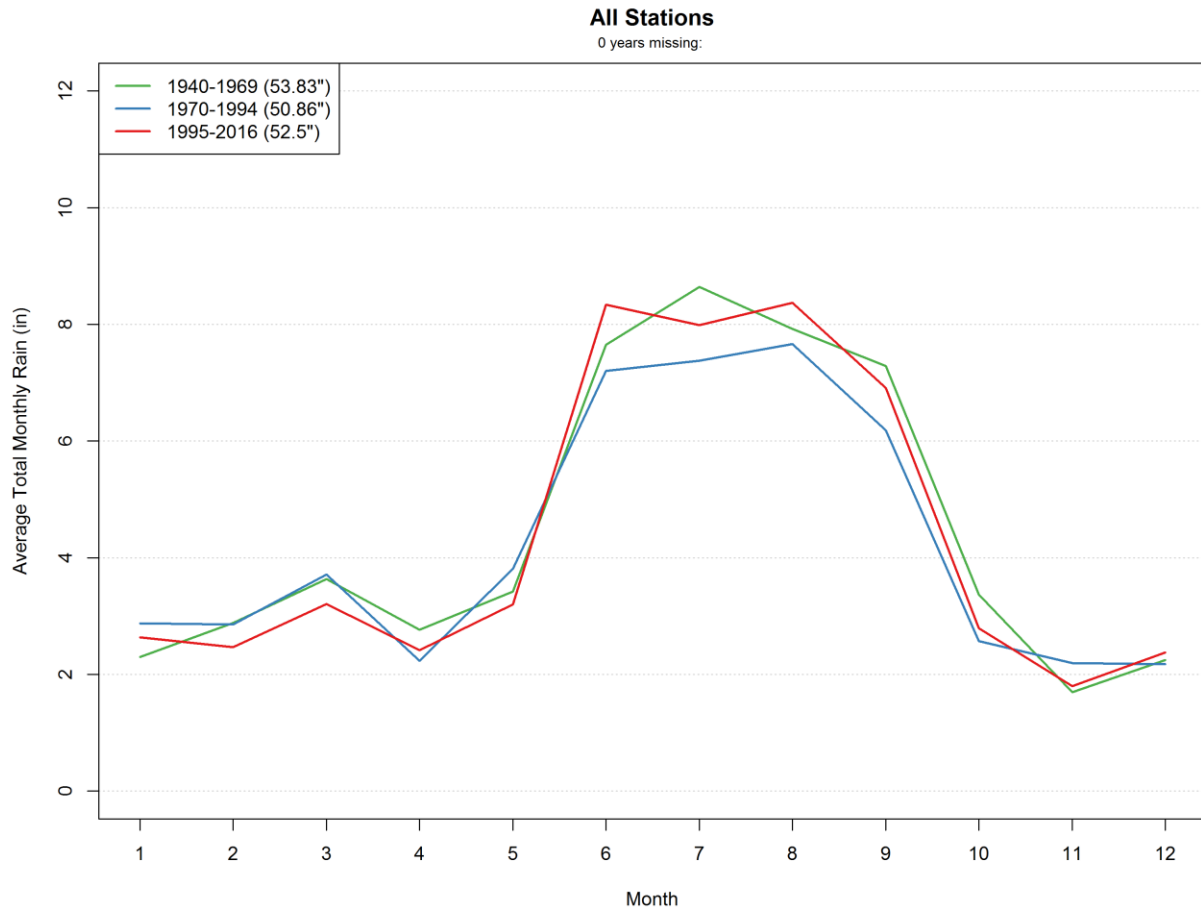


Figure 17. Mean monthly rainfall totals for three AMO periods (line chart and table) for the District-wide data set.

	1940-1969	1970-1994	1995-2016	1890-2016 (POR)
<i>Jan</i>	2.3	2.87	2.64	2.5
<i>Feb</i>	2.88	2.86	2.47	2.74
<i>Mar</i>	3.64	3.71	3.21	3.19
<i>Apr</i>	2.77	2.24	2.42	2.5
<i>May</i>	3.42	3.81	3.2	3.7
<i>June</i>	7.65	7.2	8.34	7.73
<i>July</i>	8.65	7.38	7.99	8.09
<i>Aug</i>	7.92	7.66	8.37	8
<i>Sep</i>	7.29	6.18	6.91	6.81
<i>Oct</i>	3.37	2.57	2.79	3.17
<i>Nov</i>	1.69	2.2	1.8	1.83
<i>Dec</i>	2.25	2.18	2.38	2.22

3.4 Tropical Cyclone Landfalls

Cyclone track data was downloaded from Unisys Weather¹, which utilizes data from NOAA's Tropical Prediction Center. Unisys describes the data as follows: "This is a list of Atlantic hurricanes since 1851... Data courtesy of Tropical Prediction Center... The Atlantic Tracks File is an ASCII (text) file containing the 6-hourly (0000, 0600, 1200, 1800 UTC) center locations (latitude and longitude in tenths of degrees) and intensities (maximum 1-minute surface wind speeds in knots and minimum central pressures in millibars) for all Tropical Storms and Hurricanes from 1851 through 2002. More information on this file is found in NOAA Technical Memorandum NWS NHC 22 'A Tropical Cyclone Data Tape for the North Atlantic Basin, 1886-1983: Contents, Limitations, and Uses' by Brian R. Jarvinen, Charles J. Neumann, and Mary A. S. Davis." This positional data was converted into shapefiles of track points and lines (each line was saved with the storm's *maximum* windspeed along that track).

For tropical cyclone strike analyses, the District plus a 25-mile buffer was considered. The 25-mile buffer is perhaps conservative, given that hurricanes can span several hundreds of miles in diameter. However, a hurricane's eye rarely exceeds 50 miles across, so the 25-mile buffer generally requires that, at minimum, the edge of the hurricane's eye at least touched District boundaries for it to count as a strike.

Finally, storm track lines were used to create kernel density estimate plots that can be thought of as smoothed spatial histograms. They do not speak to absolute storm activity levels (as the phases had different overall levels of activity) but rather *relative* intra-phase activity – that is, where activity tended to be spatially concentrated *during that particular phase*. Nor do these plots utilize wind speed information in cells. Each cell's value, indicated by the color scale, essentially represents the proportion of that phase's storm activity that occurred in that cell. The intention of these figures is to qualitatively show *where* storms are tending to spatially occur within each phase, and how that spatial focal point has changed between phases.

The results of the cyclone strikes analyses are shown in Figures 18 through 21.

¹ weather.unisys.com/hurricane/atlantic/

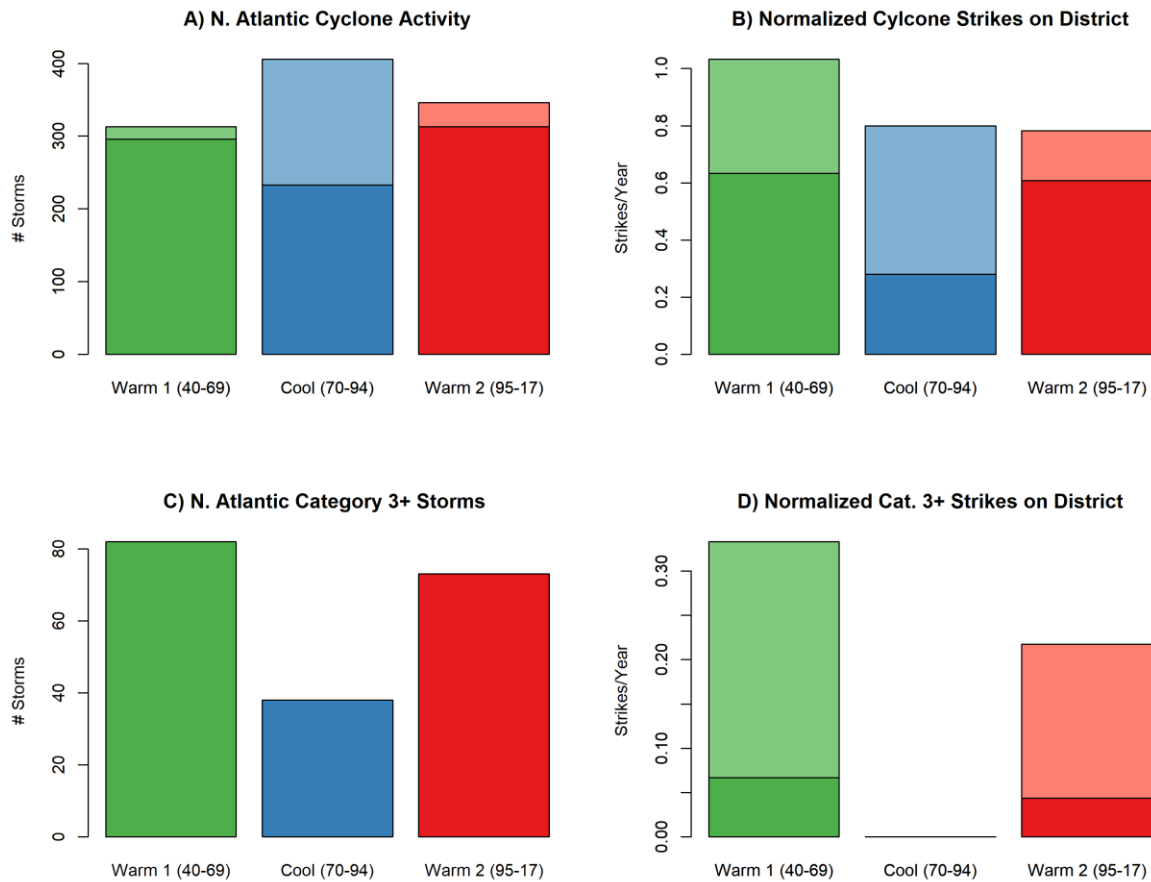


Figure 18. For the last warm (Warm1; 1940-1969, green), cool (Cool1, 1970-1994, blue), and current warm (Warm2; 1995-2017, red) AMO phases: A) Total North Atlantic basin activity and B) average number of cyclone strikes per year on the District, where light colors are depressions and dark colors are tropical storms or higher. C) Total North Atlantic basin major storm (Category 3 or higher) activity. D) Average number of major storm strikes per year on the District, where lighter colors indicate the storm was at least Category 3 when it entered the District and darker colors indicates the storm was Category 3 at some point in its life. As seen in (C) and (D), while North Atlantic cyclone and major storm activity have essentially returned to levels seen in the earlier warm AMO phase, these storms are not striking the District as frequently (D).

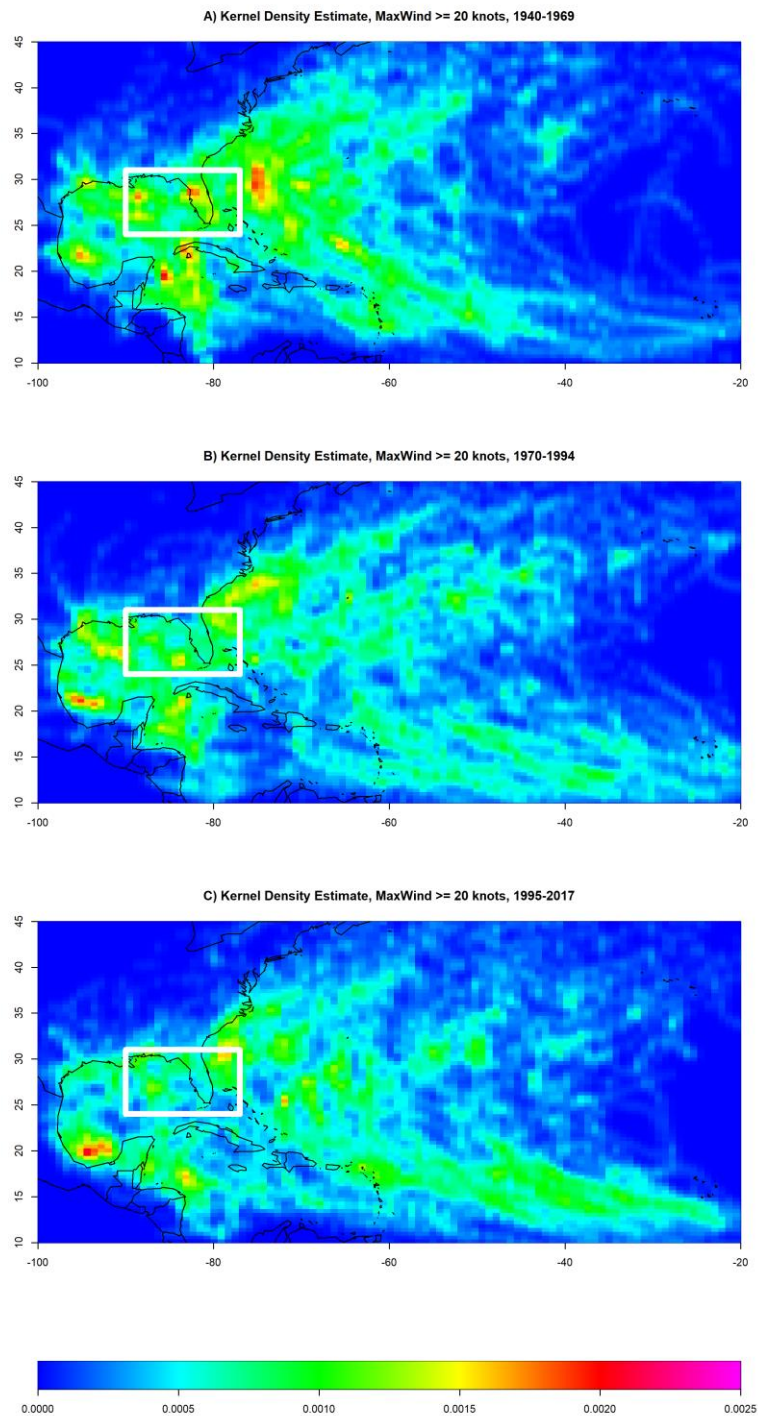


Figure 19. Spatial distribution of tropical cyclone activity in the North Atlantic basin for the A) last warm, 1940-1969, B) cool, 1970-1994, and C) the current warm, 1995-2017, AMO phase. The scale represents the relative proportion of total activity occurring in the cell during that phase. Less activity has been concentrated on Florida (white rectangle) from the last warm phase to the present.

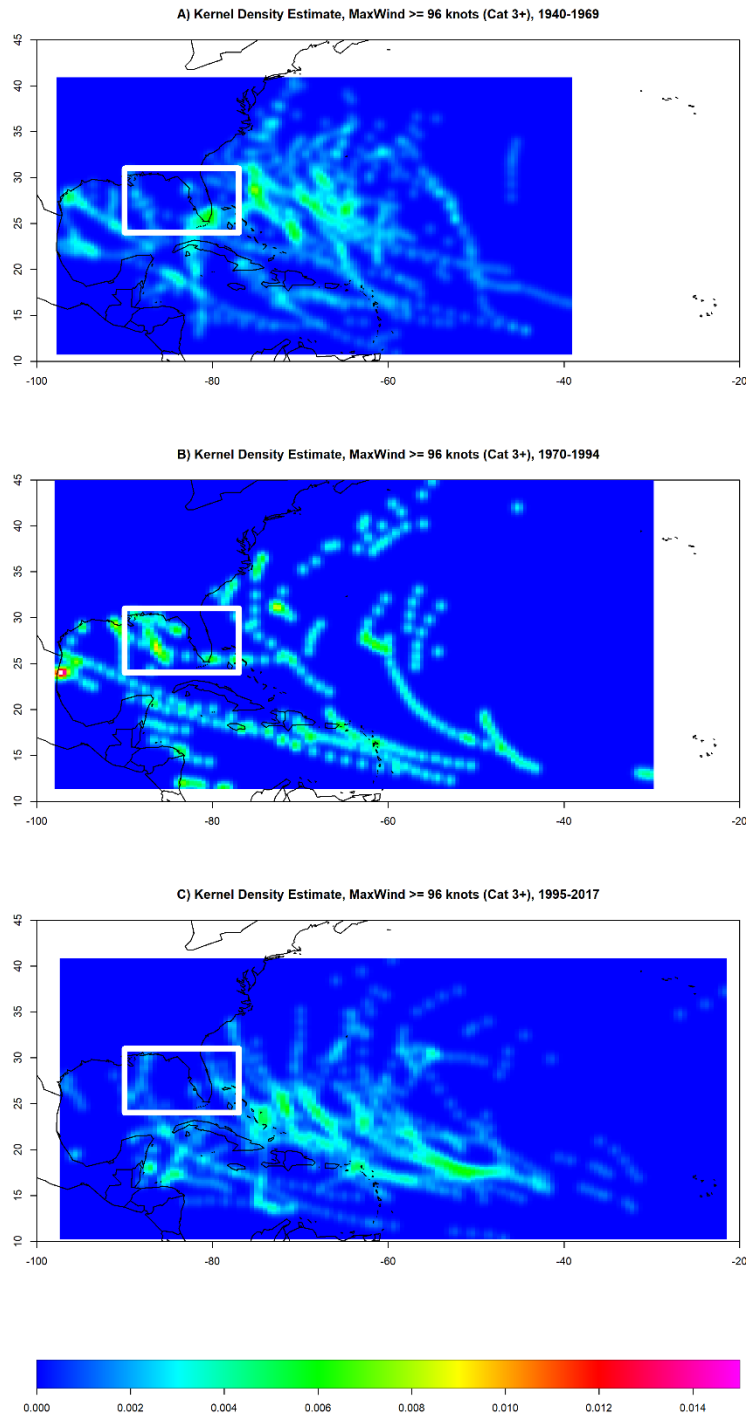


Figure 20. Spatial distribution of storms activity in the North Atlantic basin for storms that at some point achieved Category 3 or higher, for the A) last warm, 1940-1969, B) cool, 1970-1994, and C) the current warm, 1995-2017, AMO phase. Scale represents the relative proportion of activity occurring in the cell during that phase. Less activity has been concentrated on Florida (white rectangle) from the last warm phase to the present.

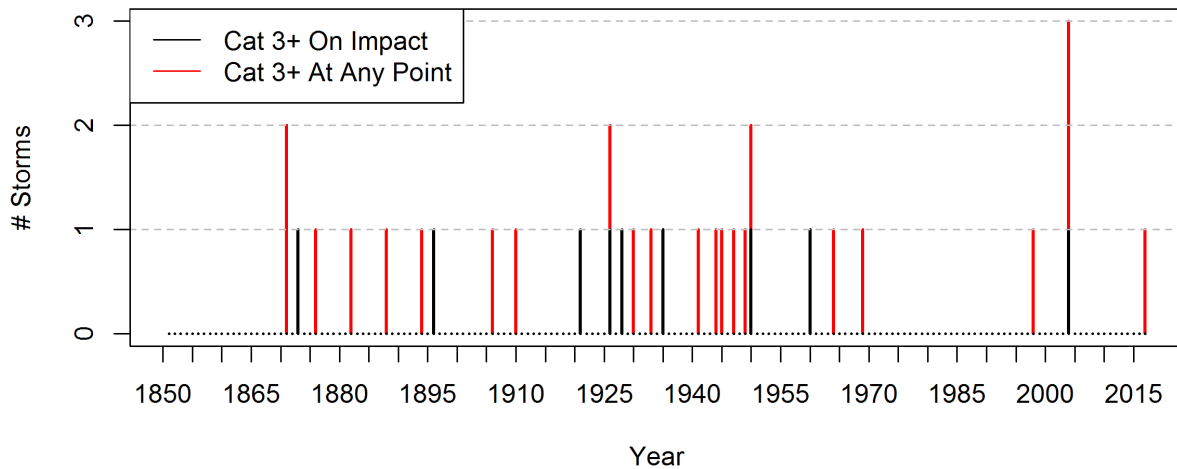


Figure 21. The number of Category 3 or higher storms striking the District plus a 25-mile buffer, from 1851 to 2017. Red color indicates the storm was Category 3 at any point in its life; black indicates it was Category 3 when it made landfall in the District (plus buffer). The District was subjected to relatively frequent strikes from about 1925 to 1970, with no strikes thereafter until almost 2000.

3.5 El Nino and La Nino

Using Oceanic Nino Index (ONI) data available from the Climate Prediction Center (CPC) of the National Atmospheric and Oceanic Administration and National Weather Service², the occurrence of La Nina and El Nino during the three AMO phases was analyzed from 1950 to 2017. By tying the month of La Nina or El Nino occurrence to the District-wide monthly rainfall dataset, average monthly rainfall was derived during La Nina, El Nino, and neutral months (Figure 22). Additionally, the number of La Nina, El Nino, and neutral months occurring in each AMO phase was summarized Figures 23 and 24). Note that, while most of our AMO rainfall analyses start in 1940, ENSO data from the CPC begins in 1950; however, extending the older warm phase to include months from 1940 to 1949, classified by the Australian Government Bureau of Meteorology³, yielded similar results for La Nina and El Nino frequency.

² http://origin.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ONI_v5.php

³ <http://www.bom.gov.au/climate/enso/>

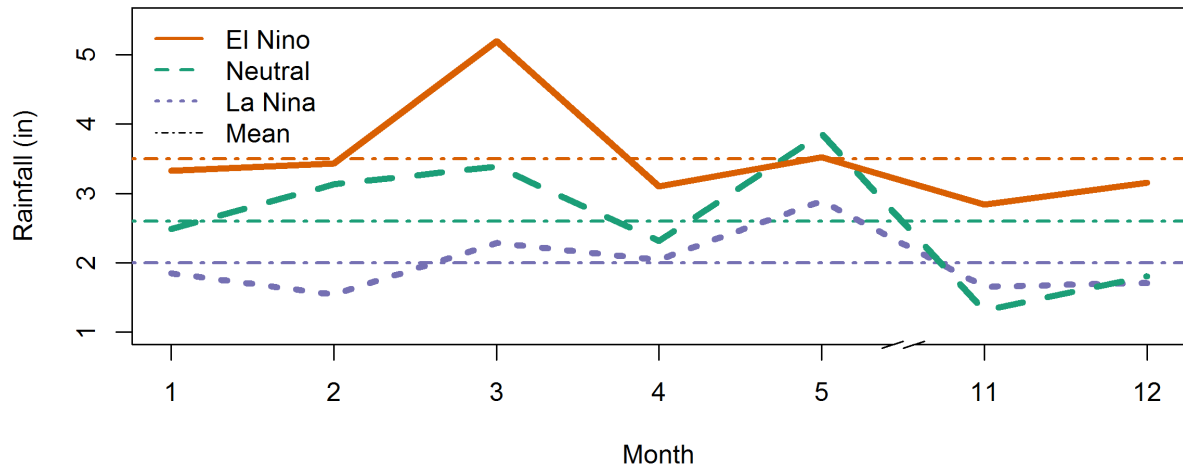
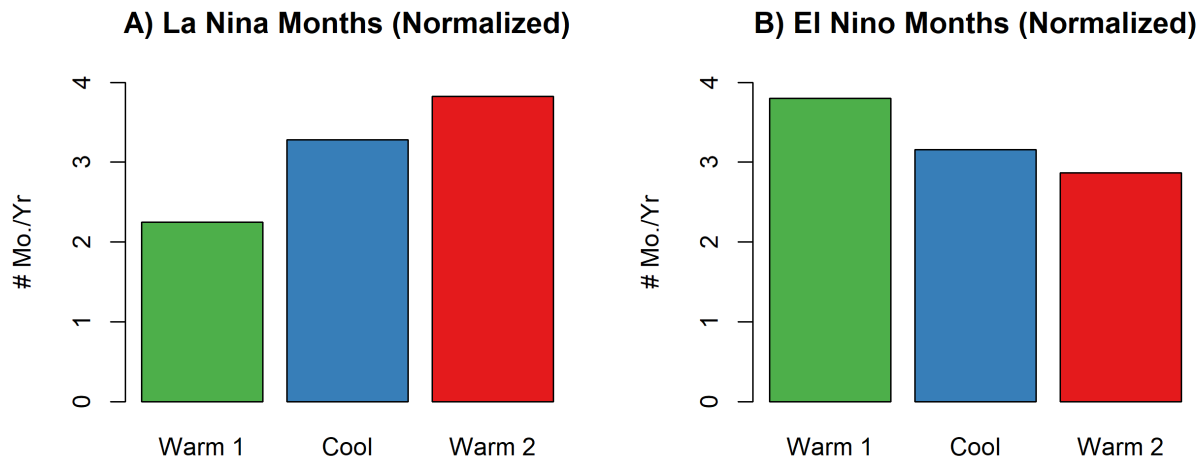


Figure 22. Average *dry season* monthly rainfall, using data from 1950 to 2016 for all stations, for El Niño (red), Neutral (green), and La Niña (purple) months. Nearly across the board, El Niño rainfall exceeds both neutral and La Niña in average monthly dry season rainfall. The horizontal mean lines are for the dry months only and are 3.5, 2.6, and 2.0 inches per month, respectively, for El Niño, neutral, and La Niña months.



Warm 1 = 1950-69; Cool = 1970-94; Warm 2 = 1995-2017
 From http://www.cpc.noaa.gov/products/analysis_monitoring/ensostuff/ensoyear

Figure 23. The number of months of A) La Niña and B) El Niño normalized by the number of years of data available for each AMO phase (Warm1 = 1950-1969; Cool1 = 1970-1994; Warm2 = 1995-2017). *The trend is for increasing La Niña and decreasing El Niño occurrence from the earlier warm 1 to the present warm 2 phase.*

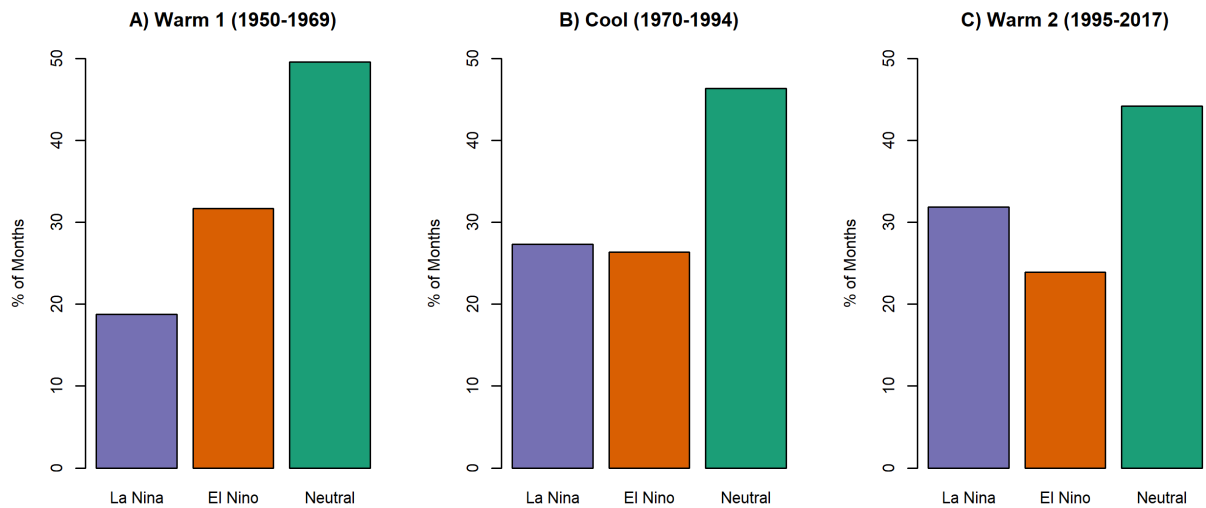


Figure 24. The percentage of months classified as La Nina (purple), El Nino (orange), and neutral (green) for the A) warm, 1950-1969, B) cool, 1970-1994, and C) warm, 1995-2017, AMO phases. *From the earlier warm 1 to the present warm 2, El Nino and neutral months represent less of the phase while La Nina conditions represent more.*

4.0 Discussion

Using the BIO_AVG dataset for the north half of the SWFWMD, inspection of the bar graphs of the wet and dry seasons for the three time periods indicates that, as might be expected, actual wet season rainfall was higher in both the AMO warm periods than in the cool AMO period (Figure 8). However, increased wet season rainfall for the 1995-2016 period was completely offset by decreased dry season rainfall such that there was essentially no long-term change in mean rainfall between the cool AMO phase starting in 1970 and the more recent warm AMO since 1995 – still nearly 4 inches below the previous warm period from 1940-1969 (equal to roughly a 20% reduction in streamflow or recharge per the math in the [Introduction](#)).

Similar results were observed for a number of rainfall gaging sites evaluated (see [“Summary Maps”](#) and [“Individual Station Data”](#)), with almost a third of sites, showing that the decrease in dry season rainfall completely negated the increase in wet season rainfall, leaving rainfall essentially unchanged since 1970 (Figure 7). This average bears out in the District-wide data set of 36 stations, which shows that dry season rainfall has been lower in the most recent warm period than the preceding cool one, with increased wet season rainfall making up the difference such that the most recent warm period’s average annual total exceeds that of the preceding cool one by about 1.6 inches per year (Figures 14 and 15); nevertheless, the current warm period falls short of the

previous warm period by about 1.3 inches per year based on an average of the 36 sites. An investigation into long-term changes in seasonal patterns is detailed below.

4.1 Wet Season Rainfall: Major Storm Landfalls

Comparing the most recent warm period (1995-2016) to the previous warm period (1940-1969), a majority of stations remain below 1940-1969 annual and wet season average totals. This is also evident in the averaged District-wide data set, where, as previously discussed, the annual mean has fallen from 53.8 inches for the last warm period to 52.5 inches for the current (Figures [4](#) through [6](#)).

A lack of landfalling major hurricanes could explain, in part, why wet season totals fall short of the previous wet AMO cycle. As shown in Figures [18A](#) and [18C](#), overall North Atlantic basin cyclone activity has – as expected given our understanding of the AMO – increased to match levels in the last warm phase. What has changed, however, is the number of strikes on the District, as revealed in Figures [18B](#) and [D](#). On that front, the average number of cyclone strikes per year fell by almost 25% from the last warm phase to the cool phase and has stayed at that level into the current warm phase (Figure [18B](#)). (However, when depressions are excluded, the annual strike rate dropped during the cool phase but has recovered in the current warm phase to levels seen in the last; Figure [18B](#).) If only major storms (Category 3 and higher) are considered – whether one requires that they have that level on impact or merely at any stage in their track history – the average number of strikes per year has fallen by a third (Figure [18D](#)). Figure [21](#) shows this as a time series, where storms hit every few years from about 1925 to 1970, and then nothing occurs for nearly three decades thereafter. Likewise, the kernel density estimate plots (Figures [19](#) and [20](#)) show the spatial focal points of storm activity migrating eastward into the open Atlantic Ocean off of Florida over time.

Of course, for this paper, a storm strike's value is viewed as a proxy for a particularly intense rainfall event that affected the District. However, various factors affect the amount of rainfall that a storm provides, that amount not being wholly dependent on the storm's intensity (Saffir-Simpson scale using windspeed or central pressure), which is the only level of refinement available in the track dataset. However, inasmuch as major hurricane storm strikes are proxies for intense rainfall events, the District has been experiencing fewer of them in recent decades, which is consistent with the decrease in wet season rainfall from the last warm phase to the current.

For the United States as a whole, 9 out of 11 years from 2000 to 2010 recorded zero major hurricane landfalls (a total of 28 major hurricanes formed in the Atlantic Basin during the nine years). In particular, the state of Florida saw 11 consecutive years – from 2005 (Wilma) until 2016 (Hermine) – without a single landfalling hurricane. This represents the longest hurricane drought for the state in more than 150 years.

4.2 Dry Season Rainfall: El Nino and La Nina

Comparing the most recent warm period (1995-2016) to the immediately preceding cool period (1970-1994), generally speaking, 1) dry season rainfall has decreased significantly, especially over the northern half of the District (Figure 8), 2) wet season rainfall has increased at all 36 stations, consistent with the AMO transition (Figure 9), and 3) average annual rainfall has decreased for northern stations while increasing for southern stations (Figure 7).

The different behavior between the southern and northern stations (Figure 7) is consistent with Kelly's hypothesis (2004) that "one would expect to find higher flows during AMO warmings in peninsular Florida (positive correlations between AMO warmings and rainfall) while at the same time lower flows at most sites across the continental United States (negative correlations between AMO warmings and rainfall)," with the reverse true during AMO cool periods. In this case, however, the northern transition zone would have had to move southward of Kelly's (2004) original delineation (which was based on river flows, not rainfall) near the latitude of the Waccasassa River.

More persuasively, however, are the large decreases in dry season rainfall that occurred in the northern half of the District during the most recent AMO warm period, completely canceling out increased wet season rainfall. This net deficit has resulted in generally low aquifer water levels, springflows, and riverflows that have yet to increase from the preceding cool AMO period (1970-1994). As a result, these more recent warm AMO flows have not recovered to flows experienced during the previous warm AMO period prior to 1970. It's important to note that dry season rainfall patterns are *not related* to the AMO and are closely tied to winter-early spring seasonal processes related to El Nino and La Nina frequency. The effects were grouped into a common time periods associated with the AMO for comparison purposes.

Since the 1950s-60s, La Nina periods have occurred more frequently even as El Nino events have decreased in frequency. When normalizing the data by the number of years of data available for each phase (Figure 23), the normalized annual number of months classified as *La Nina has increased by about 70% from the last to the current warm phase*, even as the normalized number of months of *El Nino have decreased by about a quarter*. At the same time, climate has become more "extreme" as judged by the number of "neutral" months (neither La Nina or El Nino), where such months have fallen from 50% of the phase total in the last warm phase to 44% in the current (Figure 24). The implications for dry season rainfall are depicted in Figure 22, which shows the same pattern has been found for the southeastern United States in many other studies: dry season rainfall is higher during El Nino and lower during La Nina. For the District-wide dataset specifically, dry season mean monthly rainfall was 25% higher during El Nino than La Nina. Since tropical cyclone landfalls rarely occur during the dry season, unlike the wet season values, the dry season average monthly rainfall values by ENSO

category are unlikely to be biased by the fact that the last warm AMO phase had more cyclone landfalls.

As previously discussed, the AMO influences wet season rainfall. The recent warm phase's decrease in El Niño frequency was apparently counteracted somewhat by the AMO warming, thus pushing annual rainfall to generally match or exceed levels of the cool phase (Figure 7). Nevertheless, the current decrease in El Niño events reveals itself through the general failure of rainfall to match that of the last warm phase (Figure 4). Overall, however, as the AMO does little for dry season rainfall, the AMO warming could not mask the dry season impacts of lower rainfall due to increasing La Niña frequency, at least in the northern District, during the recent warm phase when compared to the previous two phases of the AMO (Figures 4, 5, 7, and 8).

With only three AMO phases briefly examined here, it's difficult to say whether the apparent increase in La Niña and decrease in El Niño activity signifies a long-term trend. Some prior work finds evidence that ENSO activity has varied across the Holocene and longer, with periods of relatively high and low ENSO activity – alternating at various timescales from decadal to millennial – superimposed on a long-term trend of decreasing ENSO activity that started 1,200 years ago (Moy et al. 2002; Cane 2005). Explanations for these variations include changes in insolation as a function of orbital, solar, or volcanic activity. Other research suggests that climate change could alter El Niño and La Niña intensity and frequency in coming decades (e.g. Cai et al. 1999; Cai et al. 2014).

4.3 Multi-Year Rainfall

Finally, because the amount of runoff to a river is dependent in most cases on the amount of storage in the watershed that must be filled before runoff occurs, it is helpful to have a sense of multi-year wet and dry periods and the cumulative effects of multi-year rainfall surpluses or deficits. Periods of extended drought may greatly increase the amount of storage in lakes, wetlands, and soils that must be overcome before runoff occurs. The wettest consecutive years occurred during the early to mid-1960s (Figures 11 and 16). This extended period was generally a period of high discharge for many District rivers. Expectations regarding flows that occurred in the 1960s in the Withlacoochee River, for example, should be tempered by the knowledge that this time period included the wettest 2 to 10-year rainfall periods based on 100-year rainfall records for the Ocala, Brooksville, and Inverness area. Also of note, the driest 2, 3, 4, 5 and 10-year periods of rainfall for that region occurred during the late 1990s to early 2000's, so it is reasonable to expect that flows in the Withlacoochee River were unusually low during that period. The plot in Figure 11 clearly illustrates that the period of 1920 to approximately 1970 was much wetter than more recent decades. Similarly, the District-wide plot in Figure 16 generally shows an upwards slope from about 1945 to

1965, and multi-year averages mark the 1960s as unusually wet and the late 2000s as unusually dry.

5.0 Summary

1. Relatively small changes in rainfall can result in relatively large changes in recharge, since recharge represents what remains of rainfall after evapotranspiration and runoff – and evapotranspiration varies little year-to-year.
2. Many long-term rainfall and flow patterns observed in the District from 1940 to the present can be explained, in large part, by climatic cycles such as the AMO and ENSO, plus the frequency of tropical cyclone landfalls in the District.
3. Comparing the current warm phase to the last warm phase, fewer tropical cyclone landfalls in the District, more La Nina months, and fewer El Nino months have led to decreased annual rainfall at most stations. Thus, the high flows that characterized the 1960s were unusually high as a function of higher rainfall caused by more El Nino months, fewer La Nina months, and more tropical cyclone strikes (on top of the warm AMO phase).
4. Comparing the current warm phase to the last cool phase, wet season rainfall has generally increased, in alignment with predictions of how the AMO impacts peninsular Florida rainfall. As a result of this increased wet season rainfall, most southern District stations have now exceeded their cool phase annual totals.
5. At the same time, an increase in La Nina months and a simultaneous decrease in El Nino months have led to lower dry season rainfall at most stations. In the northern District, these ENSO-driven dry season decreases have completely cancelled out AMO-related wet season increases such that the current warm phase has experienced lower annual rainfall than the preceding cool phase. This reduced dry season rainfall in the northern District largely explains more recent low aquifer water levels, river, and spring flows that haven't recovered to those of the preceding warm AMO period prior to 1970.

6.0 References

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Appendix A: Individual Station Data

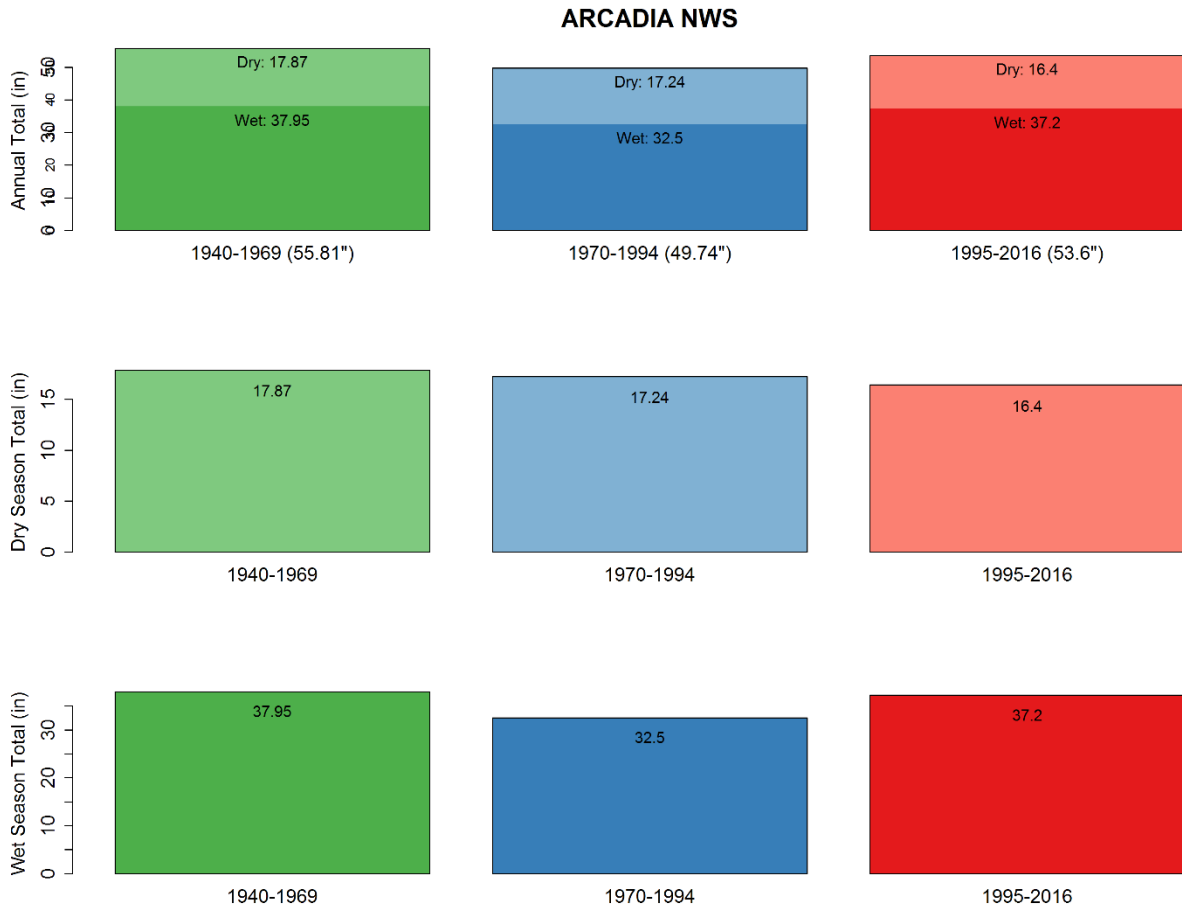
What follows is a series of figures (and tables) for individual rainfall sites shown in Figure 1. Information for each site is formatted as described for BIO_AVG (Figures [2](#), [3](#), and [4](#)).

- A site’s first figure and its accompanying table provide the mean annual, dry season and wet season rainfall for the three AMO periods. The table further contains the means for the period of record (POR).
- A site’s second figure provides the cumulative annual deviation from the POR mean annual rainfall. The table provides mean multi-year rainfall totals for the driest and wettest periods.
- A site’s third figure and its accompanying table provide the mean monthly rainfall totals for three AMO periods. The table further contains the means for the POR.

Additionally, each figure includes a list of years missing for the dataset. For some stations, the POR will extend past the earliest or latest year shown in the cumulative deficit figure or the missing years list printed on each figure; this occurs when outer years of the time series had some monthly data but lacked one or months, such that the year was excluded from annual analyses even though its available months were retained for monthly analyses as described in “[Methods](#).” Note that a (D) after the station name means the station has been discontinued; the last year of the period of record indicated in the summary and deficit tables for such stations will show the year of discontinuation.

The CSV files and R code (R Core Team, 2016) used to generate figures, and tables are available on request.

Arcadia NWS

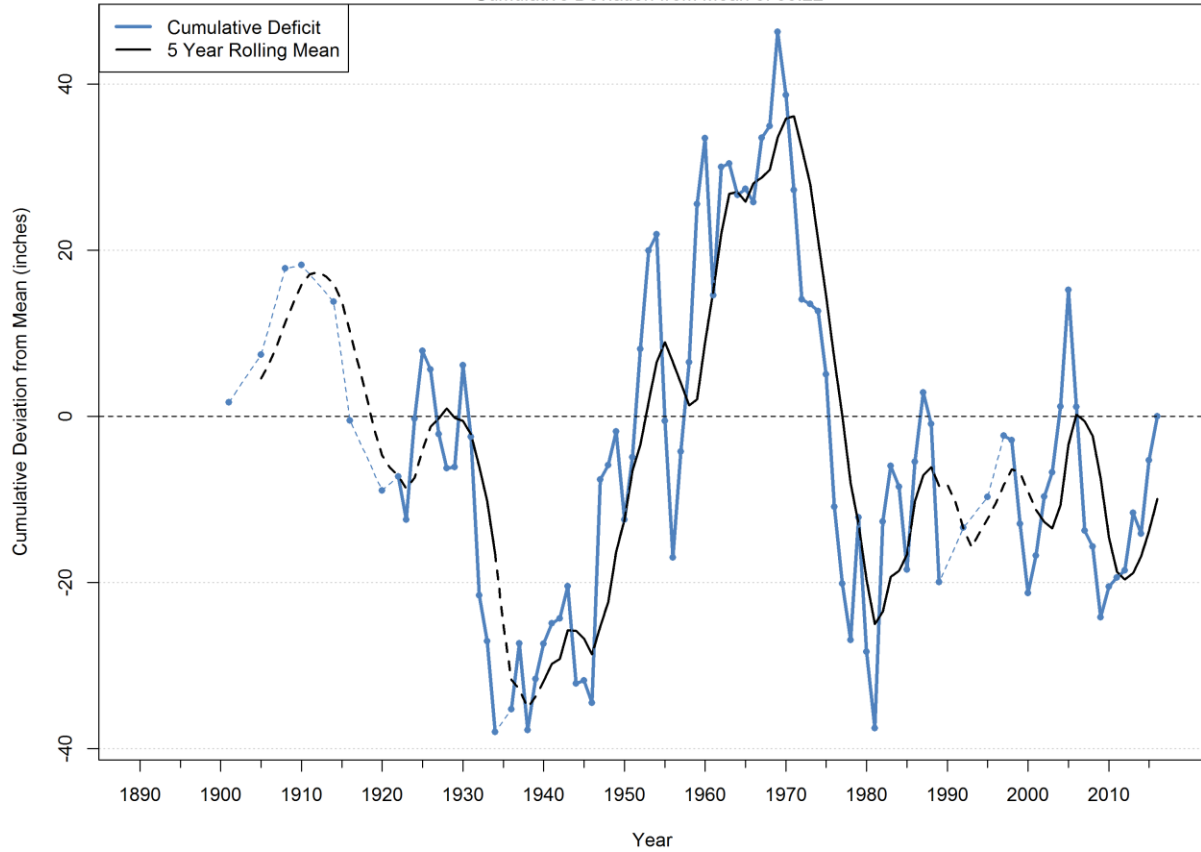


5 years missing: 1990, 1991, 1993, 1994, 1996

	1940-1969	1970-1994	1995-2016	1899-2016 (POR)
<i>Wet</i>	37.95	32.5	37.2	35.61
<i>Dry</i>	17.87	17.24	16.4	17.15
<i>Total</i>	55.81	49.74	53.6	52.76

ARCADIA NWS

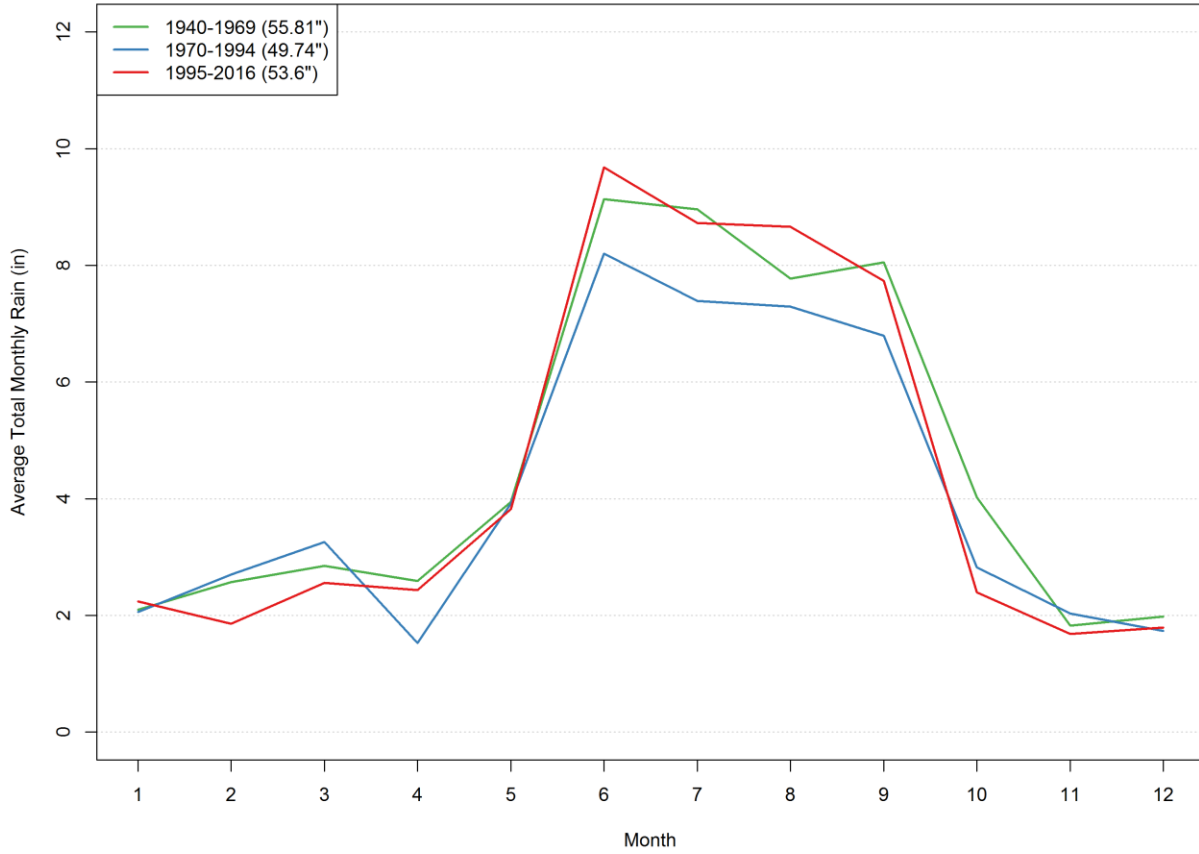
31 years missing: 1890-1900, 1902-1904, 1906, 1907, 1909, 1911-1913, 1915, 1917-1919, 1921, 1935, 1990, 1991, 1993, 1994, 1996
 Cumulative Deviation from Mean of 53.22"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	33.77	1956
<i>Driest 3 Year</i>	40.9	1956
<i>Driest 4 Year</i>	42.17	1934
<i>Driest 5 Year</i>	45.13	1978
<i>Driest 10 Year</i>	46.51	1980
<i>Wettest 2 Year</i>	69.01	1983
<i>Wettest 3 Year</i>	67.4	1959
<i>Wettest 4 Year</i>	65.83	1960
<i>Wettest 5 Year</i>	60.52	2005
<i>Wettest 10 Year</i>	58.63	1954
<i>Period of Record</i>	53.22	2016

ARCADIA NWS

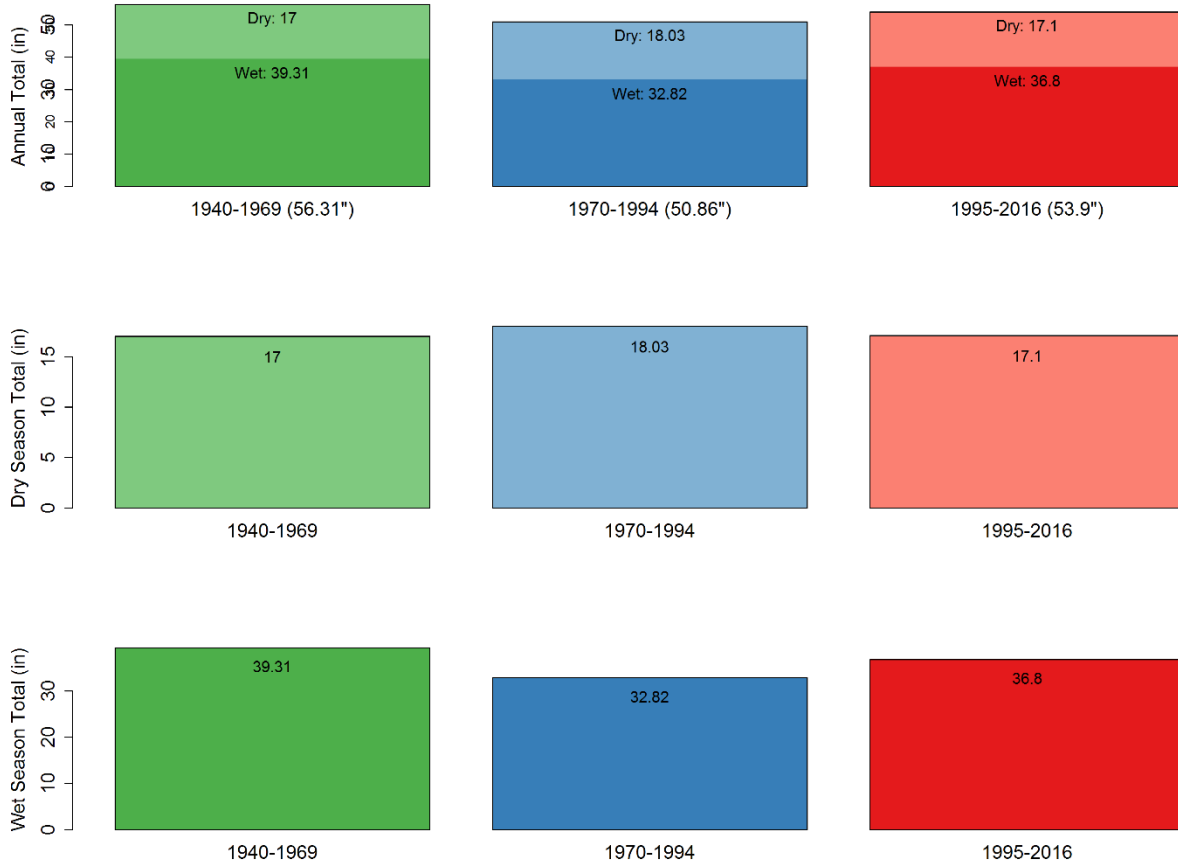
5 years missing: 1990, 1991, 1993, 1994, 1996



	1940-1969	1970-1994	1995-2016	1899-2016 (POR)
<i>Jan</i>	2.1	2.06	2.24	2.08
<i>Feb</i>	2.57	2.7	1.86	2.42
<i>Mar</i>	2.85	3.26	2.56	2.79
<i>Apr</i>	2.59	1.53	2.44	2.33
<i>May</i>	3.95	3.92	3.83	3.98
<i>June</i>	9.14	8.2	9.68	8.57
<i>July</i>	8.96	7.39	8.72	8.19
<i>Aug</i>	7.77	7.29	8.66	8.09
<i>Sep</i>	8.06	6.8	7.74	7.43
<i>Oct</i>	4.02	2.82	2.4	3.33
<i>Nov</i>	1.83	2.03	1.68	1.72
<i>Dec</i>	1.98	1.74	1.8	1.83

Archbold Biological Station NWS

ARCHBOLD BIOLOGICAL STATION NWS



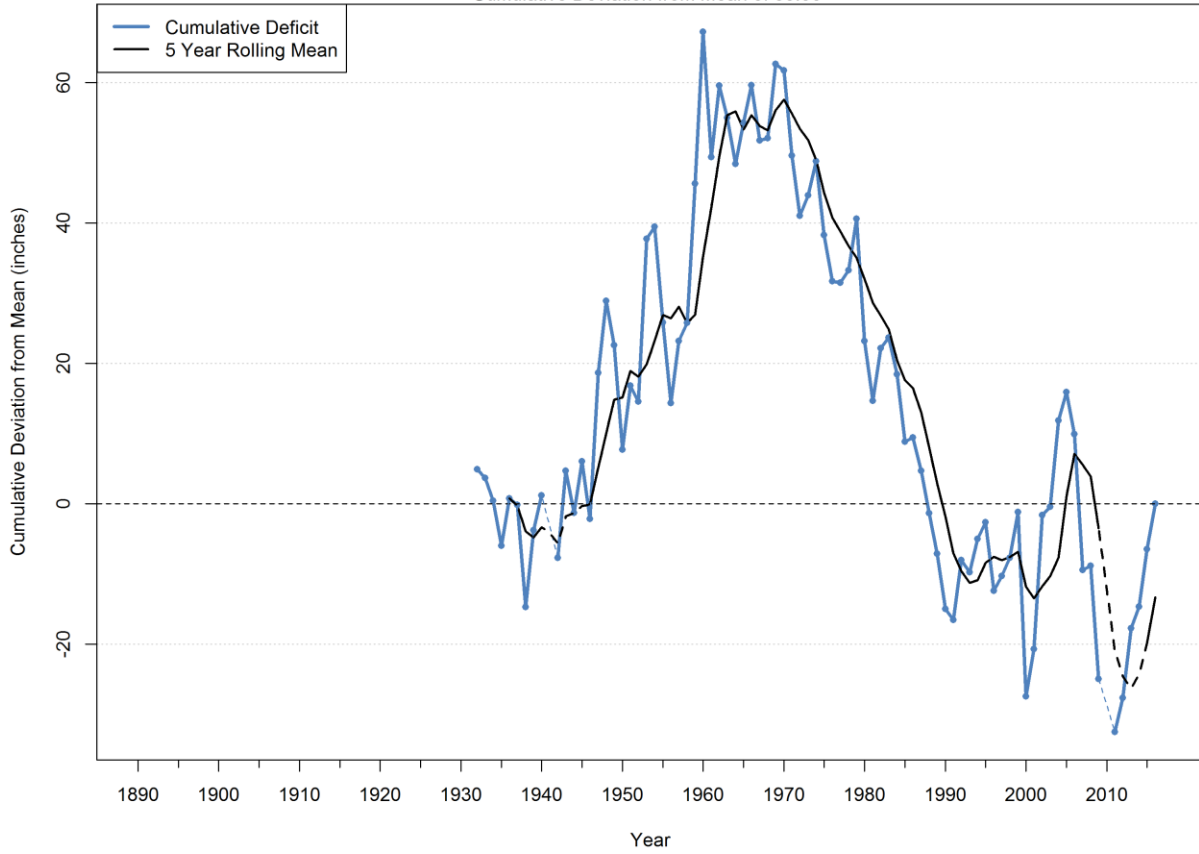
2 years missing: 1941, 2010

	1940-1969	1970-1994	1995-2016	1932-2016 (POR)
<i>Wet</i>	39.31	32.82	36.8	36.4
<i>Dry</i>	17	18.03	17.1	17.35
<i>Total</i>	56.31	50.86	53.9	53.75

ARCHBOLD BIOLOGICAL STATION NWS

44 years missing: 1890-1931, 1941, 2010

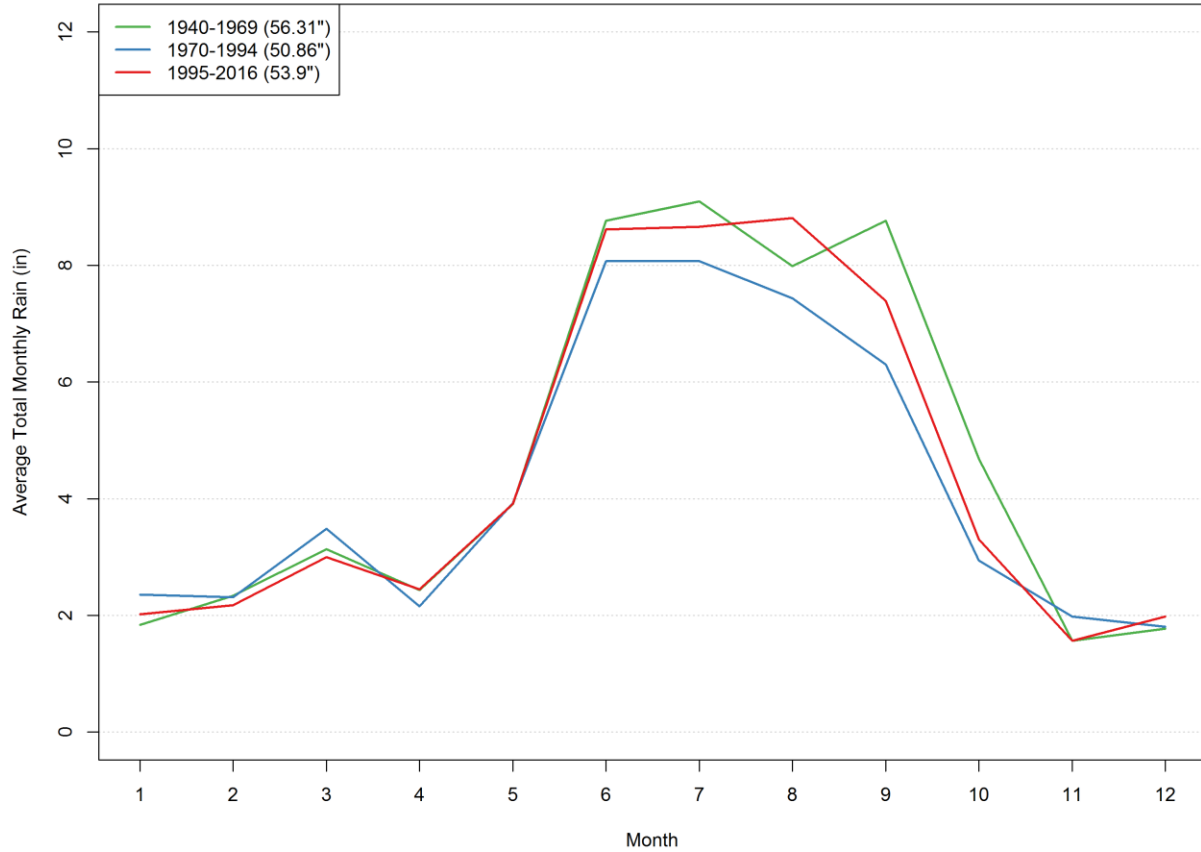
Cumulative Deviation from Mean of 53.56"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	40.62	1981
<i>Driest 3 Year</i>	41.93	2009
<i>Driest 4 Year</i>	43.35	2009
<i>Driest 5 Year</i>	46.2	2009
<i>Driest 10 Year</i>	48.8	1989
<i>Wettest 2 Year</i>	74.28	1960
<i>Wettest 3 Year</i>	68.24	1960
<i>Wettest 4 Year</i>	66.77	1960
<i>Wettest 5 Year</i>	62.23	2005
<i>Wettest 10 Year</i>	59.51	1960
<i>Period of Record</i>	53.56	2016

ARCHBOLD BIOLOGICAL STATION NWS

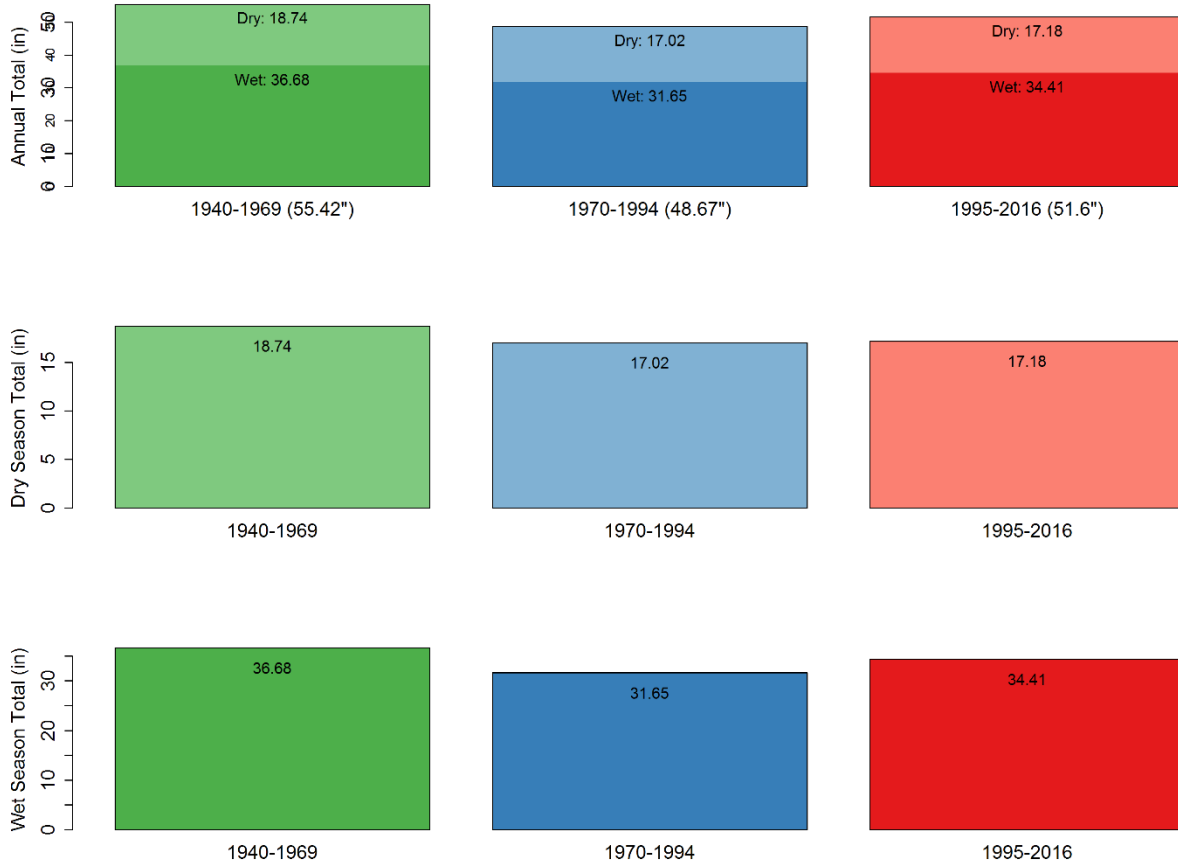
2 years missing: 1941, 2010



	1940-1969	1970-1994	1995-2016	1932-2016 (POR)
<i>Jan</i>	1.84	2.36	2.02	1.99
<i>Feb</i>	2.34	2.31	2.18	2.33
<i>Mar</i>	3.14	3.49	3	3.17
<i>Apr</i>	2.43	2.16	2.45	2.45
<i>May</i>	3.91	3.93	3.91	3.94
<i>June</i>	8.77	8.07	8.62	8.43
<i>July</i>	9.1	8.07	8.66	8.56
<i>Aug</i>	7.99	7.44	8.82	8.01
<i>Sep</i>	8.77	6.3	7.39	7.59
<i>Oct</i>	4.69	2.94	3.31	3.81
<i>Nov</i>	1.56	1.98	1.57	1.73
<i>Dec</i>	1.77	1.81	1.98	1.74

Avon Park 2 W NWS

AVON PARK 2 W NWS

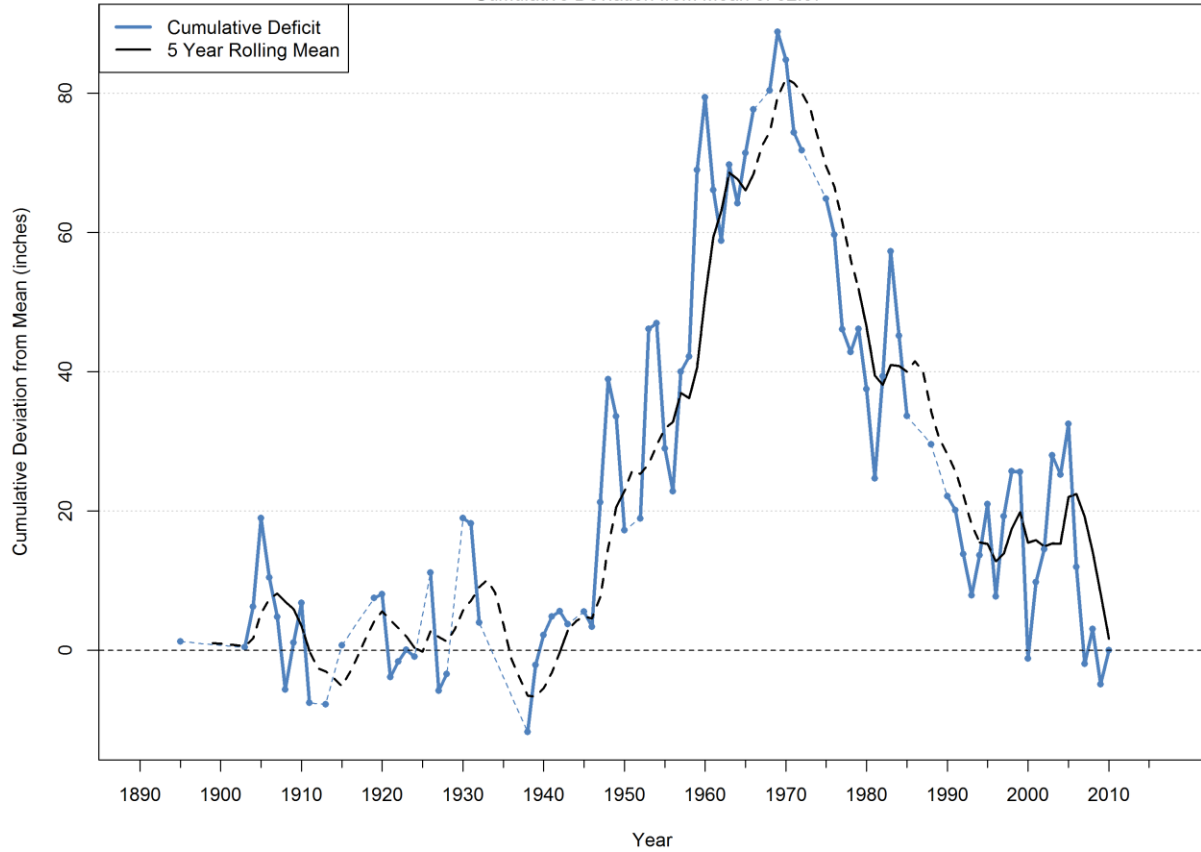


14 years missing: 1944, 1951, 1967, 1973, 1974, 1986, 1987, 1989, 2011-2016

	1940-1969	1970-1994	1995-2016	1892-2016 (POR)
<i>Wet</i>	36.68	31.65	34.41	34.76
<i>Dry</i>	18.74	17.02	17.18	17.66
<i>Total</i>	55.42	48.67	51.6	52.41

AVON PARK 2 W NWS

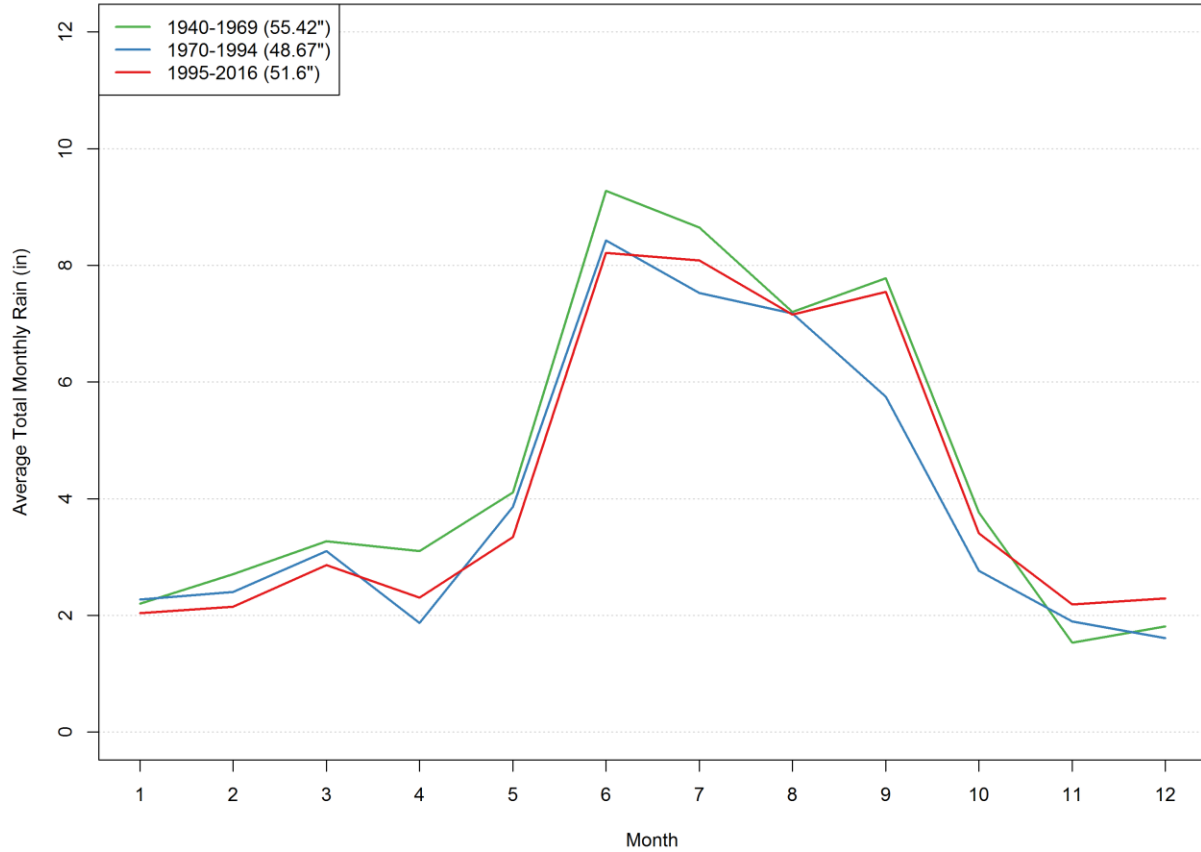
38 years missing: 1890-1894, 1896-1902, 1912, 1914, 1916-1918, 1925, 1929, 1933-1937, 1944, 1951, 1967, 1973, 1974, 1986, 1987, 1989, 2011-2016
 Cumulative Deviation from Mean of 52.87"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	35.63	2007
<i>Driest 3 Year</i>	43.05	2008
<i>Driest 4 Year</i>	43.52	2009
<i>Driest 5 Year</i>	45.87	1981
<i>Driest 10 Year</i>	49.74	1985
<i>Wettest 2 Year</i>	71.47	1960
<i>Wettest 3 Year</i>	68.25	1959
<i>Wettest 4 Year</i>	67.02	1960
<i>Wettest 5 Year</i>	62.96	1960
<i>Wettest 10 Year</i>	58.36	1966
<i>Period of Record</i>	52.87	2016

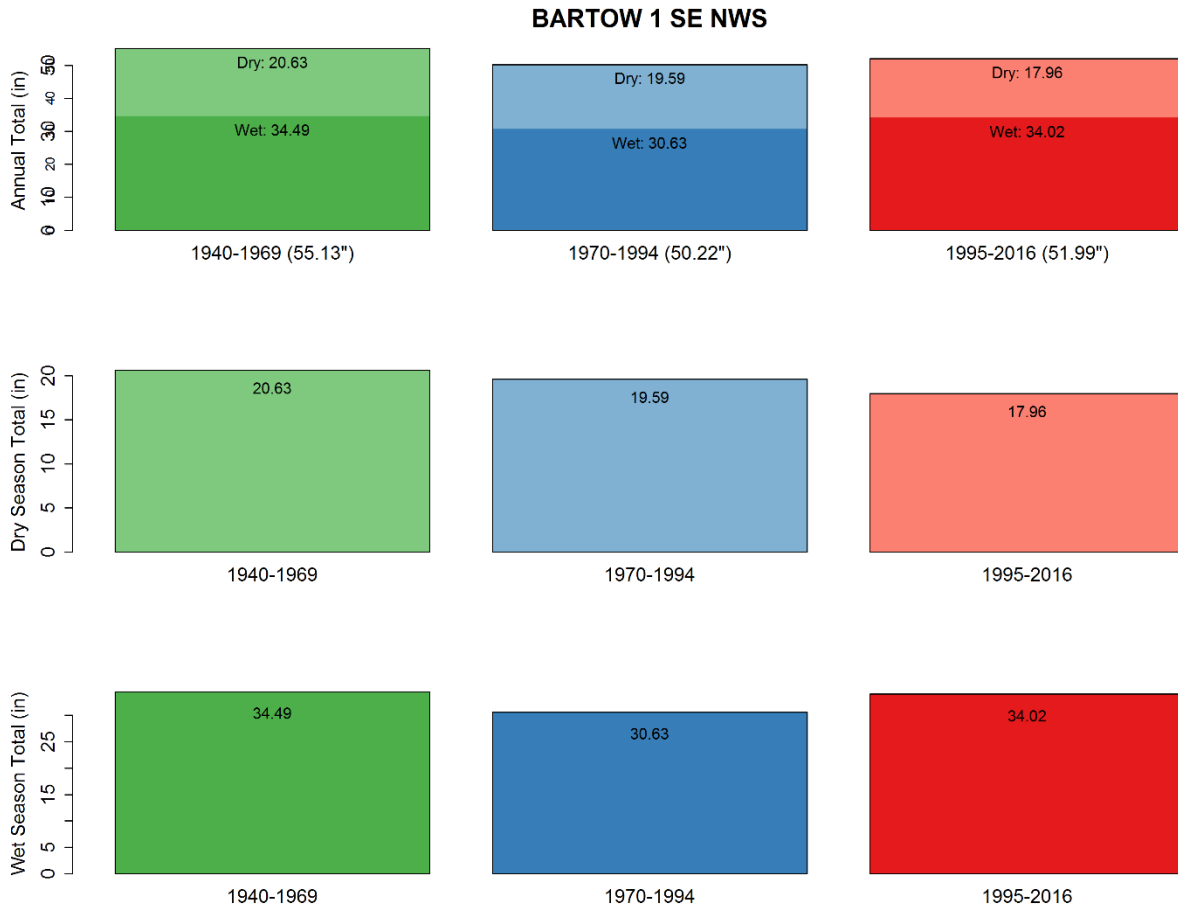
AVON PARK 2 W NWS

14 years missing: 1944, 1951, 1967, 1973, 1974, 1986, 1987, 1989, 2011-2016



	1940-1969	1970-1994	1995-2016	1892-2016 (POR)
Jan	2.2	2.27	2.04	2.18
Feb	2.71	2.4	2.15	2.46
Mar	3.27	3.1	2.86	2.78
Apr	3.1	1.87	2.31	2.54
May	4.11	3.86	3.34	4.1
June	9.28	8.43	8.21	8.64
July	8.65	7.53	8.09	8.13
Aug	7.2	7.18	7.16	7.41
Sep	7.78	5.75	7.55	7
Oct	3.77	2.77	3.41	3.58
Nov	1.53	1.9	2.19	1.78
Dec	1.81	1.61	2.29	1.82

Bartow 1 SE NWS

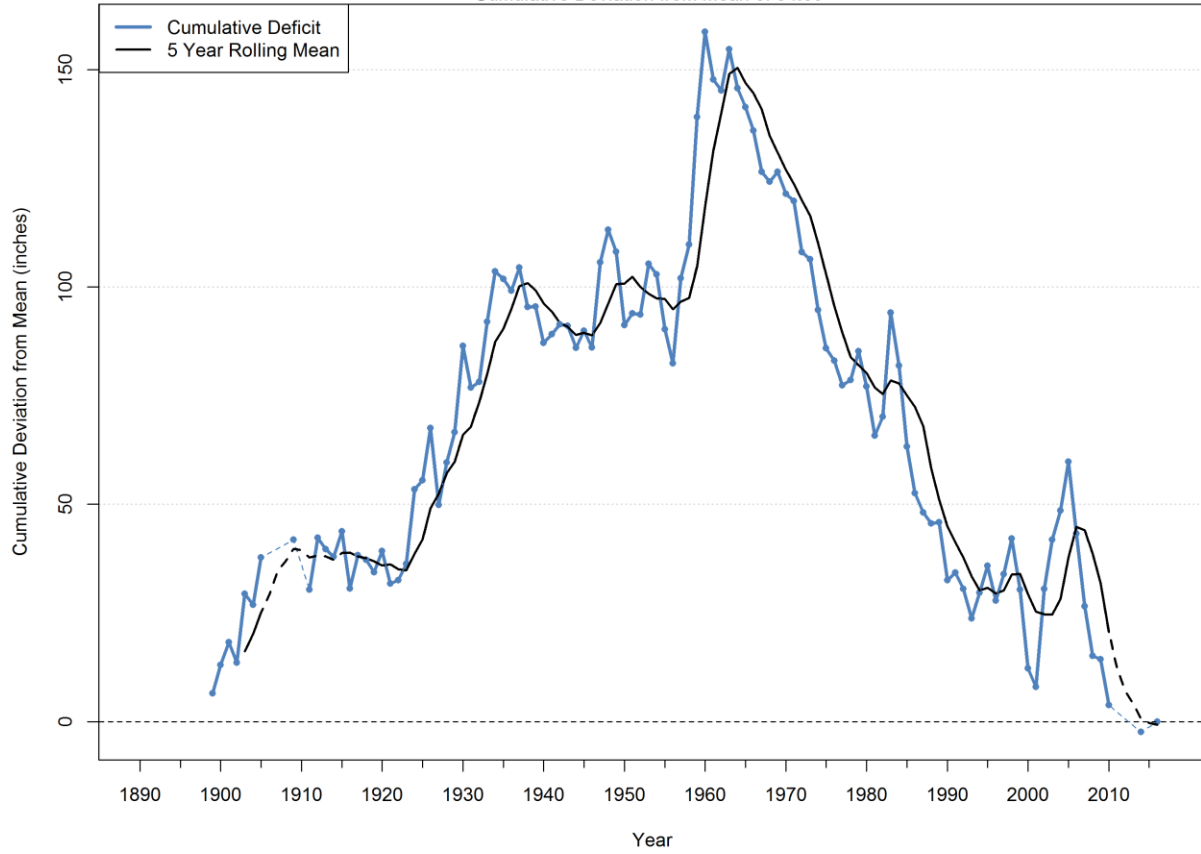


4 years missing: 2011-2013, 2015

	1940-1969	1970-1994	1995-2016	1892-2016 (POR)
<i>Wet</i>	34.49	30.63	34.02	34.2
<i>Dry</i>	20.63	19.59	17.96	19.42
<i>Total</i>	55.13	50.22	51.99	53.62

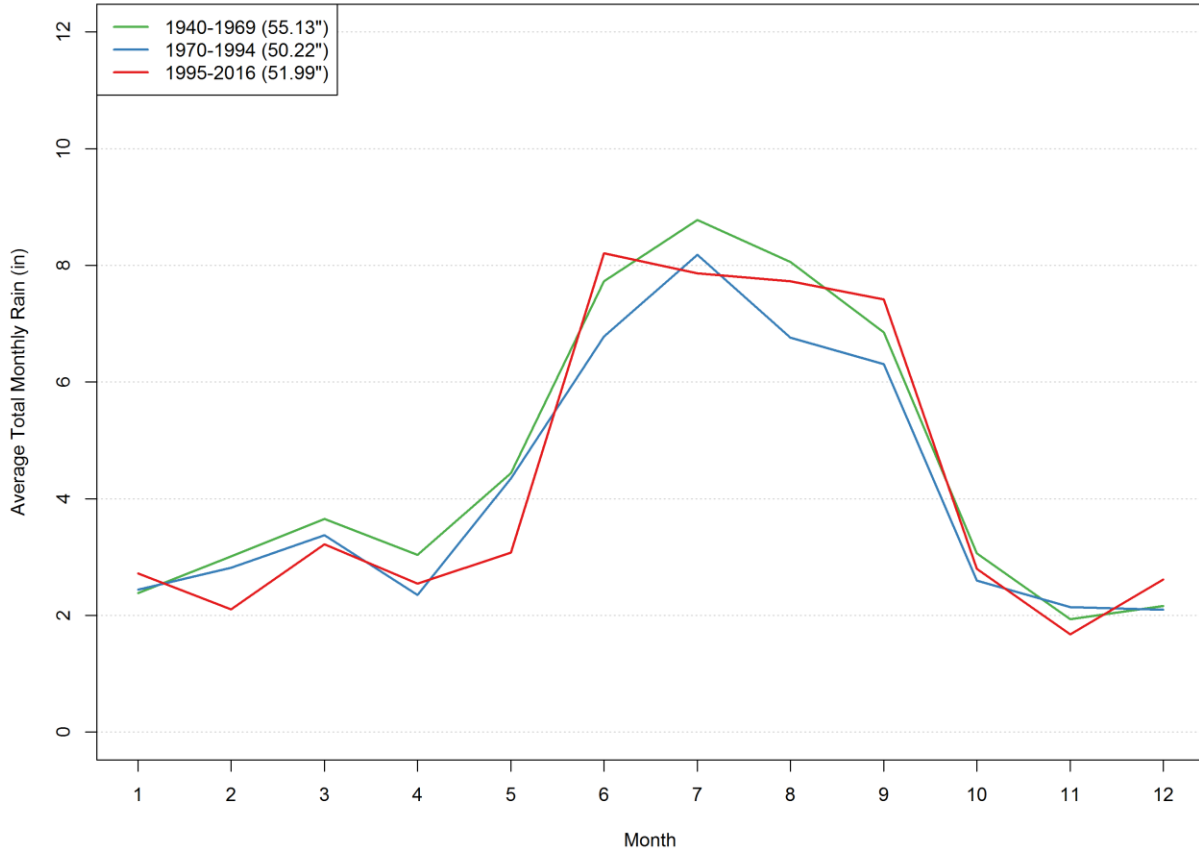
BARTOW 1 SE NWS

17 years missing: 1890-1898, 1906-1908, 1910, 2011-2013, 2015
 Cumulative Deviation from Mean of 54.09"



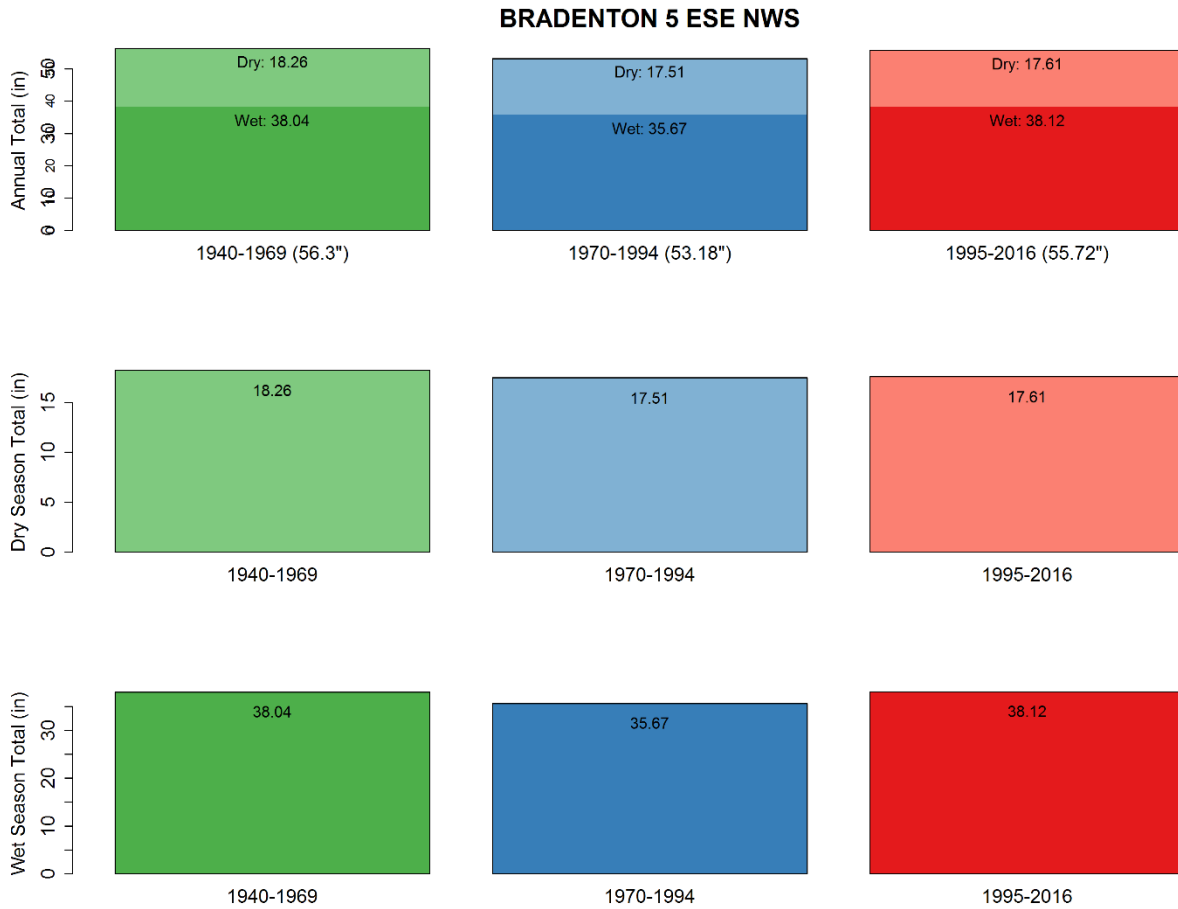
	Annual Mean	Year Ending
<i>Driest 2 Year</i>	37.48	2007
<i>Driest 3 Year</i>	39.19	2008
<i>Driest 4 Year</i>	42.59	1987
<i>Driest 5 Year</i>	42.89	2010
<i>Driest 10 Year</i>	47.06	1993
<i>Wettest 2 Year</i>	78.54	1960
<i>Wettest 3 Year</i>	72.99	1959
<i>Wettest 4 Year</i>	73.15	1960
<i>Wettest 5 Year</i>	67.78	1960
<i>Wettest 10 Year</i>	60.84	1960
<i>Period of Record</i>	54.09	2016

BARTOW 1 SE NWS
4 years missing: 2011-2013, 2015



	1940-1969	1970-1994	1995-2016	1892-2016 (POR)
Jan	2.38	2.44	2.72	2.48
Feb	3.01	2.82	2.1	2.74
Mar	3.66	3.38	3.22	3.2
Apr	3.04	2.35	2.55	2.68
May	4.44	4.35	3.07	4.31
June	7.73	6.78	8.21	8.03
July	8.78	8.18	7.87	8.26
Aug	8.06	6.76	7.73	7.74
Sep	6.85	6.31	7.42	7.1
Oct	3.07	2.6	2.8	3.07
Nov	1.94	2.15	1.68	1.82
Dec	2.16	2.1	2.62	2.18

Bradenton 5 ESE NWS

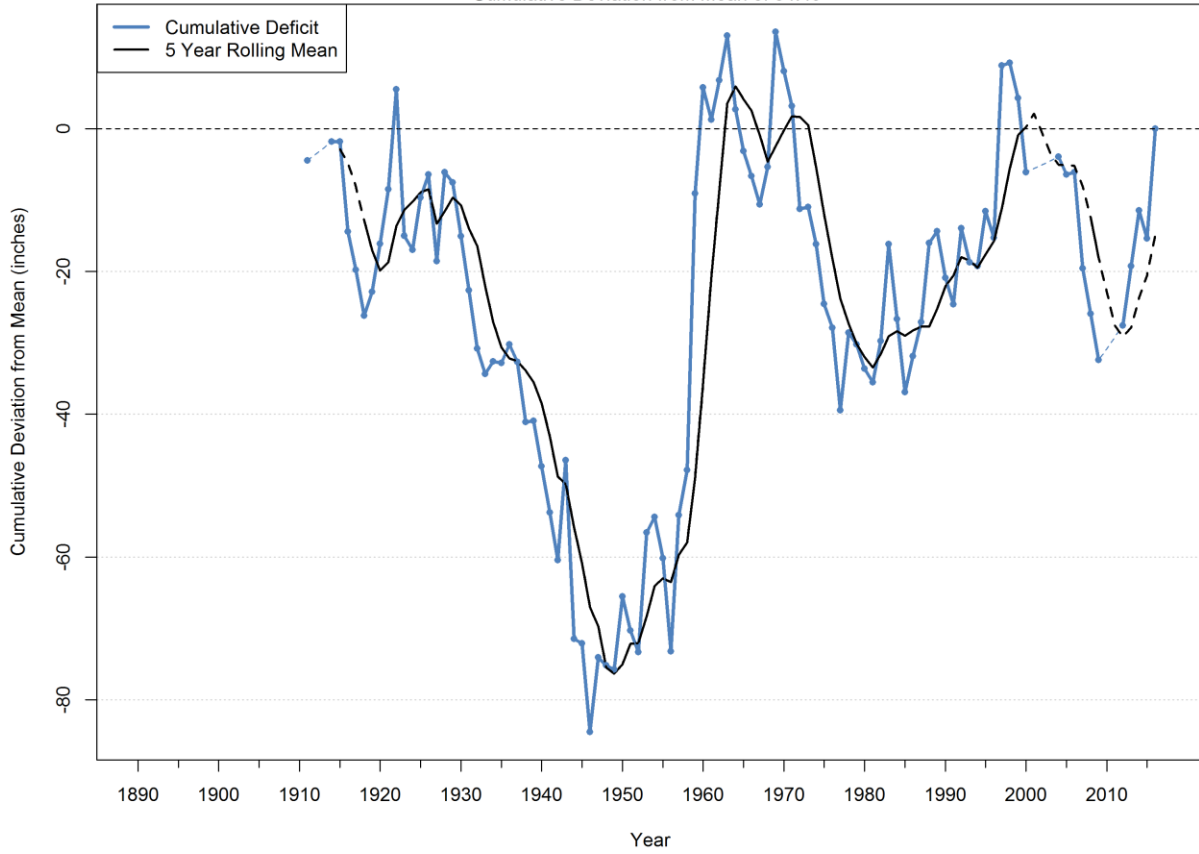


5 years missing: 2001-2003, 2010, 2011

	1940-1969	1970-1994	1995-2016	1911-2016 (POR)
<i>Wet</i>	38.04	35.67	38.12	37.04
<i>Dry</i>	18.26	17.51	17.61	17.84
<i>Total</i>	56.3	53.18	55.72	54.88

BRADENTON 5 ESE NWS

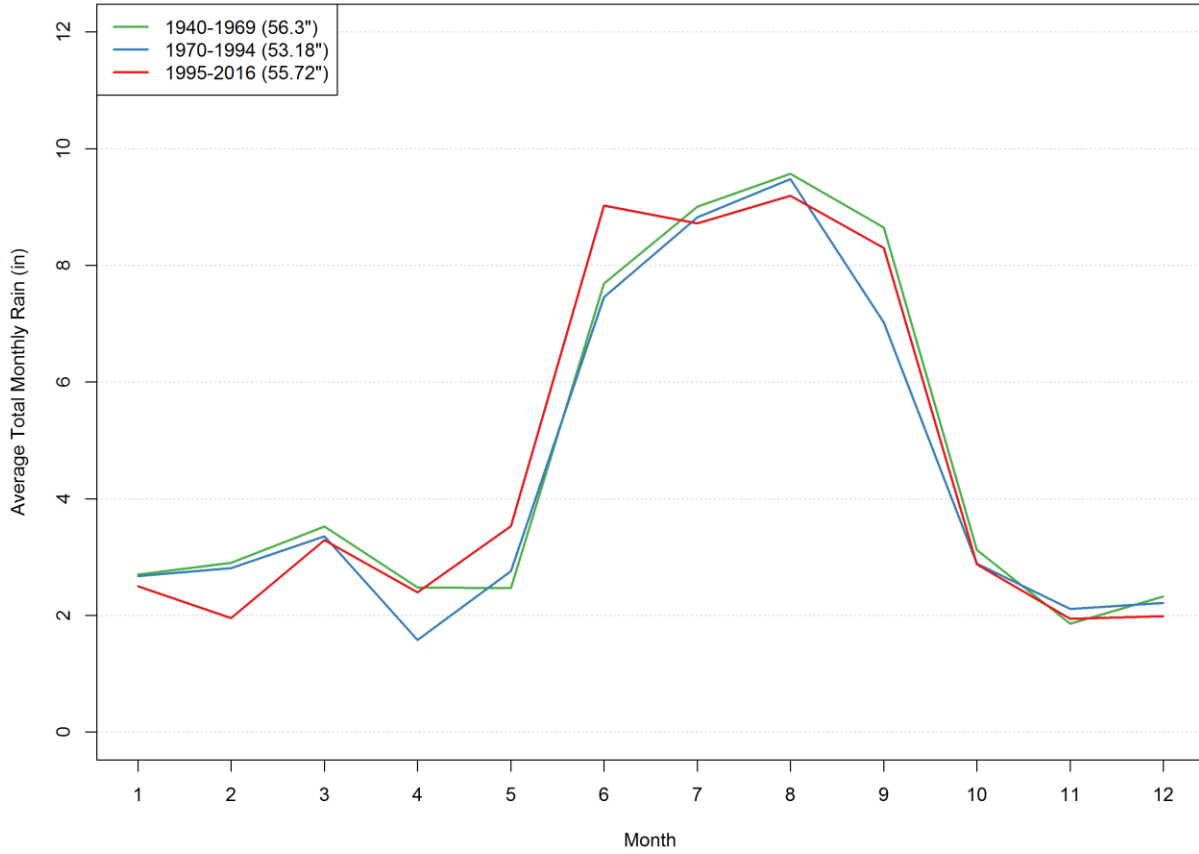
28 years missing: 1890-1910, 1912, 1913, 2001-2003, 2010, 2011
 Cumulative Deviation from Mean of 54.49"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	41.67	1945
<i>Driest 3 Year</i>	41.79	1946
<i>Driest 4 Year</i>	47.37	1977
<i>Driest 5 Year</i>	47.97	1975
<i>Driest 10 Year</i>	49.06	1946
<i>Wettest 2 Year</i>	81.28	1960
<i>Wettest 3 Year</i>	75.87	1959
<i>Wettest 4 Year</i>	74.22	1960
<i>Wettest 5 Year</i>	69.38	1961
<i>Wettest 10 Year</i>	62.5	1962
<i>Period of Record</i>	54.49	2016

BRADENTON 5 ESE NWS

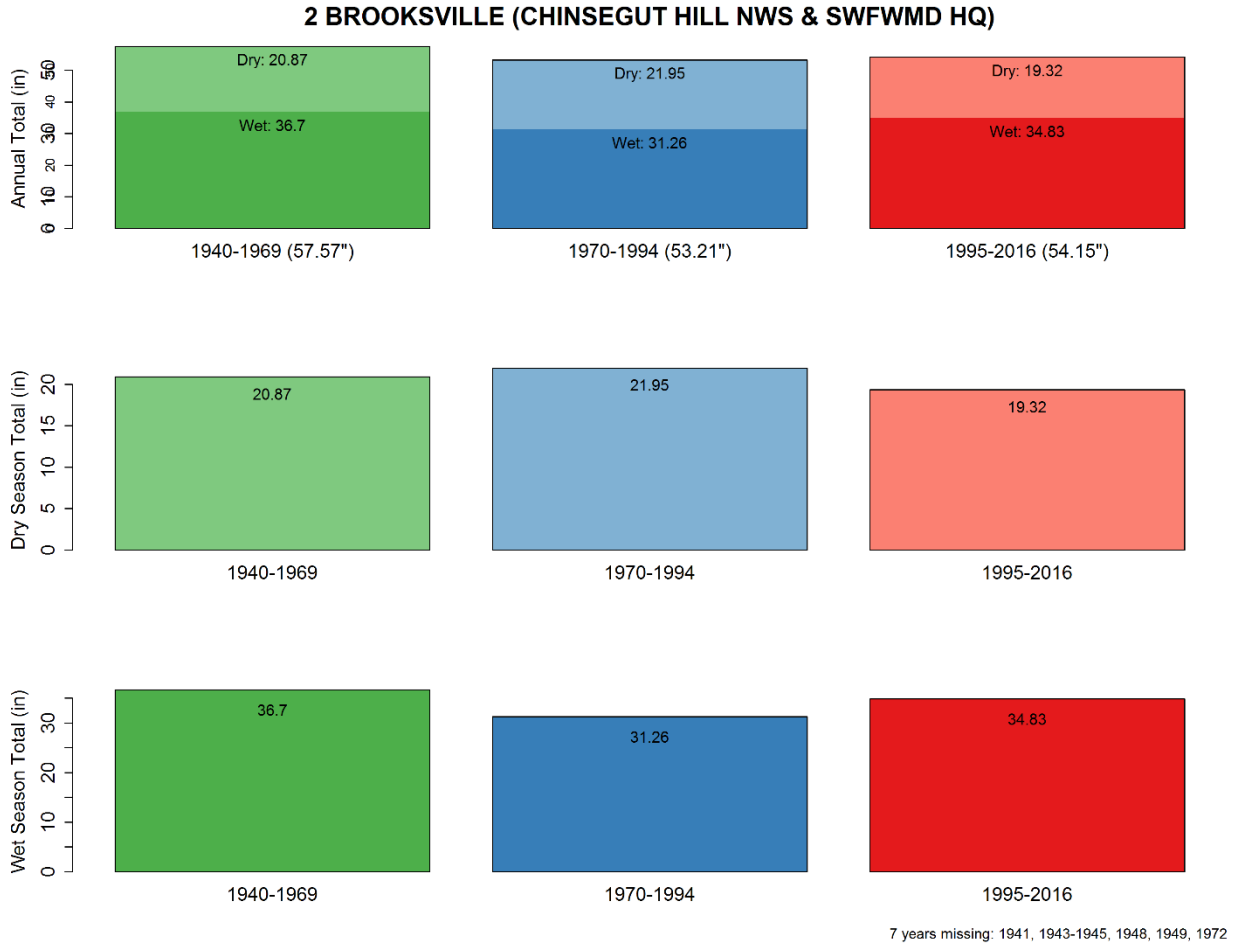
5 years missing: 2001-2003, 2010, 2011



	1940-1969	1970-1994	1995-2016	1911-2016 (POR)
Jan	2.7	2.68	2.5	2.61
Feb	2.9	2.81	1.96	2.72
Mar	3.52	3.36	3.29	3.1
Apr	2.48	1.58	2.4	2.27
May	2.47	2.76	3.53	3.04
June	7.69	7.45	9.02	7.56
July	9.01	8.83	8.72	8.95
Aug	9.57	9.48	9.2	9.39
Sep	8.65	7.02	8.3	7.96
Oct	3.12	2.89	2.87	3.17
Nov	1.86	2.11	1.94	1.95
Dec	2.32	2.21	1.99	2.15

Brooksville Chinsegut Hill NWS (D) and SWFWMD Headquarters

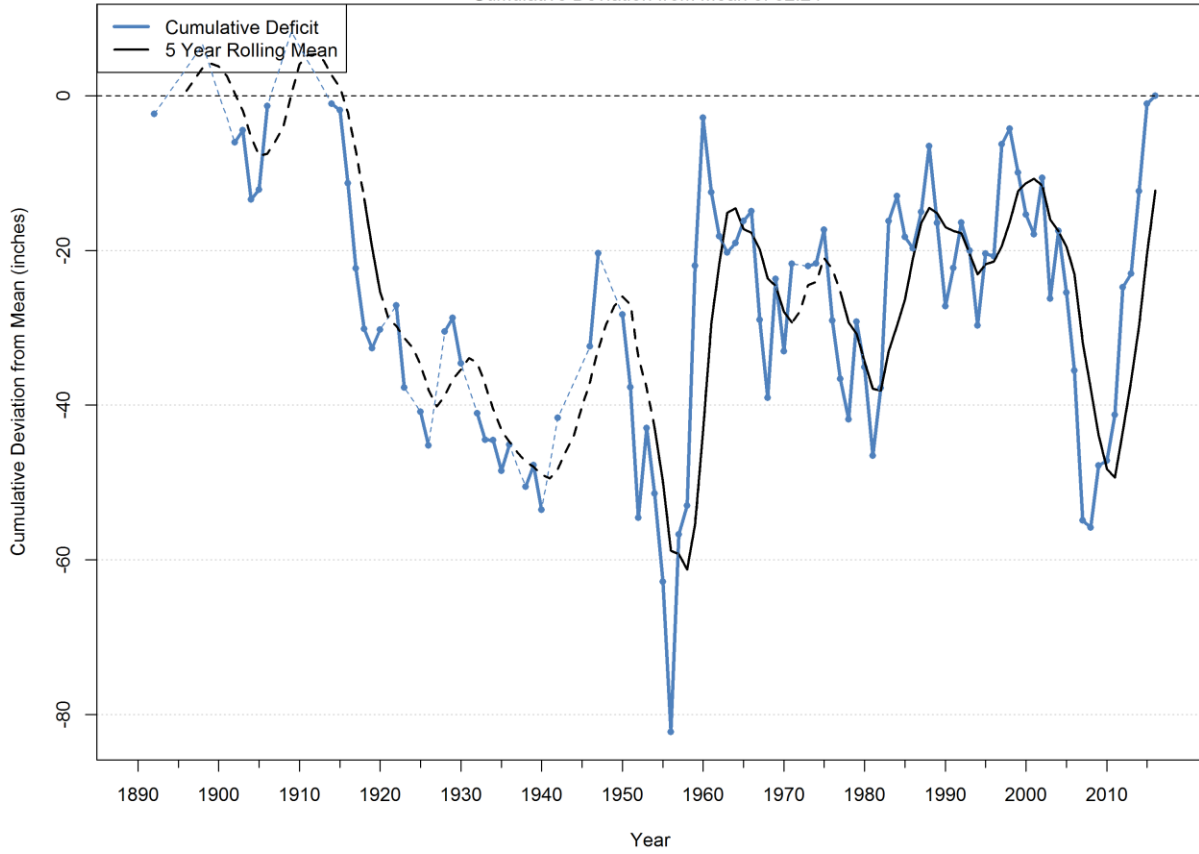
Brooksville Chinsegut Hill NWS began operation in 1892 but was discontinued in 2012. Therefore, data for this site was extended through 2016 with data from SWFWMD Headquarters (SWFWMD Station ID 20882), which is located approximately 11 miles south-southwest of the original, beginning in 2012. In the [summary maps](#), the results of this combination are plotted at the location of Brooksville Chinsegut Hill NWS.



	1940-1969	1970-1994	1995-2016	1892-2016 (POR)
<i>Wet</i>	36.7	31.26	34.83	35.35
<i>Dry</i>	20.87	21.95	19.32	20.44
<i>Total</i>	57.57	53.21	54.15	55.79

2 BROOKSVILLE (CHINSEGUT HILL NWS & SWFWMD HQ)

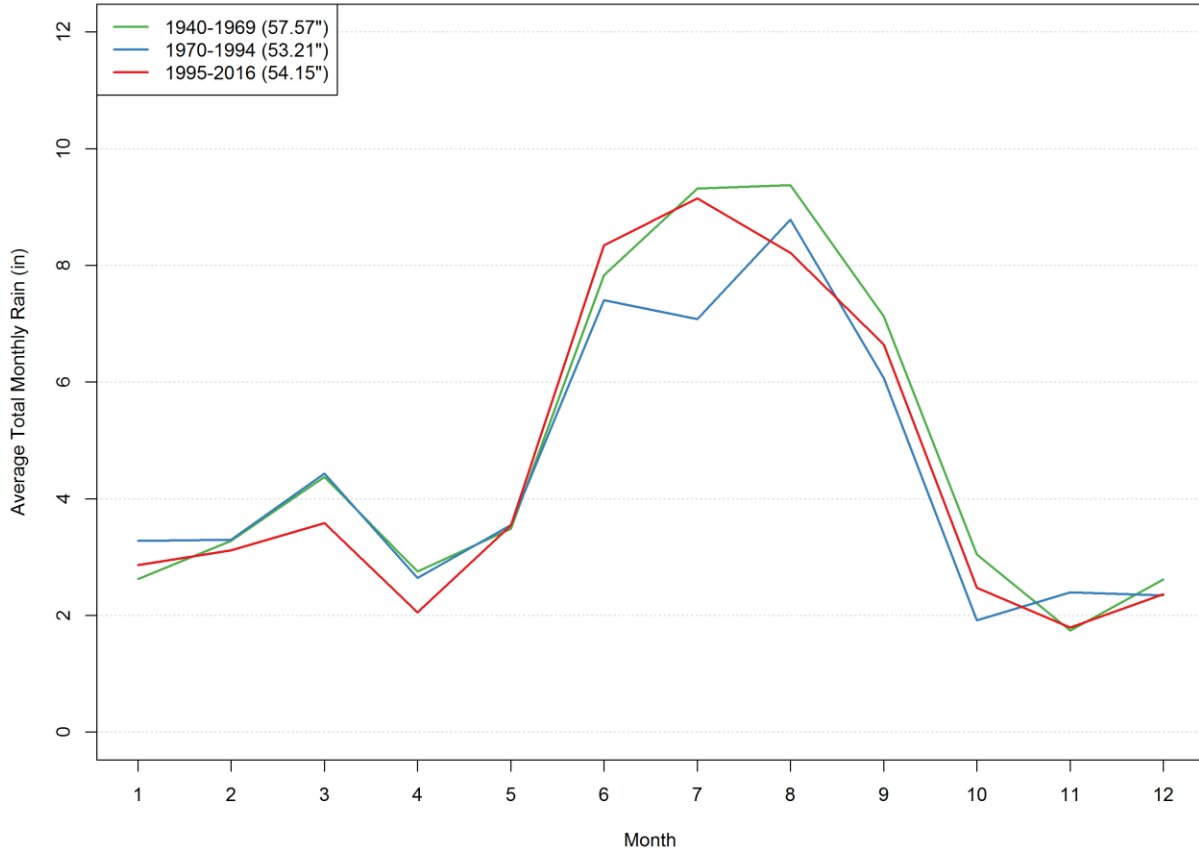
28 years missing: 1890, 1891, 1893-1897, 1899-1901, 1907, 1908, 1910-1913, 1921, 1924, 1927, 1931, 1937, 1941, 1943-1945, 1948, 1949, 1972
 Cumulative Deviation from Mean of 52.24"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	36.83	1956
<i>Driest 3 Year</i>	39.13	1956
<i>Driest 4 Year</i>	42.65	2008
<i>Driest 5 Year</i>	43.33	1956
<i>Driest 10 Year</i>	47.08	2008
<i>Wettest 2 Year</i>	77.3	1960
<i>Wettest 3 Year</i>	72.34	1959
<i>Wettest 4 Year</i>	72.09	1960
<i>Wettest 5 Year</i>	66.19	1961
<i>Wettest 10 Year</i>	58.97	1966
<i>Period of Record</i>	52.24	2016

2 BROOKSVILLE (CHINSEGUT HILL NWS & SWFWMD HQ)

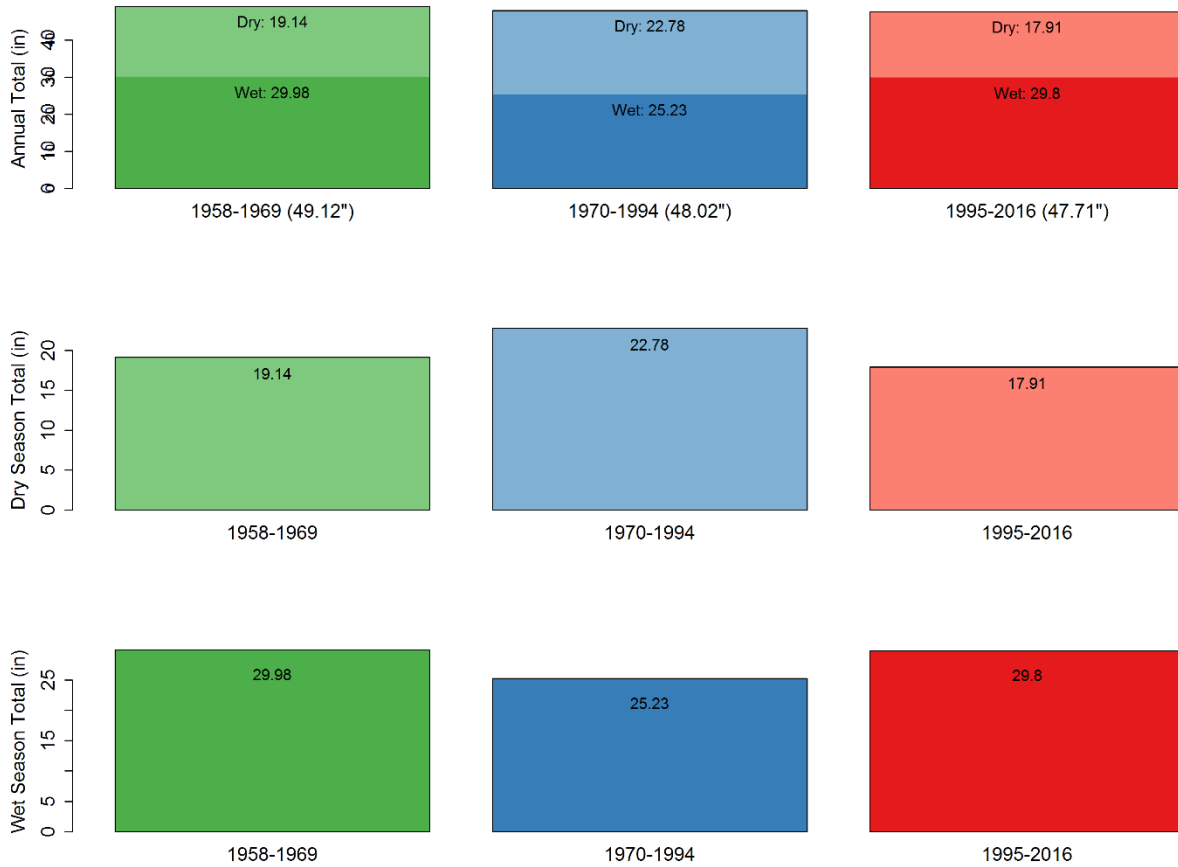
7 years missing: 1941, 1943-1945, 1948, 1949, 1972



	1940-1969	1970-1994	1995-2016	1892-2016 (POR)
<i>Jan</i>	2.62	3.28	2.86	2.78
<i>Feb</i>	3.28	3.3	3.12	3.14
<i>Mar</i>	4.37	4.44	3.58	3.68
<i>Apr</i>	2.75	2.64	2.05	2.65
<i>May</i>	3.49	3.55	3.55	3.72
<i>June</i>	7.83	7.41	8.35	8.03
<i>July</i>	9.32	7.08	9.15	9.07
<i>Aug</i>	9.38	8.78	8.22	8.78
<i>Sep</i>	7.12	6.07	6.64	6.63
<i>Oct</i>	3.05	1.92	2.47	2.83
<i>Nov</i>	1.74	2.4	1.79	1.97
<i>Dec</i>	2.62	2.34	2.37	2.49

Burrell Lock (Lisbon) NWS

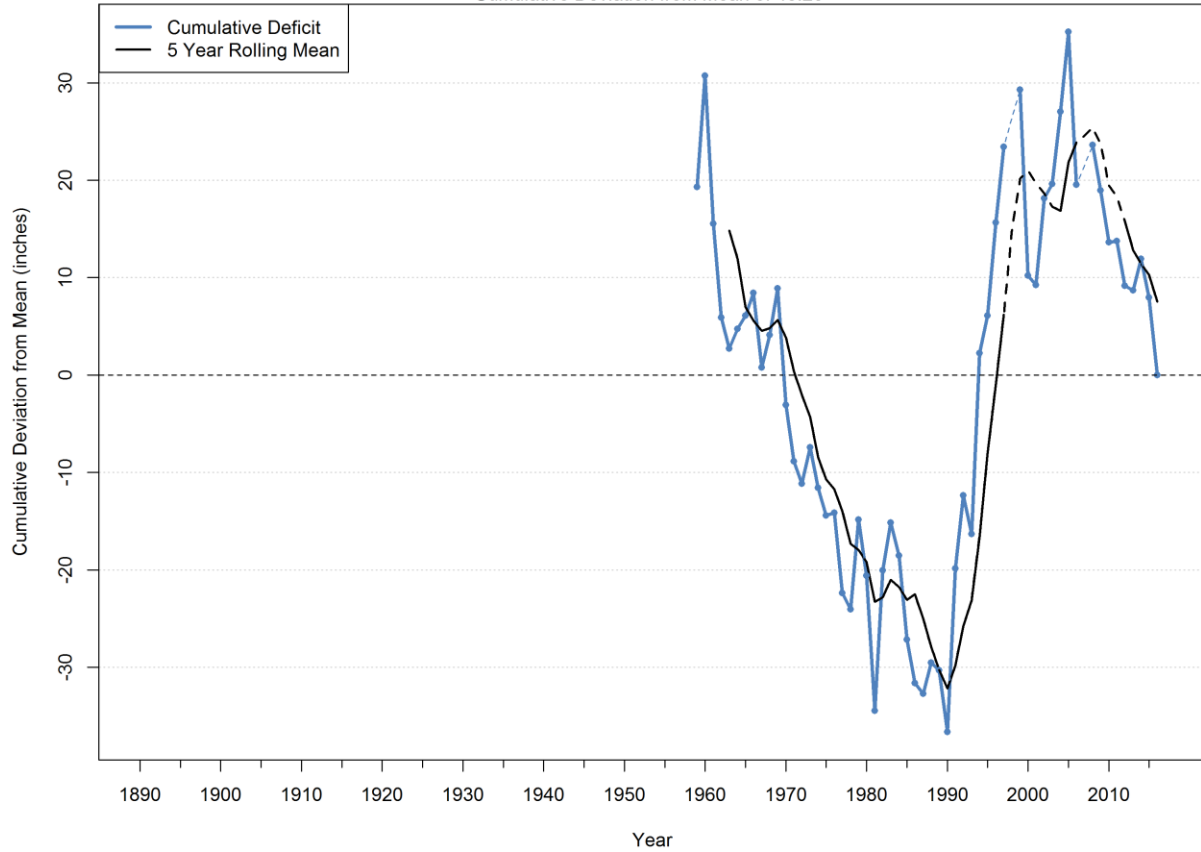
BURRELL LOCK (LISBON) NWS



21 years missing: 1940-1958, 1998, 2007

	1958-1969	1970-1994	1995-2016	1958-2016 (POR)
<i>Wet</i>	29.98	25.23	29.8	27.85
<i>Dry</i>	19.14	22.78	17.91	20.24
<i>Total</i>	49.12	48.02	47.71	48.1

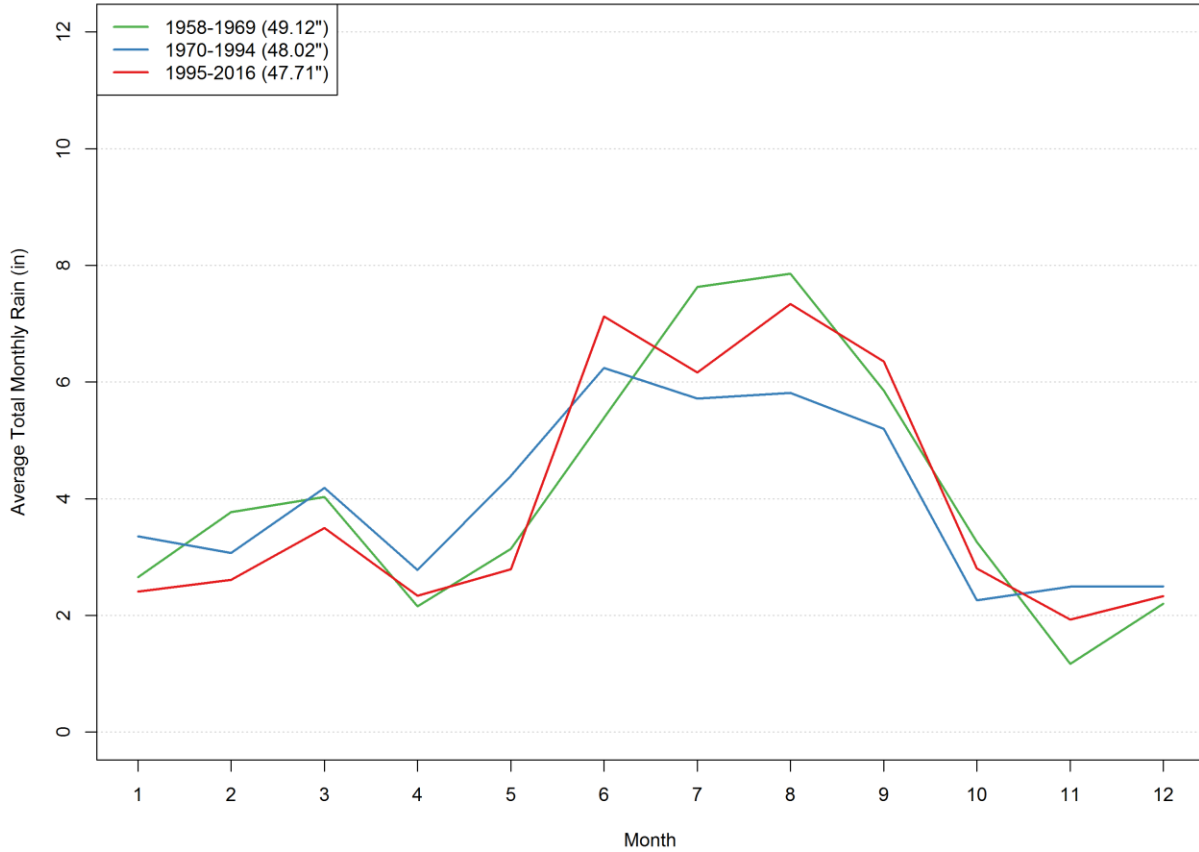
BURRELL LOCK (LISBON) NWS
 71 years missing: 1890-1958, 1998, 2007
 Cumulative Deviation from Mean of 48.28"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	35.88	1962
<i>Driest 3 Year</i>	38.95	1963
<i>Driest 4 Year</i>	41.79	1964
<i>Driest 5 Year</i>	43.36	1965
<i>Driest 10 Year</i>	44.9	1970
<i>Wettest 2 Year</i>	63.64	1960
<i>Wettest 3 Year</i>	58.95	1996
<i>Wettest 4 Year</i>	58.23	1997
<i>Wettest 5 Year</i>	56.83	1995
<i>Wettest 10 Year</i>	53.9	1997
<i>Period of Record</i>	48.28	2016

BURRELL LOCK (LISBON) NWS

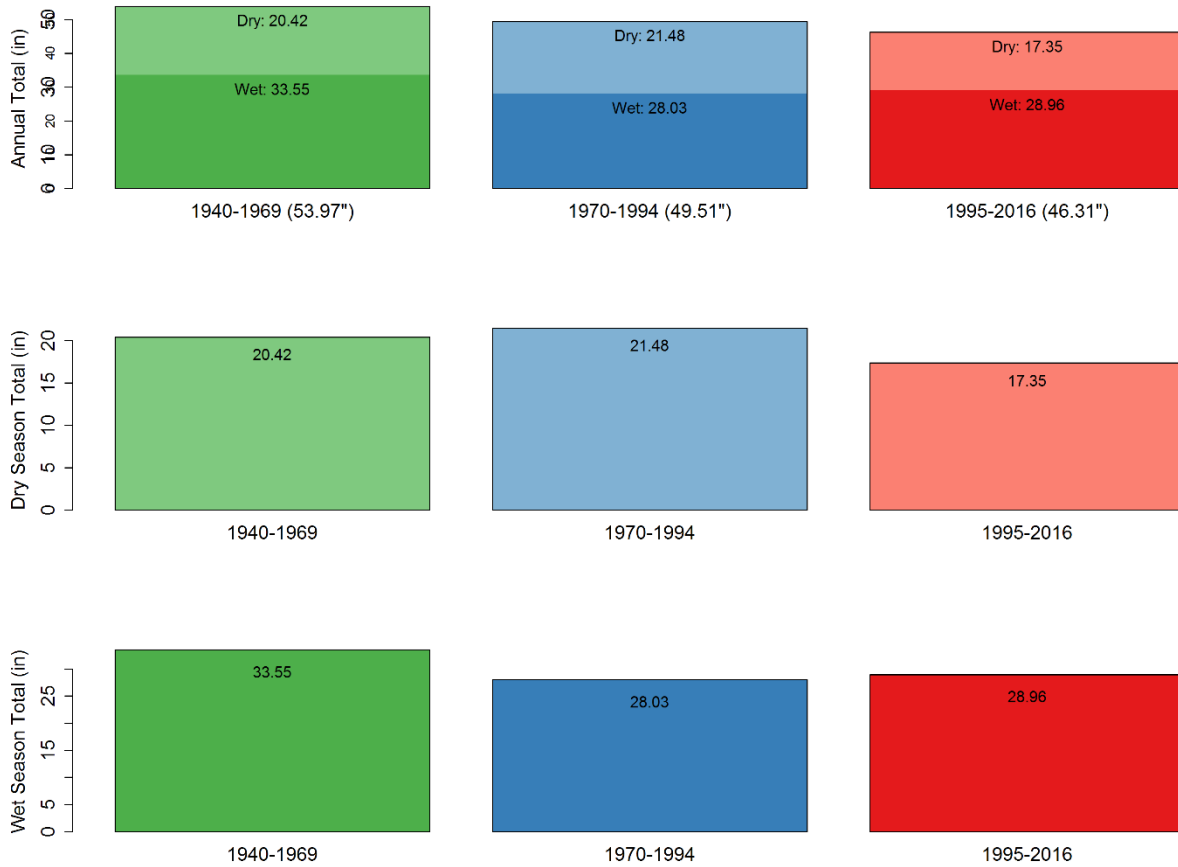
21 years missing: 1940-1958, 1998, 2007



	1958-1969	1970-1994	1995-2016	1958-2016 (POR)
<i>Jan</i>	2.66	3.36	2.41	2.86
<i>Feb</i>	3.77	3.07	2.61	3.03
<i>Mar</i>	4.03	4.19	3.5	3.9
<i>Apr</i>	2.15	2.78	2.34	2.49
<i>May</i>	3.14	4.4	2.79	3.55
<i>June</i>	5.39	6.24	7.13	6.42
<i>July</i>	7.63	5.72	6.16	6.25
<i>Aug</i>	7.86	5.81	7.34	6.77
<i>Sep</i>	5.85	5.2	6.35	5.76
<i>Oct</i>	3.26	2.26	2.81	2.66
<i>Nov</i>	1.17	2.5	1.93	2.03
<i>Dec</i>	2.2	2.5	2.33	2.38

Bushnell 1 E NWS

BUSHNELL 1 E NWS

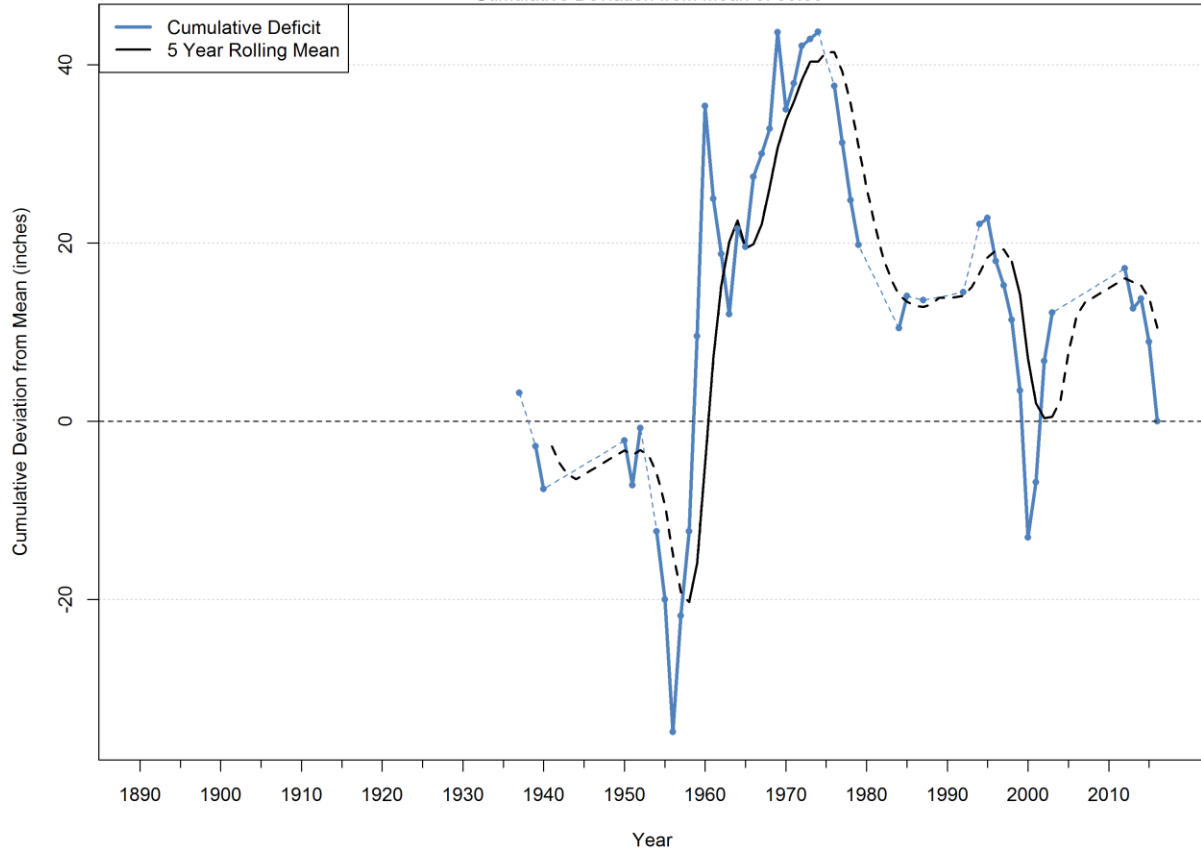


29 years missing: 1941-1949, 1953, 1975, 1980-1983, 1986, 1988-1991, 1993, 2004-2011

	1940-1969	1970-1994	1995-2016	1918-2016 (POR)
<i>Wet</i>	33.55	28.03	28.96	30.44
<i>Dry</i>	20.42	21.48	17.35	19.57
<i>Total</i>	53.97	49.51	46.31	50.01

BUSHNELL 1 E NWS

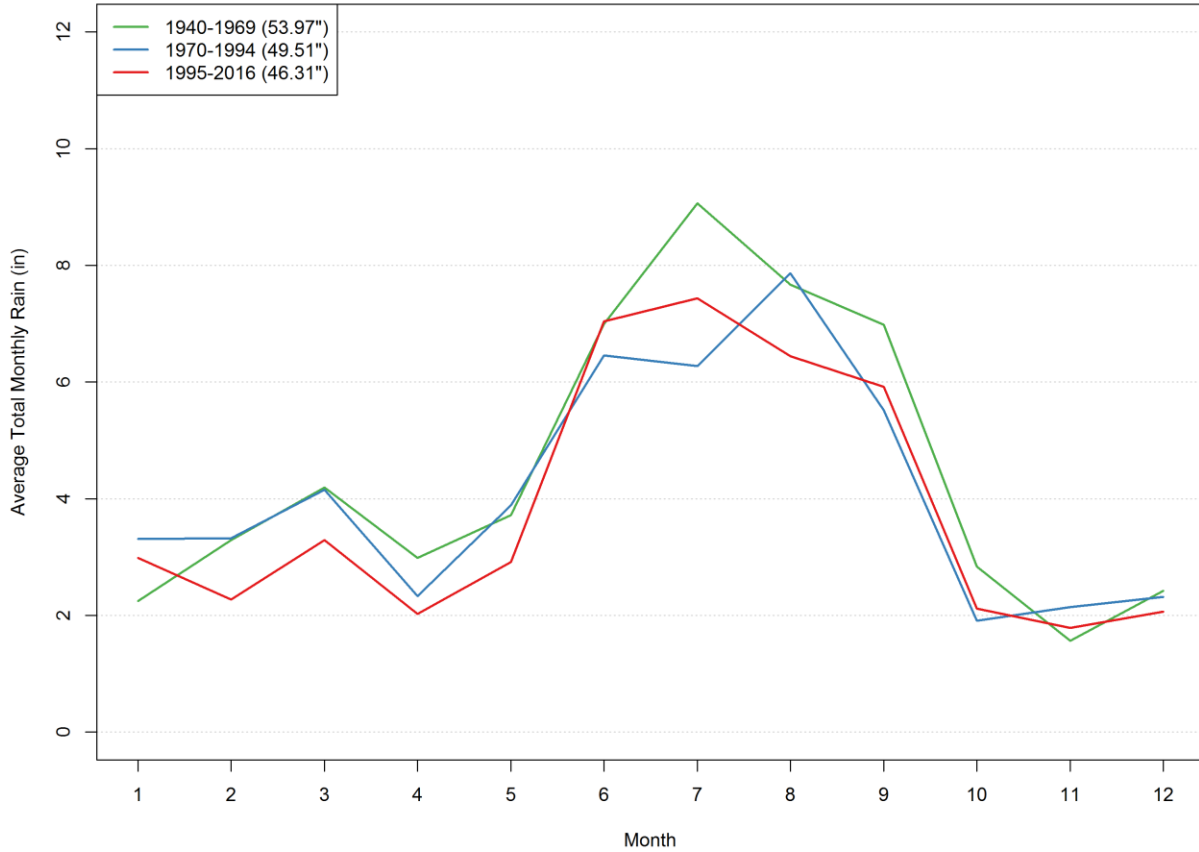
77 years missing: 1890-1936, 1938, 1941-1949, 1953, 1975, 1980-1983, 1986, 1988-1991, 1993, 2004-2011
 Cumulative Deviation from Mean of 50.39"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	38.2	2000
<i>Driest 3 Year</i>	39.02	1956
<i>Driest 4 Year</i>	42.64	2000
<i>Driest 5 Year</i>	43.23	2000
<i>Driest 10 Year</i>	50.16	2003
<i>Wettest 2 Year</i>	74.23	1960
<i>Wettest 3 Year</i>	69.44	1960
<i>Wettest 4 Year</i>	67.94	1960
<i>Wettest 5 Year</i>	62.35	1961
<i>Wettest 10 Year</i>	56.62	1966
<i>Period of Record</i>	50.39	2016

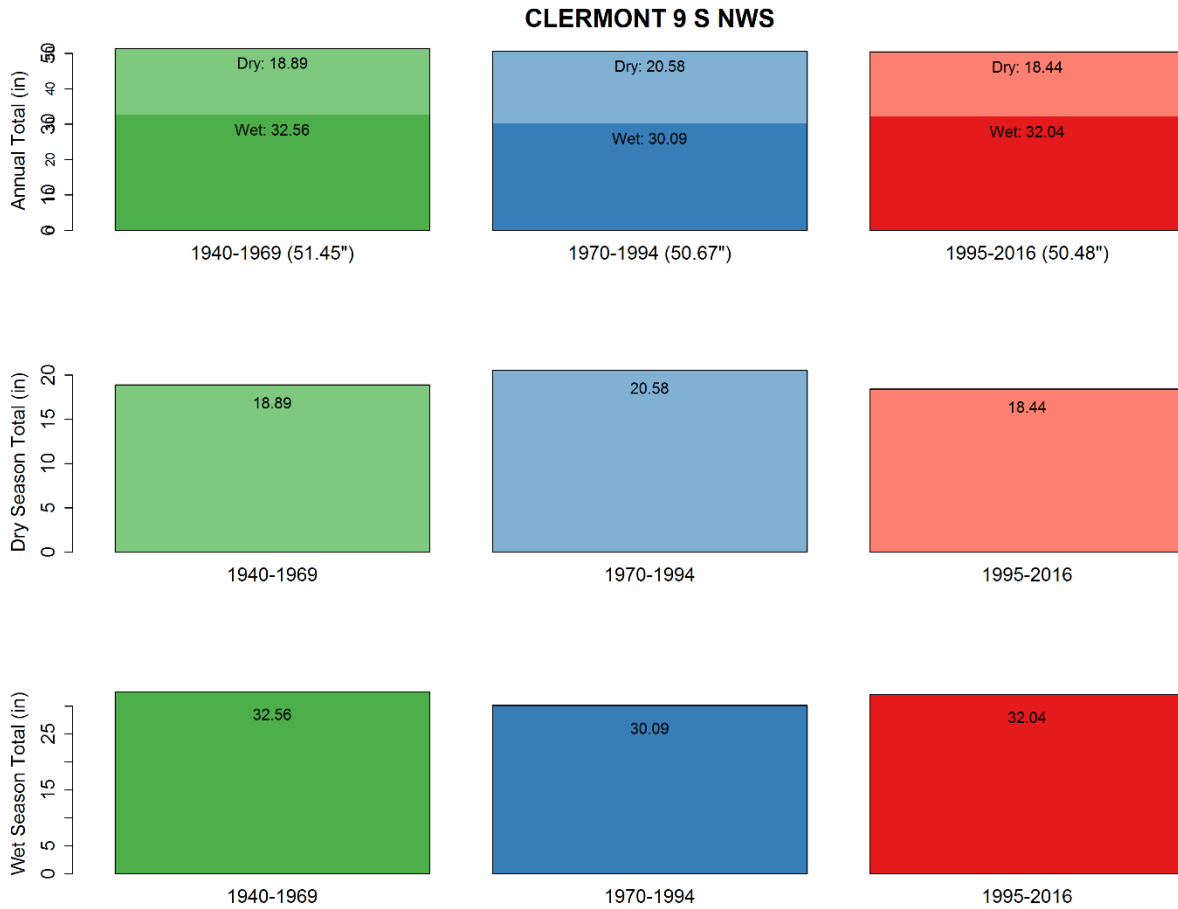
BUSHNELL 1 E NWS

29 years missing: 1941-1949, 1953, 1975, 1980-1983, 1986, 1988-1991, 1993, 2004-2011



	1940-1969	1970-1994	1995-2016	1918-2016 (POR)
<i>Jan</i>	2.24	3.31	2.99	2.78
<i>Feb</i>	3.29	3.33	2.28	2.99
<i>Mar</i>	4.19	4.16	3.29	3.82
<i>Apr</i>	2.99	2.33	2.03	2.46
<i>May</i>	3.72	3.89	2.91	3.46
<i>June</i>	6.99	6.46	7.04	6.86
<i>July</i>	9.06	6.28	7.44	7.7
<i>Aug</i>	7.67	7.86	6.45	7.37
<i>Sep</i>	6.98	5.52	5.92	6.15
<i>Oct</i>	2.84	1.91	2.12	2.36
<i>Nov</i>	1.56	2.14	1.79	1.85
<i>Dec</i>	2.42	2.32	2.07	2.22

Clermont 9 S NWS

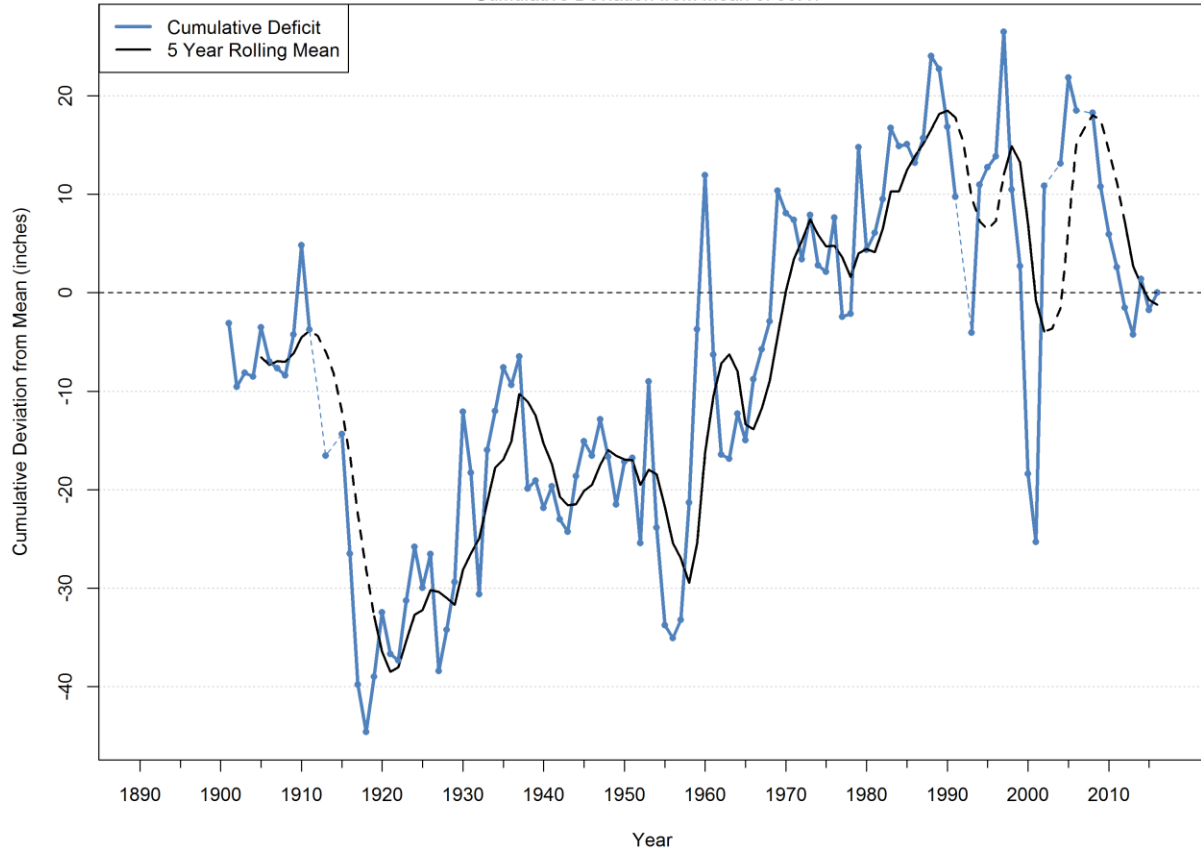


3 years missing: 1992, 2003, 2007

	1940-1969	1970-1994	1995-2016	1901-2016 (POR)
<i>Wet</i>	32.56	30.09	32.04	31.56
<i>Dry</i>	18.89	20.58	18.44	19.07
<i>Total</i>	51.45	50.67	50.48	50.63

CLERMONT 9 S NWS

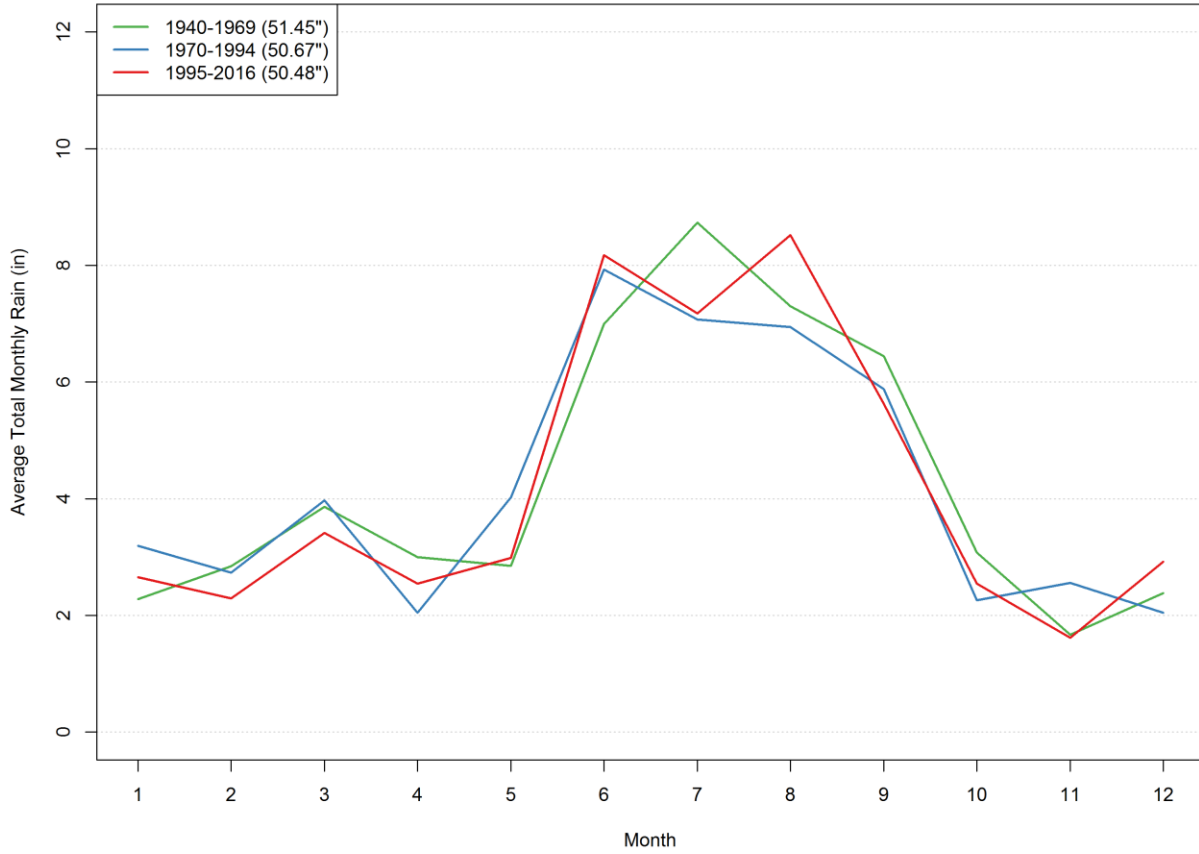
16 years missing: 1890-1900, 1912, 1914, 1992, 2003, 2007
 Cumulative Deviation from Mean of 50.47"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	36.04	2000
<i>Driest 3 Year</i>	35.52	2000
<i>Driest 4 Year</i>	37.52	2001
<i>Driest 5 Year</i>	42.64	2001
<i>Driest 10 Year</i>	48.44	1957
<i>Wettest 2 Year</i>	67.09	1960
<i>Wettest 3 Year</i>	65.51	1960
<i>Wettest 4 Year</i>	62.21	1960
<i>Wettest 5 Year</i>	59.6	1960
<i>Wettest 10 Year</i>	53.66	1937
<i>Period of Record</i>	50.47	2016

CLERMONT 9 S NWS

3 years missing: 1992, 2003, 2007



	1940-1969	1970-1994	1995-2016	1901-2016 (POR)
<i>Jan</i>	2.28	3.19	2.66	2.5
<i>Feb</i>	2.85	2.74	2.29	2.63
<i>Mar</i>	3.86	3.97	3.42	3.45
<i>Apr</i>	3	2.04	2.54	2.67
<i>May</i>	2.85	4.03	2.99	3.69
<i>June</i>	7	7.93	8.17	7.52
<i>July</i>	8.73	7.08	7.18	7.62
<i>Aug</i>	7.3	6.94	8.52	7.4
<i>Sep</i>	6.45	5.88	5.63	6.24
<i>Oct</i>	3.08	2.26	2.55	2.78
<i>Nov</i>	1.67	2.56	1.62	1.83
<i>Dec</i>	2.38	2.04	2.93	2.31

Crescent City NWS

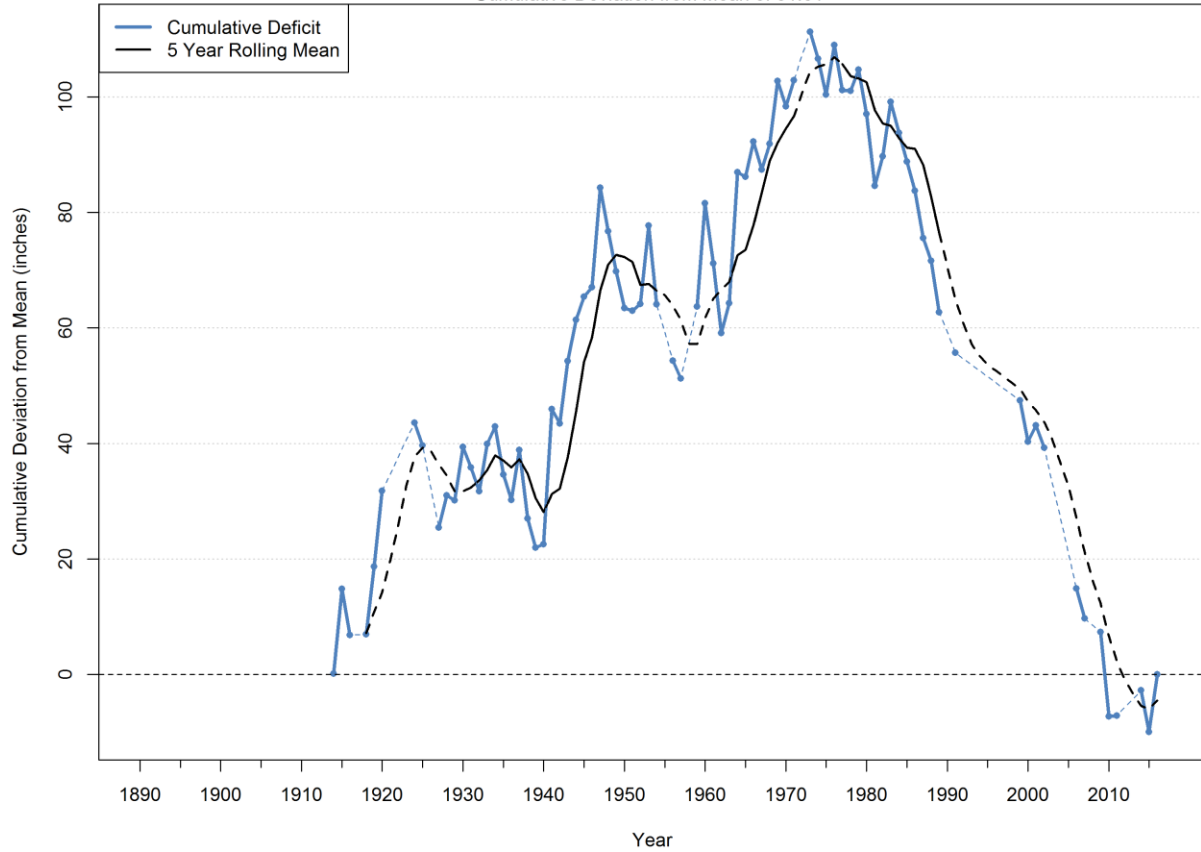


17 years missing: 1955, 1958, 1972, 1990, 1992-1998, 2003-2005, 2008, 2012, 2013

	1940-1969	1970-1994	1995-2016	1912-2016 (POR)
<i>Wet</i>	33.98	27.54	30.62	30.87
<i>Dry</i>	20.65	21.99	18.92	20.81
<i>Total</i>	54.64	49.53	49.53	51.68

CRESCENT CITY NWS

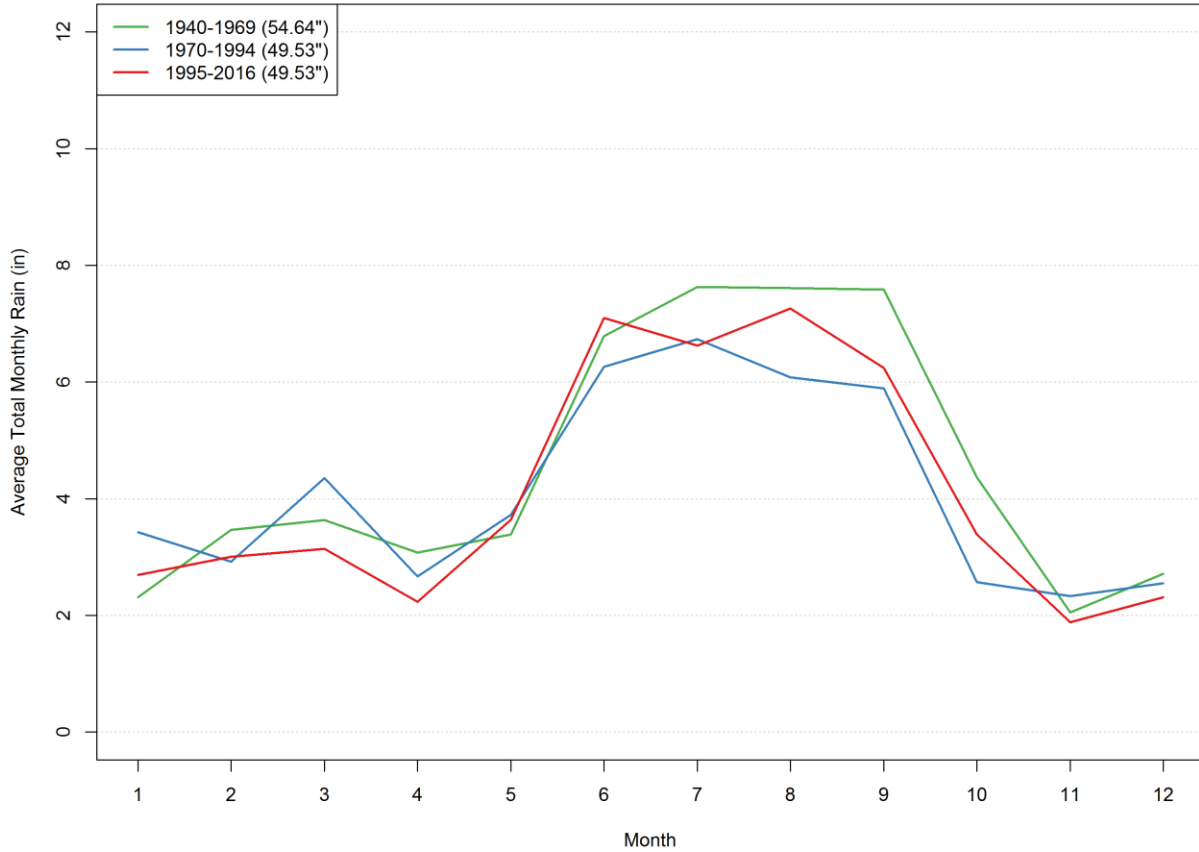
46 years missing: 1890-1913, 1917, 1921-1923, 1926, 1955, 1958, 1972, 1990, 1992-1998, 2003-2005, 2008, 2012, 2013
 Cumulative Deviation from Mean of 51.61"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	36.83	2007
<i>Driest 3 Year</i>	44.61	1989
<i>Driest 4 Year</i>	45.1	1989
<i>Driest 5 Year</i>	45.4	1989
<i>Driest 10 Year</i>	47.42	1989
<i>Wettest 2 Year</i>	66.77	1960
<i>Wettest 3 Year</i>	62.19	1943
<i>Wettest 4 Year</i>	61.33	1944
<i>Wettest 5 Year</i>	60.19	1945
<i>Wettest 10 Year</i>	56.59	1948
<i>Period of Record</i>	51.61	2016

CRESCENT CITY NWS

17 years missing: 1955, 1958, 1972, 1990, 1992-1998, 2003-2005, 2008, 2012, 2013



	1940-1969	1970-1994	1995-2016	1912-2016 (POR)
Jan	2.31	3.43	2.69	2.65
Feb	3.47	2.92	3	3.11
Mar	3.64	4.36	3.14	3.65
Apr	3.08	2.67	2.23	2.83
May	3.39	3.73	3.64	3.98
June	6.79	6.26	7.1	6.92
July	7.63	6.74	6.62	6.98
Aug	7.61	6.08	7.26	6.89
Sep	7.59	5.89	6.24	6.36
Oct	4.37	2.57	3.39	3.73
Nov	2.05	2.33	1.89	2.01
Dec	2.72	2.55	2.31	2.59

Cross City 1 E NWS

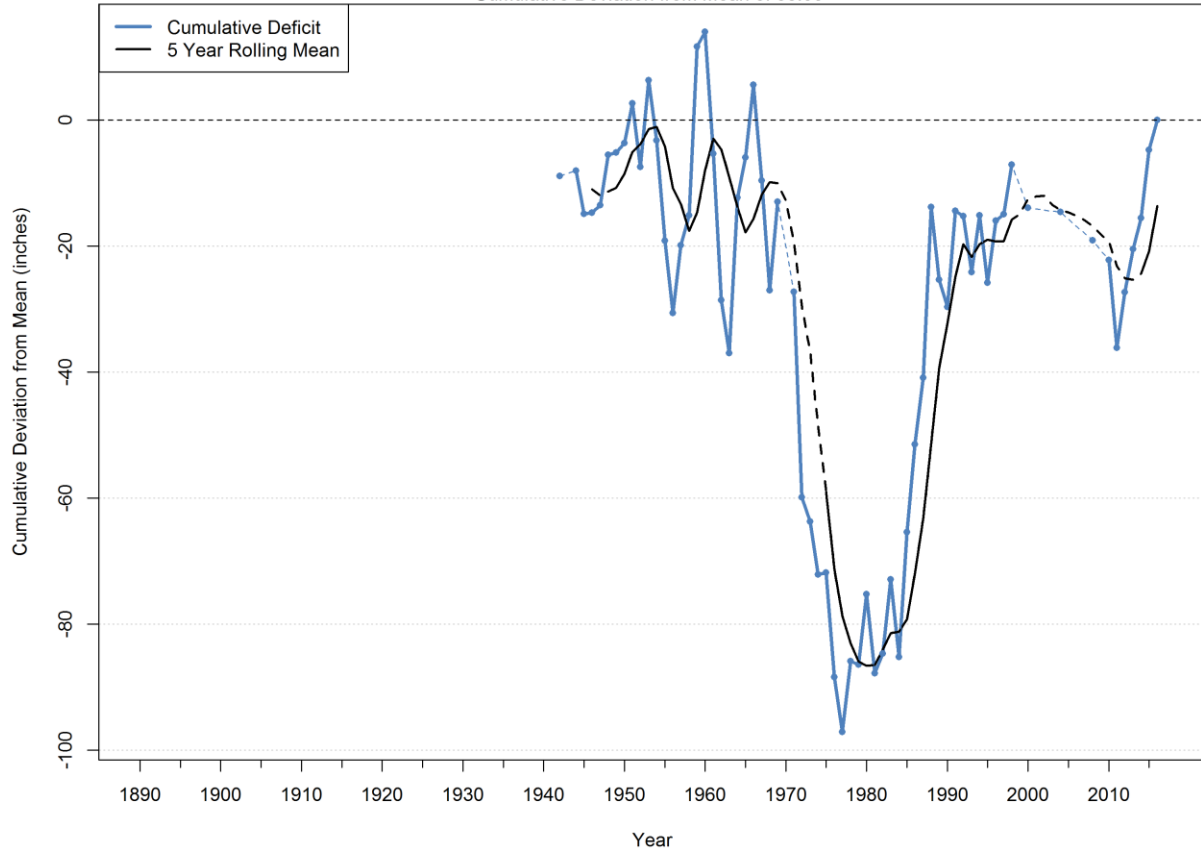


12 years missing: 1940, 1941, 1943, 1970, 1999, 2001-2003, 2005-2007, 2009

	1942-1969	1970-1994	1995-2016	1942-2016 (POR)
<i>Wet</i>	34.68	33.57	36.11	34.72
<i>Dry</i>	22.39	24.66	21.56	22.93
<i>Total</i>	57.08	58.23	57.67	57.65

CROSS CITY 1 E NWS

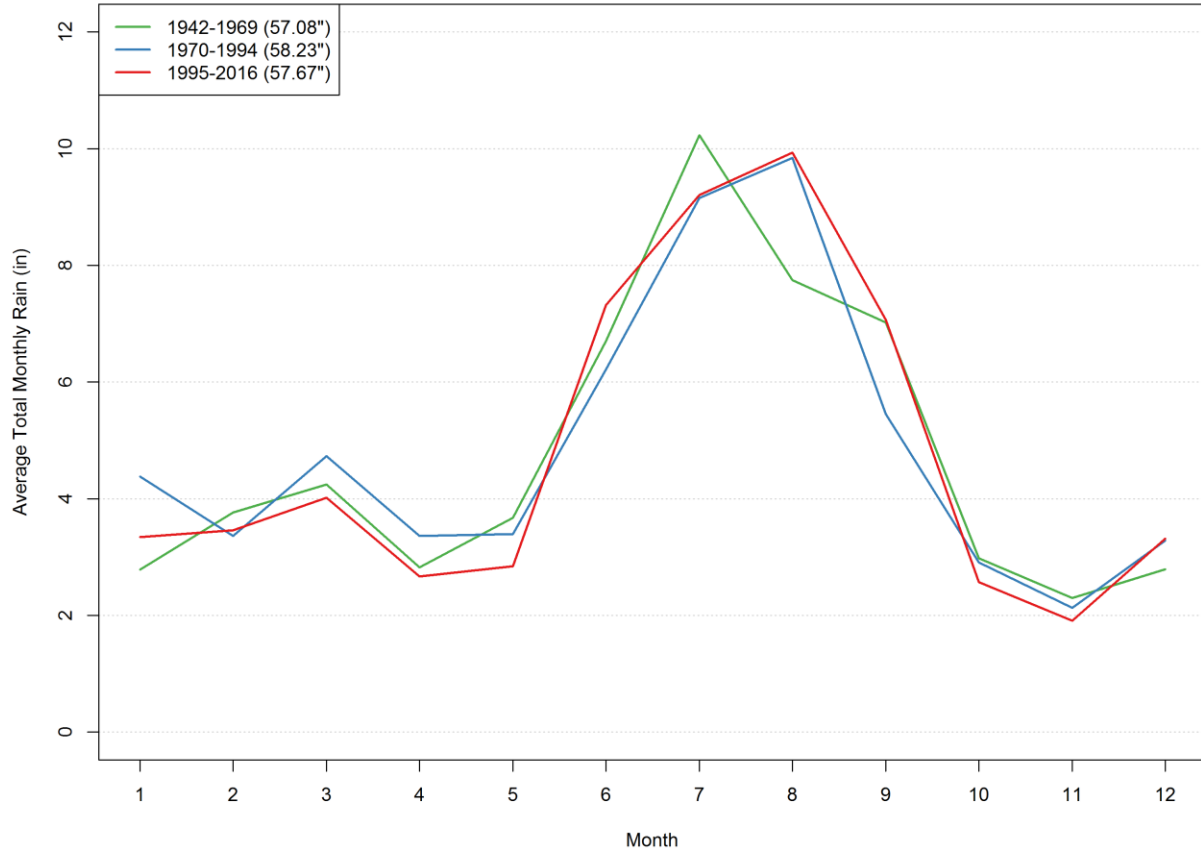
62 years missing: 1890-1941, 1943, 1970, 1999, 2001-2003, 2005-2007, 2009
 Cumulative Deviation from Mean of 58.05"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	34.6	1972
<i>Driest 3 Year</i>	41.06	1963
<i>Driest 4 Year</i>	43.27	1974
<i>Driest 5 Year</i>	45.82	1976
<i>Driest 10 Year</i>	51.82	1980
<i>Wettest 2 Year</i>	76.86	1988
<i>Wettest 3 Year</i>	75.23	1988
<i>Wettest 4 Year</i>	75.9	1988
<i>Wettest 5 Year</i>	70.02	1989
<i>Wettest 10 Year</i>	65.39	1991
<i>Period of Record</i>	58.05	2016

CROSS CITY 1 E NWS

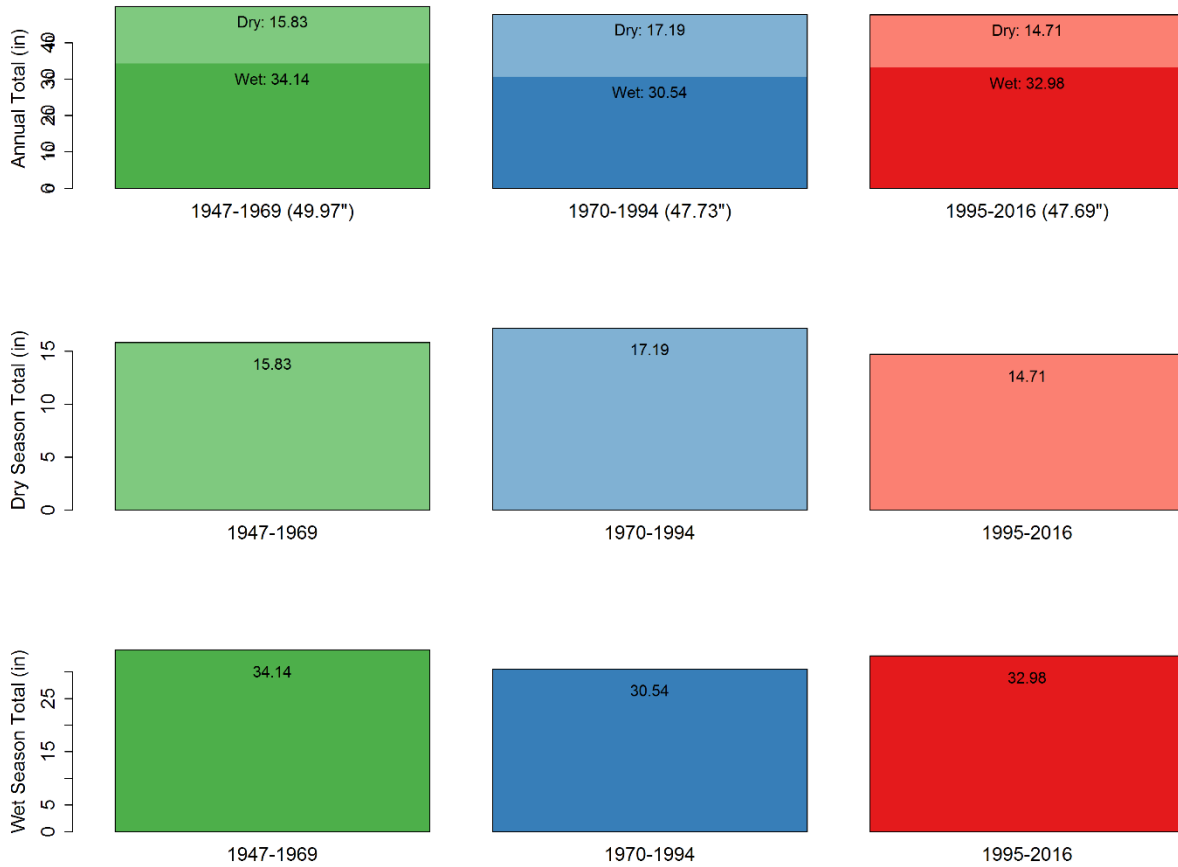
12 years missing: 1940, 1941, 1943, 1970, 1999, 2001-2003, 2005-2007, 2009



	1942-1969	1970-1994	1995-2016	1942-2016 (POR)
<i>Jan</i>	2.79	4.38	3.34	3.48
<i>Feb</i>	3.77	3.36	3.46	3.54
<i>Mar</i>	4.25	4.73	4.02	4.34
<i>Apr</i>	2.82	3.36	2.67	2.96
<i>May</i>	3.67	3.4	2.85	3.36
<i>June</i>	6.7	6.22	7.32	6.71
<i>July</i>	10.23	9.16	9.21	9.6
<i>Aug</i>	7.75	9.84	9.94	9.05
<i>Sep</i>	7.02	5.45	7.07	6.52
<i>Oct</i>	2.98	2.91	2.57	2.84
<i>Nov</i>	2.3	2.13	1.91	2.14
<i>Dec</i>	2.79	3.29	3.32	3.11

Desoto City 8 SW NWS

DESOTO CITY 8 SW NWS

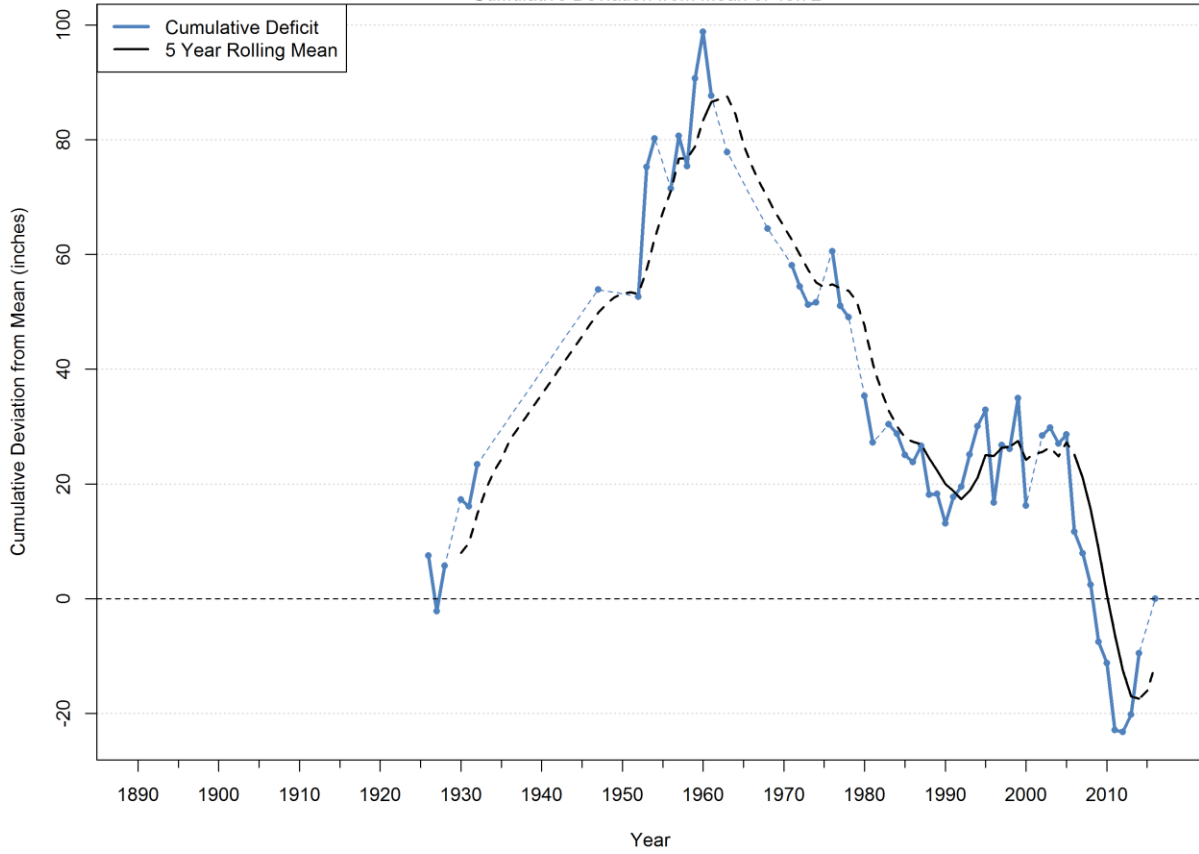


24 years missing: 1940-1946, 1948-1951, 1955, 1962, 1964-1967, 1969, 1970, 1975, 1979, 1982, 2001, 2015

	1947-1969	1970-1994	1995-2016	1925-2016 (POR)
<i>Wet</i>	34.14	30.54	32.98	32.79
<i>Dry</i>	15.83	17.19	14.71	16.27
<i>Total</i>	49.97	47.73	47.69	49.06

DESOTO CITY 8 SW NWS

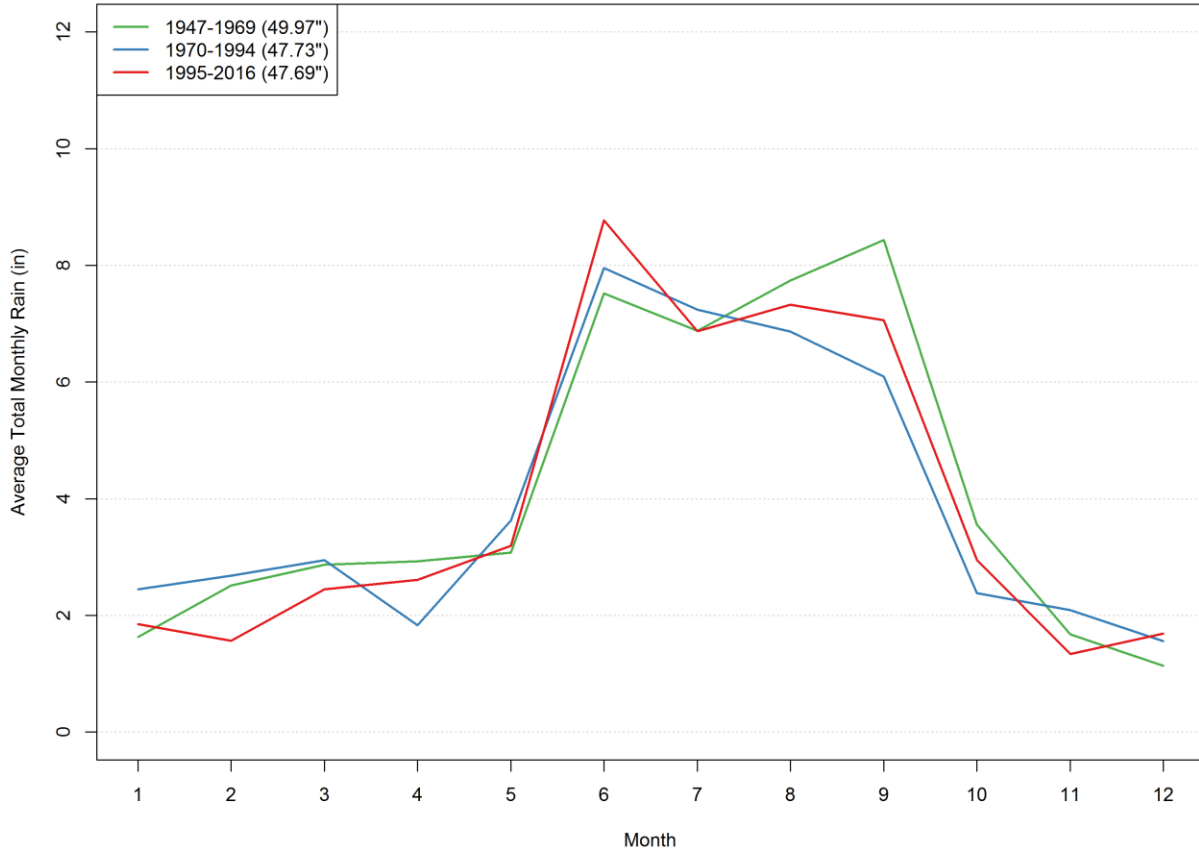
68 years missing: 1890-1925, 1929, 1933-1946, 1948-1951, 1955, 1962, 1964-1967, 1969, 1970, 1975, 1979, 1982, 2001, 2015
 Cumulative Deviation from Mean of 48.72"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	37.8	1981
<i>Driest 3 Year</i>	40.01	2008
<i>Driest 4 Year</i>	39.7	2009
<i>Driest 5 Year</i>	40.76	2010
<i>Driest 10 Year</i>	43.56	2012
<i>Wettest 2 Year</i>	62.51	1954
<i>Wettest 3 Year</i>	57.5	1954
<i>Wettest 4 Year</i>	55.55	1960
<i>Wettest 5 Year</i>	52.67	1995
<i>Wettest 10 Year</i>	50.39	1999
<i>Period of Record</i>	48.72	2016

DESOTO CITY 8 SW NWS

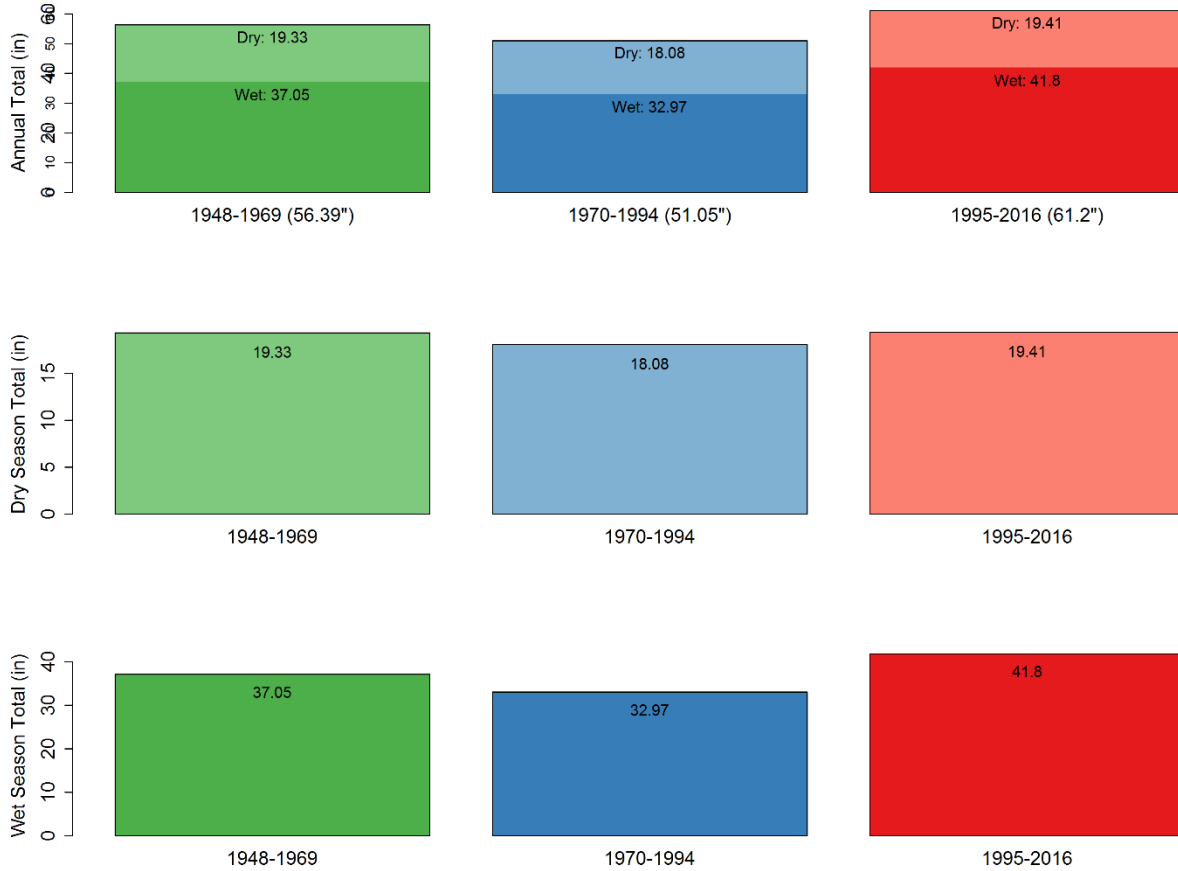
24 years missing: 1940-1946, 1948-1951, 1955, 1962, 1964-1967, 1969, 1970, 1975, 1979, 1982, 2001, 2015



	1947-1969	1970-1994	1995-2016	1925-2016 (POR)
<i>Jan</i>	1.63	2.45	1.85	2.01
<i>Feb</i>	2.52	2.68	1.57	2.19
<i>Mar</i>	2.87	2.95	2.45	2.87
<i>Apr</i>	2.93	1.83	2.61	2.6
<i>May</i>	3.08	3.63	3.2	3.44
<i>June</i>	7.52	7.96	8.77	7.97
<i>July</i>	6.88	7.24	6.87	7.18
<i>Aug</i>	7.74	6.87	7.33	7.28
<i>Sep</i>	8.43	6.09	7.06	7.49
<i>Oct</i>	3.56	2.38	2.96	2.86
<i>Nov</i>	1.67	2.09	1.34	1.67
<i>Dec</i>	1.14	1.56	1.69	1.48

Fort Green 12 WSW NWS

FORT GREEN 12 WSW NWS

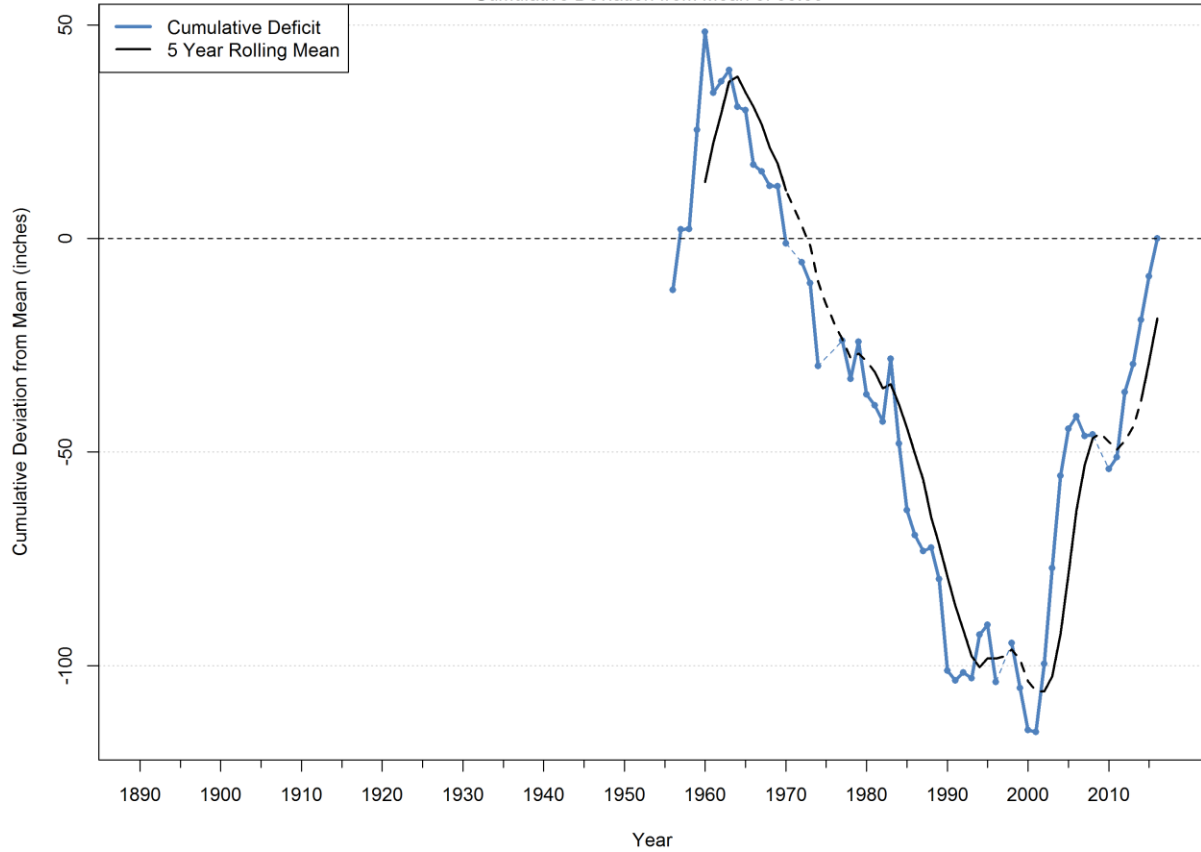


21 years missing: 1940-1955, 1971, 1975, 1976, 1997, 2009

	1948-1969	1970-1994	1995-2016	1948-2016 (POR)
<i>Wet</i>	37.05	32.97	41.8	37.07
<i>Dry</i>	19.33	18.08	19.41	18.84
<i>Total</i>	56.39	51.05	61.2	55.91

FORT GREEN 12 WSW NWS

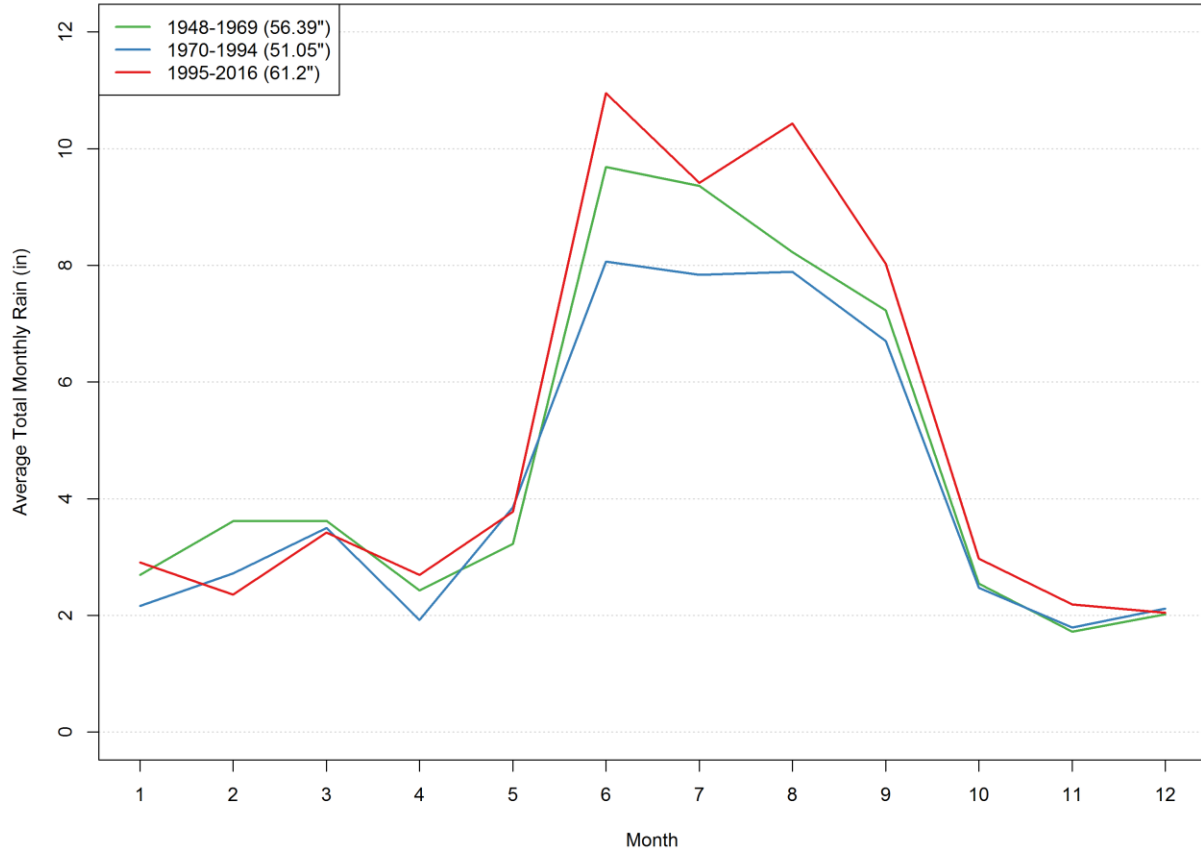
71 years missing: 1890-1955, 1971, 1975, 1976, 1997, 2009
 Cumulative Deviation from Mean of 55.65"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	37.95	1985
<i>Driest 3 Year</i>	41.91	1986
<i>Driest 4 Year</i>	44.4	1987
<i>Driest 5 Year</i>	46.81	1988
<i>Driest 10 Year</i>	48.18	1993
<i>Wettest 2 Year</i>	78.74	1960
<i>Wettest 3 Year</i>	75.66	2004
<i>Wettest 4 Year</i>	73.42	2005
<i>Wettest 5 Year</i>	70.45	2006
<i>Wettest 10 Year</i>	61.41	2007
<i>Period of Record</i>	55.65	2016

FORT GREEN 12 WSW NWS

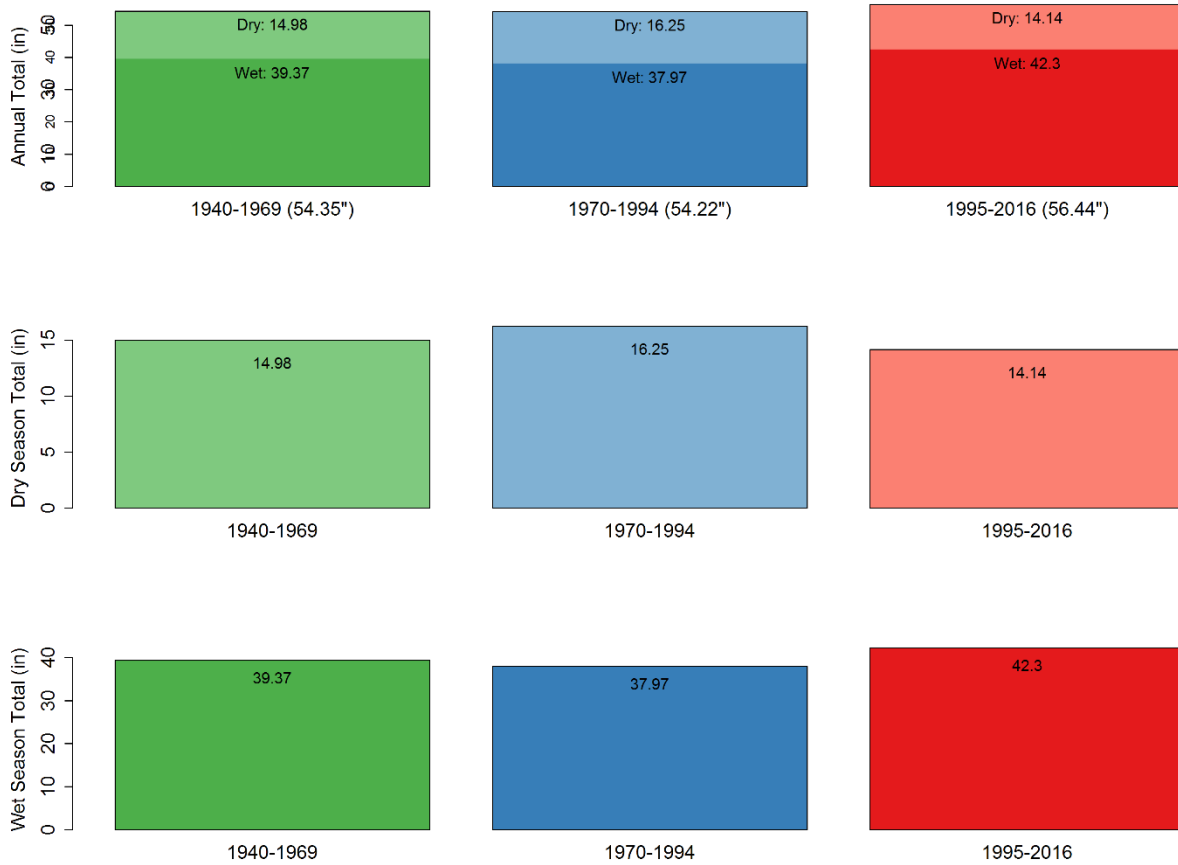
21 years missing: 1940-1955, 1971, 1975, 1976, 1997, 2009



	1948-1969	1970-1994	1995-2016	1948-2016 (POR)
<i>Jan</i>	2.7	2.16	2.91	2.55
<i>Feb</i>	3.61	2.72	2.36	2.79
<i>Mar</i>	3.62	3.5	3.42	3.5
<i>Apr</i>	2.43	1.92	2.7	2.32
<i>May</i>	3.23	3.86	3.78	3.69
<i>June</i>	9.69	8.07	10.95	9.48
<i>July</i>	9.36	7.84	9.41	8.76
<i>Aug</i>	8.23	7.89	10.43	8.87
<i>Sep</i>	7.23	6.7	8.02	7.3
<i>Oct</i>	2.55	2.48	2.97	2.67
<i>Nov</i>	1.72	1.8	2.19	1.92
<i>Dec</i>	2.02	2.12	2.05	2.07

Fort Myers Page Field Airport NWS

FORT MYERS PAGE FIELD AIRPORT NWS

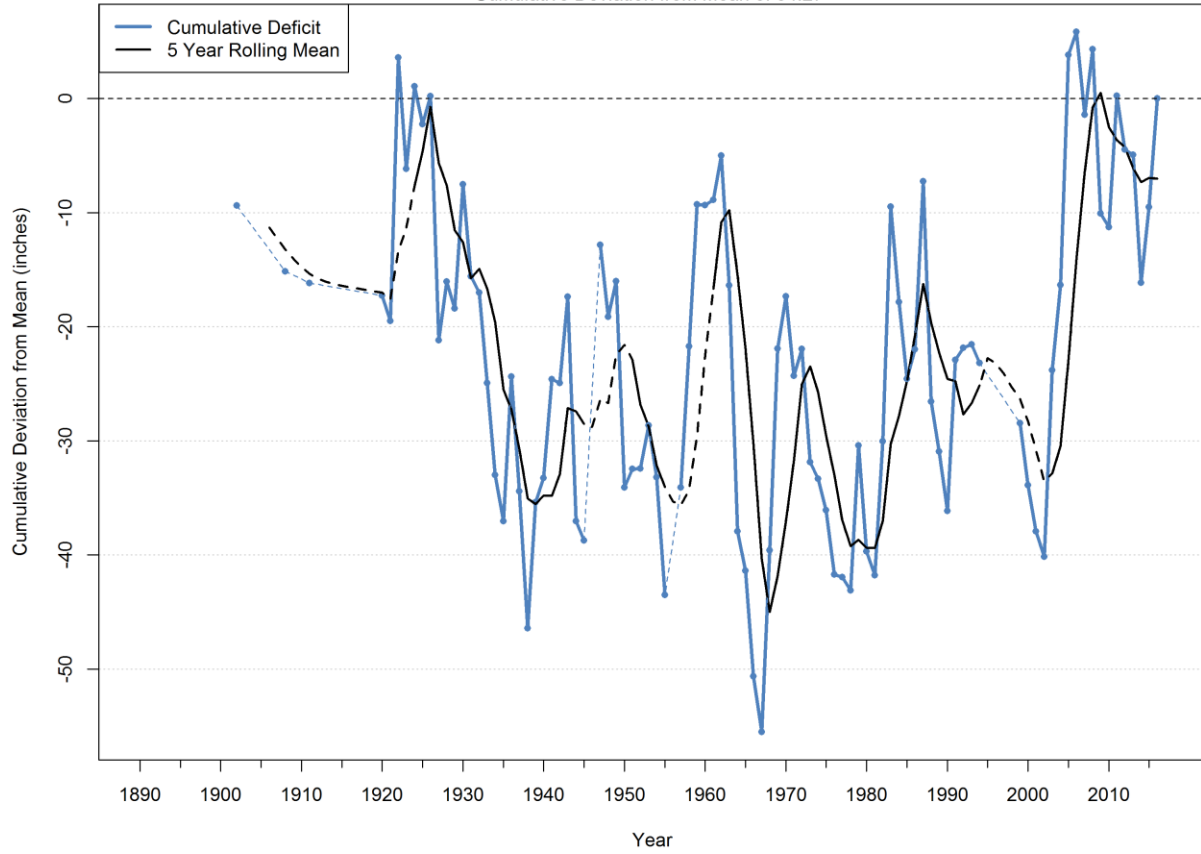


6 years missing: 1946, 1956, 1995-1998

	1940-1969	1970-1994	1995-2016	1892-2016 (POR)
<i>Wet</i>	39.37	37.97	42.3	39.29
<i>Dry</i>	14.98	16.25	14.14	14.92
<i>Total</i>	54.35	54.22	56.44	54.22

FORT MYERS PAGE FIELD AIRPORT NWS

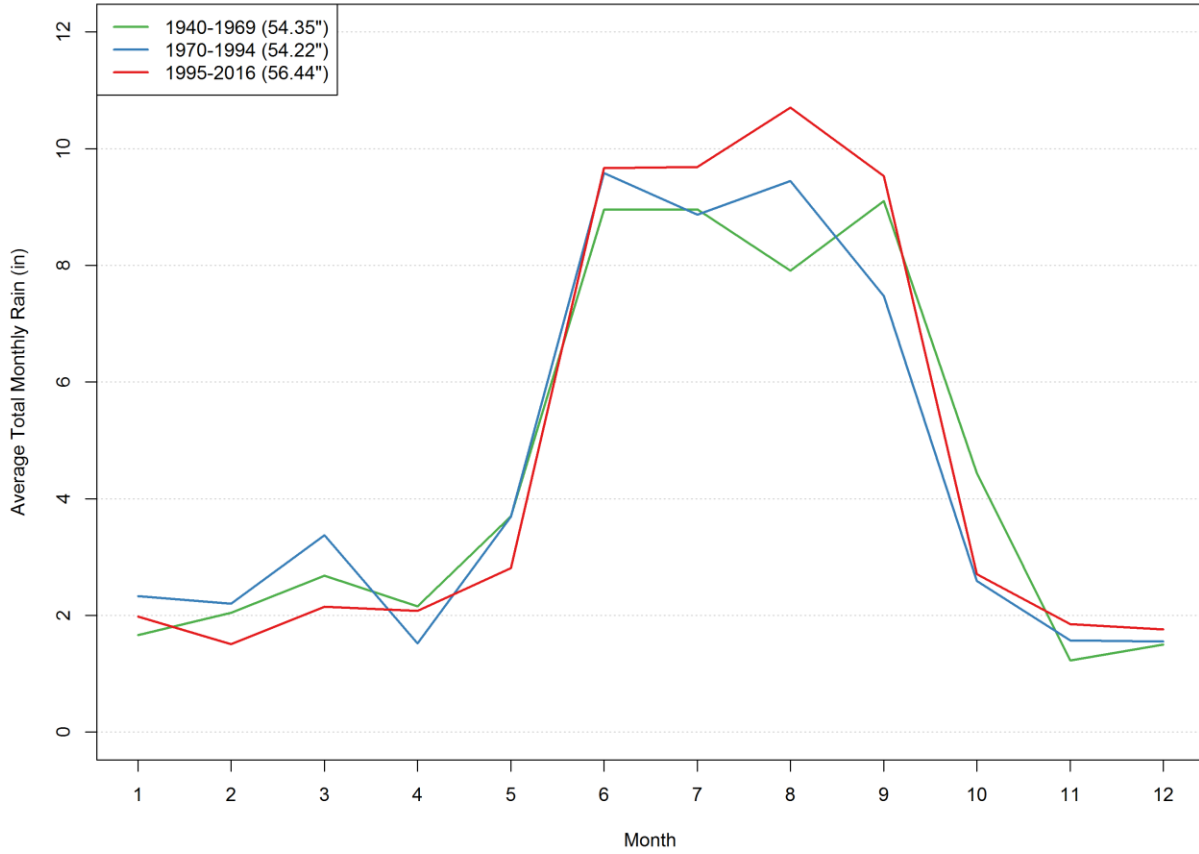
33 years missing: 1890-1901, 1903-1907, 1909, 1910, 1912-1919, 1946, 1956, 1995-1998
 Cumulative Deviation from Mean of 54.27"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	37.81	1964
<i>Driest 3 Year</i>	42.15	1965
<i>Driest 4 Year</i>	42.86	1966
<i>Driest 5 Year</i>	44.17	1967
<i>Driest 10 Year</i>	50.79	1935
<i>Wettest 2 Year</i>	71.08	1969
<i>Wettest 3 Year</i>	68.94	2005
<i>Wettest 4 Year</i>	65.77	2006
<i>Wettest 5 Year</i>	63.03	2006
<i>Wettest 10 Year</i>	58.09	2011
<i>Period of Record</i>	54.27	2016

FORT MYERS PAGE FIELD AIRPORT NWS

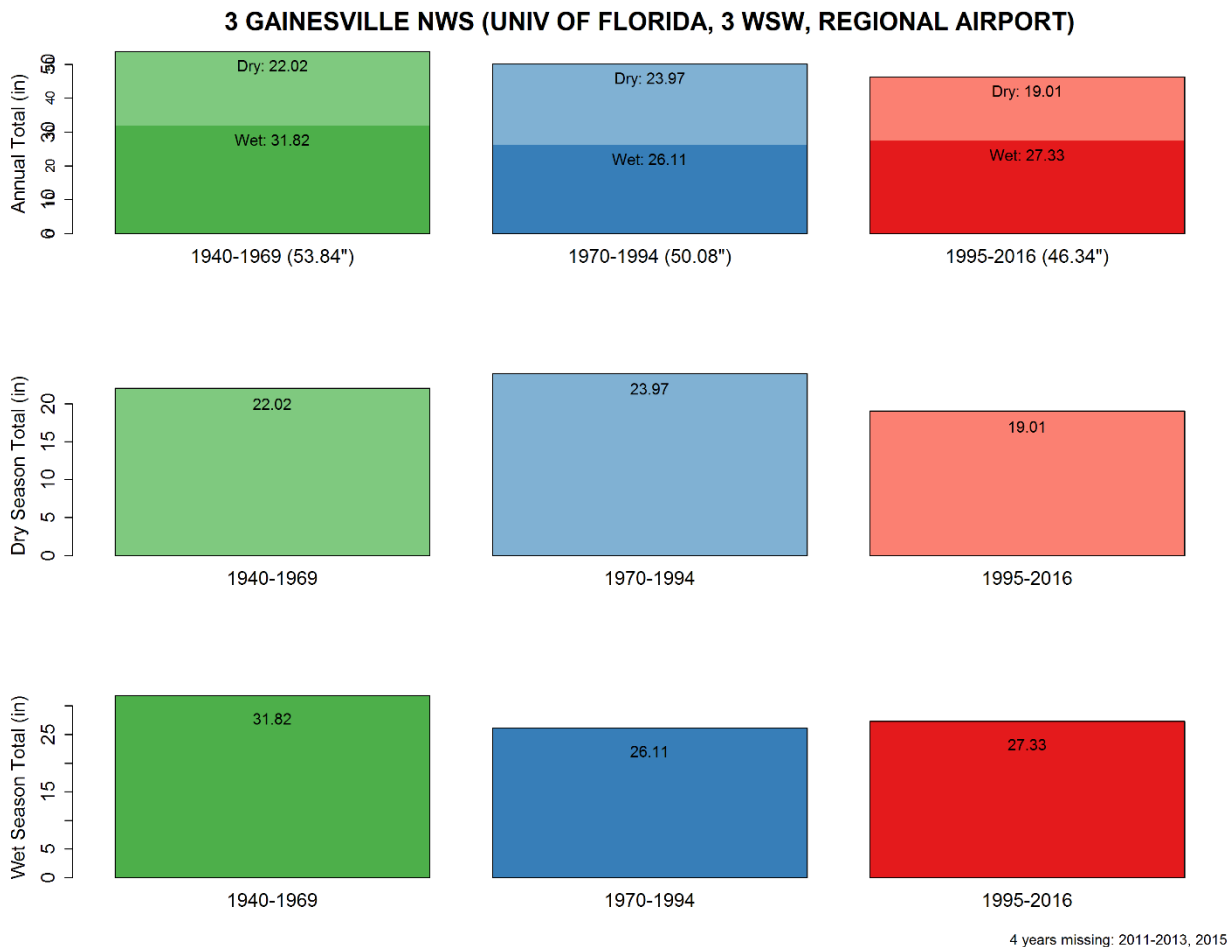
6 years missing: 1946, 1956, 1995-1998



	1940-1969	1970-1994	1995-2016	1892-2016 (POR)
<i>Jan</i>	1.67	2.33	1.98	1.84
<i>Feb</i>	2.05	2.2	1.51	1.99
<i>Mar</i>	2.68	3.38	2.15	2.45
<i>Apr</i>	2.16	1.52	2.08	2.01
<i>May</i>	3.7	3.69	2.81	3.66
<i>June</i>	8.95	9.59	9.67	9.48
<i>July</i>	8.96	8.87	9.69	8.8
<i>Aug</i>	7.91	9.45	10.7	9.05
<i>Sep</i>	9.1	7.48	9.53	8.37
<i>Oct</i>	4.44	2.59	2.71	3.6
<i>Nov</i>	1.23	1.57	1.85	1.45
<i>Dec</i>	1.5	1.55	1.76	1.52

Gainesville Univ Of Florida NWS (D), Gainesville 3 WSW (D), and Gainesville Regional Airport NWS

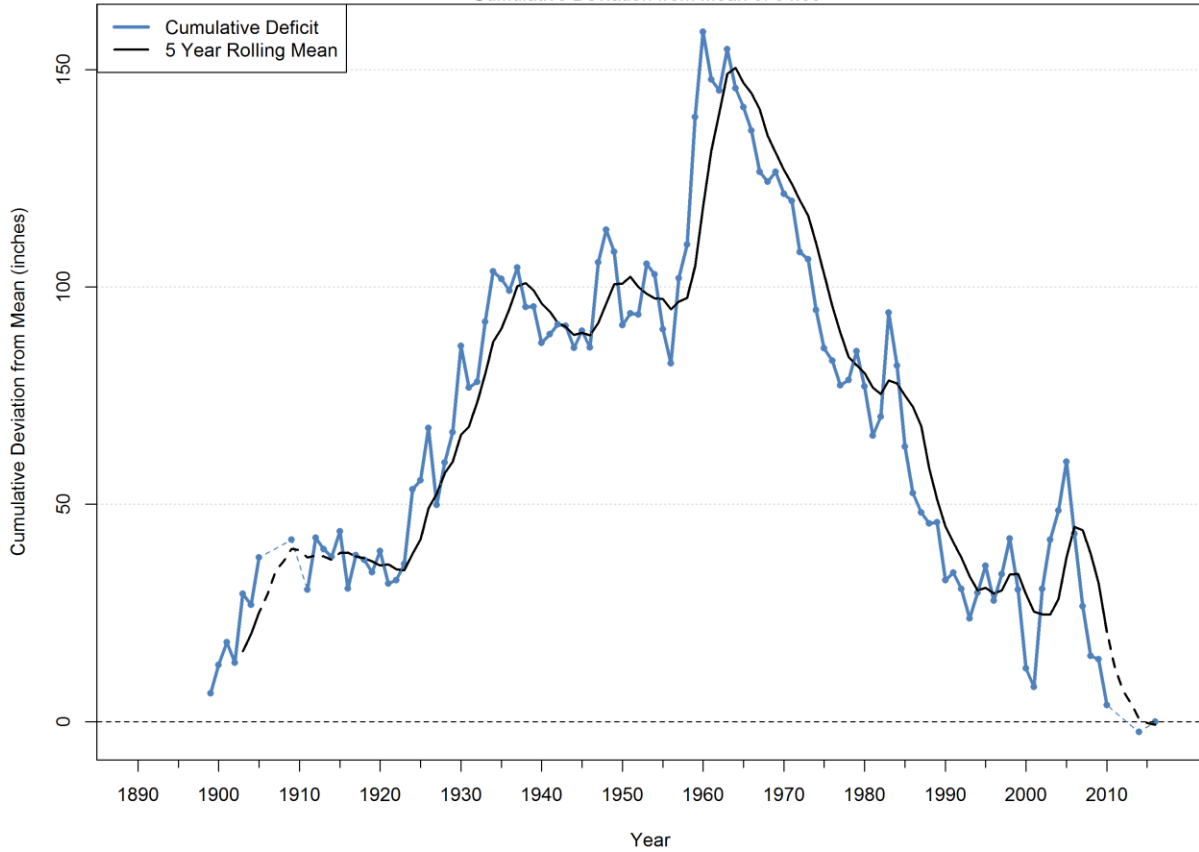
Gainesville Univ Of Florida NWS began operation in 1890 but was discontinued in 1957. Therefore, data for the site was extended from 1957 to 1988 using Gainesville 3 WSW and from 1988 to 2016 Gainesville Regional Airport NWS station, which are located approximately 1.9 miles southwest and 5.5 miles northeast of the original, respectively. On [summary maps](#), the results of this combination are plotted at the location of Gainesville Univ Of Florida NWS.



	1940-1969	1970-1994	1995-2016	1890-2016 (POR)
<i>Wet</i>	31.91	26.17	27.33	29.33
<i>Dry</i>	21.98	24.05	19.01	21.17
<i>Total</i>	53.9	50.22	46.34	50.5

3 GAINESVILLE NWS (UNIV OF FLORIDA, 3 WSW, REGIONAL AIRPORT)

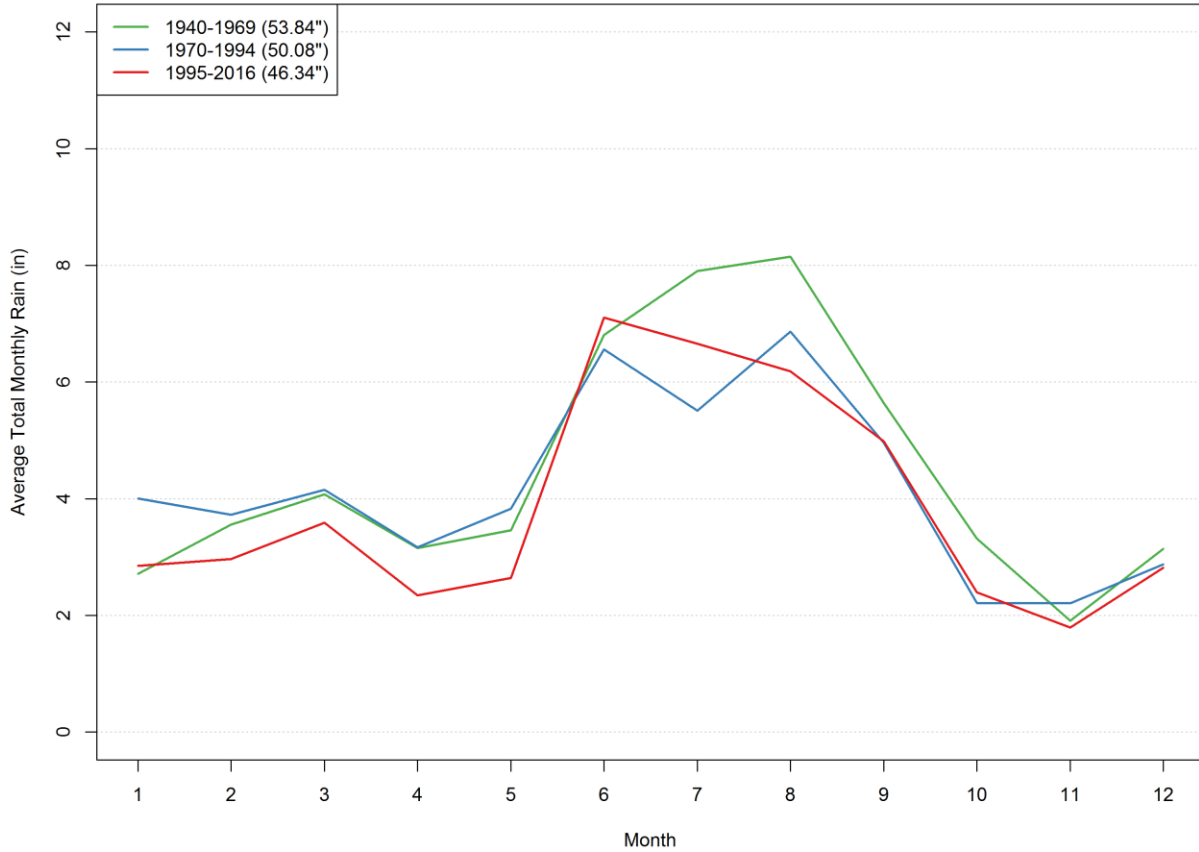
17 years missing: 1890-1898, 1906-1908, 1910, 2011-2013, 2015
 Cumulative Deviation from Mean of 54.09"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	37.48	2007
<i>Driest 3 Year</i>	39.19	2008
<i>Driest 4 Year</i>	42.59	1987
<i>Driest 5 Year</i>	42.89	2010
<i>Driest 10 Year</i>	47.06	1993
<i>Wettest 2 Year</i>	78.54	1960
<i>Wettest 3 Year</i>	72.99	1959
<i>Wettest 4 Year</i>	73.15	1960
<i>Wettest 5 Year</i>	67.78	1960
<i>Wettest 10 Year</i>	60.84	1960
<i>Period of Record</i>	54.09	2016

3 GAINESVILLE NWS (UNIV OF FLORIDA, 3 WSW, REGIONAL AIRPORT)

4 years missing: 2011-2013, 2015



	1940-1969	1970-1994	1995-2016	1890-2016 (POR)
Jan	2.73	4.03	2.85	3.17
Feb	3.53	3.72	2.97	3.28
Mar	4.08	4.18	3.59	3.67
Apr	3.12	3.19	2.34	2.87
May	3.45	3.87	2.64	3.38
June	6.82	6.57	7.11	6.78
July	7.94	5.47	6.66	7.11
Aug	8.15	6.97	6.19	7.24
Sep	5.71	4.92	4.99	5.37
Oct	3.29	2.25	2.4	2.83
Nov	1.92	2.25	1.8	1.9
Dec	3.15	2.82	2.82	2.91

High Springs NWS (D)

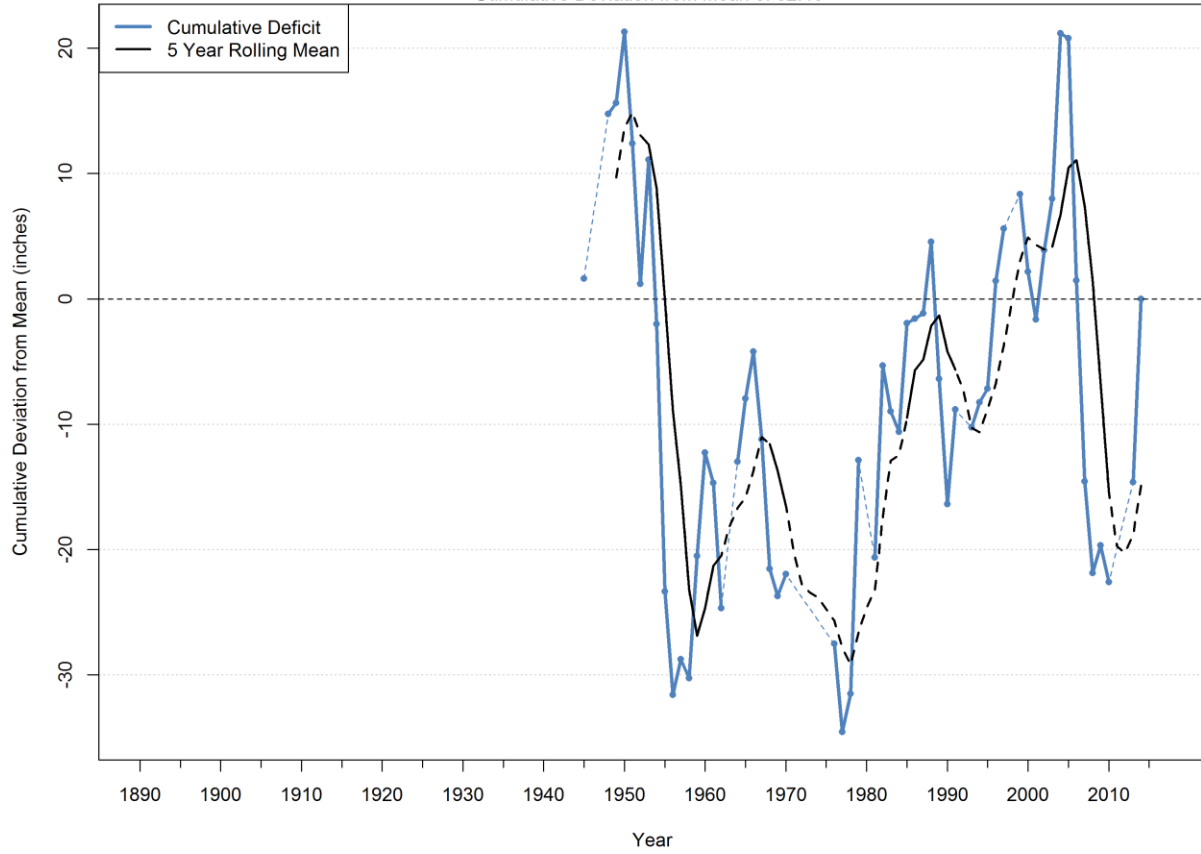


20 years missing: 1940-1944, 1946, 1947, 1963, 1971-1975, 1980, 1992, 1998, 2011, 2012, 2015, 2016

	1944-1969	1970-1994	1995-2015	1944-2015 (POR)
<i>Wet</i>	30.25	29.31	31.25	30.2
<i>Dry</i>	21.44	24.83	21.66	22.64
<i>Total</i>	51.69	54.13	52.9	52.84

HIGH SPRINGS NWS (D)

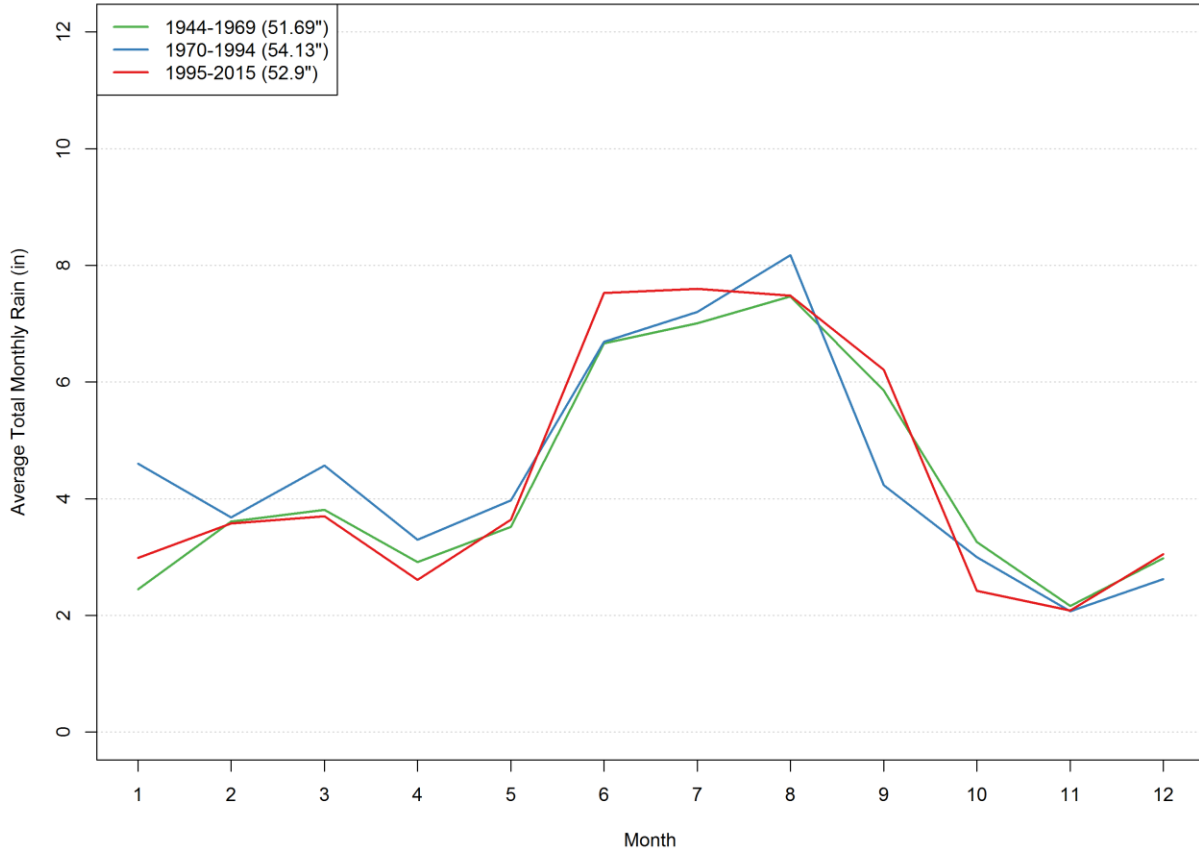
70 years missing: 1890-1944, 1946, 1947, 1963, 1971-1975, 1980, 1992, 1998, 2011, 2012, 2015, 2016
 Cumulative Deviation from Mean of 52.43"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	34.74	2007
<i>Driest 3 Year</i>	38.2	1956
<i>Driest 4 Year</i>	41.67	2008
<i>Driest 5 Year</i>	43.51	1955
<i>Driest 10 Year</i>	47.93	1958
<i>Wettest 2 Year</i>	63.74	2014
<i>Wettest 3 Year</i>	60.05	2004
<i>Wettest 4 Year</i>	58.05	2005
<i>Wettest 5 Year</i>	56.25	1986
<i>Wettest 10 Year</i>	53.61	1991
<i>Period of Record</i>	52.43	2016

HIGH SPRINGS NWS (D)

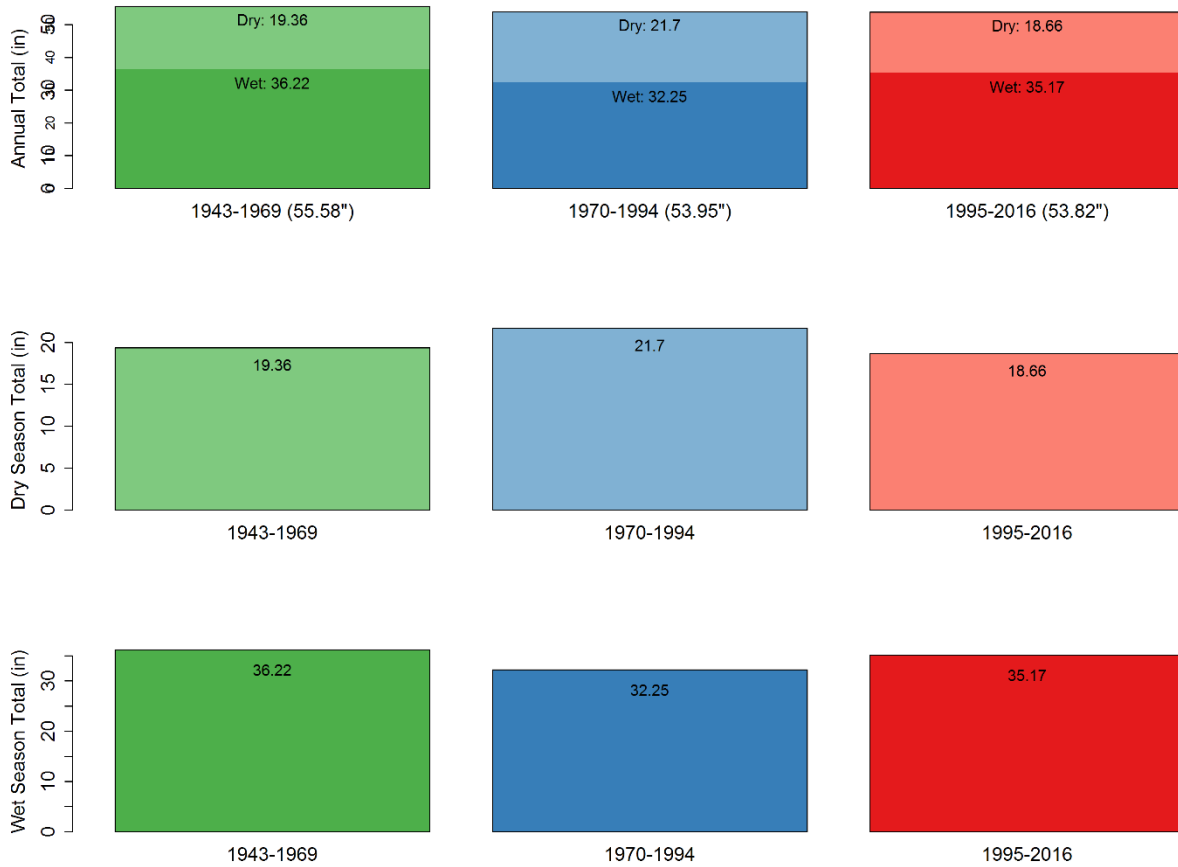
20 years missing: 1940-1944, 1946, 1947, 1963, 1971-1975, 1980, 1992, 1998, 2011, 2012, 2015, 2016



	1944-1969	1970-1994	1995-2015	1944-2015 (POR)
<i>Jan</i>	2.45	4.6	2.99	3.33
<i>Feb</i>	3.61	3.68	3.58	3.62
<i>Mar</i>	3.81	4.57	3.7	4.03
<i>Apr</i>	2.91	3.3	2.61	2.95
<i>May</i>	3.52	3.97	3.64	3.71
<i>June</i>	6.66	6.69	7.53	6.93
<i>July</i>	7.01	7.21	7.6	7.24
<i>Aug</i>	7.47	8.18	7.48	7.73
<i>Sep</i>	5.85	4.23	6.21	5.37
<i>Oct</i>	3.26	3	2.42	2.93
<i>Nov</i>	2.16	2.07	2.09	2.11
<i>Dec</i>	2.98	2.62	3.05	2.88

Hillsborough River State Park NWS

HILLSBOROUGH RIVER STATE PARK NWS

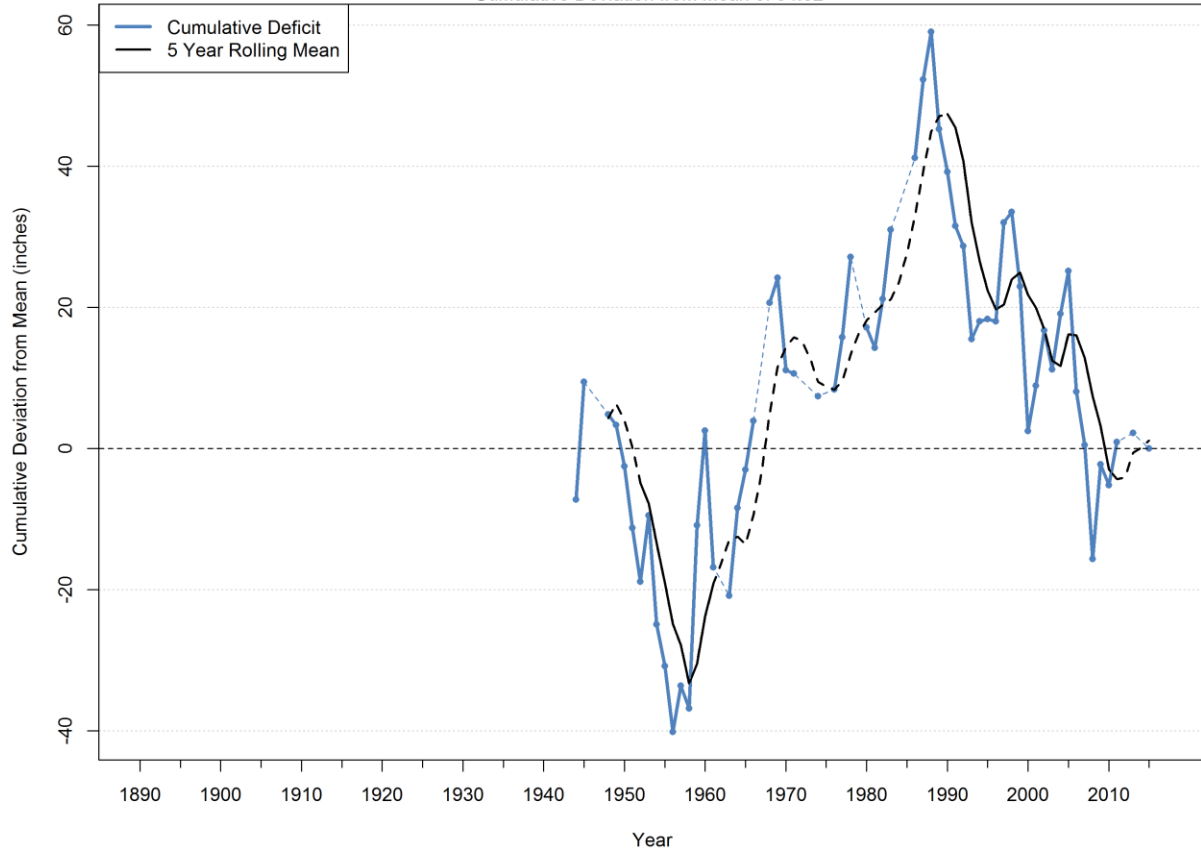


17 years missing: 1940-1943, 1946, 1947, 1962, 1967, 1972, 1973, 1975, 1979, 1984, 1985, 2012, 2014, 2016

	1943-1969	1970-1994	1995-2016	1943-2016 (POR)
<i>Wet</i>	36.22	32.25	35.17	34.61
<i>Dry</i>	19.36	21.7	18.66	19.88
<i>Total</i>	55.58	53.95	53.82	54.49

HILLSBOROUGH RIVER STATE PARK NWS

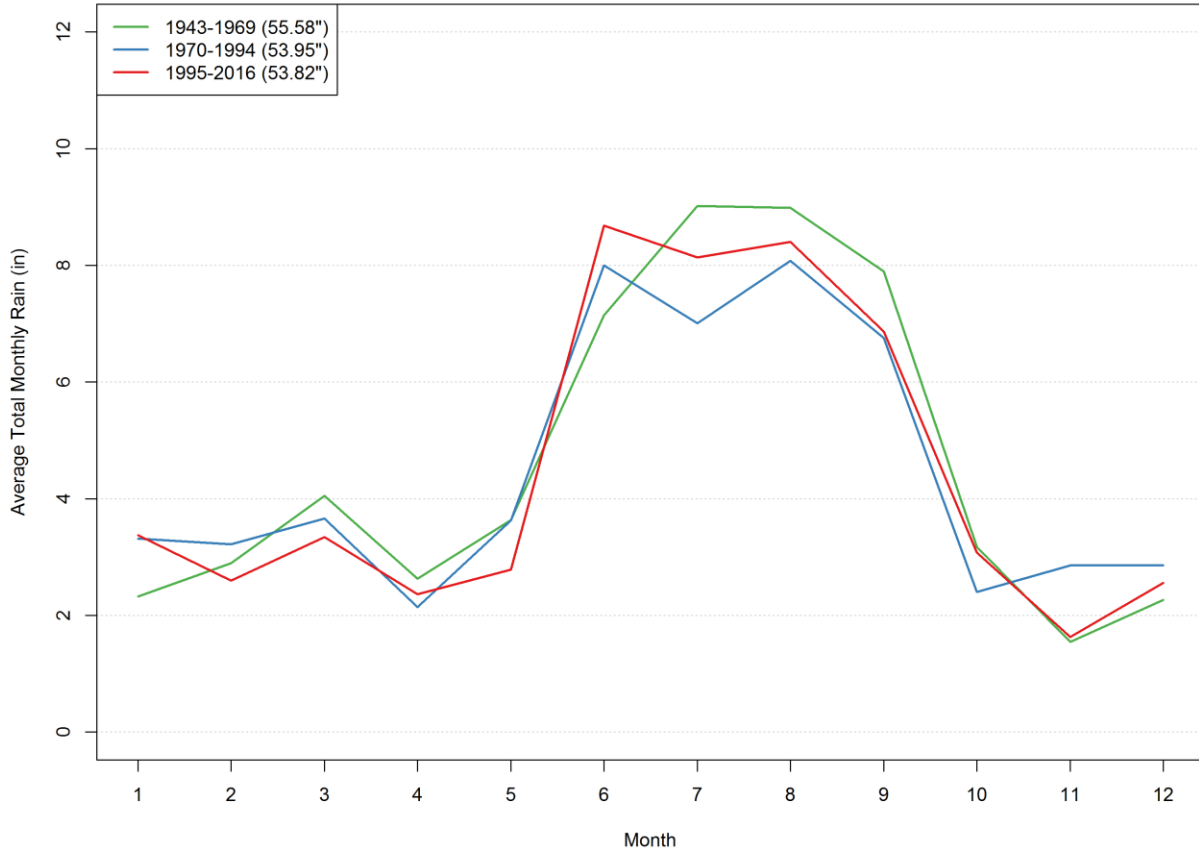
67 years missing: 1890-1943, 1946, 1947, 1962, 1967, 1972, 1973, 1975, 1979, 1984, 1985, 2012, 2014, 2016
 Cumulative Deviation from Mean of 54.32"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	38.79	2000
<i>Driest 3 Year</i>	40.71	2008
<i>Driest 4 Year</i>	45.63	2008
<i>Driest 5 Year</i>	45.61	1993
<i>Driest 10 Year</i>	49.4	2008
<i>Wettest 2 Year</i>	74	1960
<i>Wettest 3 Year</i>	66.37	1960
<i>Wettest 4 Year</i>	65	1960
<i>Wettest 5 Year</i>	60.99	1960
<i>Wettest 10 Year</i>	55	2005
<i>Period of Record</i>	54.32	2016

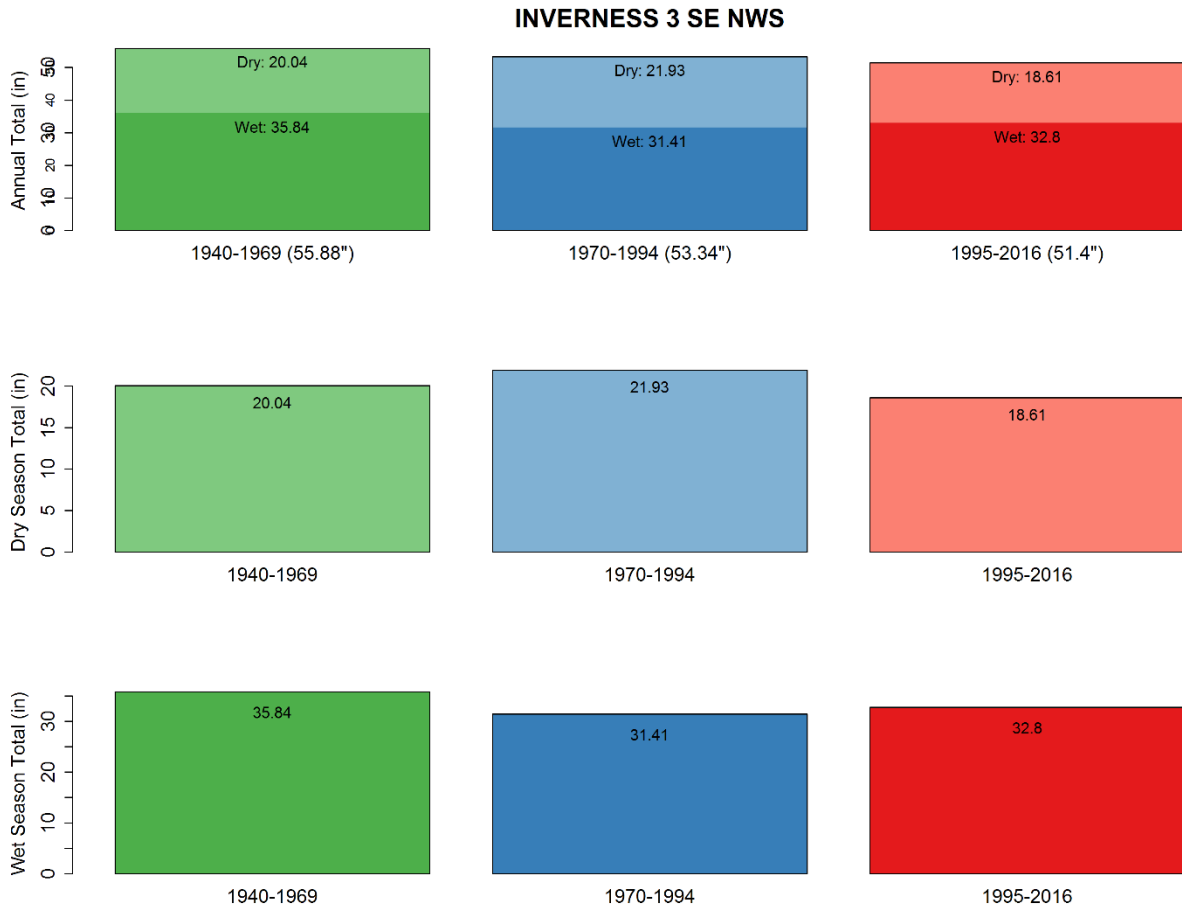
HILLSBOROUGH RIVER STATE PARK NWS

17 years missing: 1940-1943, 1946, 1947, 1962, 1967, 1972, 1973, 1975, 1979, 1984, 1985, 2012, 2014, 2016



	1943-1969	1970-1994	1995-2016	1943-2016 (POR)
<i>Jan</i>	2.33	3.32	3.38	2.98
<i>Feb</i>	2.9	3.22	2.59	2.91
<i>Mar</i>	4.05	3.66	3.34	3.71
<i>Apr</i>	2.63	2.14	2.36	2.38
<i>May</i>	3.63	3.63	2.79	3.36
<i>June</i>	7.14	8	8.68	7.9
<i>July</i>	9.02	7.01	8.14	8.12
<i>Aug</i>	8.99	8.08	8.4	8.51
<i>Sep</i>	7.89	6.76	6.86	7.2
<i>Oct</i>	3.17	2.4	3.08	2.89
<i>Nov</i>	1.55	2.86	1.63	2.01
<i>Dec</i>	2.27	2.86	2.56	2.55

Inverness 3 SE NWS

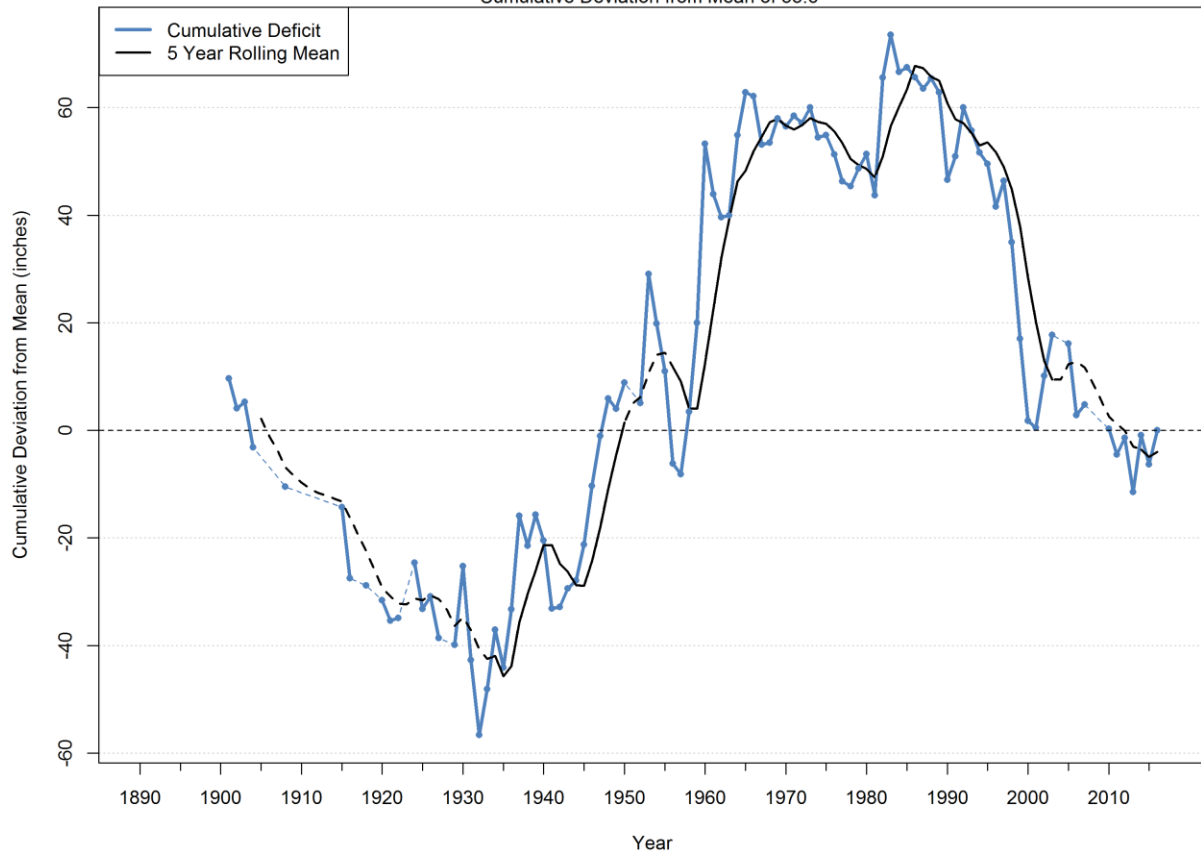


4 years missing: 1951, 2004, 2008, 2009

	1940-1969	1970-1994	1995-2016	1899-2016 (POR)
<i>Wet</i>	35.84	31.41	32.8	33.17
<i>Dry</i>	20.04	21.93	18.61	19.76
<i>Total</i>	55.88	53.34	51.4	52.92

INVERNESS 3 SE NWS

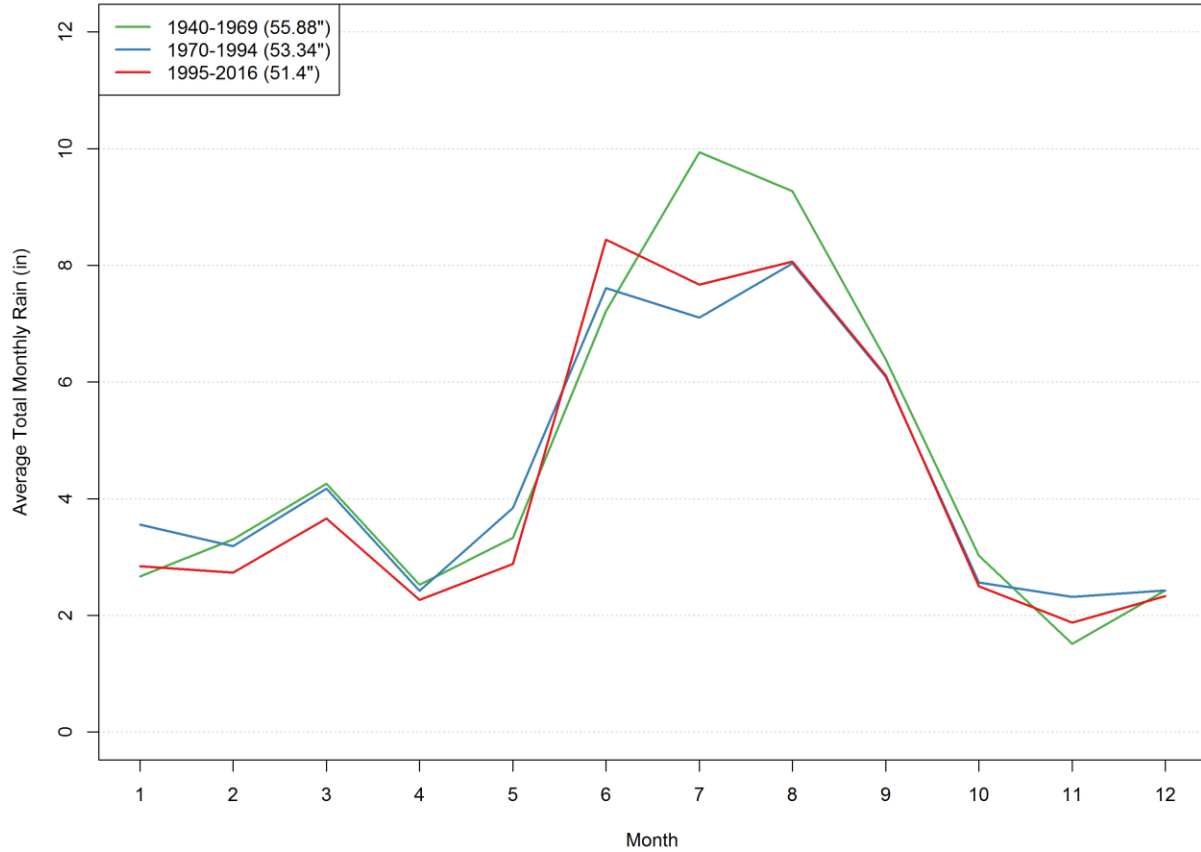
28 years missing: 1890-1900, 1905-1907, 1909-1914, 1917, 1919, 1923, 1928, 1951, 2004, 2008, 2009
 Cumulative Deviation from Mean of 53.6"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	36.98	2000
<i>Driest 3 Year</i>	38.73	2000
<i>Driest 4 Year</i>	42.13	2001
<i>Driest 5 Year</i>	44.04	2000
<i>Driest 10 Year</i>	48.56	2001
<i>Wettest 2 Year</i>	78.48	1960
<i>Wettest 3 Year</i>	74.07	1960
<i>Wettest 4 Year</i>	68.44	1960
<i>Wettest 5 Year</i>	63.61	1961
<i>Wettest 10 Year</i>	60.42	1966
<i>Period of Record</i>	53.6	2016

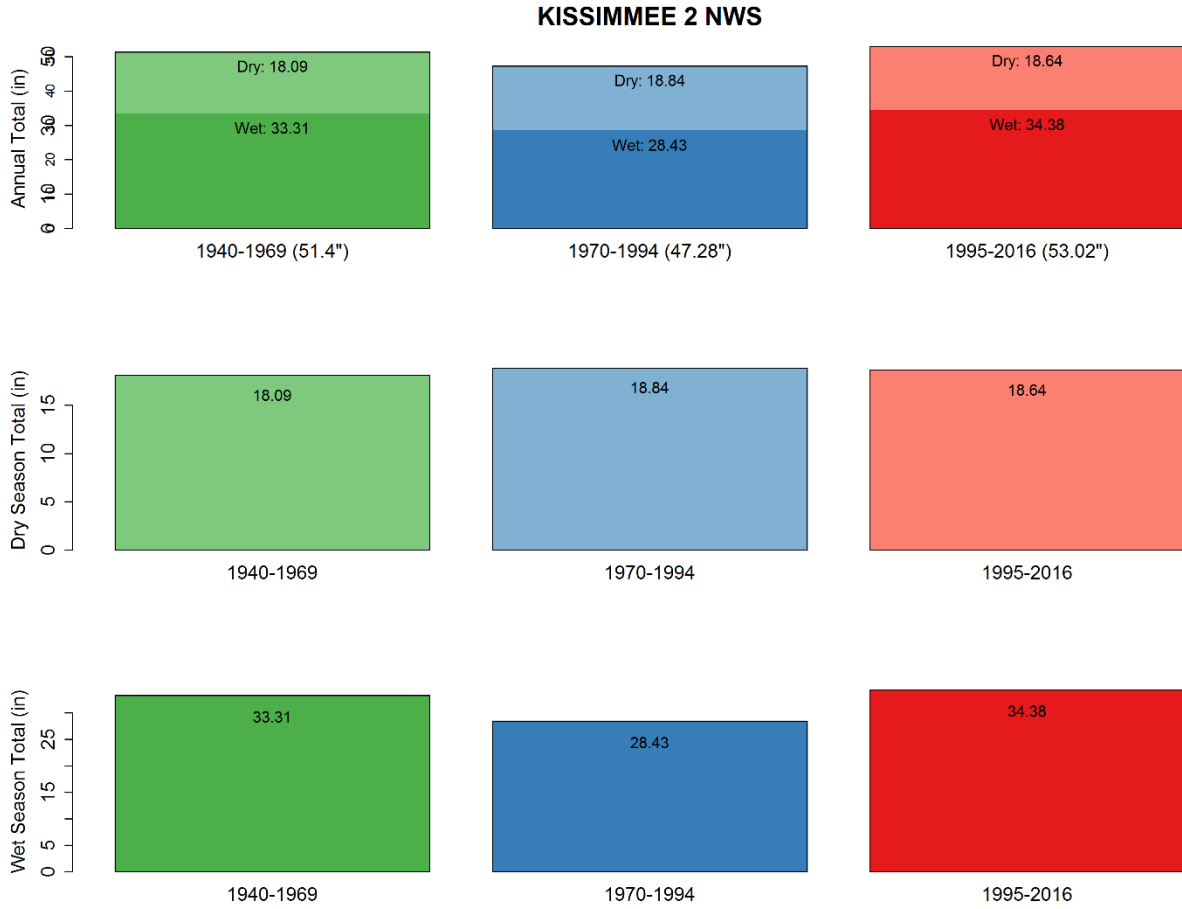
INVERNESS 3 SE NWS

4 years missing: 1951, 2004, 2008, 2009



	1940-1969	1970-1994	1995-2016	1899-2016 (POR)
<i>Jan</i>	2.67	3.56	2.85	2.72
<i>Feb</i>	3.31	3.19	2.74	2.89
<i>Mar</i>	4.26	4.17	3.66	3.77
<i>Apr</i>	2.53	2.42	2.26	2.52
<i>May</i>	3.33	3.84	2.88	3.57
<i>June</i>	7.22	7.61	8.44	7.58
<i>July</i>	9.94	7.11	7.67	8.54
<i>Aug</i>	9.27	8.03	8.07	8.15
<i>Sep</i>	6.39	6.09	6.12	6.13
<i>Oct</i>	3.02	2.57	2.5	2.76
<i>Nov</i>	1.52	2.32	1.88	1.84
<i>Dec</i>	2.43	2.43	2.33	2.45

Kissimmee 2 NWS

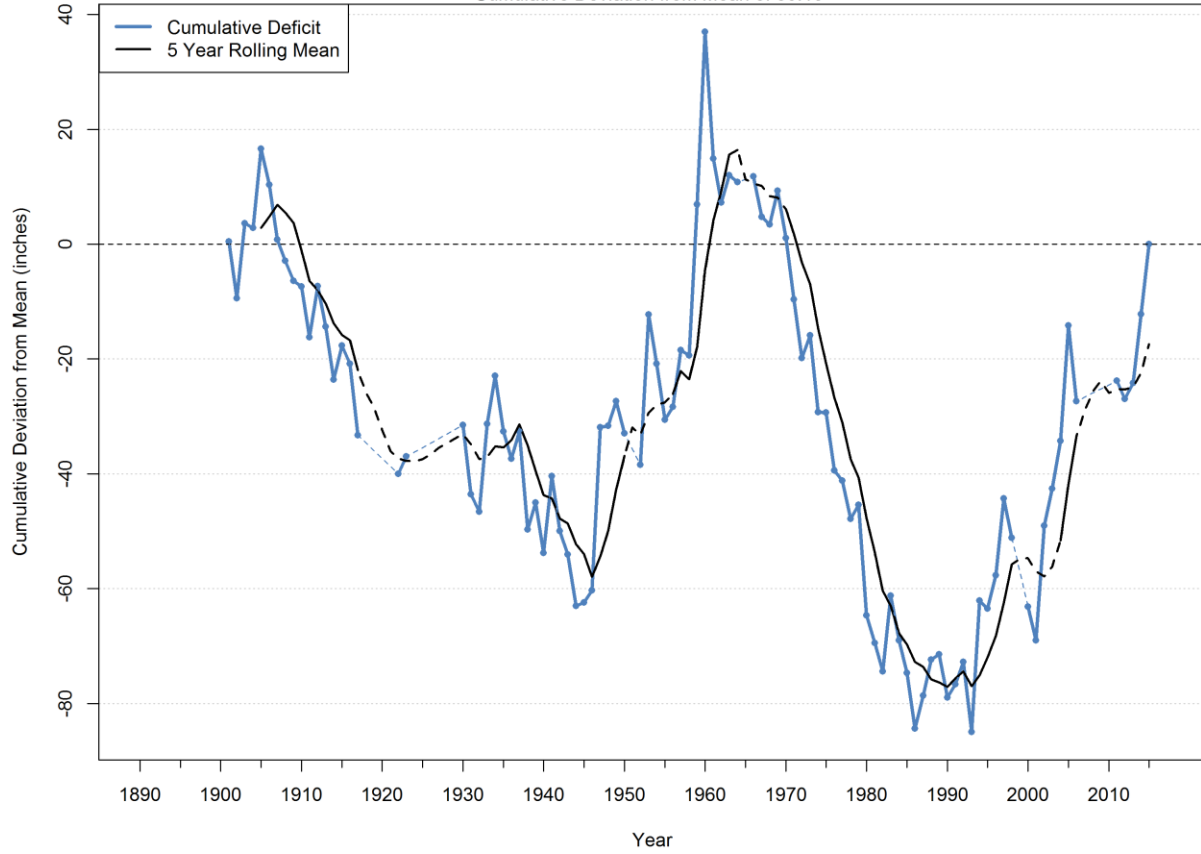


8 years missing: 1951, 1965, 1999, 2007-2010, 2016

	1940-1969	1970-1994	1995-2016	1901-2016 (POR)
<i>Wet</i>	33.31	28.43	34.38	31.49
<i>Dry</i>	18.09	18.84	18.64	18.64
<i>Total</i>	51.4	47.28	53.02	50.14

KISSIMMEE 2 NWS

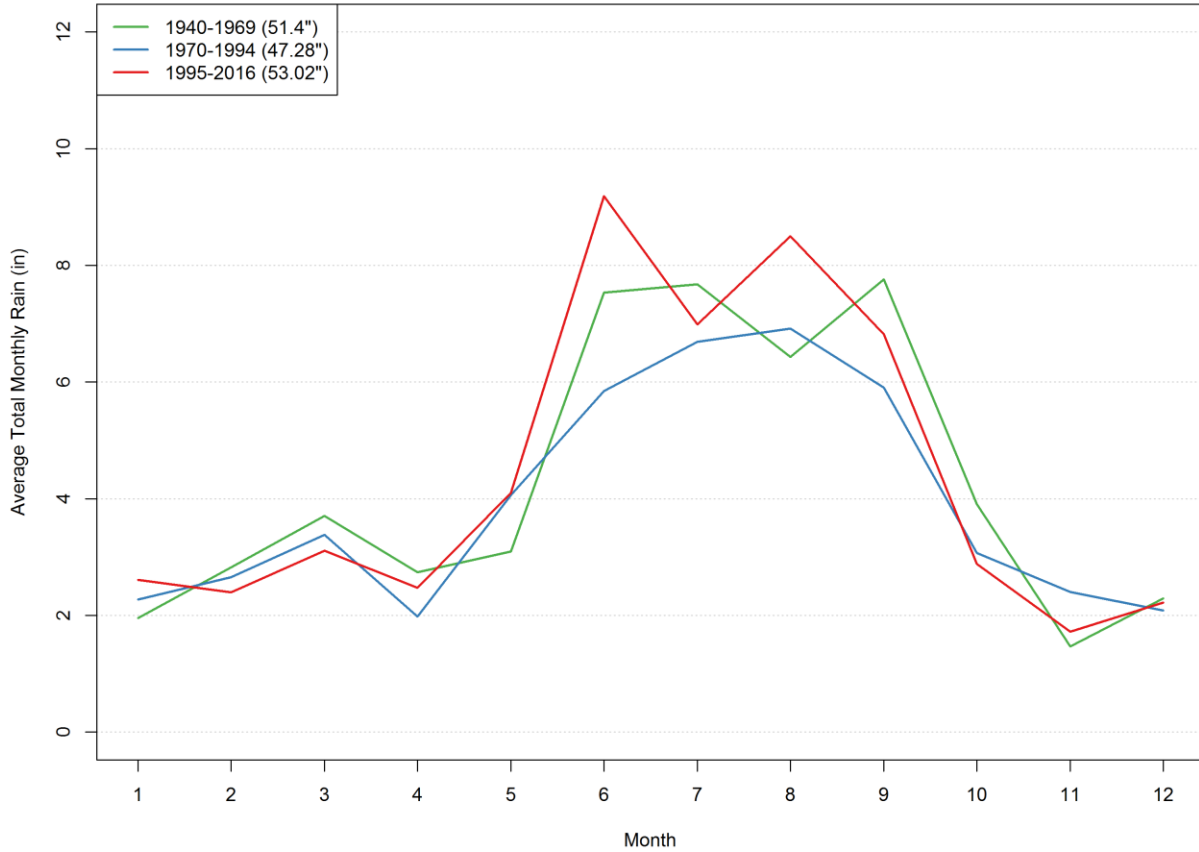
29 years missing: 1890-1900, 1918-1921, 1924-1929, 1951, 1965, 1999, 2007-2010, 2016
 Cumulative Deviation from Mean of 50.13"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	35.3	1962
<i>Driest 3 Year</i>	40.42	1972
<i>Driest 4 Year</i>	42.55	1974
<i>Driest 5 Year</i>	42.41	1974
<i>Driest 10 Year</i>	43.56	1980
<i>Wettest 2 Year</i>	78.3	1960
<i>Wettest 3 Year</i>	68.59	1960
<i>Wettest 4 Year</i>	66.45	1960
<i>Wettest 5 Year</i>	63.64	1960
<i>Wettest 10 Year</i>	54.92	1961
<i>Period of Record</i>	50.13	2016

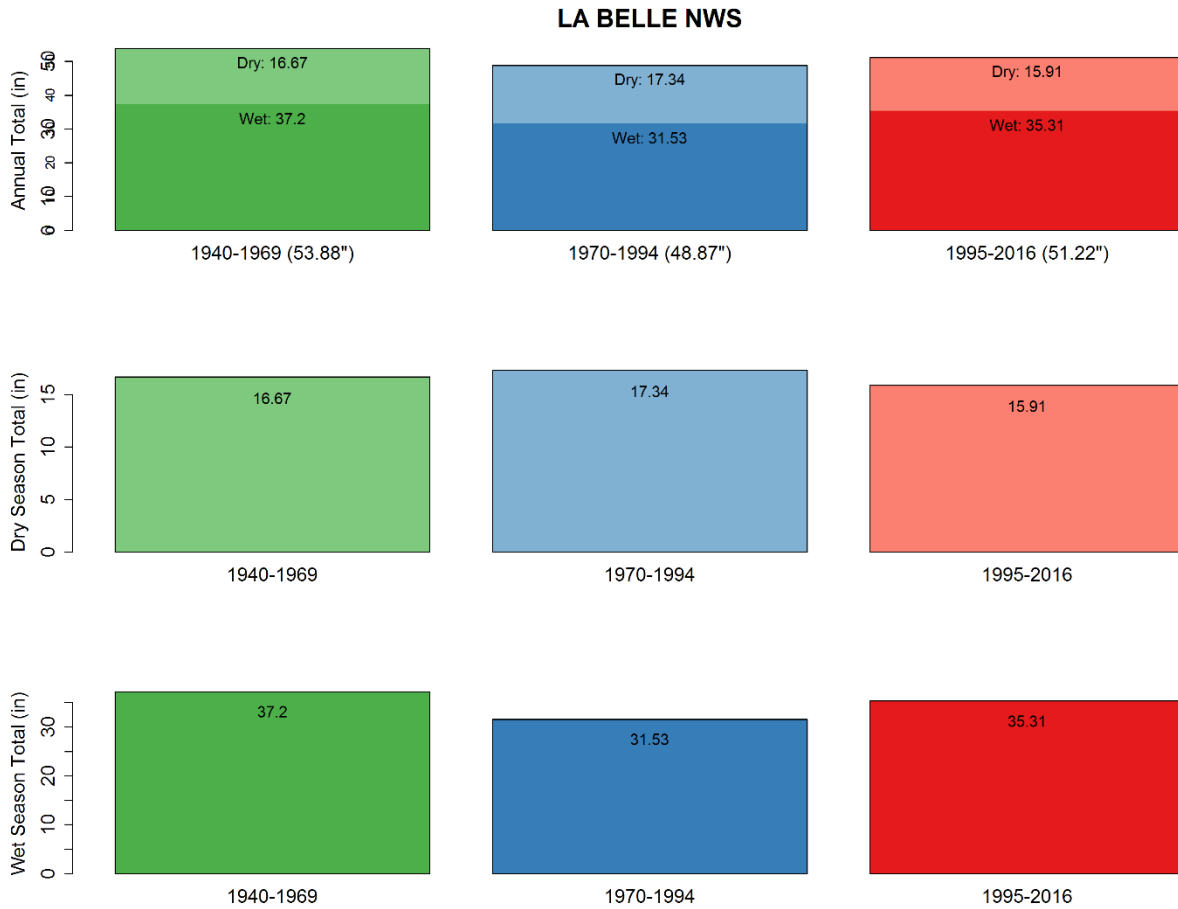
KISSIMMEE 2 NWS

8 years missing: 1951, 1965, 1999, 2007-2010, 2016



	1940-1969	1970-1994	1995-2016	1901-2016 (POR)
Jan	1.96	2.28	2.61	2.24
Feb	2.83	2.65	2.4	2.6
Mar	3.7	3.38	3.11	3.32
Apr	2.74	1.98	2.47	2.49
May	3.1	4.06	4.1	4.04
June	7.53	5.85	9.19	7.3
July	7.67	6.69	6.99	7.31
Aug	6.43	6.92	8.5	7.06
Sep	7.76	5.9	6.82	6.43
Oct	3.91	3.07	2.88	3.39
Nov	1.47	2.4	1.72	1.85
Dec	2.29	2.08	2.22	2.1

La Belle NWS

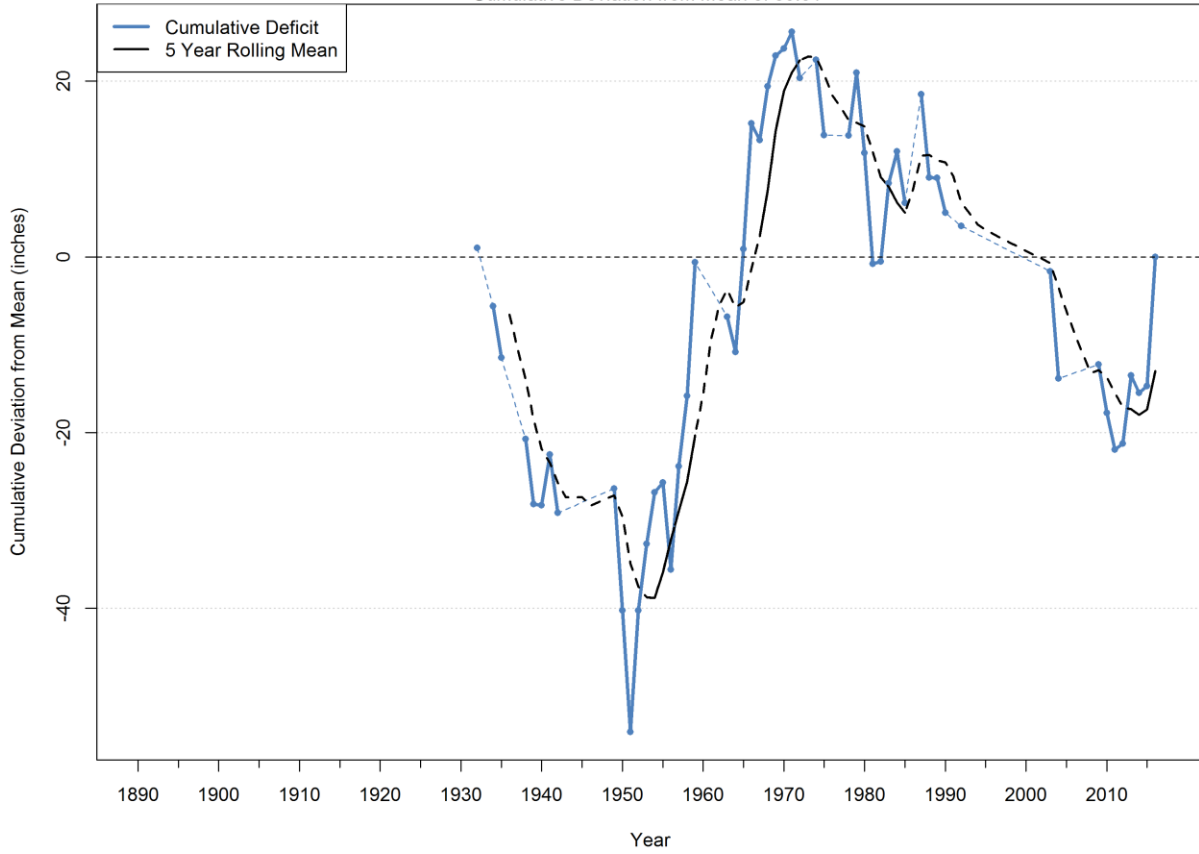


28 years missing: 1943-1948, 1960-1962, 1973, 1976, 1977, 1986, 1991, 1993-2002, 2005-2008

	1940-1969	1970-1994	1995-2016	1929-2016 (POR)
<i>Wet</i>	37.2	31.53	35.31	34.41
<i>Dry</i>	16.67	17.34	15.91	16.54
<i>Total</i>	53.88	48.87	51.22	50.96

LA BELLE NWS

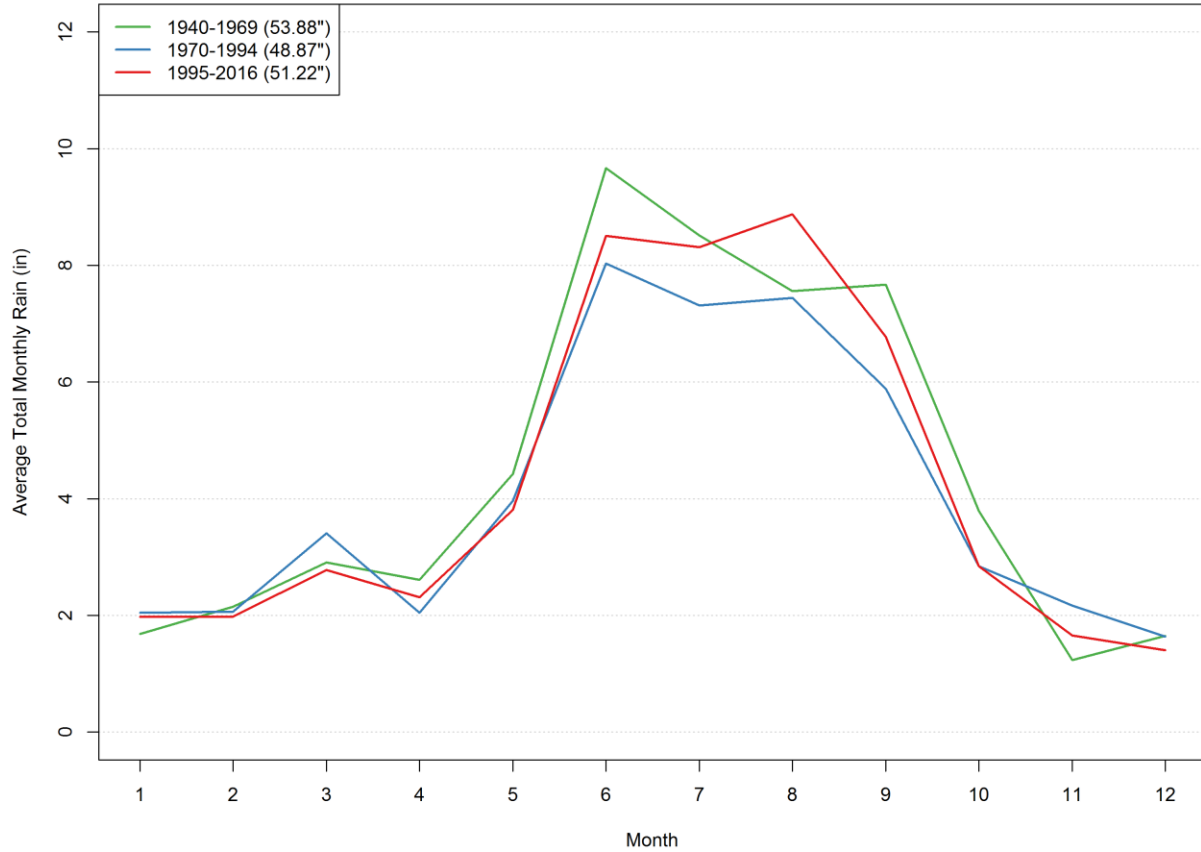
73 years missing: 1890-1931, 1933, 1936, 1937, 1943-1948, 1960-1962, 1973, 1976, 1977, 1986, 1991, 1993-2002, 2005-2008
 Cumulative Deviation from Mean of 50.51"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	36.64	1951
<i>Driest 3 Year</i>	42.18	1951
<i>Driest 4 Year</i>	46.84	1981
<i>Driest 5 Year</i>	46.98	1942
<i>Driest 10 Year</i>	51.84	1958
<i>Wettest 2 Year</i>	63.52	1966
<i>Wettest 3 Year</i>	62.18	1959
<i>Wettest 4 Year</i>	58.07	1968
<i>Wettest 5 Year</i>	57.26	1969
<i>Wettest 10 Year</i>	53.09	1959
<i>Period of Record</i>	50.51	2016

LA BELLE NWS

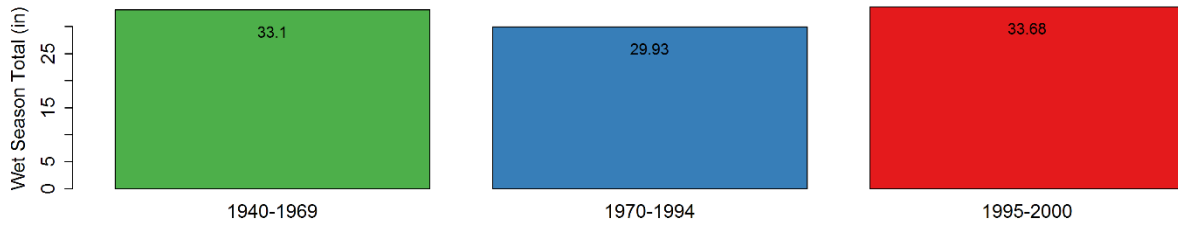
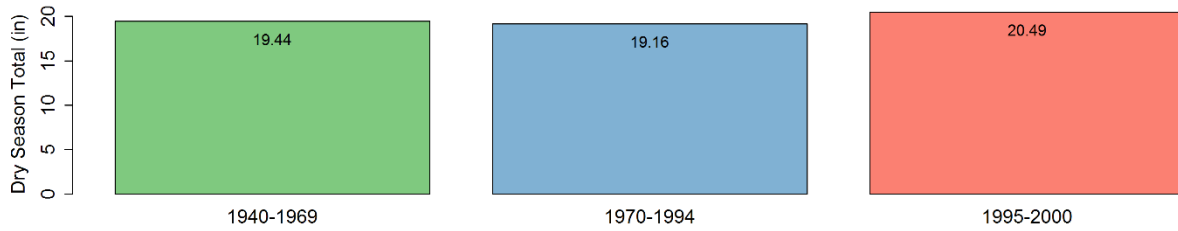
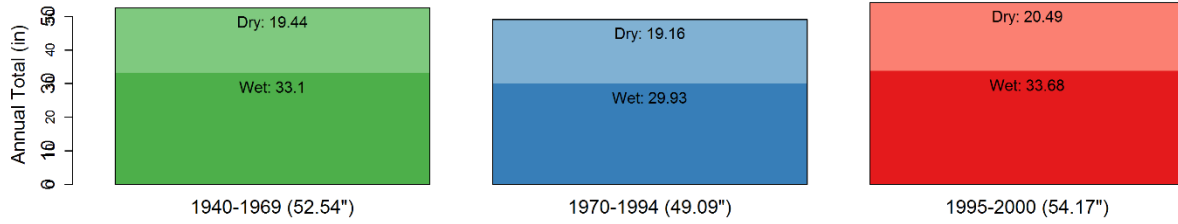
28 years missing: 1943-1948, 1960-1962, 1973, 1976, 1977, 1986, 1991, 1993-2002, 2005-2008



	1940-1969	1970-1994	1995-2016	1929-2016 (POR)
<i>Jan</i>	1.68	2.05	1.97	1.8
<i>Feb</i>	2.15	2.07	1.98	2.07
<i>Mar</i>	2.91	3.41	2.78	2.99
<i>Apr</i>	2.61	2.04	2.31	2.51
<i>May</i>	4.43	3.97	3.81	4.07
<i>June</i>	9.67	8.03	8.51	8.6
<i>July</i>	8.51	7.32	8.31	7.91
<i>Aug</i>	7.56	7.44	8.87	7.79
<i>Sep</i>	7.67	5.89	6.77	6.9
<i>Oct</i>	3.79	2.84	2.84	3.21
<i>Nov</i>	1.24	2.17	1.66	1.62
<i>Dec</i>	1.65	1.64	1.4	1.48

Lake Alfred Experimental Station NWS (D)

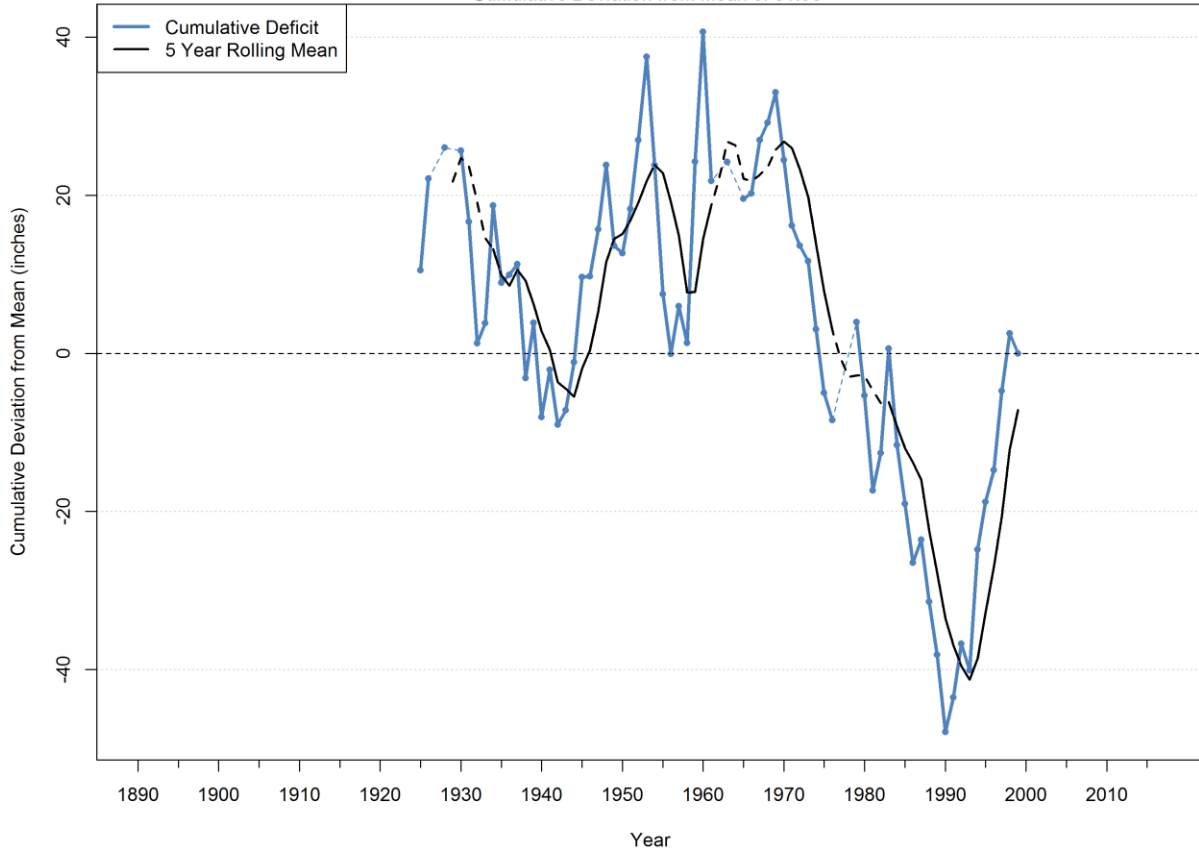
LAKE ALFRED EXPERIMENTAL STATION NWS (D)



21 years missing: 1962, 1964, 1977, 1978, 2000-2016

	1940-1969	1970-1994	1995-2000	1924-2000 (POR)
<i>Wet</i>	33.1	29.93	33.68	32.13
<i>Dry</i>	19.44	19.16	20.49	19.27
<i>Total</i>	52.54	49.09	54.17	51.4

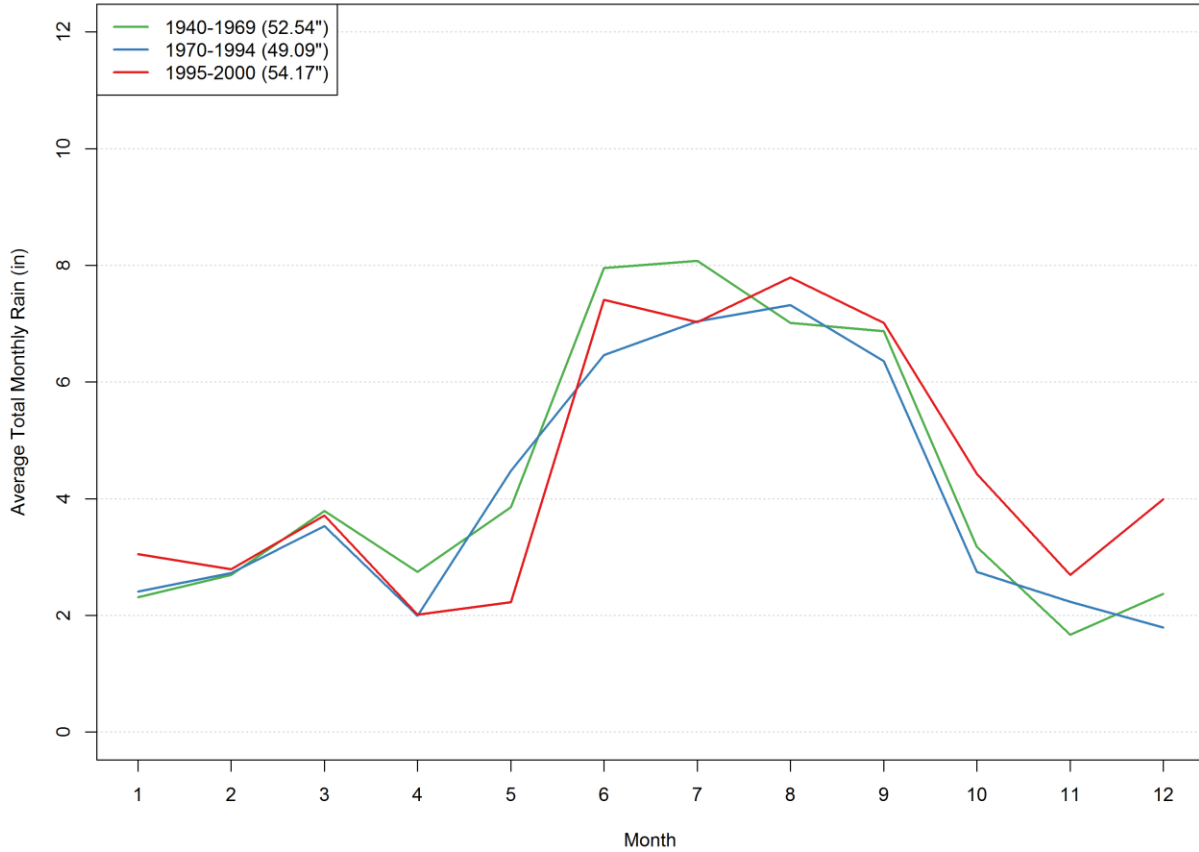
LAKE ALFRED EXPERIMENTAL STATION NWS (D)
 58 years missing: 1890-1924, 1927, 1929, 1962, 1964, 1977, 1978, 2000-2016
 Cumulative Deviation from Mean of 51.96"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	36.97	1955
<i>Driest 3 Year</i>	39.43	1956
<i>Driest 4 Year</i>	44.07	1957
<i>Driest 5 Year</i>	44.73	1958
<i>Driest 10 Year</i>	47.7	1990
<i>Wettest 2 Year</i>	71.62	1960
<i>Wettest 3 Year</i>	63.53	1960
<i>Wettest 4 Year</i>	62.15	1960
<i>Wettest 5 Year</i>	60.49	1998
<i>Wettest 10 Year</i>	56.43	1953
<i>Period of Record</i>	51.96	2016

LAKE ALFRED EXPERIMENTAL STATION NWS (D)

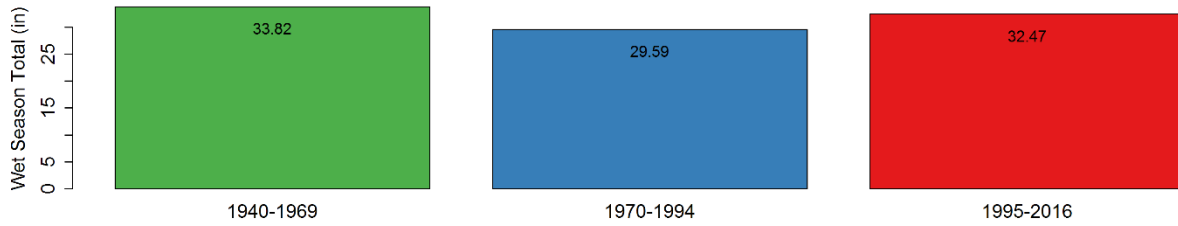
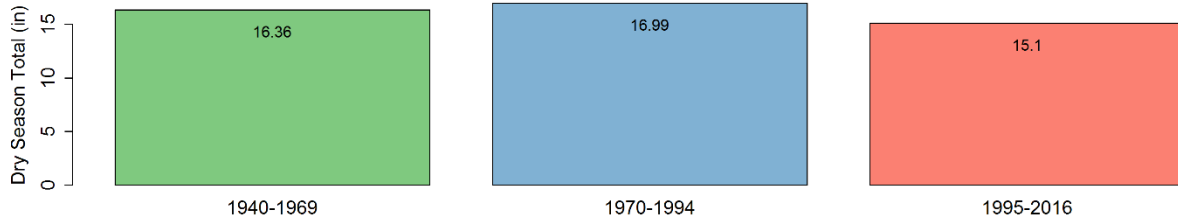
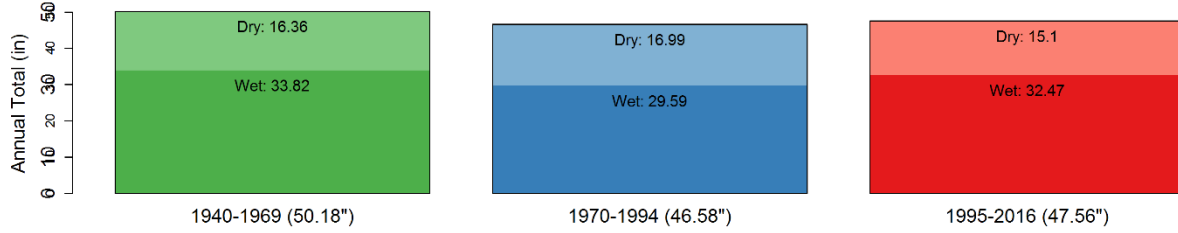
21 years missing: 1962, 1964, 1977, 1978, 2000-2016



	1940-1969	1970-1994	1995-2000	1924-2000 (POR)
<i>Jan</i>	2.31	2.41	3.05	2.36
<i>Feb</i>	2.7	2.73	2.79	2.66
<i>Mar</i>	3.79	3.53	3.72	3.55
<i>Apr</i>	2.74	2	2.02	2.57
<i>May</i>	3.86	4.48	2.23	4.17
<i>June</i>	7.96	6.46	7.41	7.52
<i>July</i>	8.08	7.04	7.03	7.55
<i>Aug</i>	7.01	7.32	7.8	7.33
<i>Sep</i>	6.88	6.36	7.01	6.74
<i>Oct</i>	3.17	2.75	4.43	2.98
<i>Nov</i>	1.67	2.23	2.69	1.86
<i>Dec</i>	2.37	1.79	3.99	2.11

Moore Haven Lock 1 NWS

MOORE HAVEN LOCK 1 NWS

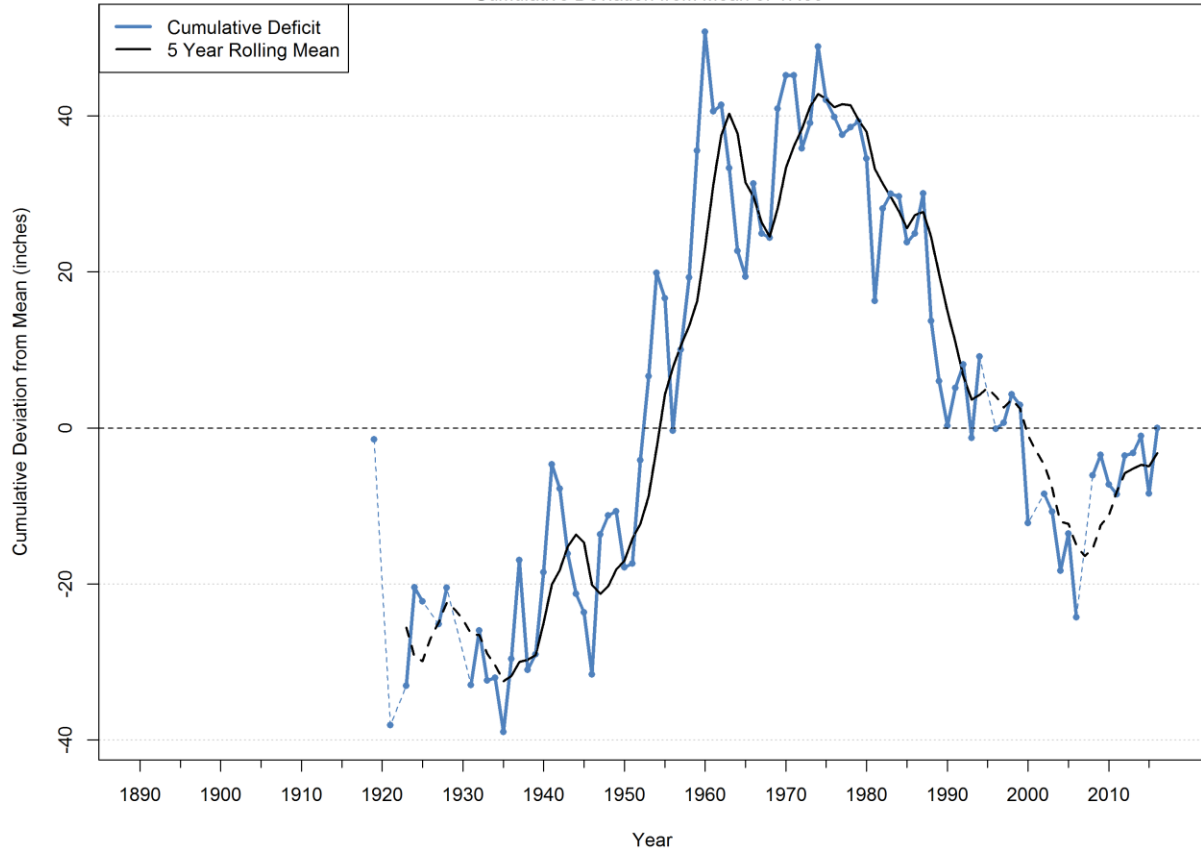


3 years missing: 1995, 2001, 2007

	1940-1969	1970-1994	1995-2016	1918-2016 (POR)
<i>Wet</i>	33.82	29.59	32.47	32.17
<i>Dry</i>	16.36	16.99	15.1	15.97
<i>Total</i>	50.18	46.58	47.56	48.14

MOORE HAVEN LOCK 1 NWS

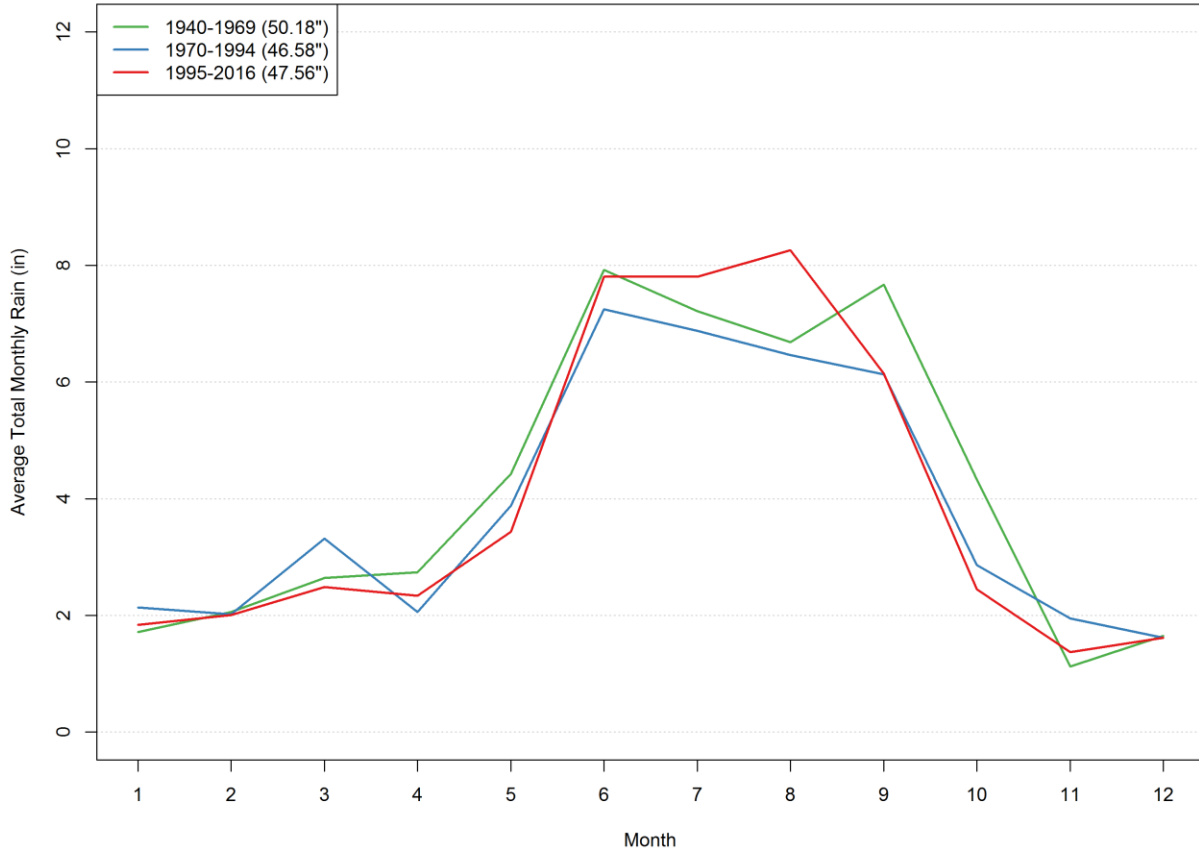
37 years missing: 1890-1918, 1920, 1922, 1926, 1929, 1930, 1995, 2001, 2007
 Cumulative Deviation from Mean of 47.85"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	35.83	1989
<i>Driest 3 Year</i>	37.93	1990
<i>Driest 4 Year</i>	40.84	1964
<i>Driest 5 Year</i>	41.58	1965
<i>Driest 10 Year</i>	44.43	1990
<i>Wettest 2 Year</i>	63.57	1960
<i>Wettest 3 Year</i>	61.42	1960
<i>Wettest 4 Year</i>	60.63	1960
<i>Wettest 5 Year</i>	56.03	1961
<i>Wettest 10 Year</i>	54.71	1960
<i>Period of Record</i>	47.85	2016

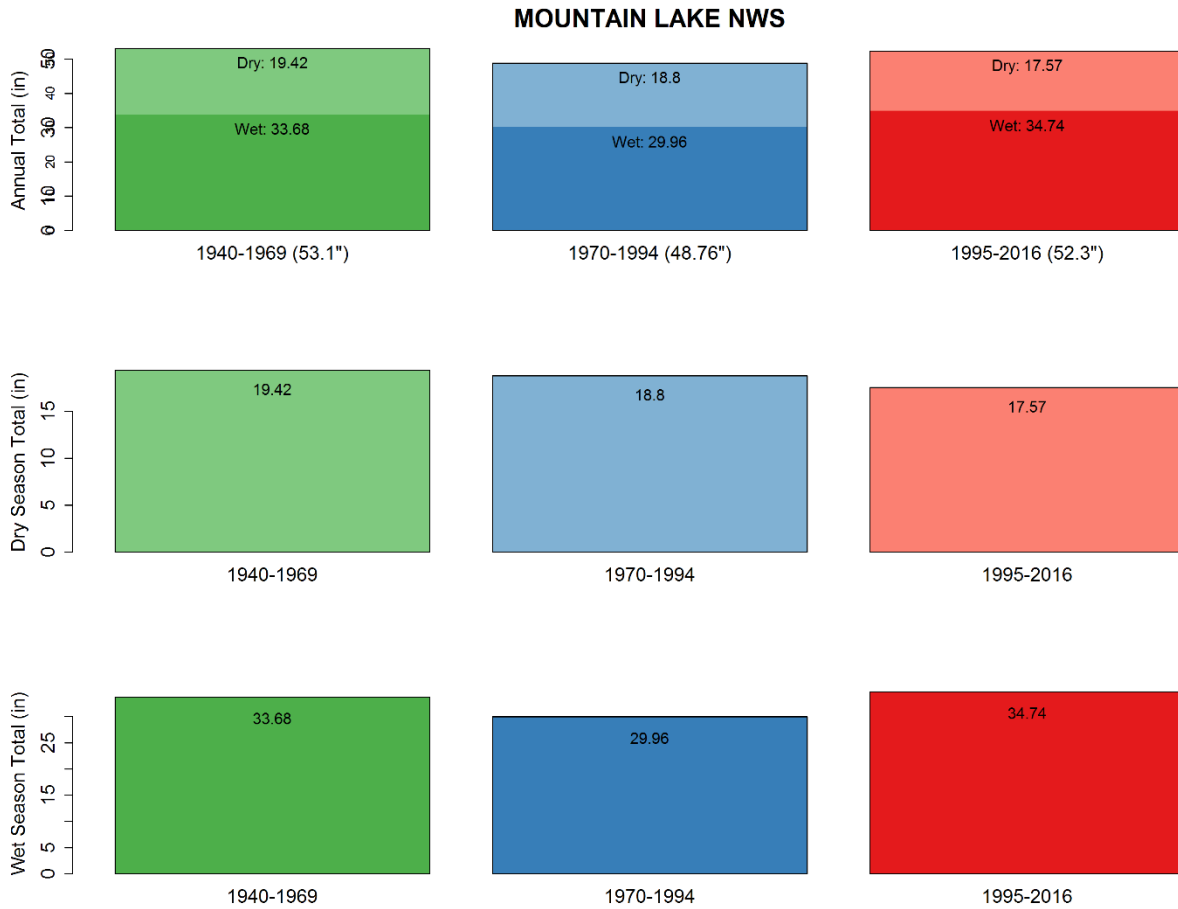
MOORE HAVEN LOCK 1 NWS

3 years missing: 1995, 2001, 2007



	1940-1969	1970-1994	1995-2016	1918-2016 (POR)
<i>Jan</i>	1.72	2.14	1.84	1.77
<i>Feb</i>	2.06	2.02	2.01	1.97
<i>Mar</i>	2.65	3.32	2.49	2.66
<i>Apr</i>	2.74	2.06	2.34	2.5
<i>May</i>	4.43	3.88	3.43	4.1
<i>June</i>	7.93	7.25	7.81	7.6
<i>July</i>	7.21	6.88	7.81	7.29
<i>Aug</i>	6.68	6.47	8.26	7.14
<i>Sep</i>	7.67	6.13	6.14	6.63
<i>Oct</i>	4.33	2.86	2.45	3.51
<i>Nov</i>	1.13	1.95	1.37	1.53
<i>Dec</i>	1.65	1.62	1.62	1.44

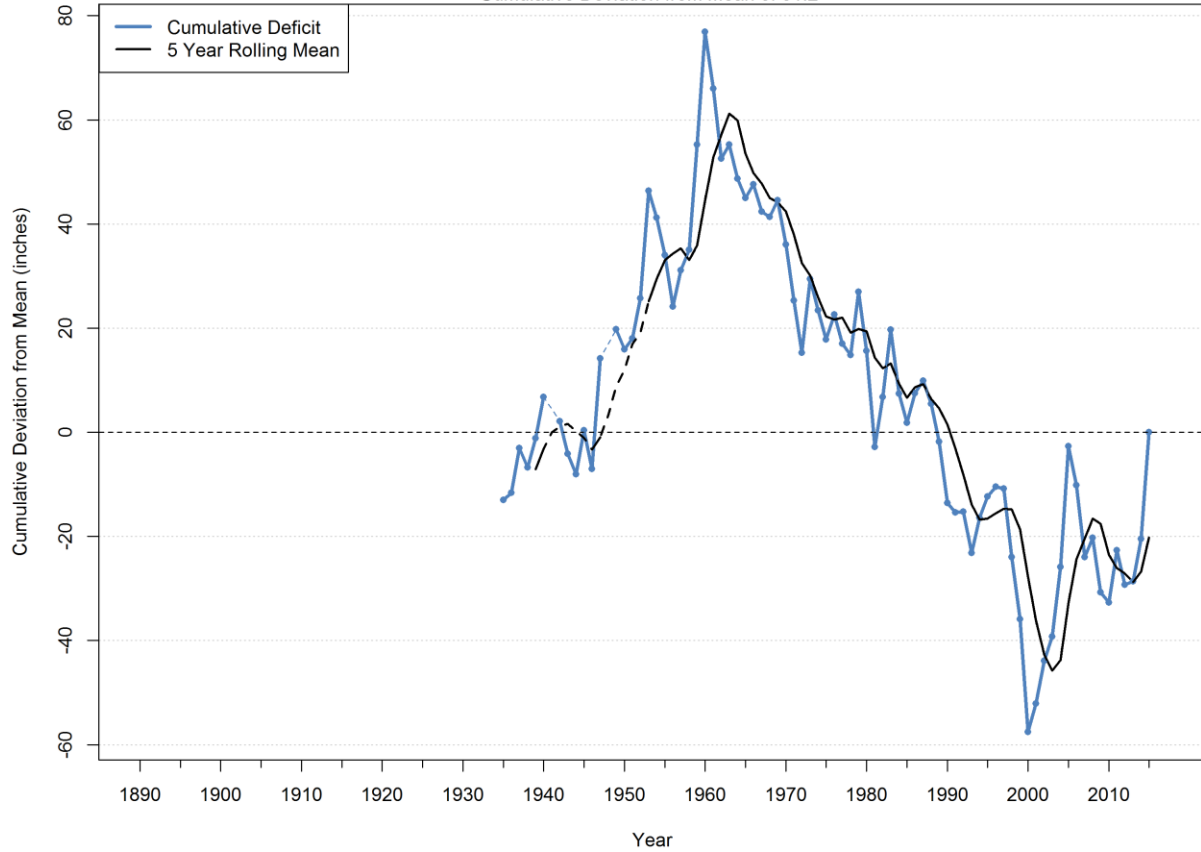
Mountain Lake NWS



3 years missing: 1941, 1948, 2016

	1940-1969	1970-1994	1995-2016	1935-2016 (POR)
<i>Wet</i>	33.68	29.96	34.74	32.78
<i>Dry</i>	19.42	18.8	17.57	18.64
<i>Total</i>	53.1	48.76	52.3	51.42

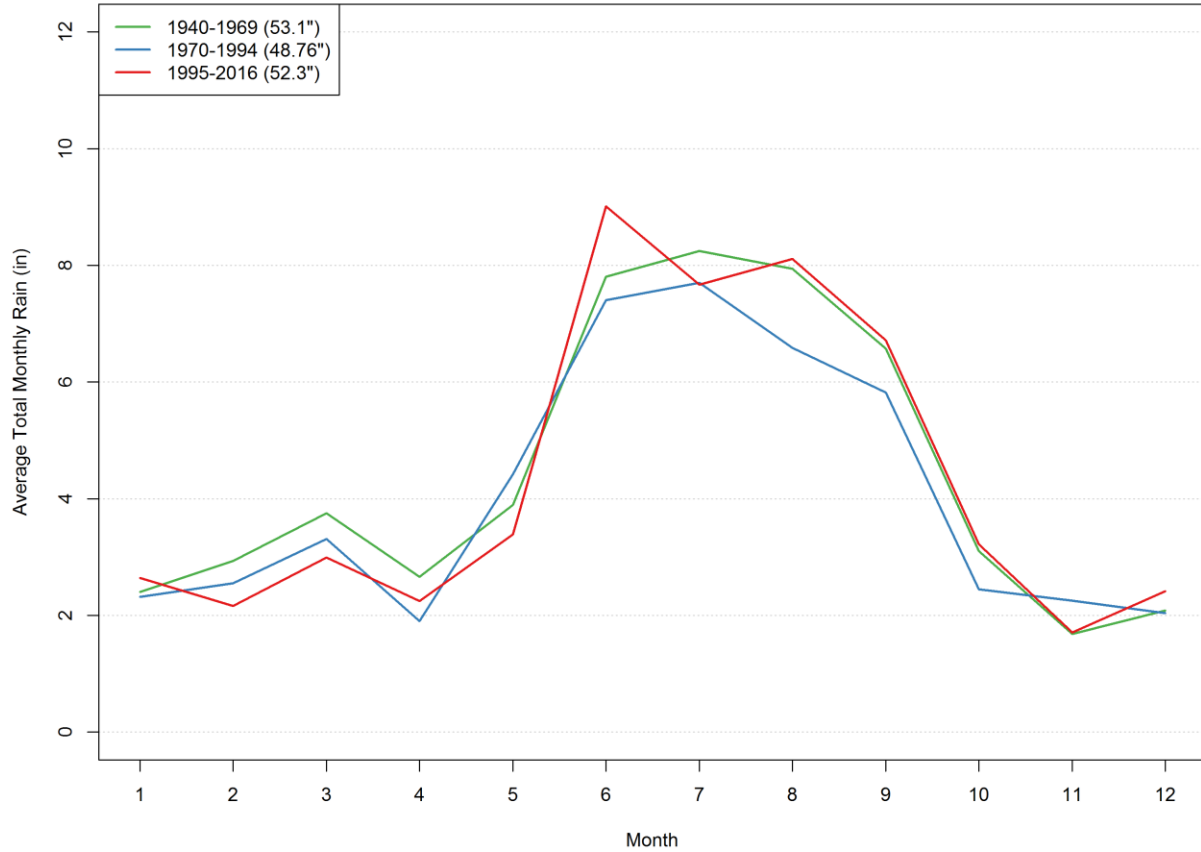
MOUNTAIN LAKE NWS
 48 years missing: 1890-1934, 1941, 1948, 2016
 Cumulative Deviation from Mean of 51.2"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	34.4	2000
<i>Driest 3 Year</i>	35.61	2000
<i>Driest 4 Year</i>	39.42	2000
<i>Driest 5 Year</i>	42.16	2000
<i>Driest 10 Year</i>	46.81	2000
<i>Wettest 2 Year</i>	72.14	1960
<i>Wettest 3 Year</i>	66.46	1960
<i>Wettest 4 Year</i>	64.39	1960
<i>Wettest 5 Year</i>	62.19	2005
<i>Wettest 10 Year</i>	57.3	1960
<i>Period of Record</i>	51.2	2016

MOUNTAIN LAKE NWS

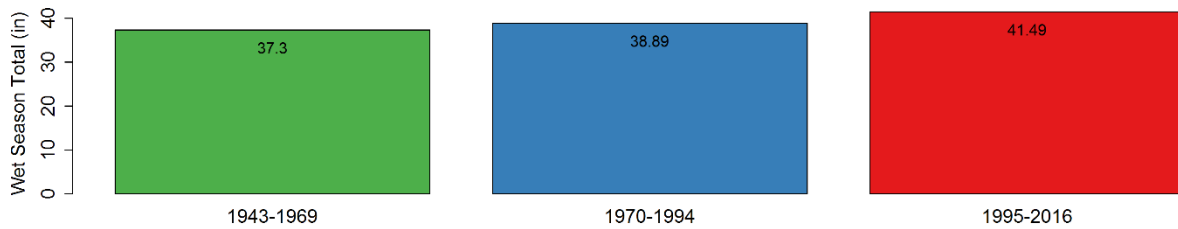
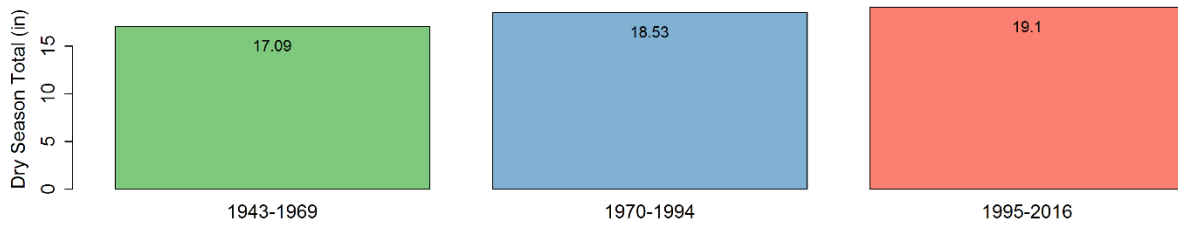
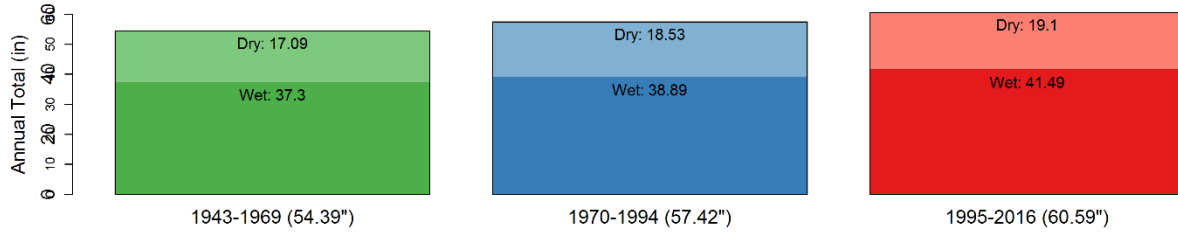
3 years missing: 1941, 1948, 2016



	1940-1969	1970-1994	1995-2016	1935-2016 (POR)
<i>Jan</i>	2.4	2.32	2.65	2.4
<i>Feb</i>	2.93	2.55	2.16	2.64
<i>Mar</i>	3.75	3.31	3	3.32
<i>Apr</i>	2.66	1.91	2.25	2.34
<i>May</i>	3.9	4.42	3.39	3.93
<i>June</i>	7.81	7.41	9.01	7.98
<i>July</i>	8.25	7.7	7.67	7.86
<i>Aug</i>	7.94	6.59	8.11	7.55
<i>Sep</i>	6.57	5.82	6.72	6.41
<i>Oct</i>	3.11	2.45	3.22	2.98
<i>Nov</i>	1.68	2.26	1.71	1.89
<i>Dec</i>	2.09	2.04	2.42	2.11

Myakka River State Park NWS

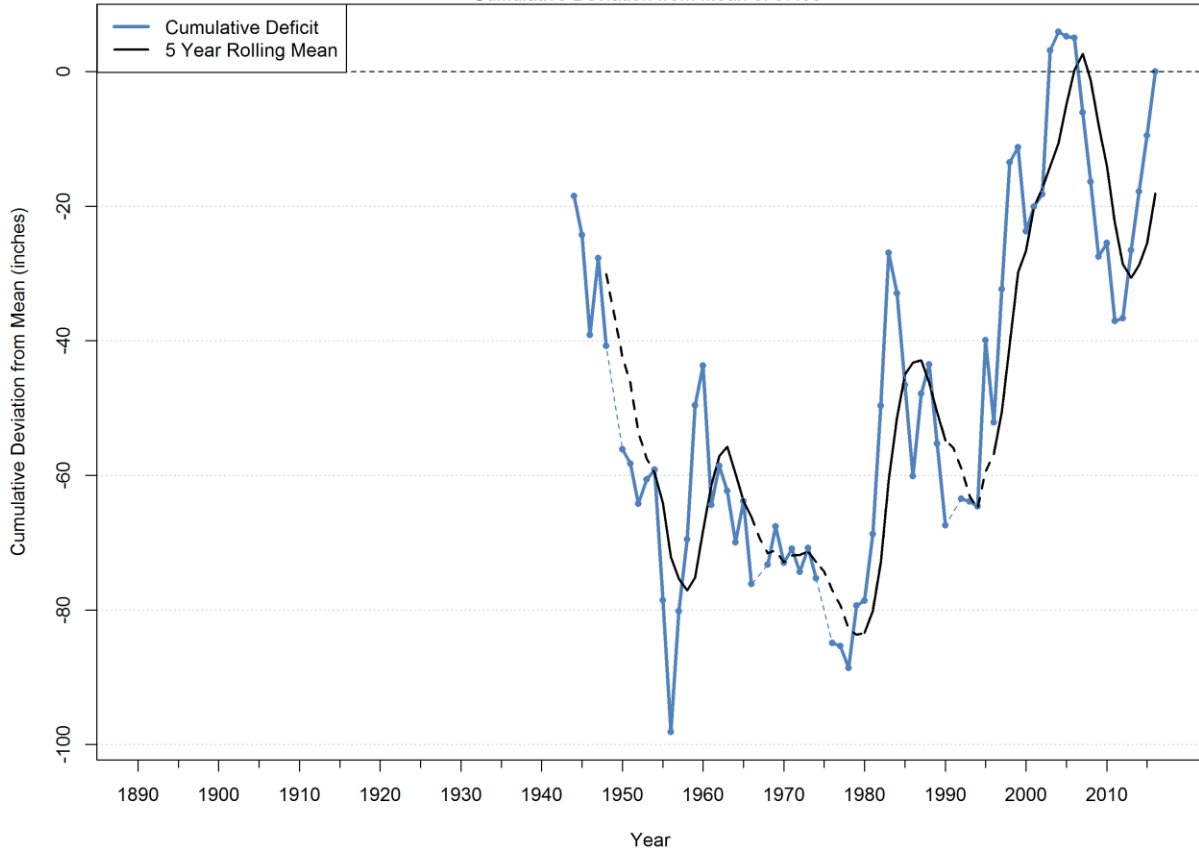
MYAKKA RIVER STATE PARK NWS



8 years missing: 1940-1943, 1949, 1967, 1975, 1991

	1943-1969	1970-1994	1995-2016	1943-2016 (POR)
<i>Wet</i>	37.3	38.89	41.49	39.15
<i>Dry</i>	17.09	18.53	19.1	18.2
<i>Total</i>	54.39	57.42	60.59	57.35

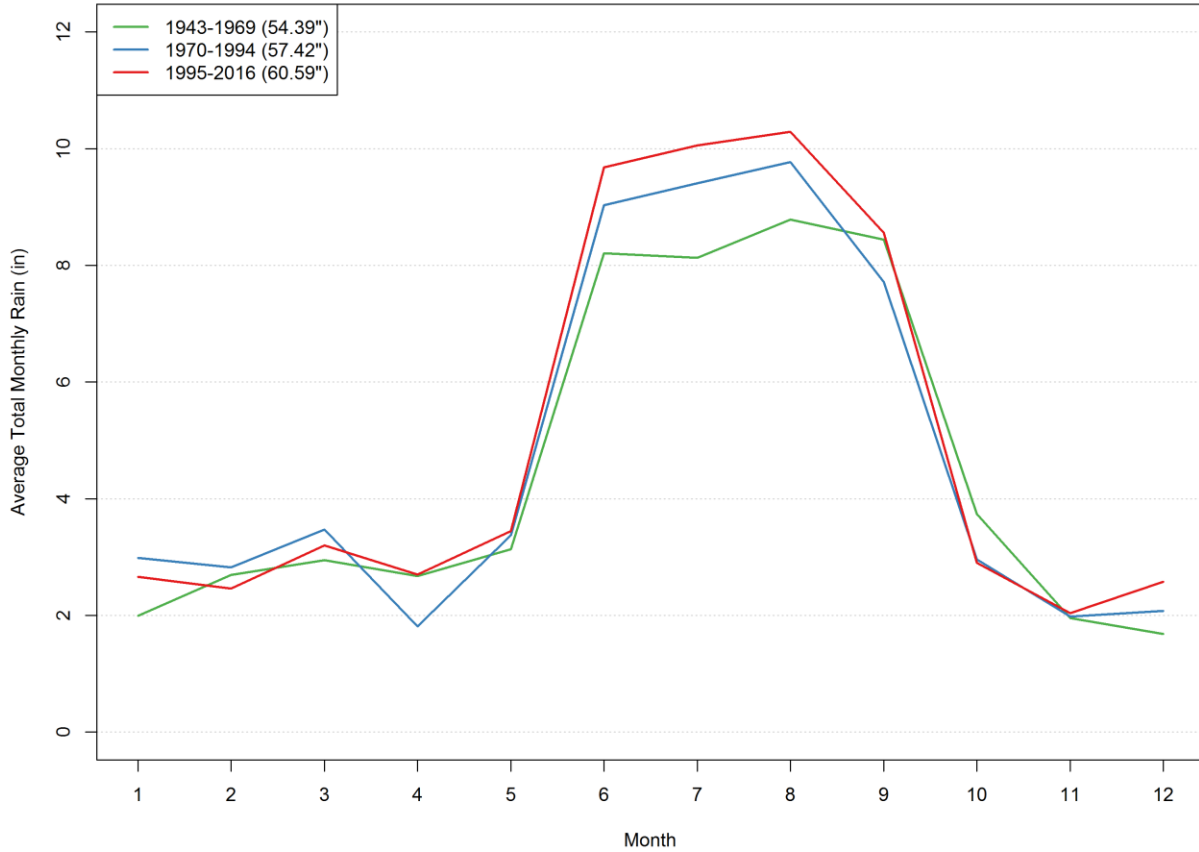
MYAKKA RIVER STATE PARK NWS
 58 years missing: 1890-1943, 1949, 1967, 1975, 1991
 Cumulative Deviation from Mean of 57.66"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	38.16	1956
<i>Driest 3 Year</i>	44.62	1946
<i>Driest 4 Year</i>	49.18	1956
<i>Driest 5 Year</i>	49.24	2011
<i>Driest 10 Year</i>	54.69	2013
<i>Wettest 2 Year</i>	78.54	1983
<i>Wettest 3 Year</i>	74.88	1983
<i>Wettest 4 Year</i>	71.27	1960
<i>Wettest 5 Year</i>	69.99	1983
<i>Wettest 10 Year</i>	64.71	2004
<i>Period of Record</i>	57.66	2016

MYAKKA RIVER STATE PARK NWS

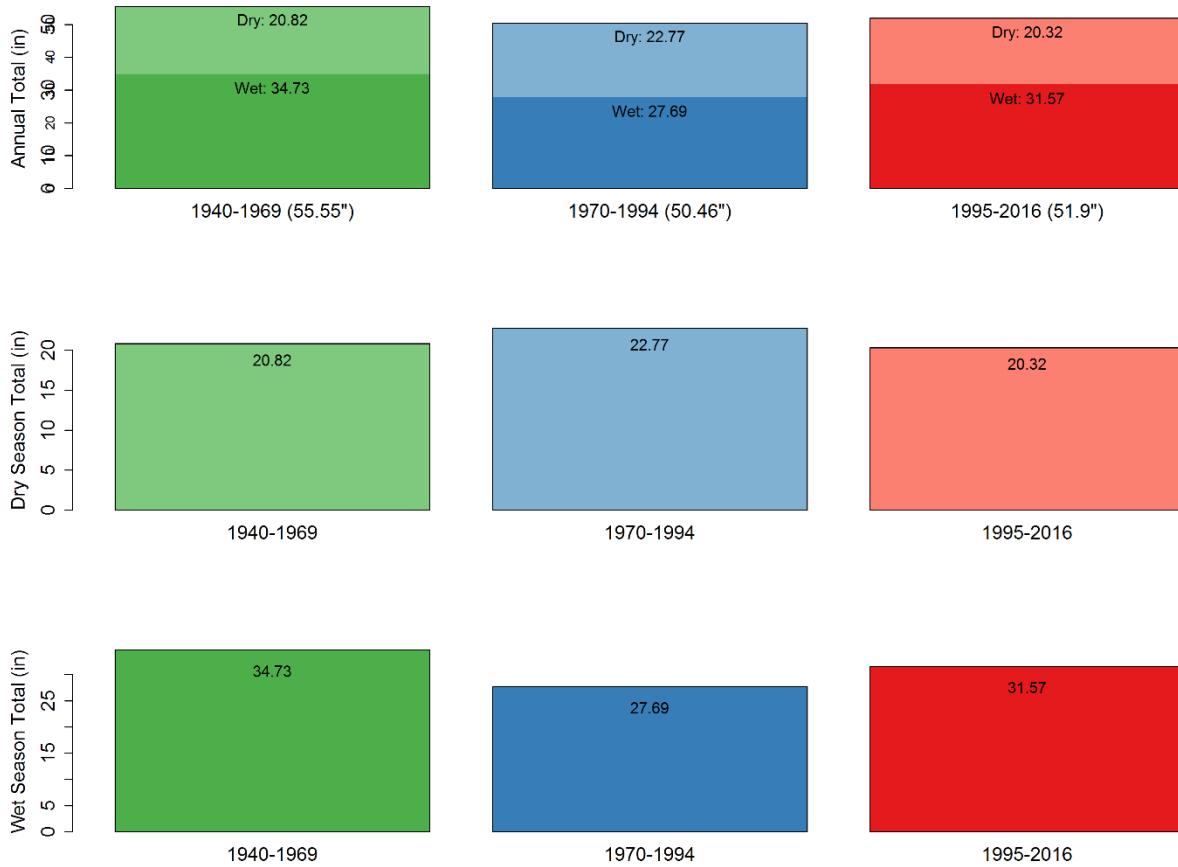
8 years missing: 1940-1943, 1949, 1967, 1975, 1991



	1943-1969	1970-1994	1995-2016	1943-2016 (POR)
Jan	1.99	2.99	2.66	2.54
Feb	2.7	2.82	2.46	2.67
Mar	2.95	3.47	3.2	3.21
Apr	2.67	1.82	2.7	2.39
May	3.14	3.38	3.45	3.32
June	8.21	9.03	9.68	8.94
July	8.13	9.41	10.06	9.16
Aug	8.78	9.77	10.29	9.59
Sep	8.44	7.72	8.56	8.23
Oct	3.74	2.96	2.9	3.23
Nov	1.95	1.98	2.04	1.99
Dec	1.68	2.08	2.58	2.08

Ocala NWS

OCALA NWS

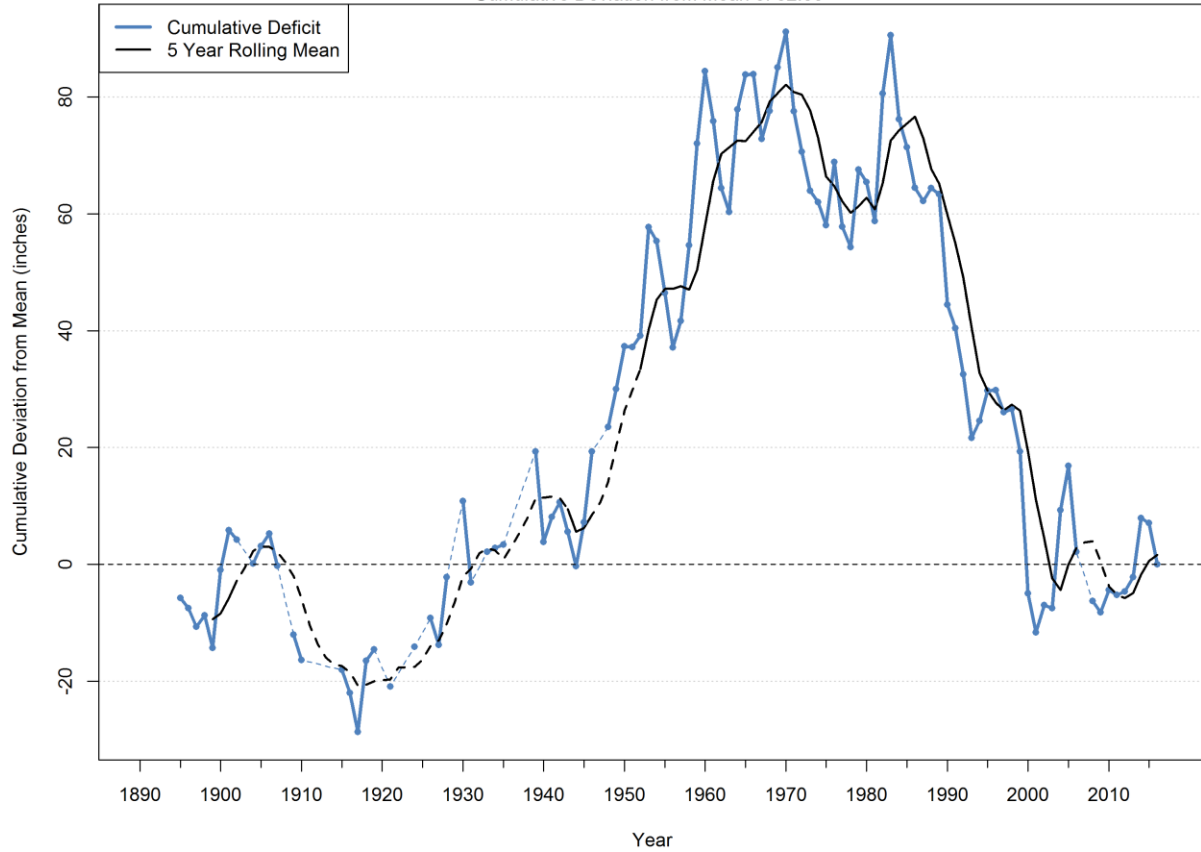


2 years missing: 1947, 2007

	1940-1969	1970-1994	1995-2016	1892-2016 (POR)
<i>Wet</i>	34.73	27.69	31.57	32.04
<i>Dry</i>	20.82	22.77	20.32	20.87
<i>Total</i>	55.55	50.46	51.9	52.91

OCALA NWS

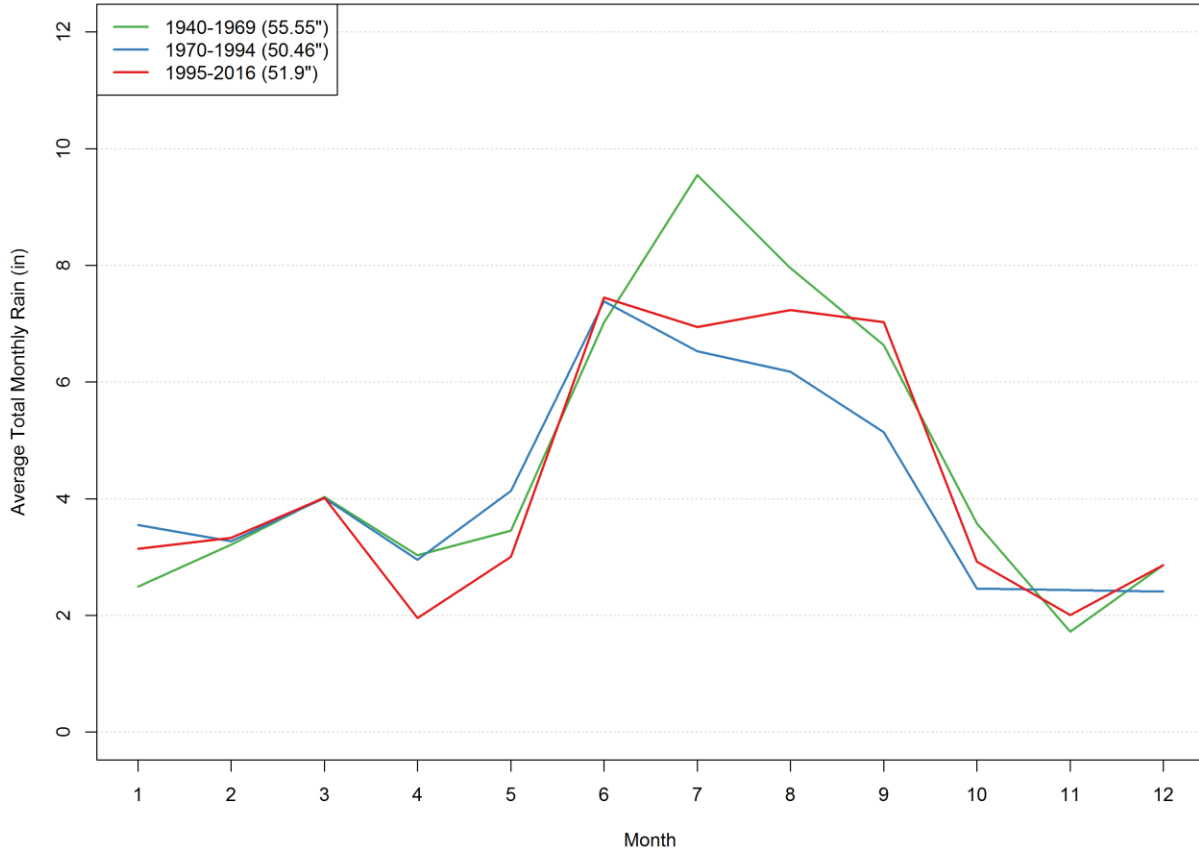
22 years missing: 1890-1894, 1903, 1908, 1911-1914, 1920, 1922, 1923, 1925, 1929, 1932, 1936-1938, 1947, 2007
 Cumulative Deviation from Mean of 52.88"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	37.1	2000
<i>Driest 3 Year</i>	40.14	2001
<i>Driest 4 Year</i>	42.44	1993
<i>Driest 5 Year</i>	44.33	1993
<i>Driest 10 Year</i>	45.99	1993
<i>Wettest 2 Year</i>	68.81	1983
<i>Wettest 3 Year</i>	67.13	1960
<i>Wettest 4 Year</i>	64.7	1960
<i>Wettest 5 Year</i>	60.63	1961
<i>Wettest 10 Year</i>	57.59	1960
<i>Period of Record</i>	52.88	2016

OCALA NWS

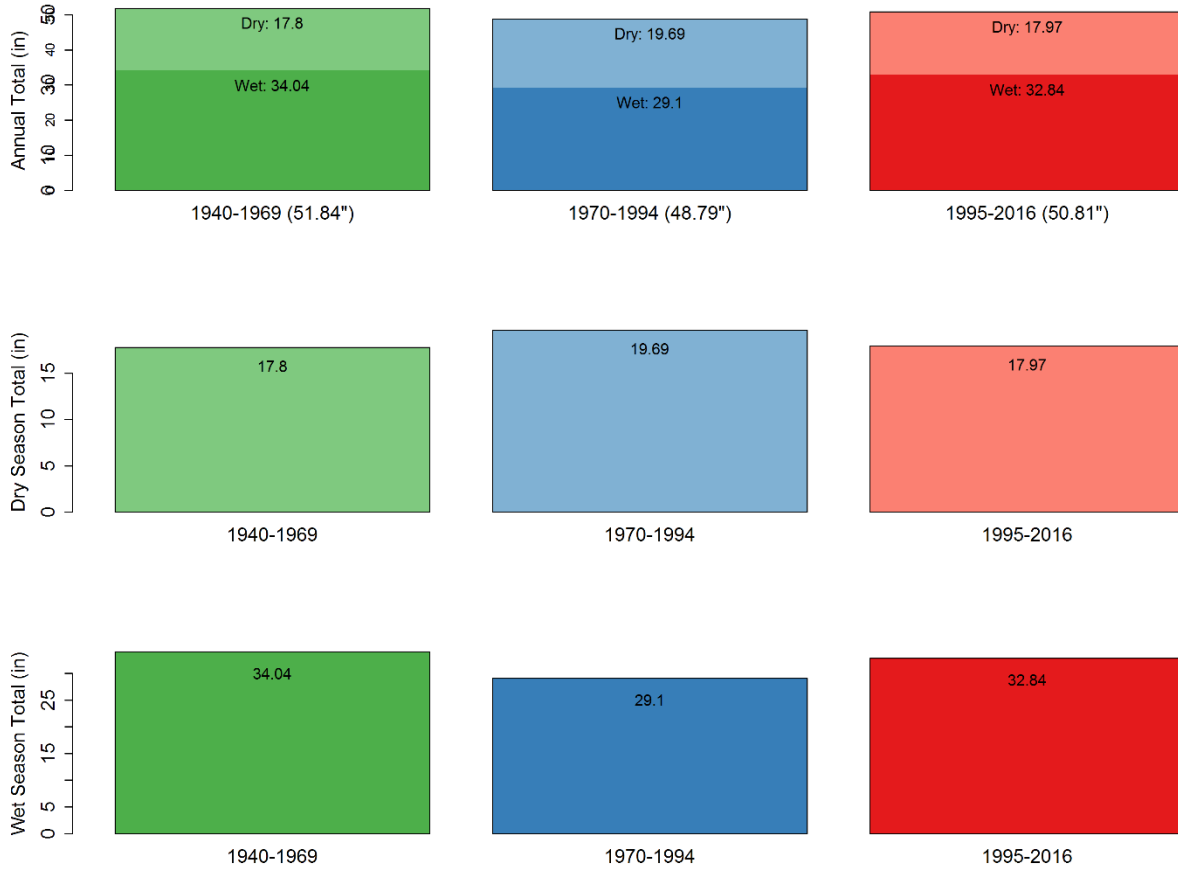
2 years missing: 1947, 2007



	1940-1969	1970-1994	1995-2016	1892-2016 (POR)
<i>Jan</i>	2.49	3.55	3.14	2.78
<i>Feb</i>	3.22	3.27	3.33	3.21
<i>Mar</i>	4.03	4.01	4.02	3.71
<i>Apr</i>	3.03	2.96	1.96	2.75
<i>May</i>	3.46	4.14	3	3.66
<i>June</i>	7.02	7.38	7.45	7.32
<i>July</i>	9.55	6.53	6.94	7.88
<i>Aug</i>	7.96	6.18	7.24	7.46
<i>Sep</i>	6.63	5.14	7.03	6.47
<i>Oct</i>	3.58	2.46	2.92	2.92
<i>Nov</i>	1.72	2.44	2.01	1.96
<i>Dec</i>	2.86	2.41	2.86	2.8

Orlando Executive (Herndon) Airport NWS

ORLANDO EXECUTIVE (HERNDON) AIRPORT NWS

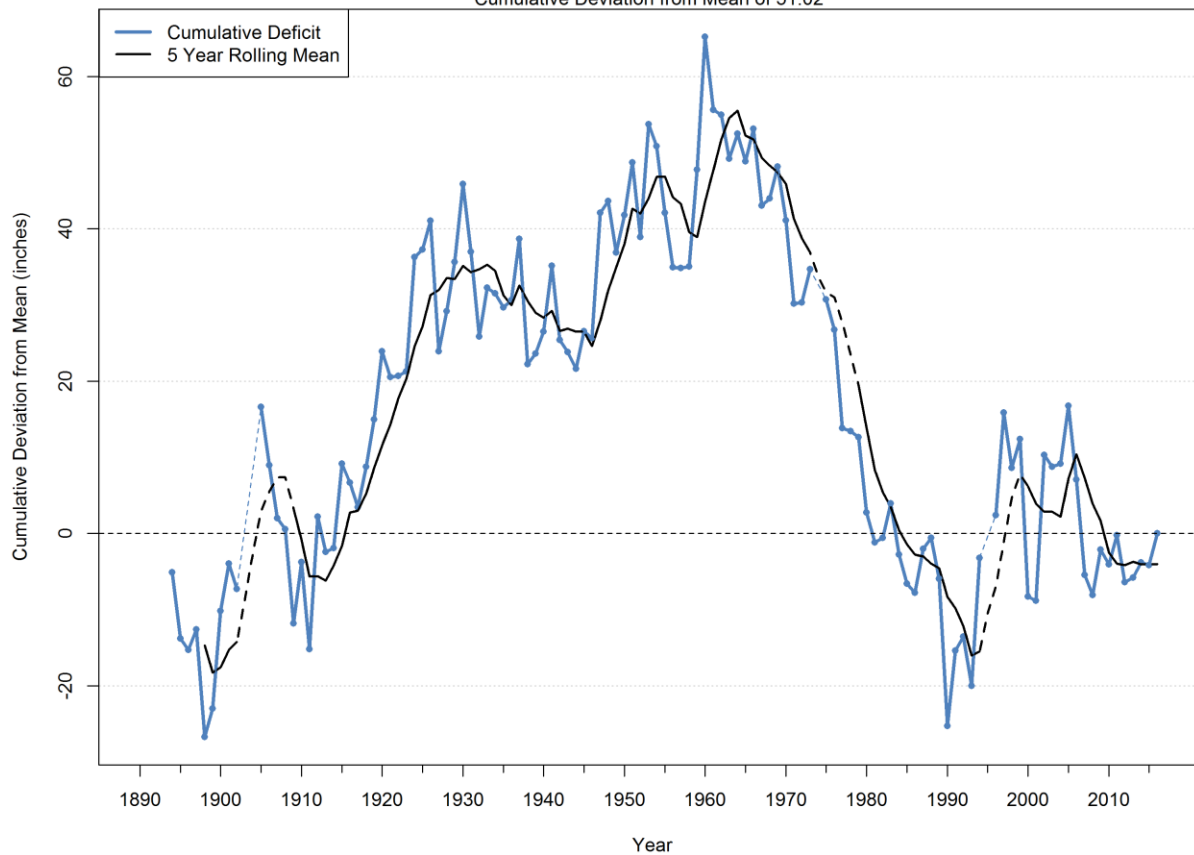


2 years missing: 1974, 1995

	1940-1969	1970-1994	1995-2016	1892-2016 (POR)
<i>Wet</i>	34.04	29.1	32.84	32.48
<i>Dry</i>	17.8	19.69	17.97	18.42
<i>Total</i>	51.84	48.79	50.81	50.9

ORLANDO EXECUTIVE (HERNDON) AIRPORT NWS

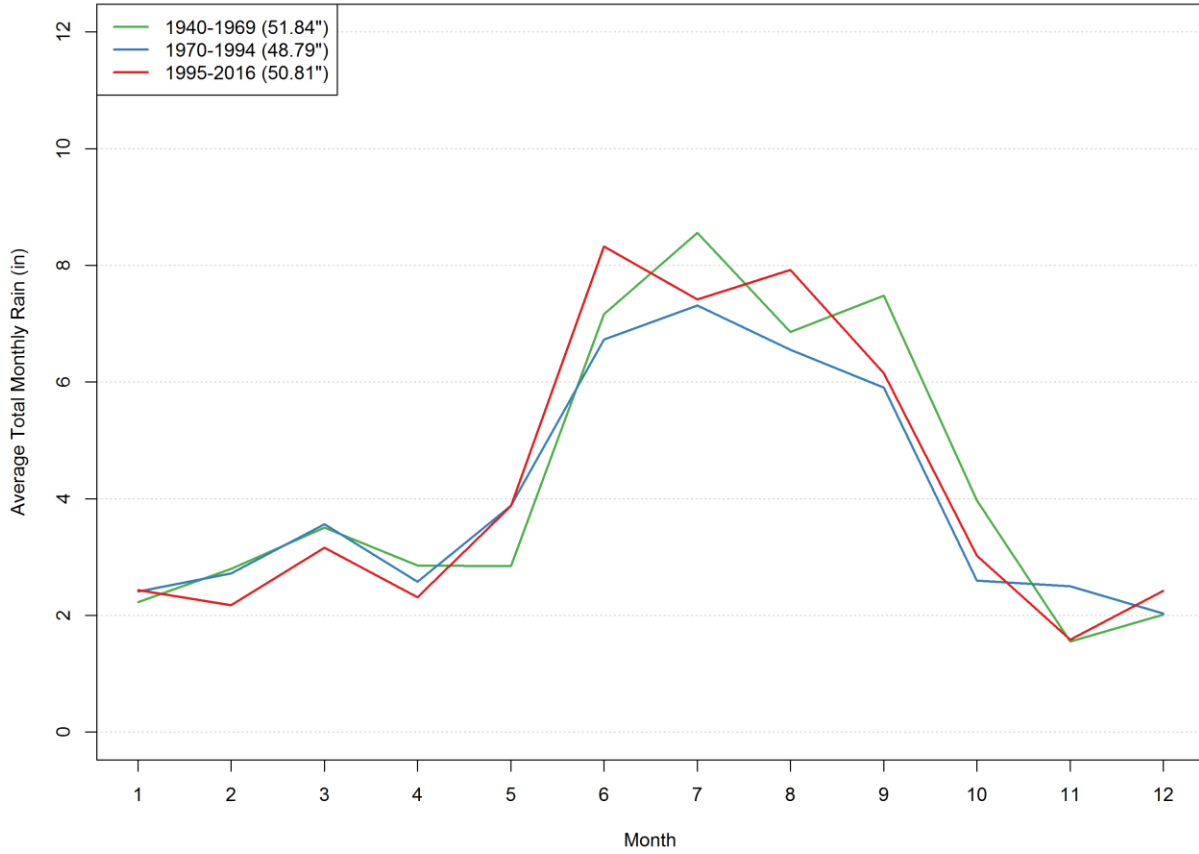
8 years missing: 1890-1893, 1903, 1904, 1974, 1995
 Cumulative Deviation from Mean of 51.02"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	38.67	1990
<i>Driest 3 Year</i>	42.73	2008
<i>Driest 4 Year</i>	43.92	1909
<i>Driest 5 Year</i>	45.43	1980
<i>Driest 10 Year</i>	47.28	1984
<i>Wettest 2 Year</i>	66.09	1960
<i>Wettest 3 Year</i>	61.13	1960
<i>Wettest 4 Year</i>	58.58	1960
<i>Wettest 5 Year</i>	56.03	2005
<i>Wettest 10 Year</i>	54.84	1924
<i>Period of Record</i>	51.02	2016

ORLANDO EXECUTIVE (HERNDON) AIRPORT NWS

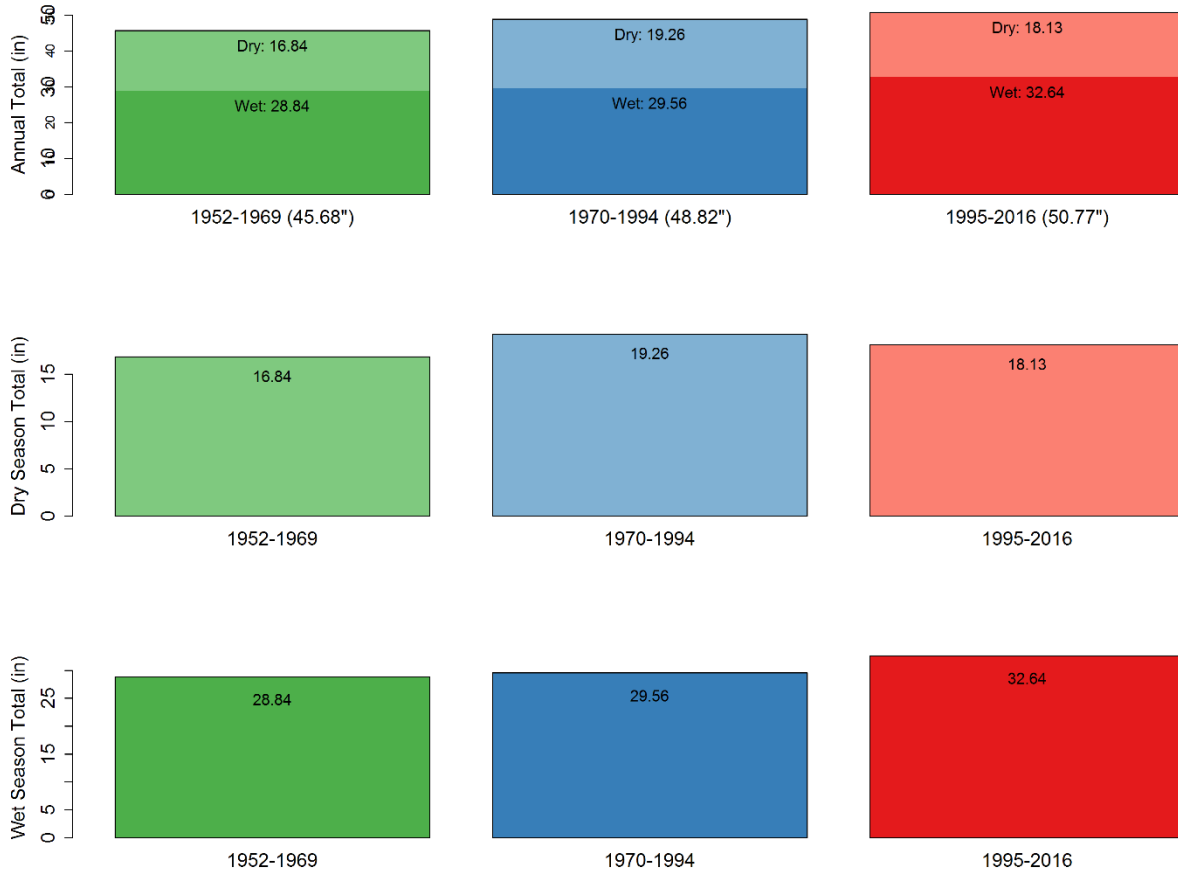
2 years missing: 1974, 1995



	1940-1969	1970-1994	1995-2016	1892-2016 (POR)
Jan	2.23	2.41	2.44	2.33
Feb	2.8	2.72	2.18	2.53
Mar	3.5	3.56	3.16	3.16
Apr	2.86	2.58	2.31	2.6
May	2.85	3.88	3.87	3.84
June	7.17	6.73	8.33	7.34
July	8.56	7.31	7.42	7.76
Aug	6.86	6.56	7.92	6.97
Sep	7.48	5.9	6.15	6.74
Oct	3.97	2.6	3.02	3.67
Nov	1.55	2.5	1.58	1.82
Dec	2.01	2.03	2.42	2.14

Orlando International Airport NWS

ORLANDO INTERNATIONAL AIRPORT NWS

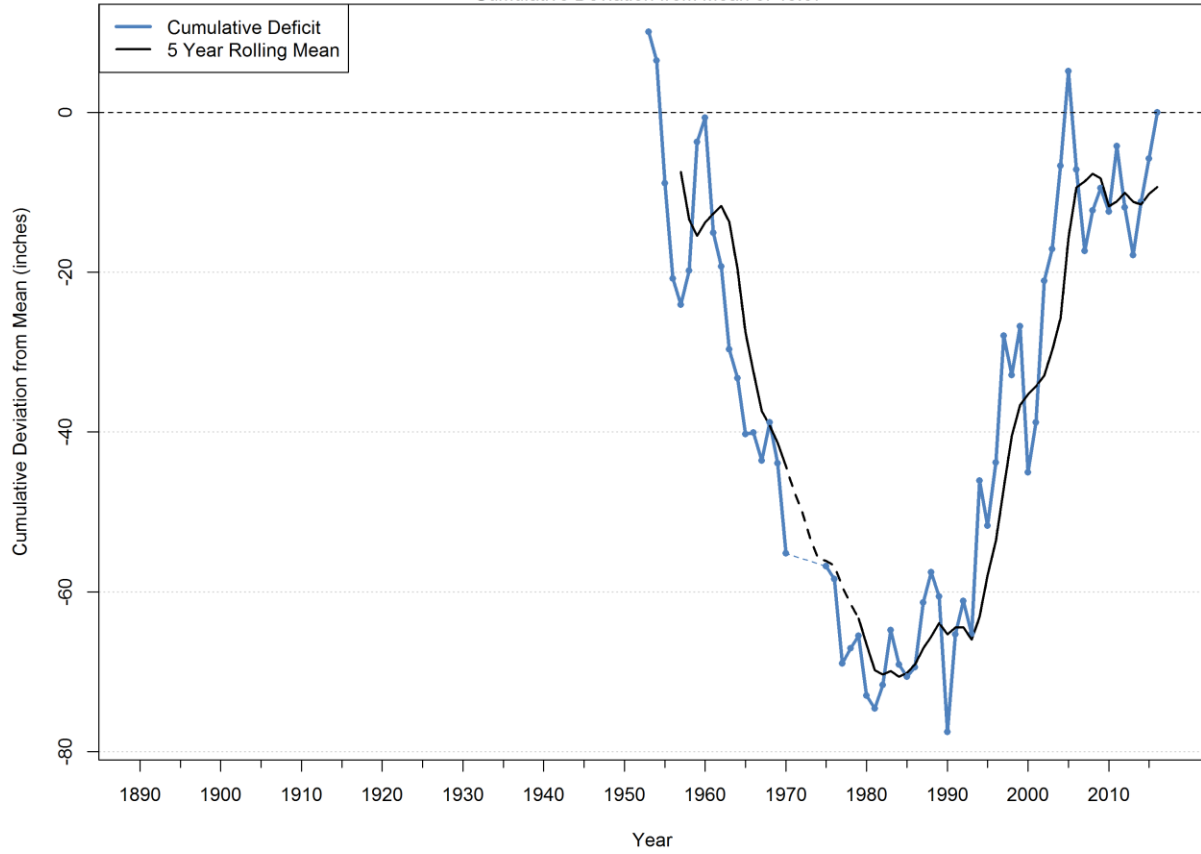


17 years missing: 1940-1952, 1971-1974

	1952-1969	1970-1994	1995-2016	1952-2016 (POR)
<i>Wet</i>	28.84	29.56	32.64	30.45
<i>Dry</i>	16.84	19.26	18.13	18.16
<i>Total</i>	45.68	48.82	50.77	48.61

ORLANDO INTERNATIONAL AIRPORT NWS

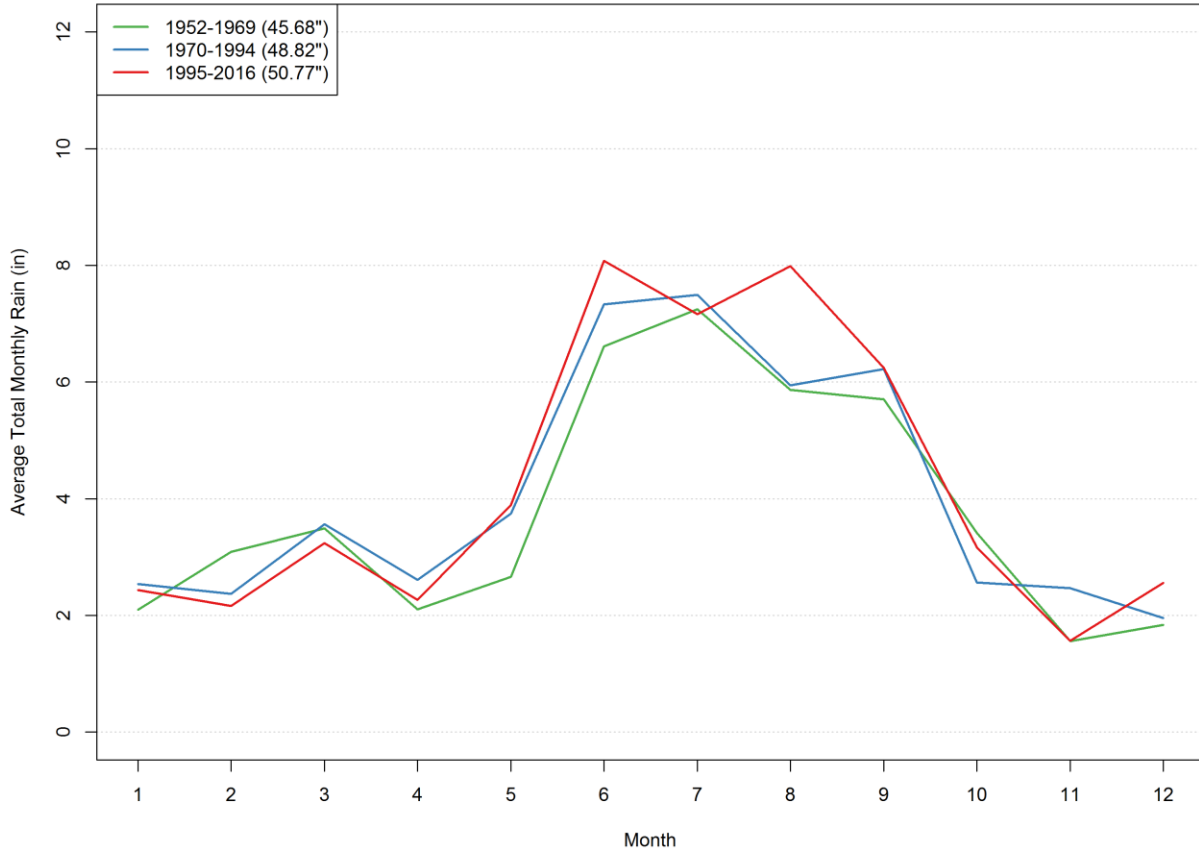
67 years missing: 1890-1952, 1971-1974
Cumulative Deviation from Mean of 48.67"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	35.03	1956
<i>Driest 3 Year</i>	38.39	1956
<i>Driest 4 Year</i>	40.14	1957
<i>Driest 5 Year</i>	40.74	1965
<i>Driest 10 Year</i>	43.22	1970
<i>Wettest 2 Year</i>	60.66	2002
<i>Wettest 3 Year</i>	59.38	2004
<i>Wettest 4 Year</i>	59.67	2005
<i>Wettest 5 Year</i>	58.72	2005
<i>Wettest 10 Year</i>	54.36	2005
<i>Period of Record</i>	48.67	2016

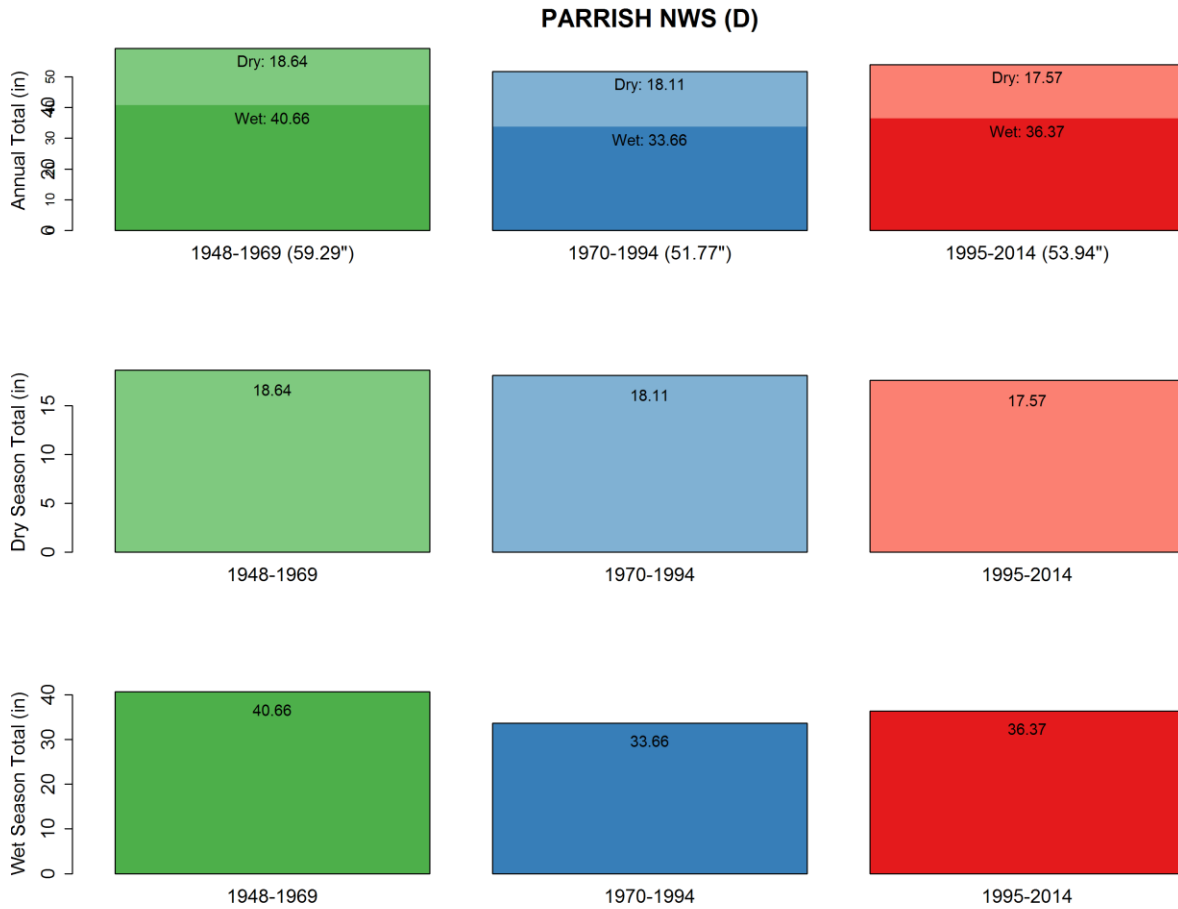
ORLANDO INTERNATIONAL AIRPORT NWS

17 years missing: 1940-1952, 1971-1974



	1952-1969	1970-1994	1995-2016	1952-2016 (POR)
<i>Jan</i>	2.1	2.54	2.44	2.38
<i>Feb</i>	3.09	2.37	2.16	2.5
<i>Mar</i>	3.49	3.57	3.24	3.43
<i>Apr</i>	2.1	2.61	2.27	2.35
<i>May</i>	2.66	3.74	3.9	3.5
<i>June</i>	6.61	7.34	8.08	7.39
<i>July</i>	7.25	7.49	7.16	7.31
<i>Aug</i>	5.87	5.94	7.99	6.65
<i>Sep</i>	5.7	6.23	6.25	6.08
<i>Oct</i>	3.41	2.56	3.17	3.03
<i>Nov</i>	1.56	2.46	1.57	1.88
<i>Dec</i>	1.84	1.95	2.56	2.13

Parrish NWS (D)

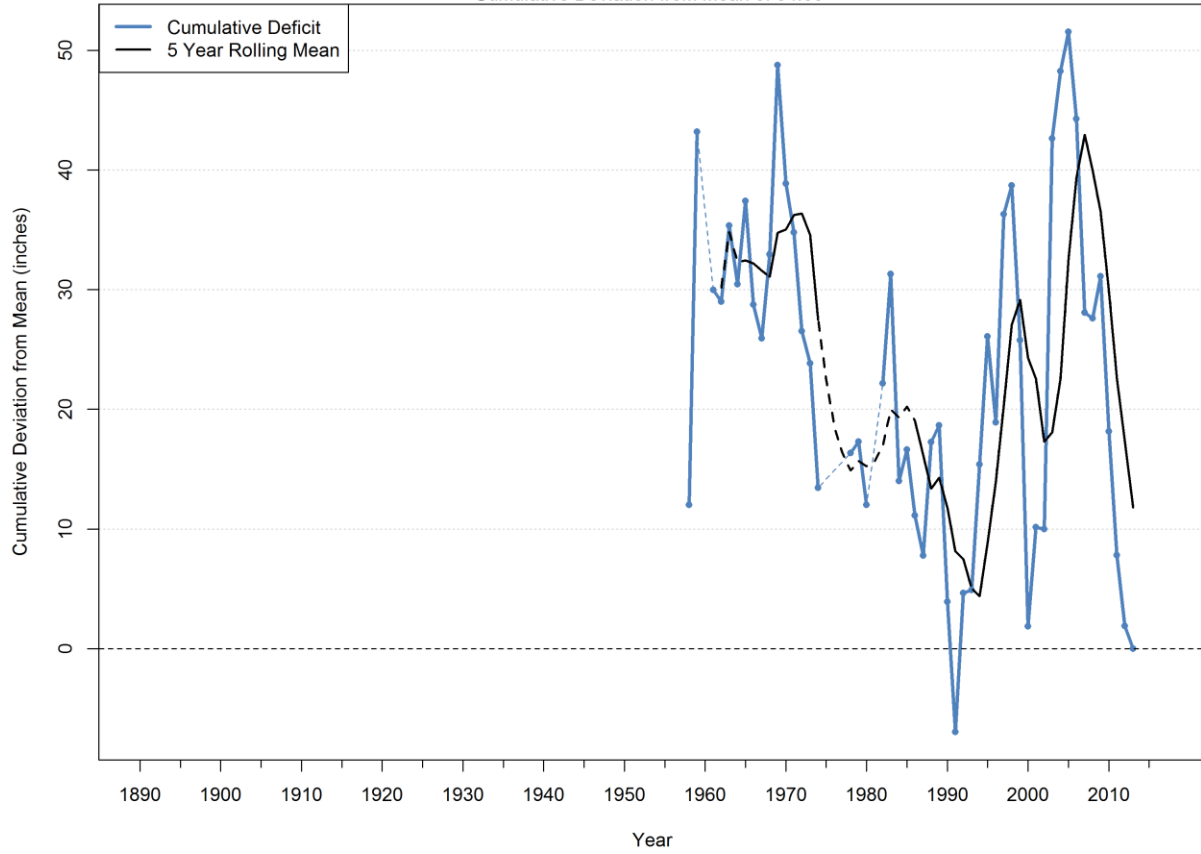


26 years missing: 1940-1957, 1960, 1975-1977, 1981, 2014-2016

	1948-1969	1970-1994	1995-2014	1948-2014 (POR)
<i>Wet</i>	40.66	33.66	36.37	36.38
<i>Dry</i>	18.64	18.11	17.57	18.04
<i>Total</i>	59.29	51.77	53.94	54.42

PARRISH NWS (D)

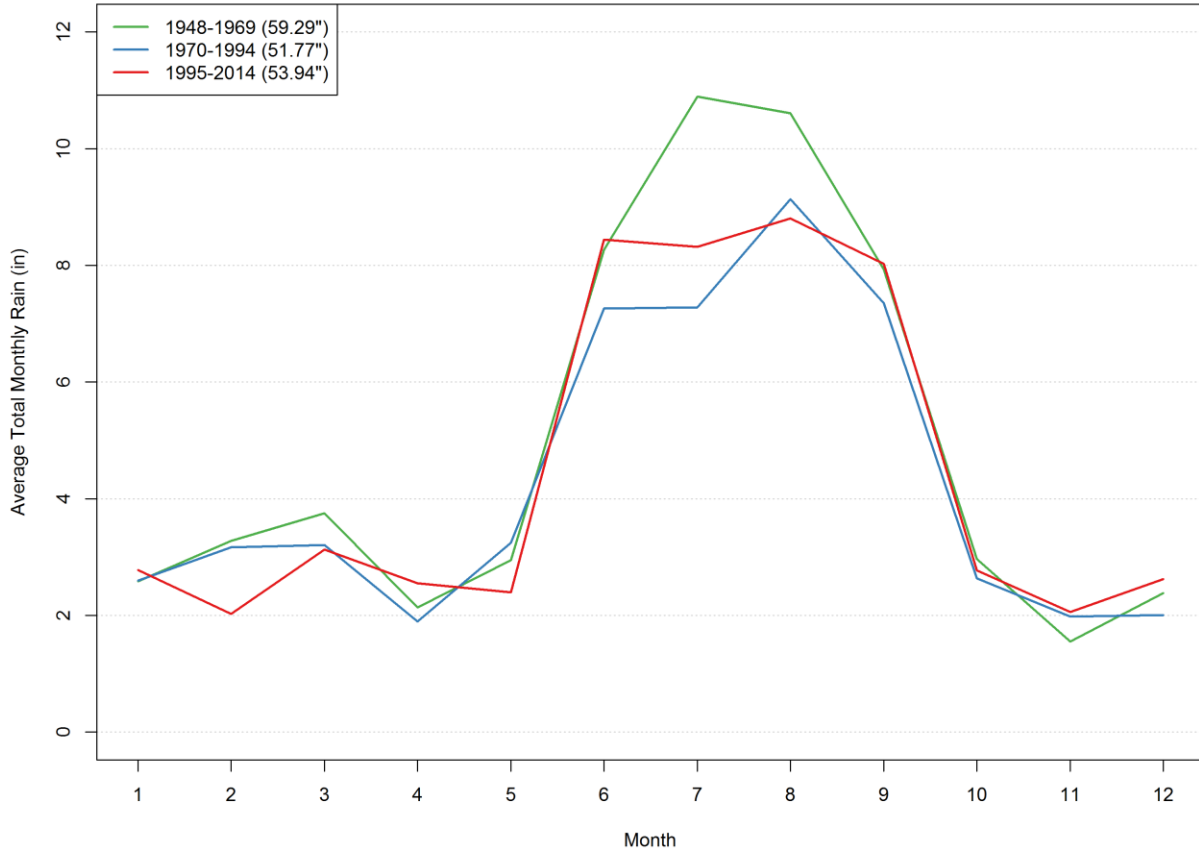
76 years missing: 1890-1957, 1960, 1975-1977, 1981, 2014-2016
 Cumulative Deviation from Mean of 54.68"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	36.27	2000
<i>Driest 3 Year</i>	43.2	2000
<i>Driest 4 Year</i>	46.9	2013
<i>Driest 5 Year</i>	47.39	2011
<i>Driest 10 Year</i>	50.42	2013
<i>Wettest 2 Year</i>	76.27	1959
<i>Wettest 3 Year</i>	68.53	2005
<i>Wettest 4 Year</i>	66.28	2004
<i>Wettest 5 Year</i>	64.61	2005
<i>Wettest 10 Year</i>	58.45	2003
<i>Period of Record</i>	54.68	2016

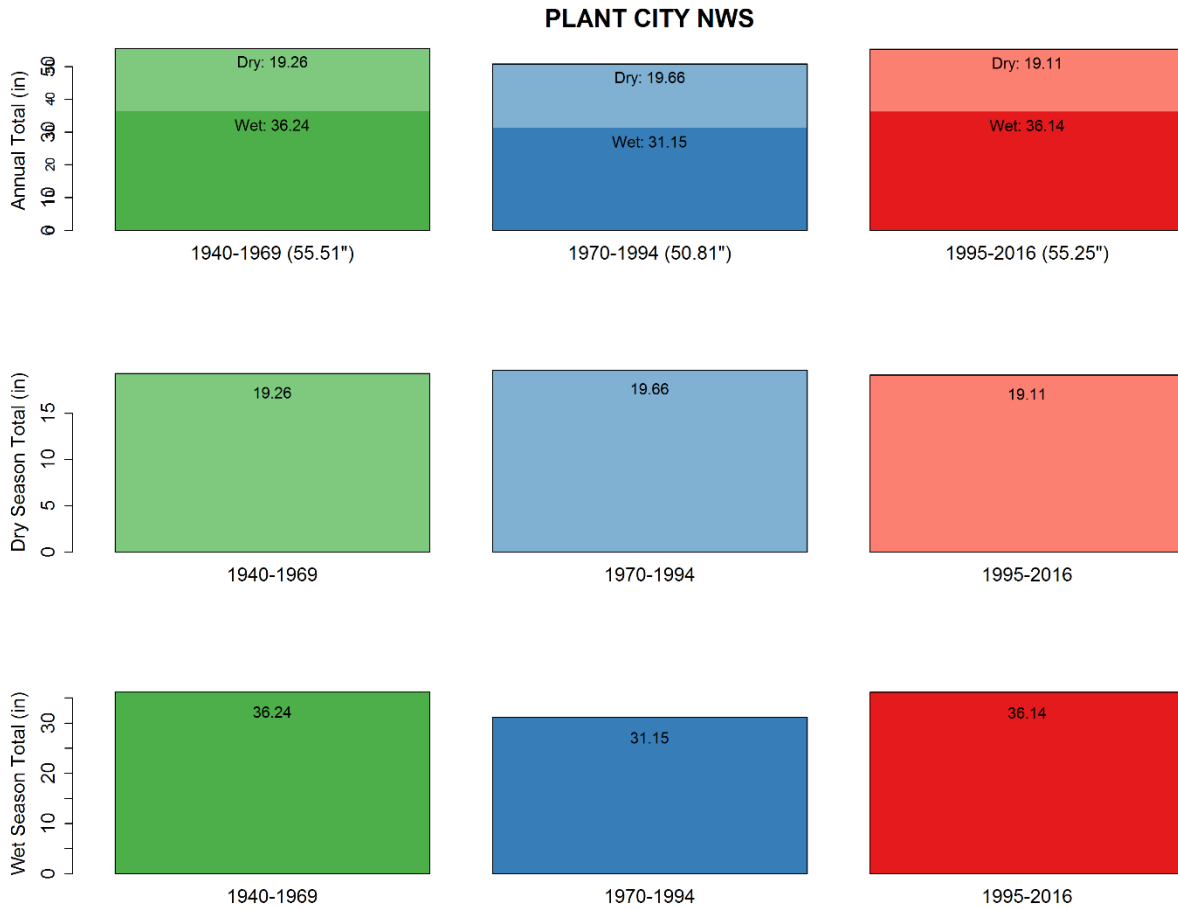
PARRISH NWS (D)

26 years missing: 1940-1957, 1960, 1975-1977, 1981, 2014-2016



	1948-1969	1970-1994	1995-2014	1948-2014 (POR)
<i>Jan</i>	2.59	2.6	2.78	2.66
<i>Feb</i>	3.28	3.17	2.03	2.81
<i>Mar</i>	3.75	3.21	3.13	3.32
<i>Apr</i>	2.14	1.89	2.55	2.17
<i>May</i>	2.95	3.24	2.39	2.89
<i>June</i>	8.27	7.26	8.44	7.9
<i>July</i>	10.89	7.28	8.32	8.6
<i>Aug</i>	10.61	9.13	8.81	9.4
<i>Sep</i>	7.93	7.35	8.03	7.71
<i>Oct</i>	2.97	2.64	2.77	2.77
<i>Nov</i>	1.55	1.98	2.06	1.9
<i>Dec</i>	2.38	2.01	2.62	2.3

Plant City NWS

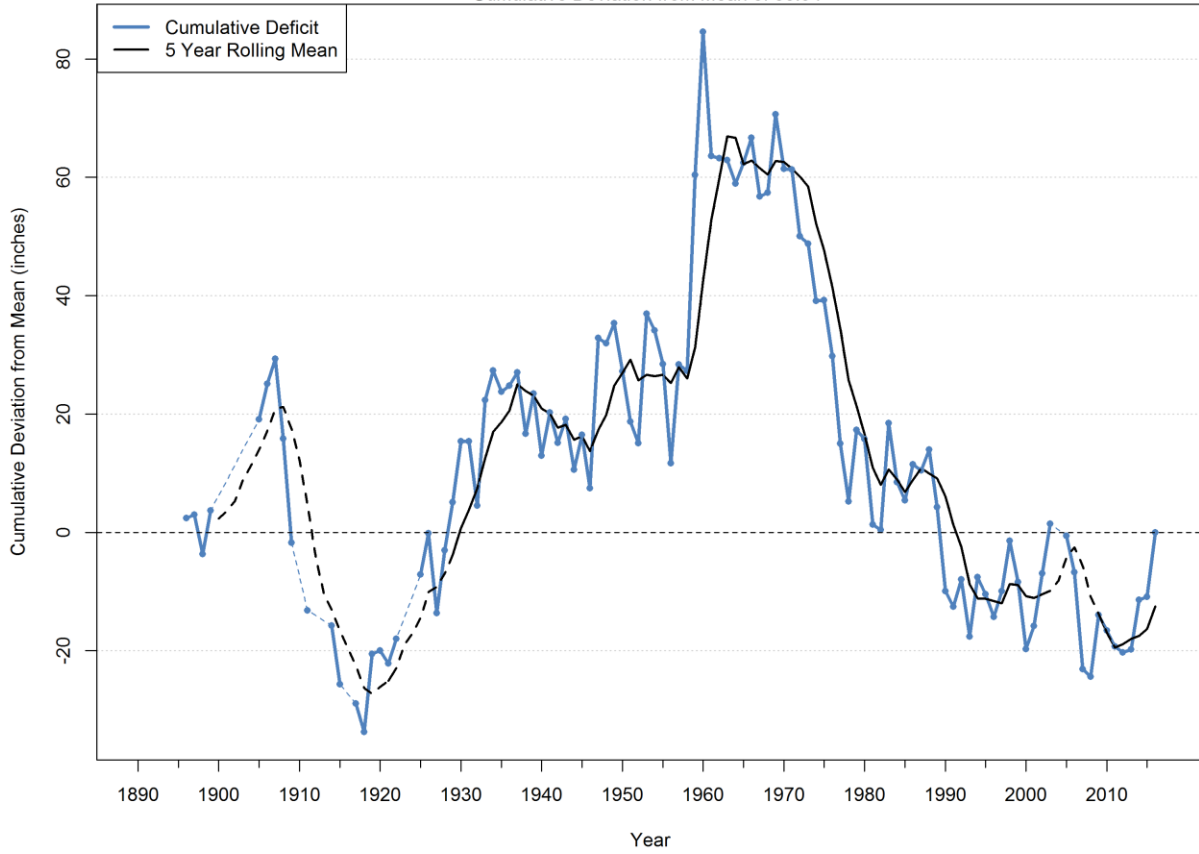


1 years missing: 2004

	1940-1969	1970-1994	1995-2016	1893-2016 (POR)
<i>Wet</i>	36.24	31.15	36.14	34.71
<i>Dry</i>	19.26	19.66	19.11	19.47
<i>Total</i>	55.51	50.81	55.25	54.18

PLANT CITY NWS

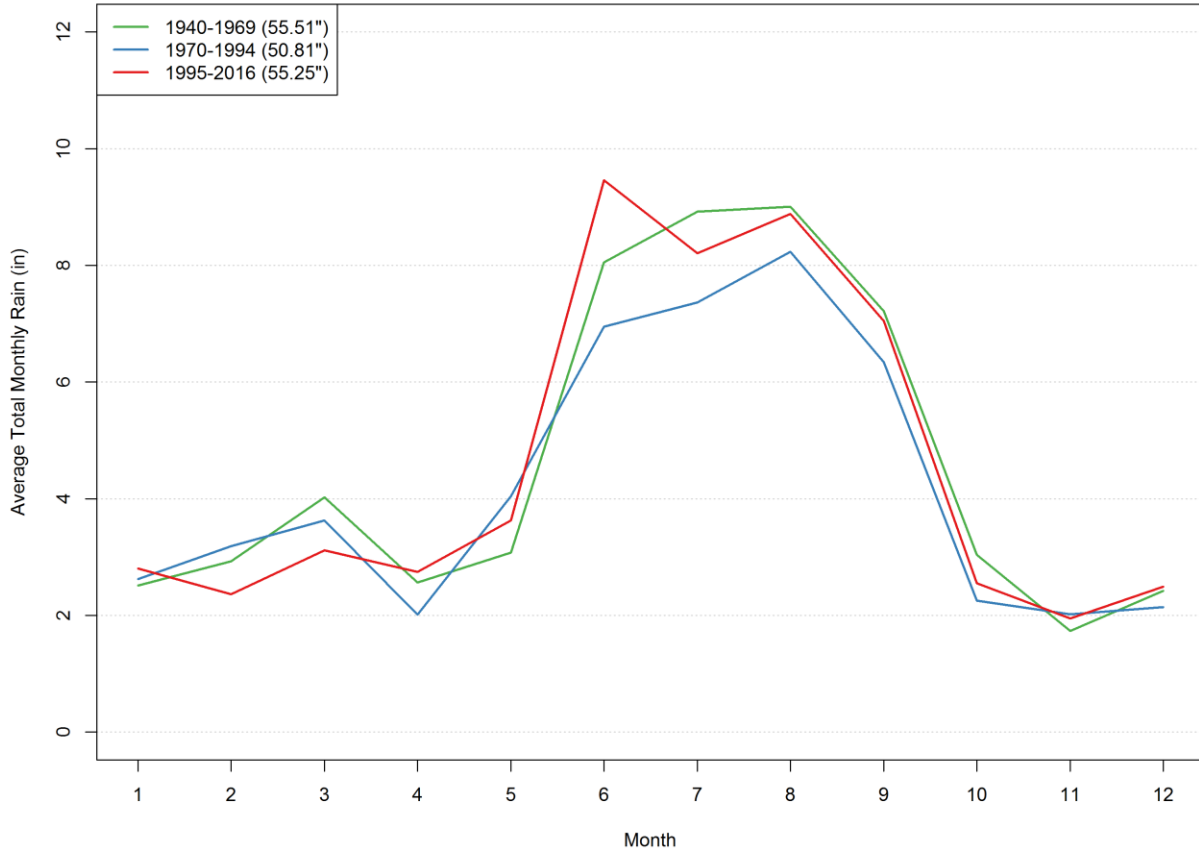
18 years missing: 1890-1895, 1900-1904, 1910, 1912, 1913, 1916, 1923, 1924, 2004
 Cumulative Deviation from Mean of 53.94"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	38.39	1909
<i>Driest 3 Year</i>	42.6	1978
<i>Driest 4 Year</i>	45.48	1978
<i>Driest 5 Year</i>	45.22	1978
<i>Driest 10 Year</i>	47.94	1981
<i>Wettest 2 Year</i>	82.59	1960
<i>Wettest 3 Year</i>	72.66	1960
<i>Wettest 4 Year</i>	72.16	1960
<i>Wettest 5 Year</i>	65.16	1960
<i>Wettest 10 Year</i>	59.67	1960
<i>Period of Record</i>	53.94	2016

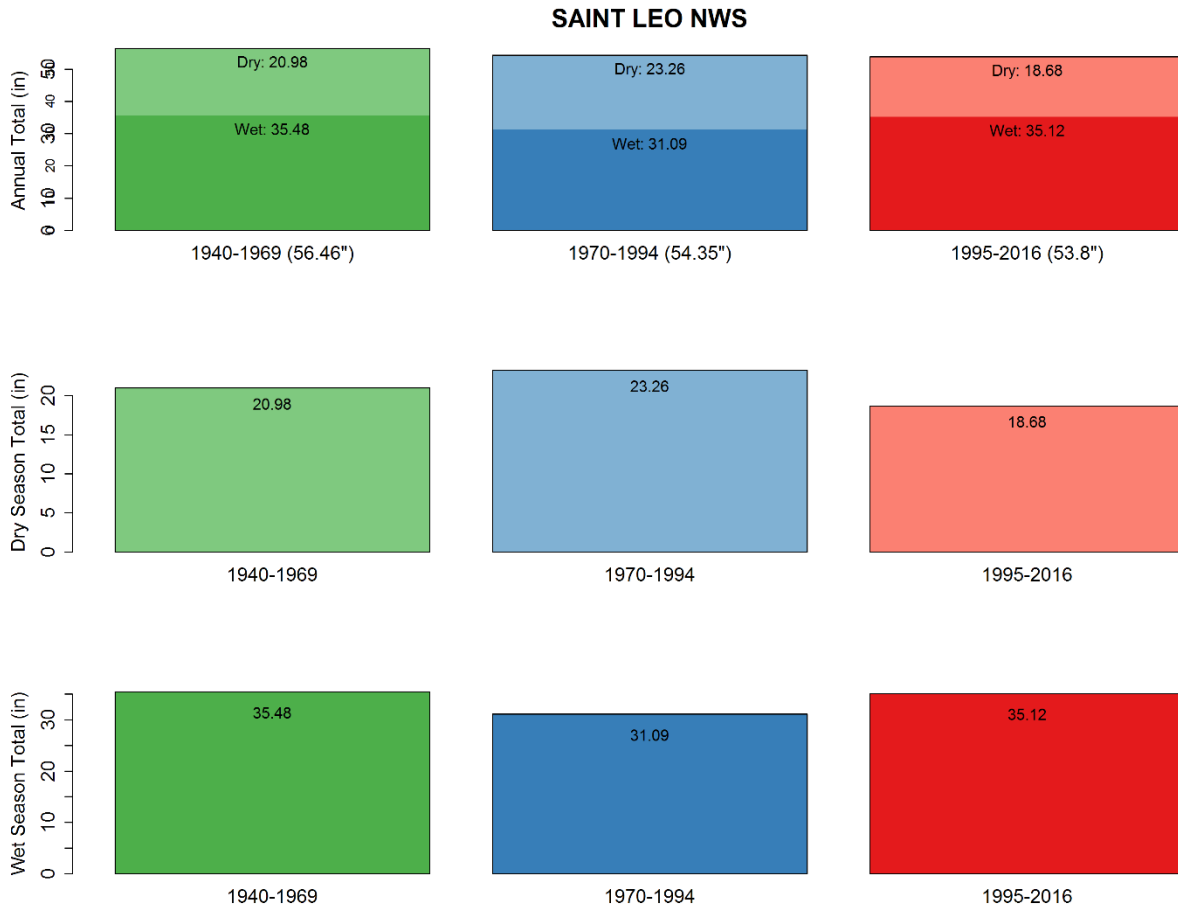
PLANT CITY NWS

1 years missing: 2004



	1940-1969	1970-1994	1995-2016	1893-2016 (POR)
<i>Jan</i>	2.51	2.62	2.8	2.51
<i>Feb</i>	2.93	3.19	2.36	2.92
<i>Mar</i>	4.03	3.63	3.12	3.38
<i>Apr</i>	2.57	2.01	2.75	2.57
<i>May</i>	3.08	4.04	3.63	3.97
<i>June</i>	8.05	6.95	9.46	8.04
<i>July</i>	8.92	7.37	8.21	8.33
<i>Aug</i>	9.01	8.23	8.88	8.67
<i>Sep</i>	7.22	6.34	7.05	6.84
<i>Oct</i>	3.04	2.26	2.55	2.83
<i>Nov</i>	1.73	2.02	1.95	1.84
<i>Dec</i>	2.42	2.15	2.49	2.28

Saint Leo NWS

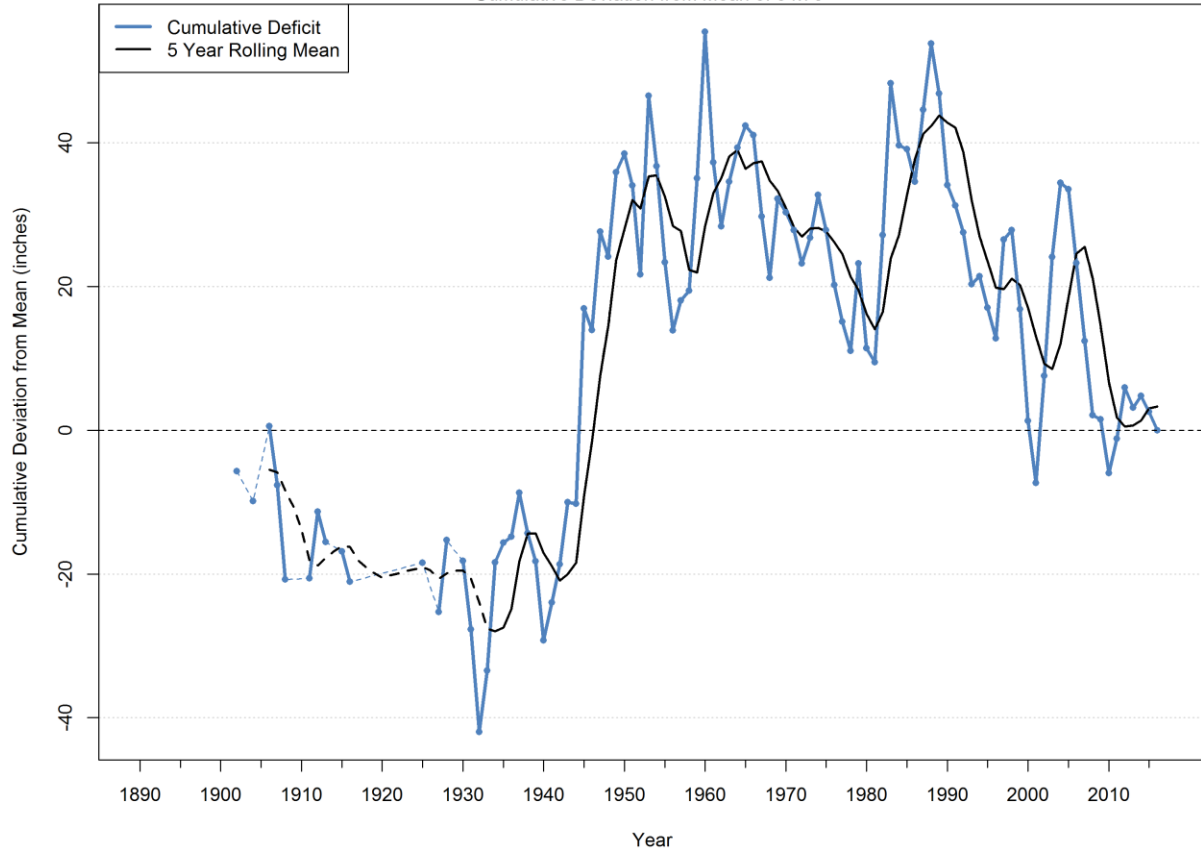


0 years missing:

	1940-1969	1970-1994	1995-2016	1895-2016 (POR)
<i>Wet</i>	35.48	31.09	35.12	35.4
<i>Dry</i>	20.98	23.26	18.68	20.38
<i>Total</i>	56.46	54.35	53.8	55.78

SAINT LEO NWS

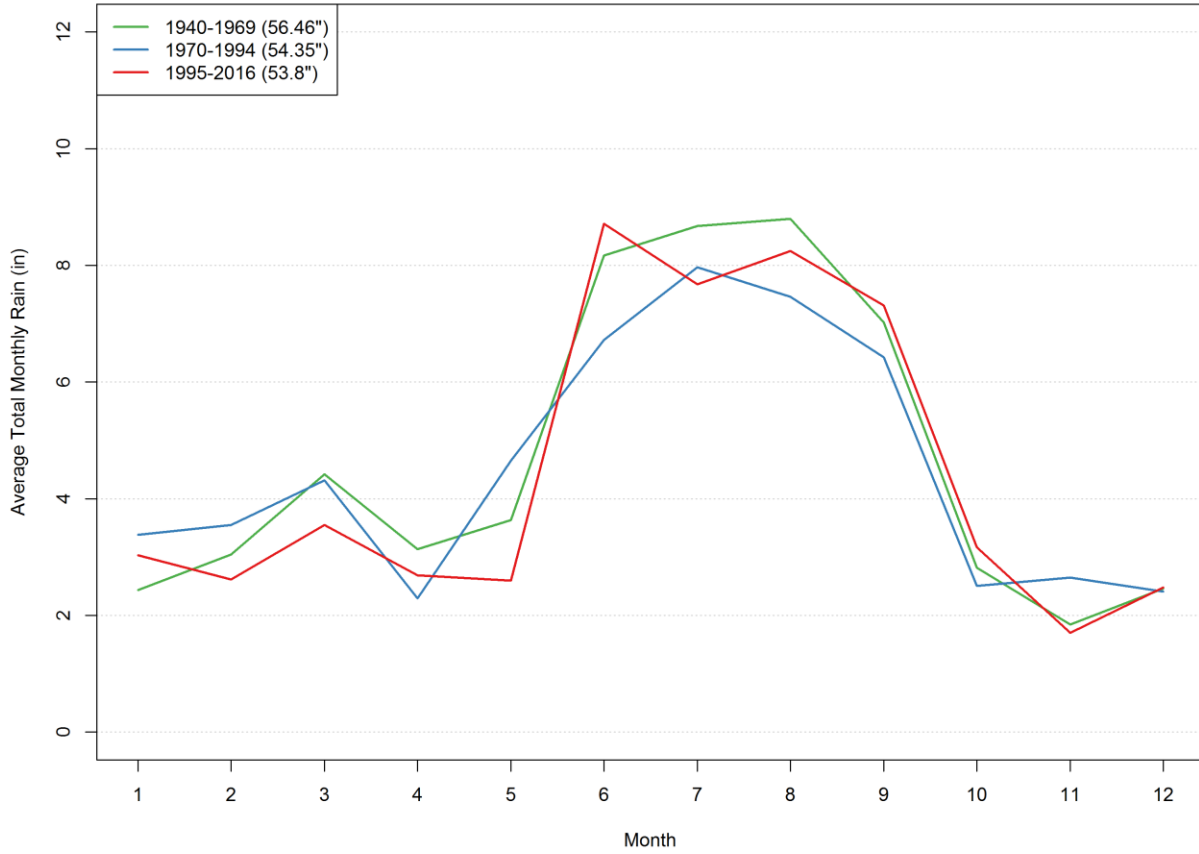
27 years missing: 1890-1901, 1903, 1905, 1909, 1910, 1914, 1917-1924, 1926, 1929
 Cumulative Deviation from Mean of 54.78"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	41.25	1962
<i>Driest 3 Year</i>	43.06	2001
<i>Driest 4 Year</i>	46.32	2001
<i>Driest 5 Year</i>	46.88	2010
<i>Driest 10 Year</i>	50.92	2001
<i>Wettest 2 Year</i>	74.17	1983
<i>Wettest 3 Year</i>	68.7	2004
<i>Wettest 4 Year</i>	65.16	1960
<i>Wettest 5 Year</i>	64.04	1947
<i>Wettest 10 Year</i>	61.55	1950
<i>Period of Record</i>	54.78	2016

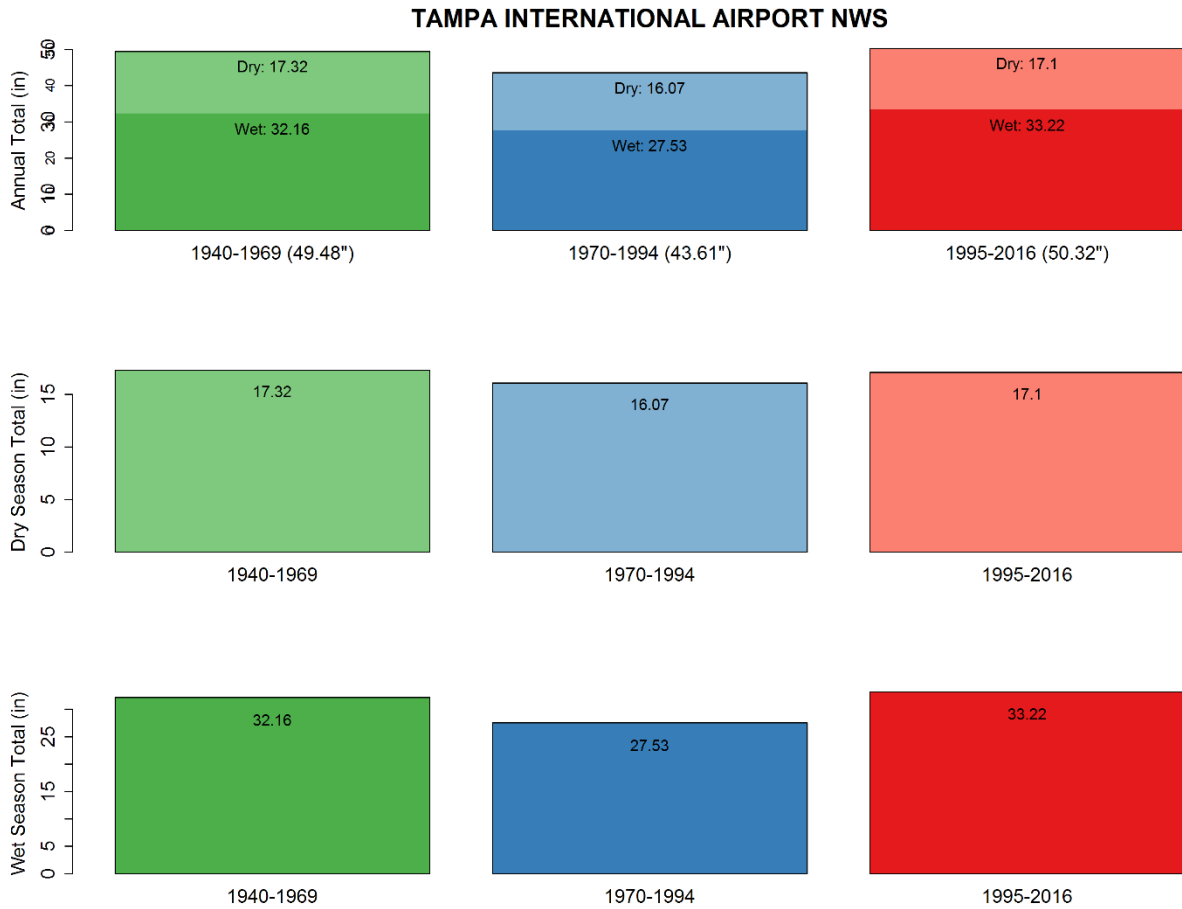
SAINT LEO NWS

0 years missing:



	1940-1969	1970-1994	1995-2016	1895-2016 (POR)
<i>Jan</i>	2.44	3.38	3.03	2.84
<i>Feb</i>	3.04	3.55	2.62	3.06
<i>Mar</i>	4.42	4.32	3.55	3.67
<i>Apr</i>	3.14	2.29	2.69	2.62
<i>May</i>	3.63	4.65	2.6	3.82
<i>June</i>	8.17	6.73	8.72	8.31
<i>July</i>	8.67	7.97	7.68	8.6
<i>Aug</i>	8.8	7.46	8.25	8.43
<i>Sep</i>	7.02	6.43	7.31	6.98
<i>Oct</i>	2.82	2.5	3.17	3.08
<i>Nov</i>	1.84	2.65	1.7	2
<i>Dec</i>	2.46	2.41	2.48	2.38

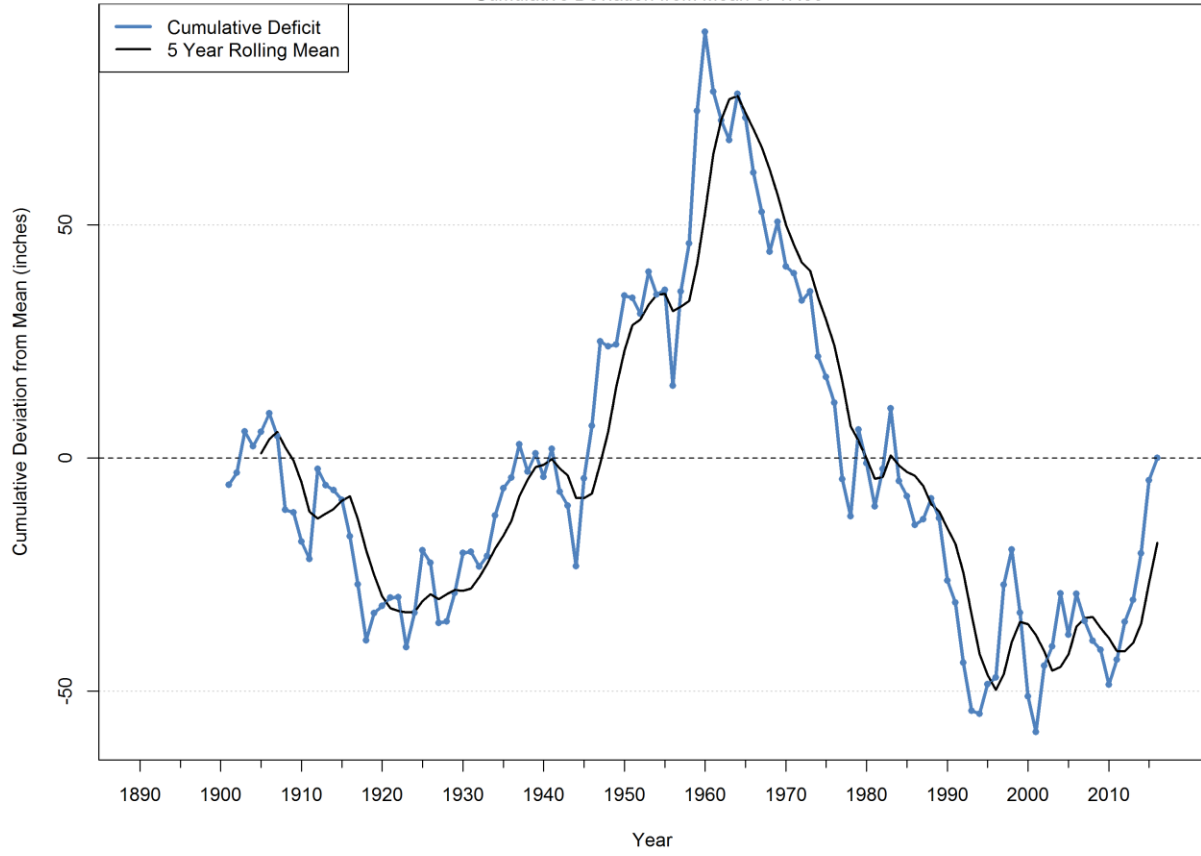
Tampa International Airport NWS



0 years missing:

	1940-1969	1970-1994	1995-2016	1901-2016 (POR)
<i>Wet</i>	32.16	27.53	33.22	31.18
<i>Dry</i>	17.32	16.07	17.1	16.65
<i>Total</i>	49.48	43.61	50.32	47.83

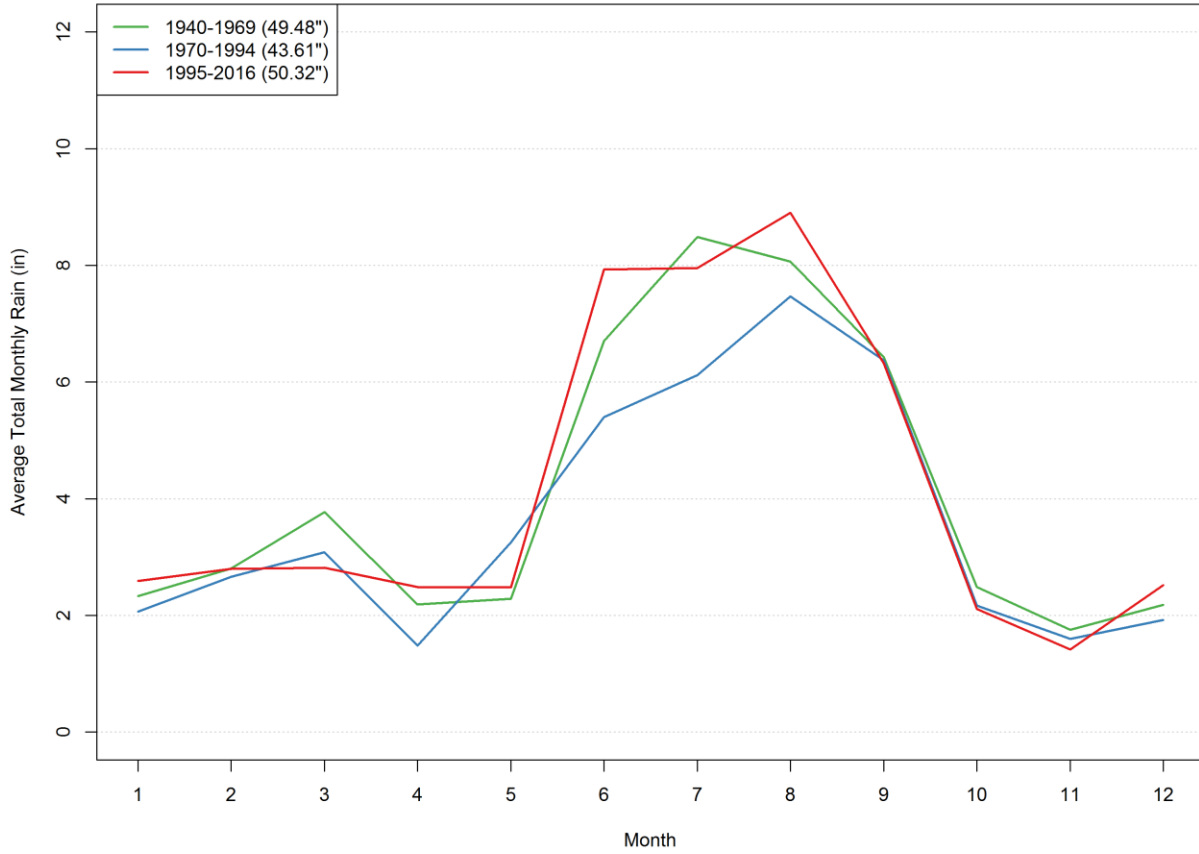
TAMPA INTERNATIONAL AIRPORT NWS
 11 years missing: 1890-1900
 Cumulative Deviation from Mean of 47.83"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	32.08	2000
<i>Driest 3 Year</i>	34.77	2001
<i>Driest 4 Year</i>	37.48	1993
<i>Driest 5 Year</i>	38.19	1978
<i>Driest 10 Year</i>	41.33	1993
<i>Wettest 2 Year</i>	70.51	1960
<i>Wettest 3 Year</i>	67.48	1959
<i>Wettest 4 Year</i>	66.79	1960
<i>Wettest 5 Year</i>	60.44	1961
<i>Wettest 10 Year</i>	53.66	1954
<i>Period of Record</i>	47.83	2016

TAMPA INTERNATIONAL AIRPORT NWS

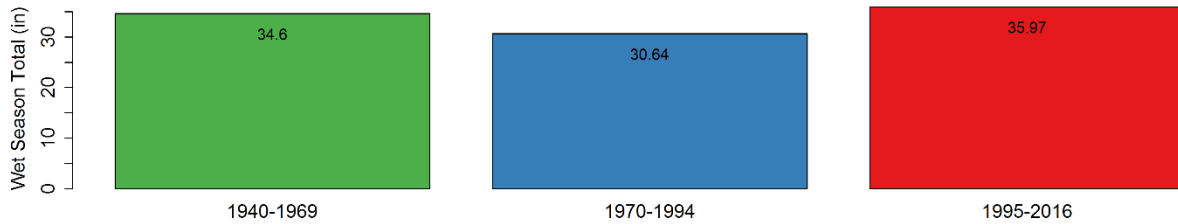
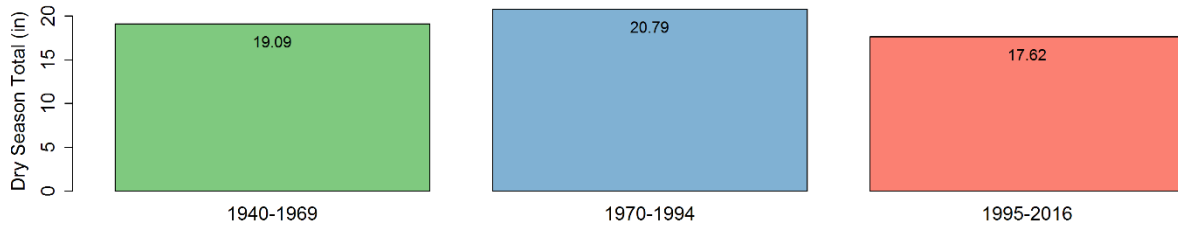
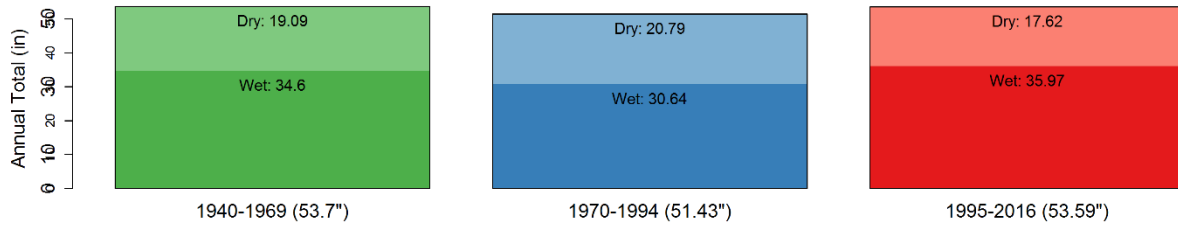
0 years missing:



	1940-1969	1970-1994	1995-2016	1901-2016 (POR)
<i>Jan</i>	2.33	2.06	2.59	2.25
<i>Feb</i>	2.8	2.66	2.8	2.69
<i>Mar</i>	3.77	3.09	2.82	3
<i>Apr</i>	2.19	1.48	2.49	2.08
<i>May</i>	2.28	3.25	2.48	2.97
<i>June</i>	6.7	5.4	7.93	6.73
<i>July</i>	8.49	6.12	7.95	7.65
<i>Aug</i>	8.06	7.47	8.9	8.03
<i>Sep</i>	6.42	6.37	6.32	6.32
<i>Oct</i>	2.49	2.17	2.11	2.45
<i>Nov</i>	1.76	1.6	1.41	1.56
<i>Dec</i>	2.18	1.93	2.52	2.1

Tarpon Springs Sewage Plant NWS

TARPON SPRINGS SEWAGE PLANT NWS

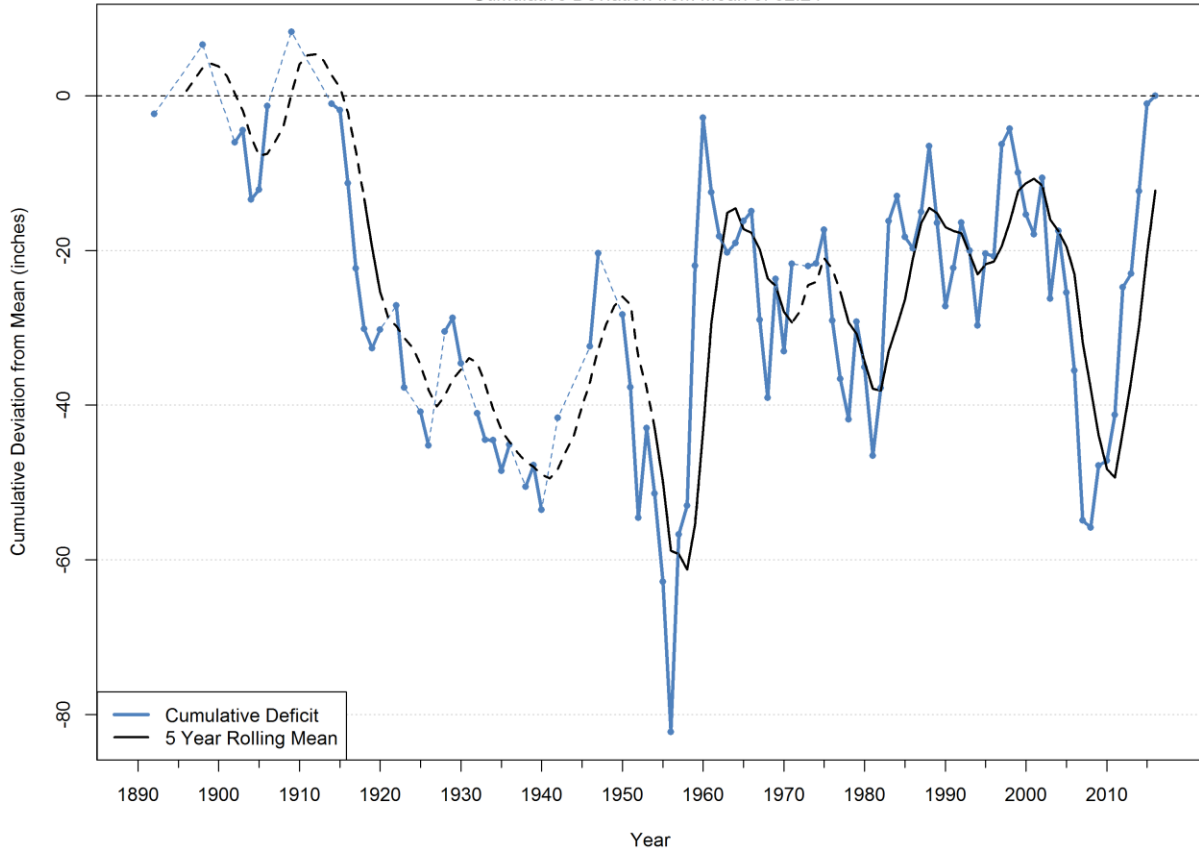


7 years missing: 1941, 1943-1945, 1948, 1949, 1972

	1940-1969	1970-1994	1995-2016	1892-2016 (POR)
<i>Wet</i>	34.6	30.64	35.97	33.69
<i>Dry</i>	19.09	20.79	17.62	18.46
<i>Total</i>	53.7	51.43	53.59	52.15

TARPON SPRINGS SEWAGE PLANT NWS

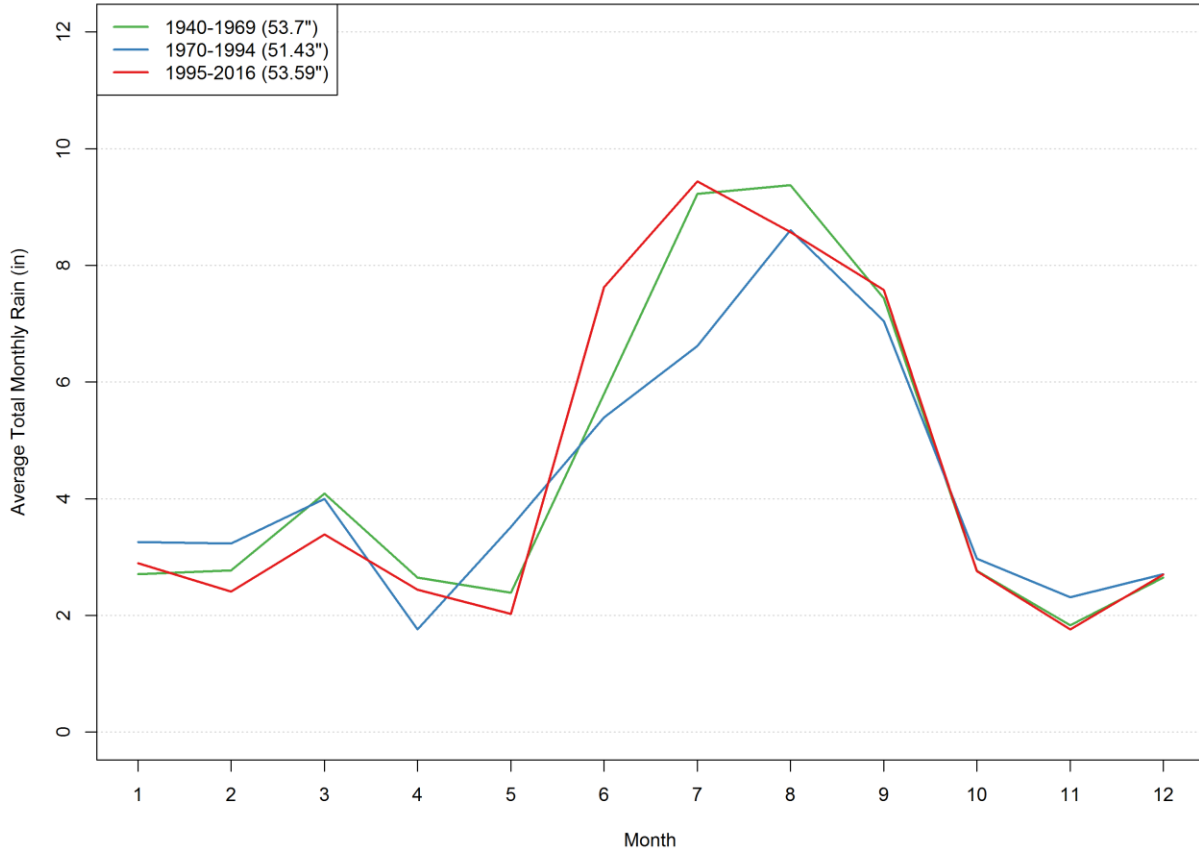
28 years missing: 1890, 1891, 1893-1897, 1899-1901, 1907, 1908, 1910-1913, 1921, 1924, 1927, 1931, 1937, 1941, 1943-1945, 1948, 1949, 1972
 Cumulative Deviation from Mean of 52.24"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	36.83	1956
<i>Driest 3 Year</i>	39.13	1956
<i>Driest 4 Year</i>	42.65	2008
<i>Driest 5 Year</i>	43.33	1956
<i>Driest 10 Year</i>	47.08	2008
<i>Wettest 2 Year</i>	77.3	1960
<i>Wettest 3 Year</i>	72.34	1959
<i>Wettest 4 Year</i>	72.09	1960
<i>Wettest 5 Year</i>	66.19	1961
<i>Wettest 10 Year</i>	58.97	1966
<i>Period of Record</i>	52.24	2016

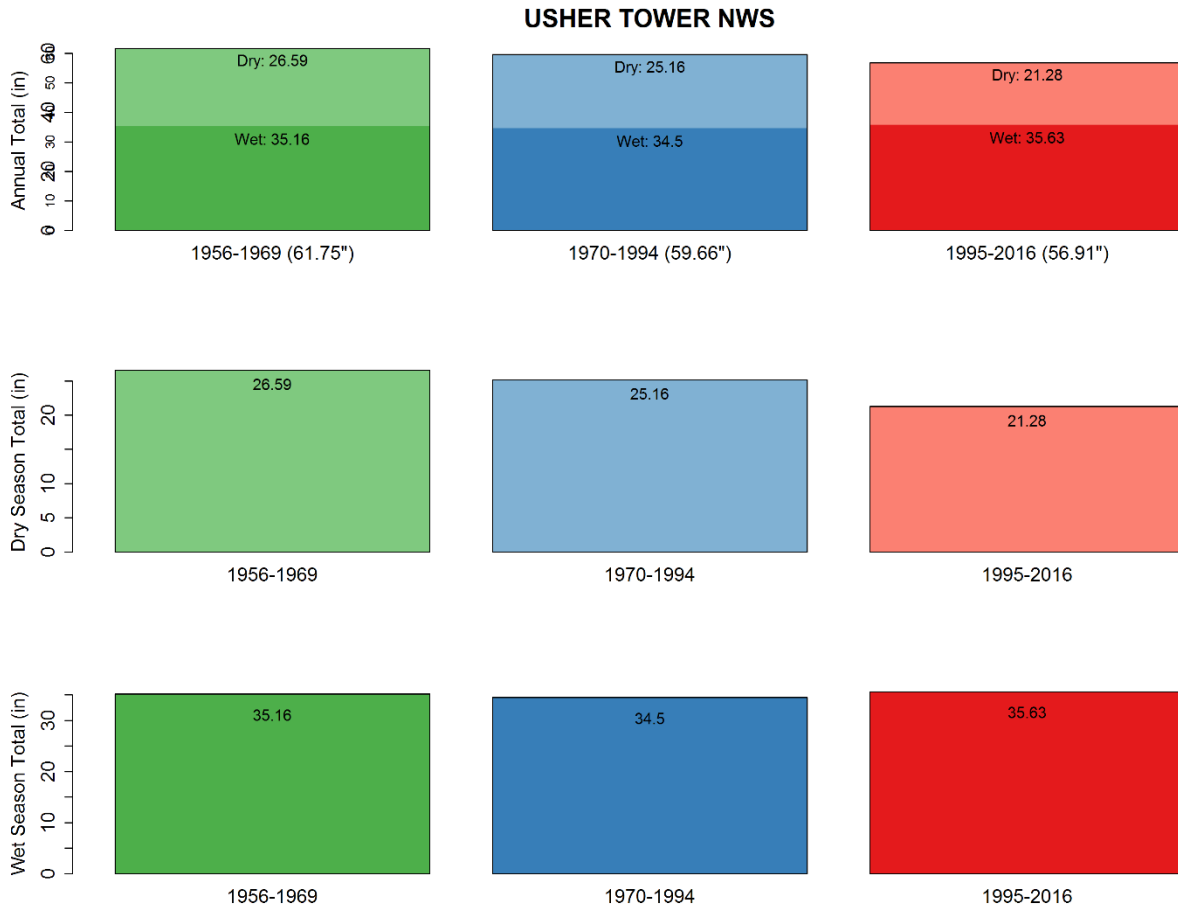
TARPON SPRINGS SEWAGE PLANT NWS

7 years missing: 1941, 1943-1945, 1948, 1949, 1972



	1940-1969	1970-1994	1995-2016	1892-2016 (POR)
<i>Jan</i>	2.71	3.26	2.89	2.74
<i>Feb</i>	2.77	3.24	2.41	2.82
<i>Mar</i>	4.09	4	3.39	3.37
<i>Apr</i>	2.65	1.76	2.44	2.25
<i>May</i>	2.39	3.52	2.03	2.77
<i>June</i>	5.8	5.39	7.62	6.15
<i>July</i>	9.23	6.62	9.44	8.47
<i>Aug</i>	9.38	8.6	8.57	8.88
<i>Sep</i>	7.43	7.05	7.58	7.23
<i>Oct</i>	2.76	2.97	2.76	2.96
<i>Nov</i>	1.83	2.31	1.76	1.94
<i>Dec</i>	2.65	2.71	2.7	2.56

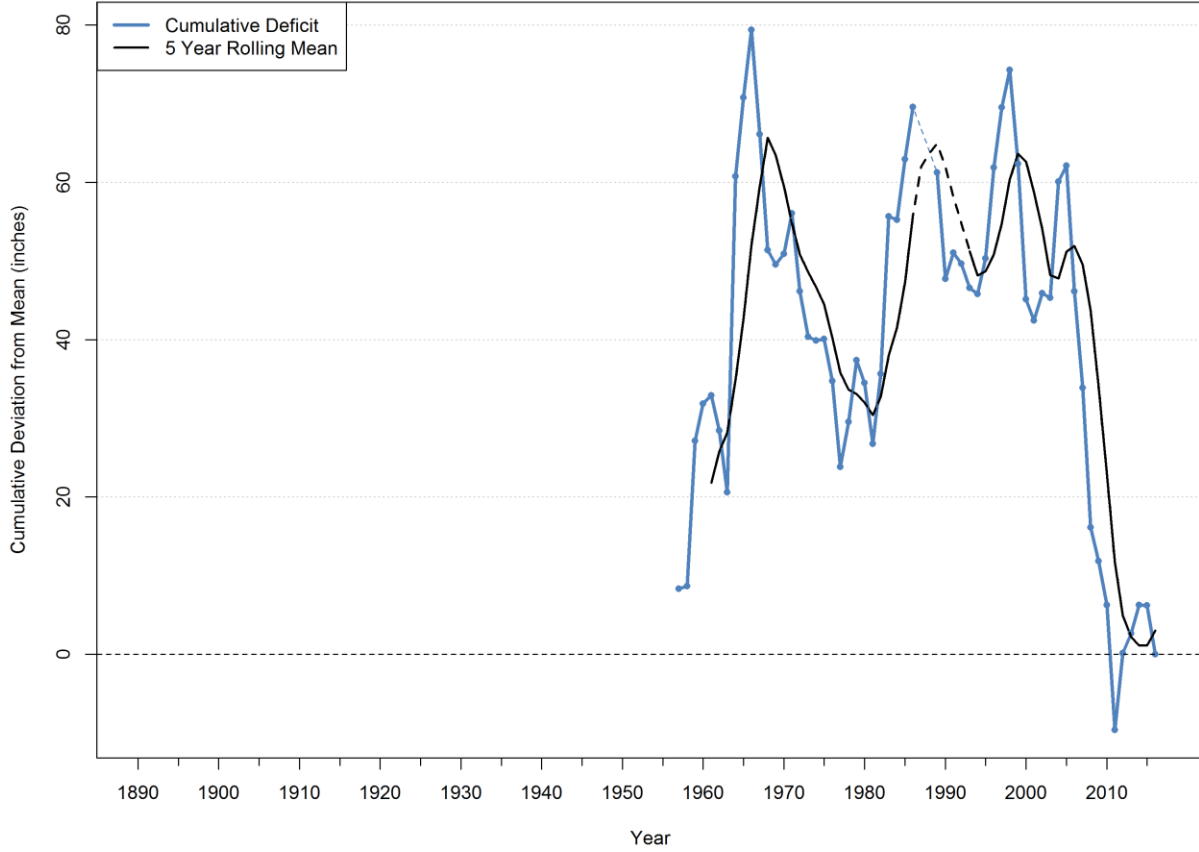
Usher Tower NWS



19 years missing: 1940-1956, 1987, 1988

	1956-1969	1970-1994	1995-2016	1956-2016 (POR)
<i>Wet</i>	35.16	34.5	35.63	35.08
<i>Dry</i>	26.59	25.16	21.28	24.05
<i>Total</i>	61.75	59.66	56.91	59.13

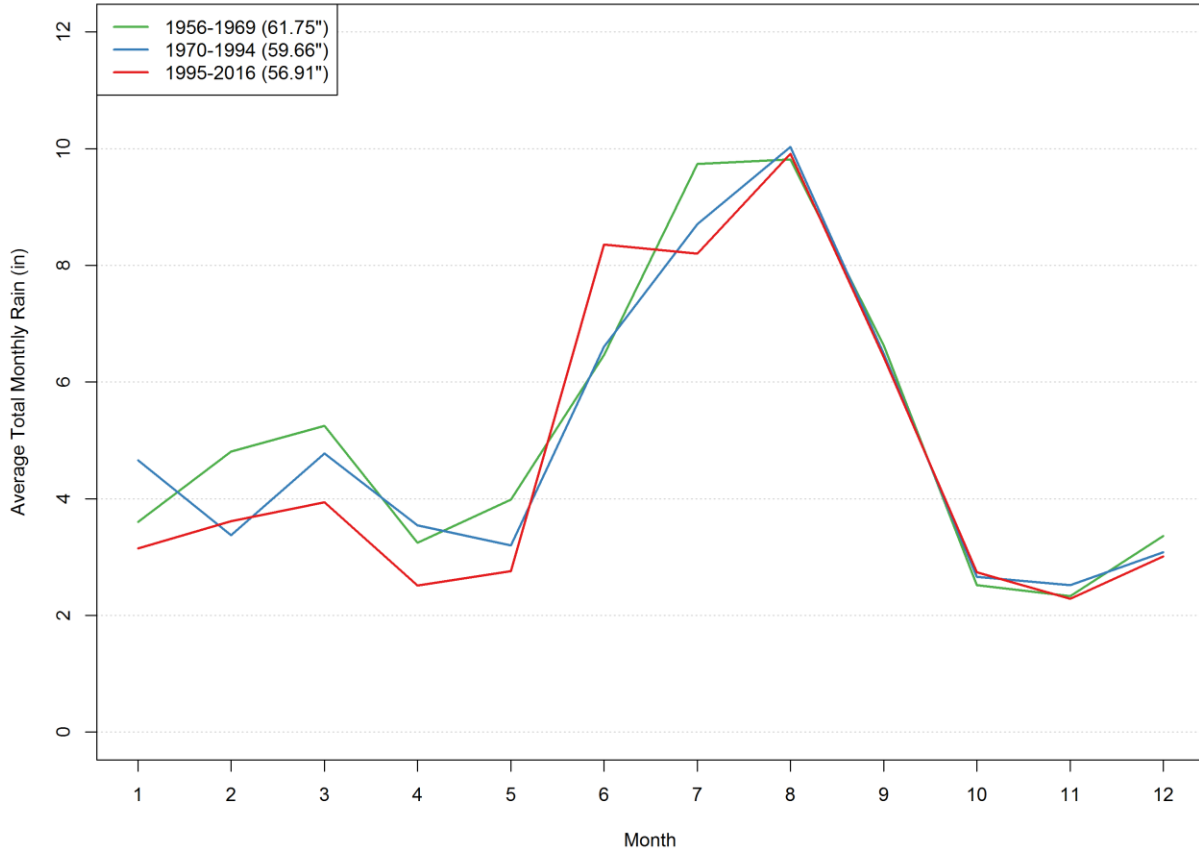
USHER TOWER NWS
 69 years missing: 1890-1956, 1987, 1988
 Cumulative Deviation from Mean of 59"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	43.97	2008
<i>Driest 3 Year</i>	43.66	2008
<i>Driest 4 Year</i>	46.42	2009
<i>Driest 5 Year</i>	47.82	2010
<i>Driest 10 Year</i>	53.18	2008
<i>Wettest 2 Year</i>	84.09	1965
<i>Wettest 3 Year</i>	78.59	1966
<i>Wettest 4 Year</i>	71.73	1966
<i>Wettest 5 Year</i>	68.28	1966
<i>Wettest 10 Year</i>	66.93	1966
<i>Period of Record</i>	59	2016

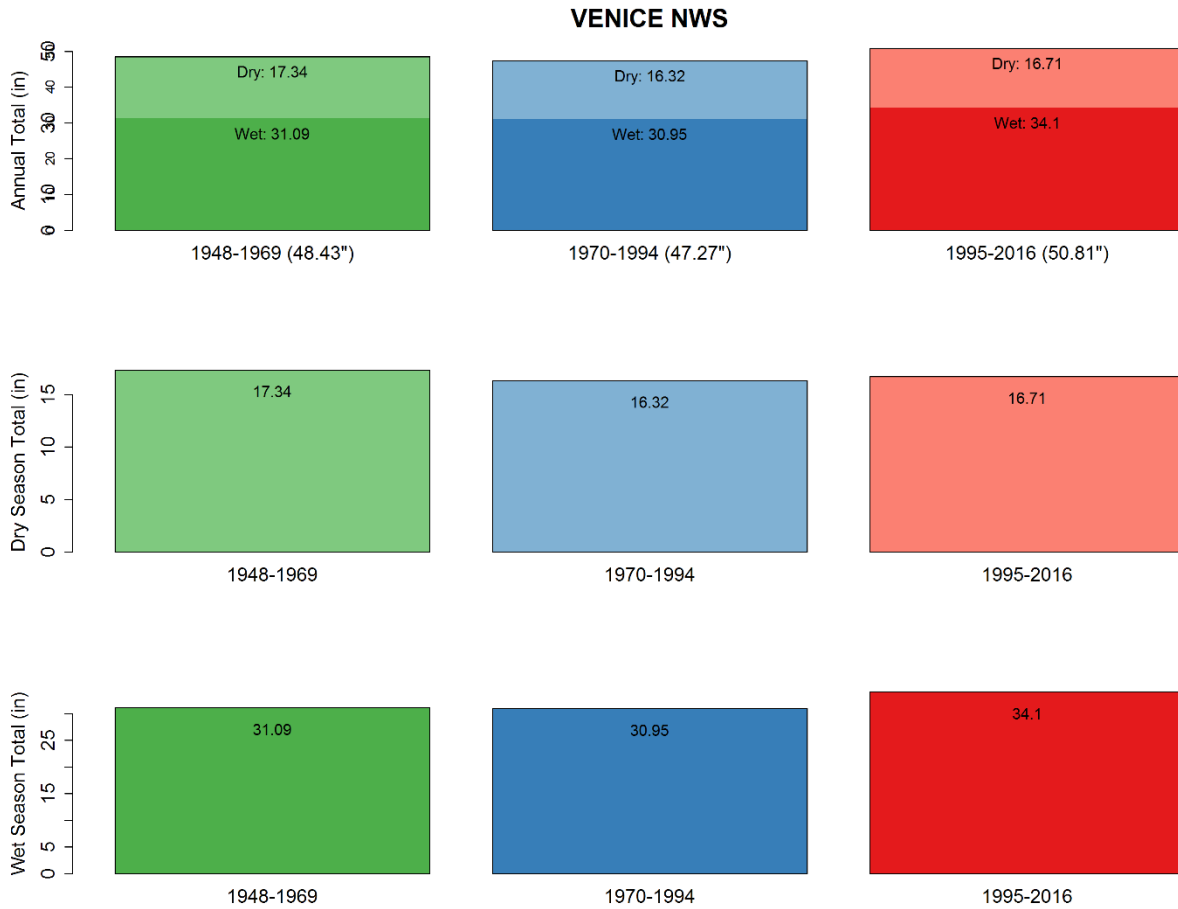
USHER TOWER NWS

19 years missing: 1940-1956, 1987, 1988



	1956-1969	1970-1994	1995-2016	1956-2016 (POR)
<i>Jan</i>	3.6	4.66	3.15	3.88
<i>Feb</i>	4.81	3.38	3.61	3.79
<i>Mar</i>	5.25	4.77	3.94	4.57
<i>Apr</i>	3.25	3.54	2.52	3.09
<i>May</i>	3.98	3.2	2.76	3.21
<i>June</i>	6.46	6.61	8.36	7.23
<i>July</i>	9.74	8.71	8.2	8.76
<i>Aug</i>	9.82	10.03	9.91	9.94
<i>Sep</i>	6.63	6.49	6.42	6.5
<i>Oct</i>	2.52	2.66	2.74	2.66
<i>Nov</i>	2.33	2.52	2.28	2.39
<i>Dec</i>	3.36	3.08	3.01	3.12

Venice NWS

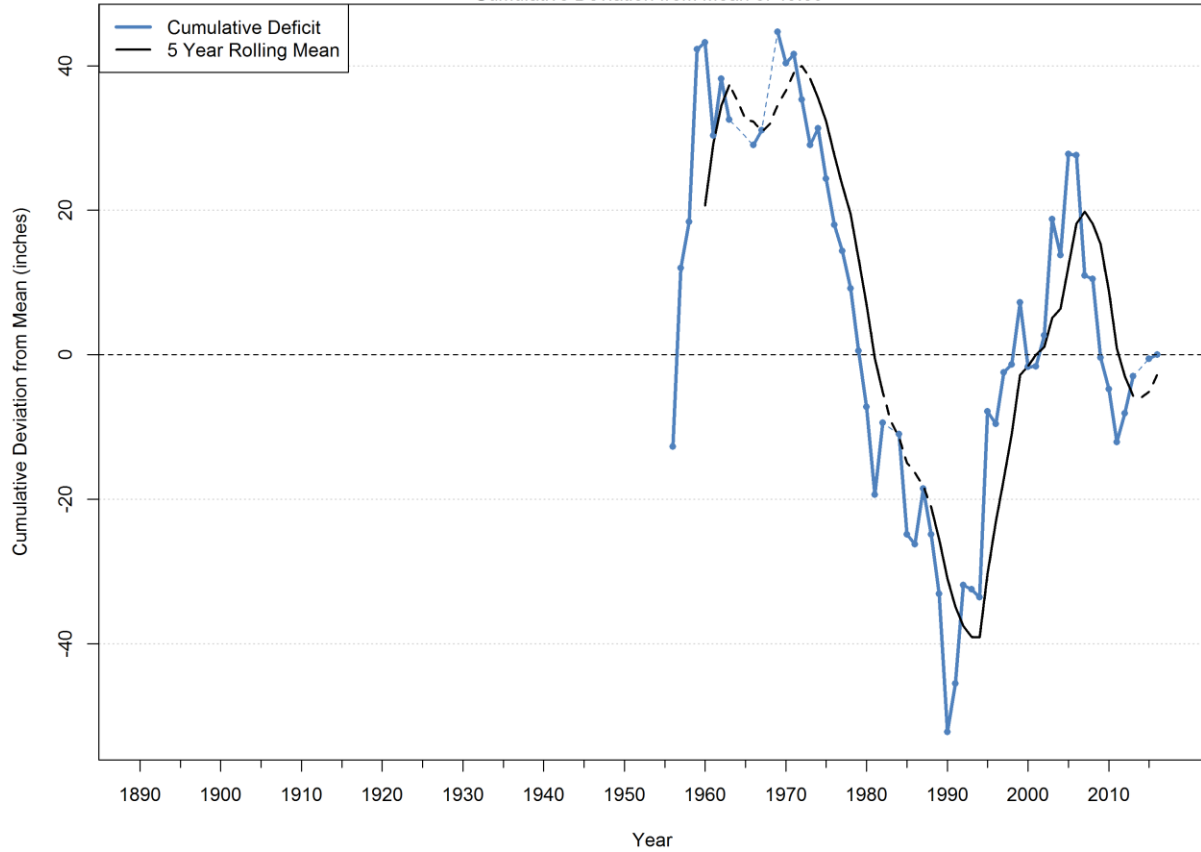


21 years missing: 1940-1955, 1964, 1965, 1968, 1983, 2014

	1948-1969	1970-1994	1995-2016	1927-2016 (POR)
<i>Wet</i>	31.09	30.95	34.1	32.05
<i>Dry</i>	17.34	16.32	16.71	16.49
<i>Total</i>	48.43	47.27	50.81	48.55

VENICE NWS

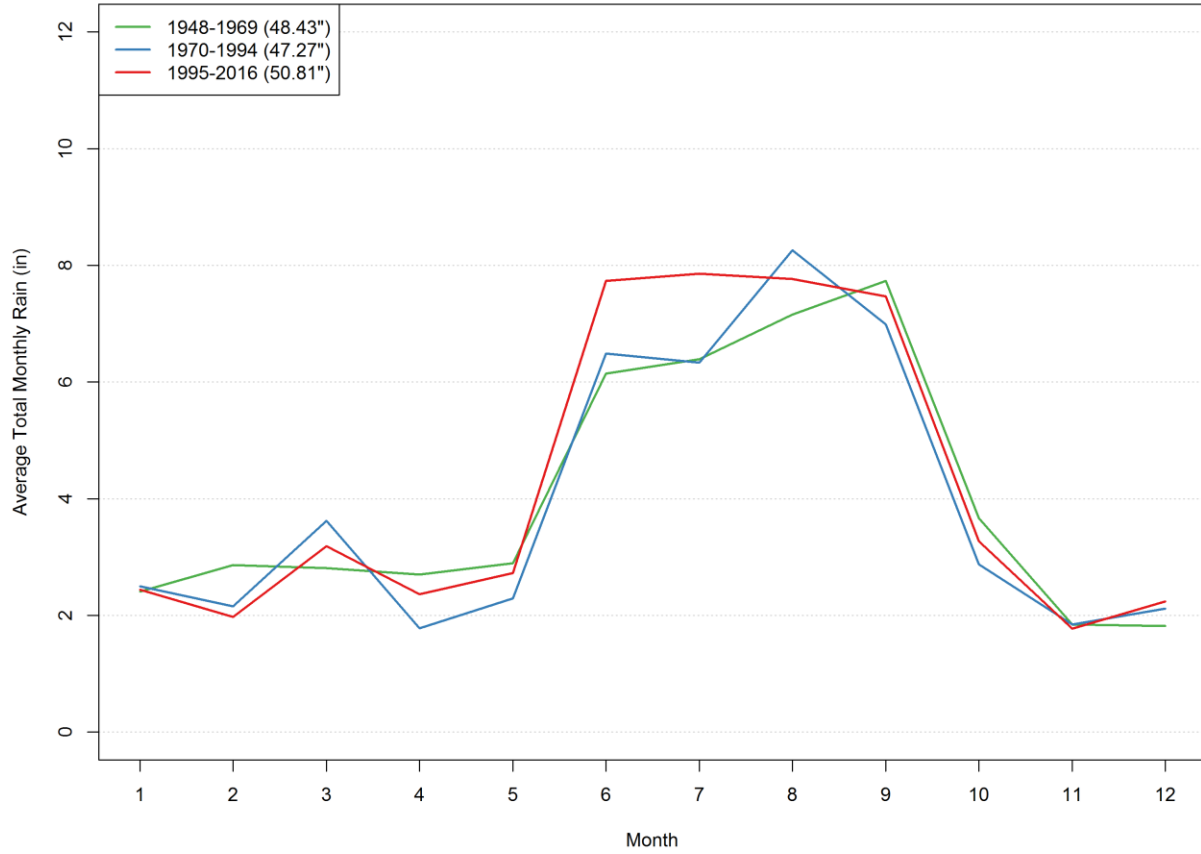
71 years missing: 1890-1955, 1964, 1965, 1968, 1983, 2014
 Cumulative Deviation from Mean of 49.39"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	35.72	1990
<i>Driest 3 Year</i>	38.16	1990
<i>Driest 4 Year</i>	40.96	1981
<i>Driest 5 Year</i>	41.45	2011
<i>Driest 10 Year</i>	43.29	1981
<i>Wettest 2 Year</i>	64.95	1958
<i>Wettest 3 Year</i>	67.73	1959
<i>Wettest 4 Year</i>	63.38	1960
<i>Wettest 5 Year</i>	58.26	1995
<i>Wettest 10 Year</i>	54.51	2003
<i>Period of Record</i>	49.39	2016

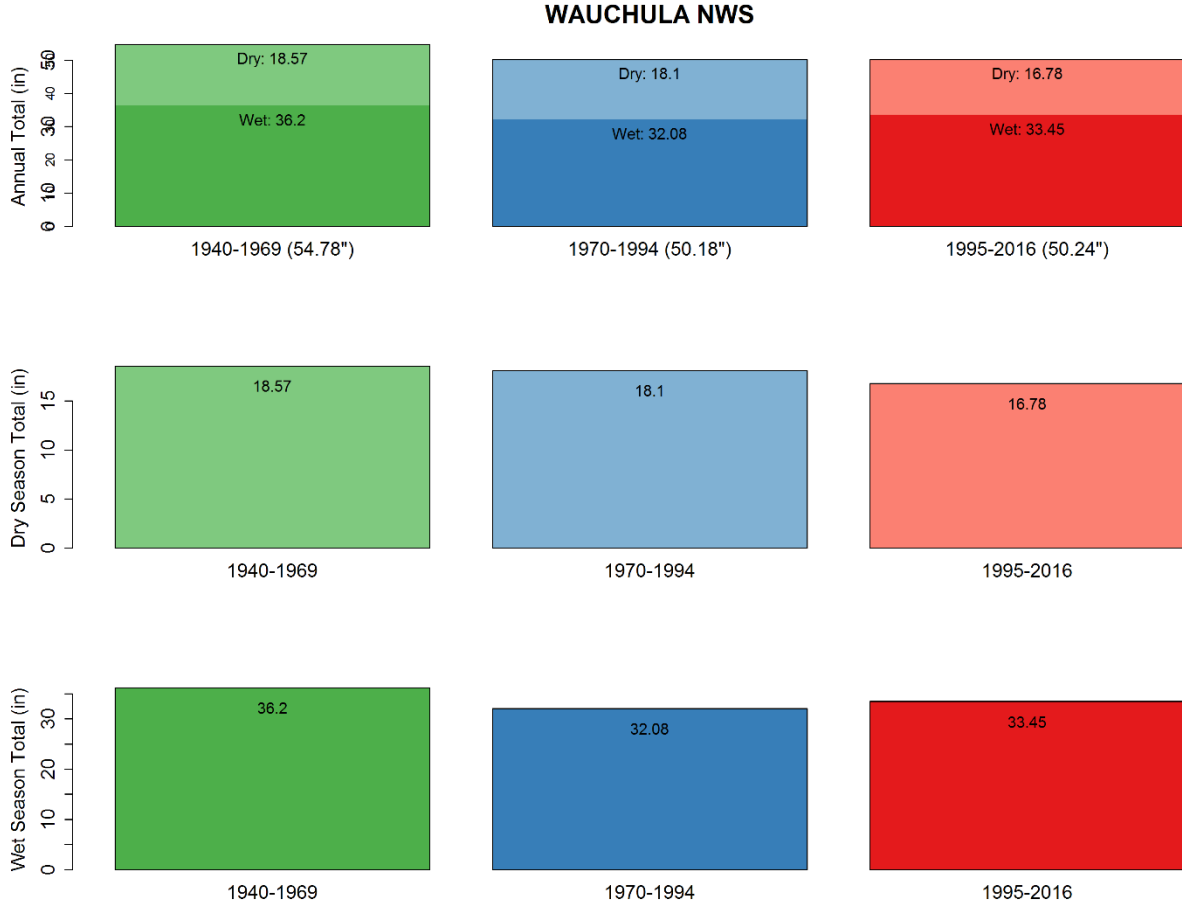
VENICE NWS

21 years missing: 1940-1955, 1964, 1965, 1968, 1983, 2014



	1948-1969	1970-1994	1995-2016	1927-2016 (POR)
<i>Jan</i>	2.41	2.5	2.44	2.43
<i>Feb</i>	2.86	2.16	1.98	2.24
<i>Mar</i>	2.81	3.63	3.19	3.22
<i>Apr</i>	2.7	1.78	2.36	2.18
<i>May</i>	2.9	2.29	2.73	2.58
<i>June</i>	6.15	6.49	7.73	6.77
<i>July</i>	6.39	6.33	7.86	6.89
<i>Aug</i>	7.16	8.26	7.77	7.86
<i>Sep</i>	7.74	6.99	7.47	7.32
<i>Oct</i>	3.67	2.87	3.28	3.21
<i>Nov</i>	1.84	1.85	1.78	1.78
<i>Dec</i>	1.82	2.12	2.24	2.07

Wauchula NWS

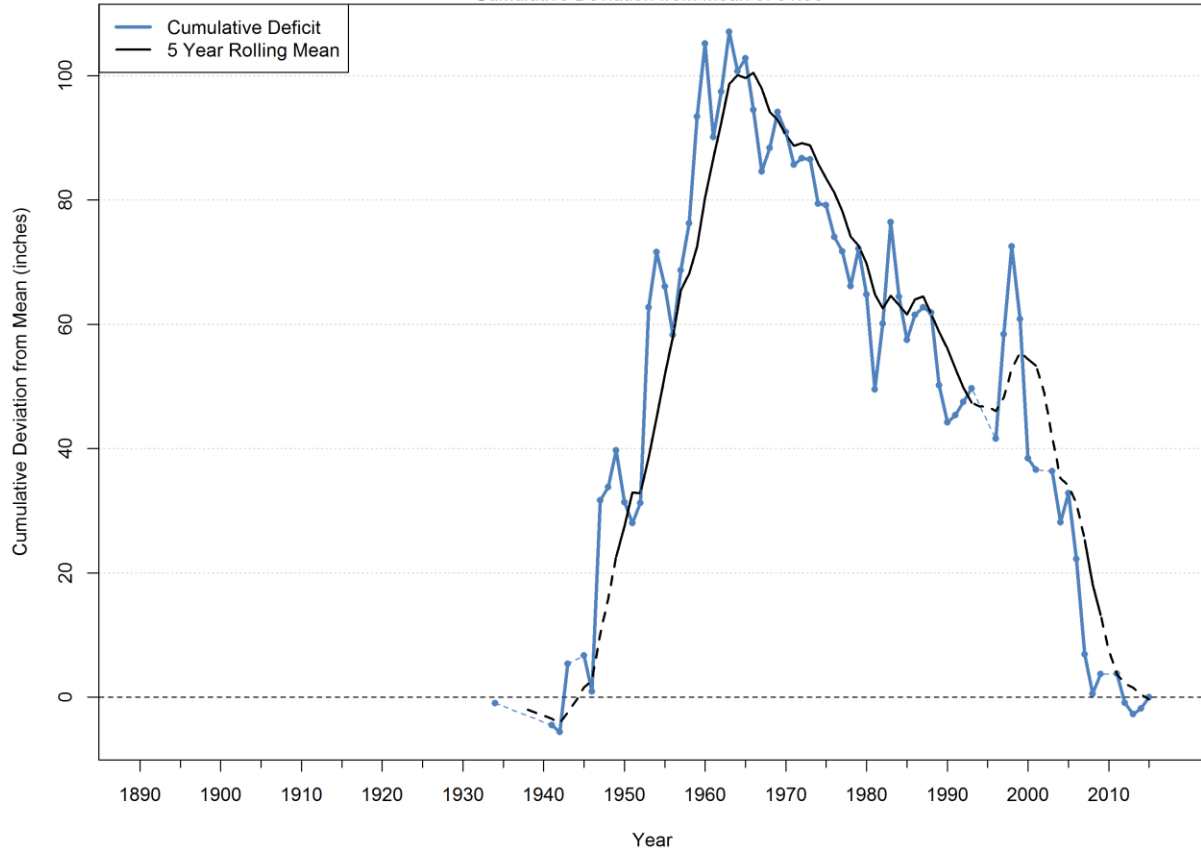


7 years missing: 1940, 1944, 1994, 1995, 2002, 2010, 2016

	1940-1969	1970-1994	1995-2016	1933-2016 (POR)
<i>Wet</i>	36.2	32.08	33.45	34.2
<i>Dry</i>	18.57	18.1	16.78	17.85
<i>Total</i>	54.78	50.18	50.24	52.05

WAUCHULA NWS

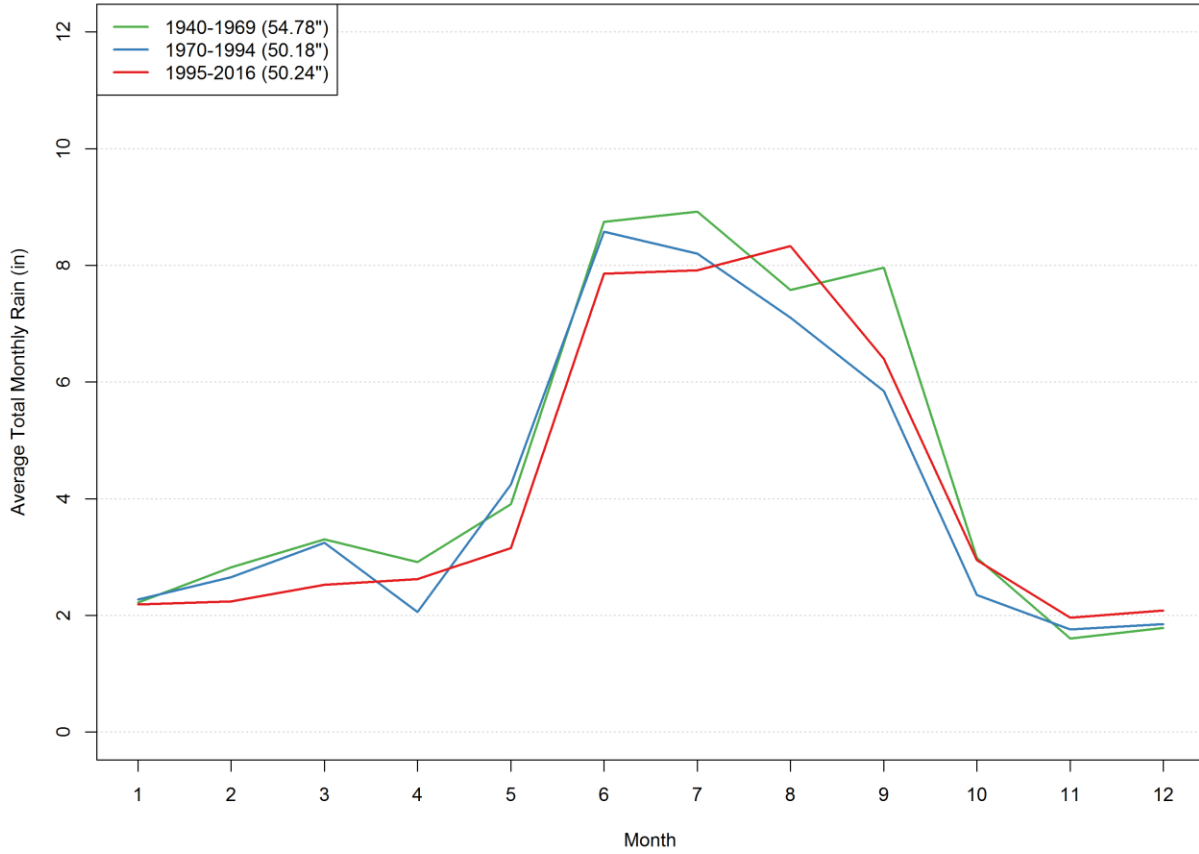
56 years missing: 1890-1933, 1935-1940, 1944, 1994, 1995, 2002, 2010, 2016
 Cumulative Deviation from Mean of 51.96"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	34.91	2000
<i>Driest 3 Year</i>	39.99	2001
<i>Driest 4 Year</i>	44.58	2007
<i>Driest 5 Year</i>	44.8	2008
<i>Driest 10 Year</i>	48.34	1981
<i>Wettest 2 Year</i>	72.14	1954
<i>Wettest 3 Year</i>	66.49	1954
<i>Wettest 4 Year</i>	63.7	1960
<i>Wettest 5 Year</i>	59.79	1960
<i>Wettest 10 Year</i>	59.35	1960
<i>Period of Record</i>	51.96	2016

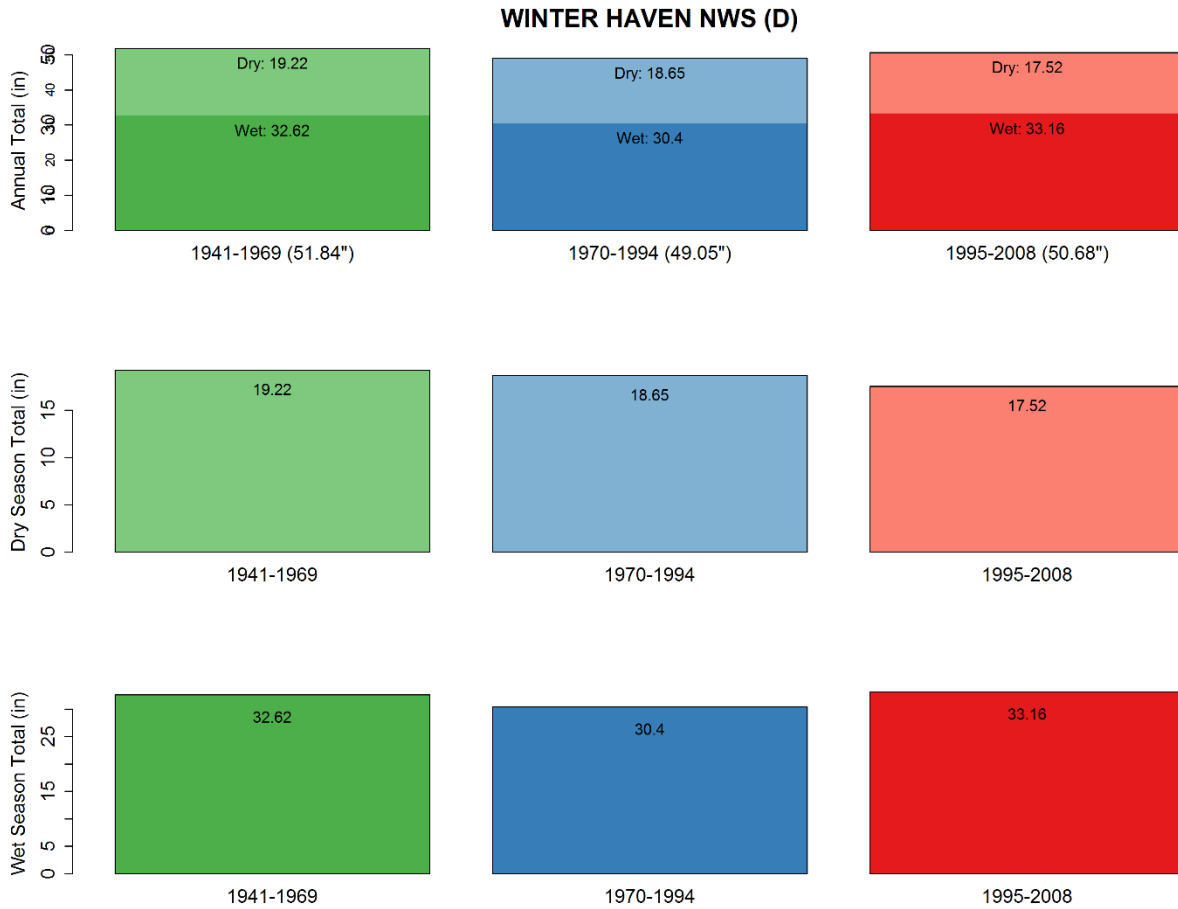
WAUCHULA NWS

7 years missing: 1940, 1944, 1994, 1995, 2002, 2010, 2016



	1940-1969	1970-1994	1995-2016	1933-2016 (POR)
Jan	2.22	2.28	2.19	2.17
Feb	2.83	2.66	2.24	2.62
Mar	3.31	3.25	2.52	2.97
Apr	2.92	2.06	2.62	2.63
May	3.91	4.25	3.16	3.85
June	8.75	8.58	7.86	8.54
July	8.92	8.2	7.92	8.43
Aug	7.58	7.1	8.33	7.62
Sep	7.96	5.85	6.4	6.77
Oct	2.98	2.35	2.95	2.84
Nov	1.6	1.76	1.96	1.76
Dec	1.79	1.85	2.09	1.84

Winter Haven NWS (D)

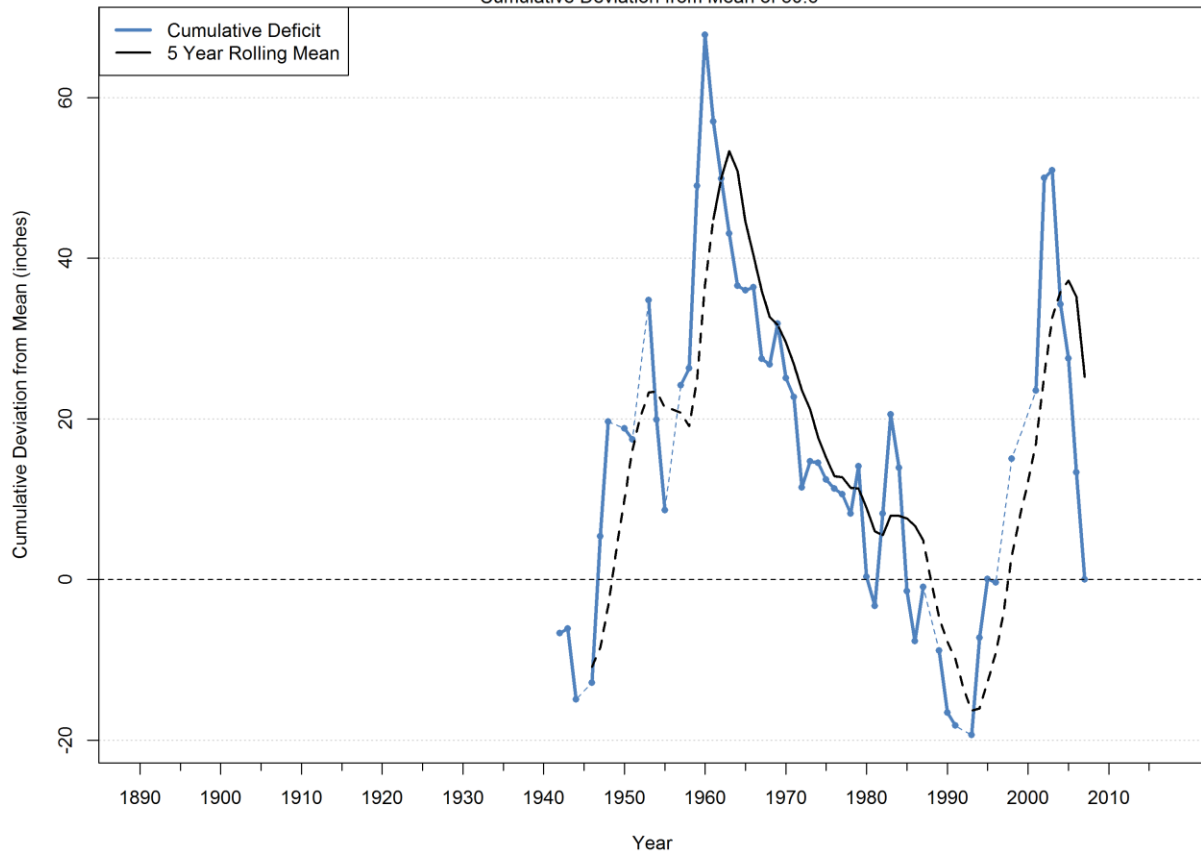


20 years missing: 1940, 1941, 1945, 1949, 1952, 1956, 1988, 1992, 1997, 1999, 2000, 2008-2016

	1940-1969	1970-1994	1995-2016	1933-2016 (POR)
<i>Wet</i>	36.2	32.08	33.45	34.2
<i>Dry</i>	18.57	18.1	16.78	17.85
<i>Total</i>	54.78	50.18	50.24	52.05

WINTER HAVEN NWS (D)

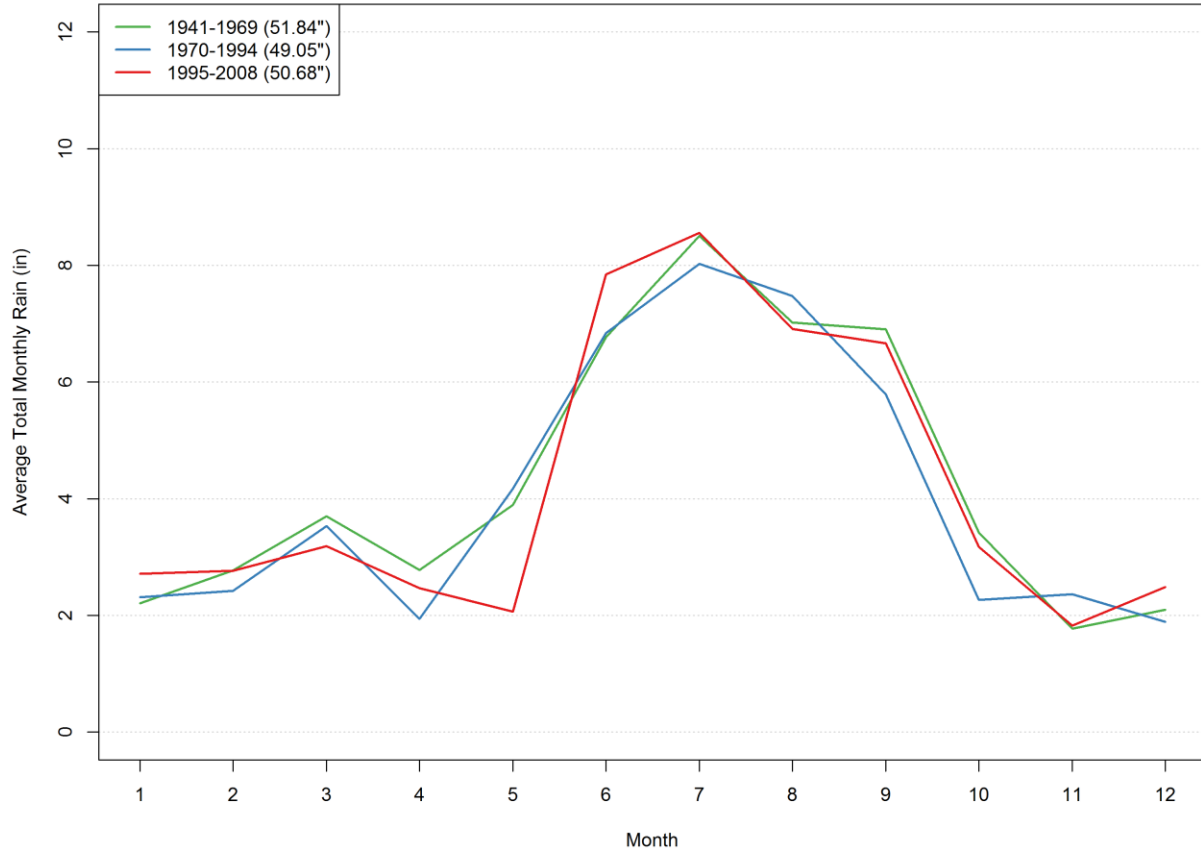
70 years missing: 1890-1941, 1945, 1949, 1952, 1956, 1988, 1992, 1997, 1999, 2000, 2008-2016
 Cumulative Deviation from Mean of 50.6"



	Annual Mean	Year Ending
<i>Driest 2 Year</i>	36.83	2007
<i>Driest 3 Year</i>	38.07	2006
<i>Driest 4 Year</i>	37.87	2007
<i>Driest 5 Year</i>	40.6	2007
<i>Driest 10 Year</i>	46.33	1970
<i>Wettest 2 Year</i>	71.33	1960
<i>Wettest 3 Year</i>	65.13	1960
<i>Wettest 4 Year</i>	65.38	1960
<i>Wettest 5 Year</i>	60.27	1961
<i>Wettest 10 Year</i>	53.37	1966
<i>Period of Record</i>	50.6	2016

WINTER HAVEN NWS (D)

20 years missing: 1940, 1941, 1945, 1949, 1952, 1956, 1988, 1992, 1997, 1999, 2000, 2008-2016



	1941-1969	1970-1994	1995-2008	1941-2008 (POR)
Jan	2.21	2.32	2.72	2.35
Feb	2.77	2.42	2.77	2.65
Mar	3.7	3.53	3.19	3.54
Apr	2.78	1.94	2.47	2.41
May	3.89	4.18	2.07	3.64
June	6.77	6.84	7.85	7.01
July	8.5	8.03	8.56	8.34
Aug	7.02	7.48	6.91	7.16
Sep	6.9	5.79	6.67	6.44
Oct	3.42	2.27	3.18	2.94
Nov	1.77	2.37	1.83	2.01
Dec	2.1	1.89	2.49	2.09