

3.0 Rainfall Analysis Results

The results of the comprehensive rainfall analyses indicated that there were no overall trends in rainfall for the rainfall data period of record (approximately 1950's to 2000) or for the period of record for which water quality trends were tested (approximately 1980's to 2000). Both of these periods of record varied by rainfall stations used to model rainfall for each basin. As previously discussed (Section 2), these two types of periods of record varied for each basin depending on the available data.

Rainfall Trends Over the Time Periods Tested

Table 3-1 presents a basin-by-basin summary of the rainfall trend results for each basin for both the rainfall data period of record and the period of record for which water quality trends were tested. This table indicates that there was one statistically significant trend for rainfall for the Matlacha Pass basin in both the rainfall period of record for Matlacha Pass (1950 to 2000) and the water quality trend period of record (1980 to 2000). The rate of change detected in both cases was approximately a 1-third of an inch increase in total precipitation per year. However, at the statistical alpha level applied to the trend testing of 0.05, one would expect to have one out of twenty trend tests be incorrectly identified as having a significant trend. This one significant result is well within the one out of twenty expectations. Thus, there is not compelling evidence that any significant overall rainfall trends have occurred for any of the basins during these times periods.

As described in Section 2, the rainfall trend analyses were very robust, and they were applied 20 to 50 years of monthly rainfall data. Clear seasonal signals were accounted for by the seasonal Kendall Tau analysis in every case tested. The detailed statistical results for rainfall trend testing for each basin for the rainfall data period of record are presented in the "POR Rainfall Trends" appendix on the report CD. The detailed statistical results for rainfall trend testing for the water quality trend test period of record are presented in the "WQ POR Rainfall Trends" appendix on the report CD.

Table 3-1 Summary of rainfall trend test results for each basin for two periods of record. The first pair of columns report trend results for the rainfall data period of record for the basin indicated, and the second pair of columns (labeled "POR") report trend results for the period of record for which water quality data were tested for trends for the basin.

Summary of Rainfall Trends

| Basin | Significant Trend? | Relative Magnitude of Trend | POR Significant Trend? | POR Relative Magnitude of Trend |
|-----------------------------|--------------------|-----------------------------|------------------------|---------------------------------|
| Charlie Creek | No | | No | |
| Charlotte Harbor Proper | No | | No | |
| Coastal Lower Peace | No | | No | |
| Coastal Venice | No | | No | |
| Cow Pen Slough | No | | No | |
| Donna & Roberts Bays | No | | No | |
| Estero Bay | No | | No | |
| Estero Bay - Estero River | No | | No | |
| Estero Bay - Hendry Creek | No | | No | |
| Estero Bay - Imperial River | No | | No | |
| Estero Bay - Spring Creek | No | | No | |
| Estero Bay - Tenmile Canal | No | | No | |
| Gasparilla Sound | No | | No | |
| Horse Creek | No | | No | |
| Joshua Creek | No | | No | |
| Lemon Bay | No | | No | |
| Lower Myakka | No | | No | |
| Matlacha Pass | Yes | 0.38 | Yes | 0.36 |
| Orange River | No | | No | |
| Payne Creek | No | | No | |
| Peace at Arcadia | No | | No | |
| Peace at Bartow | No | | No | |
| Peace at Zolpho Springs | No | | No | |
| Pine Island Sound | No | | No | |
| Shell Creek | No | | No | |
| Telegraph Swamp | No | | No | |
| Tidal Caloosahatchee | No | | No | |
| Upper Myakka | No | | No | |

Inter-annual Rainfall Variation

Although there were no overall trends in rainfall over the years, the total rainfall amount for the Charlotte Harbor Basins did vary considerably from year to year. This variation is the result of large-scale climatic variation such as the El Nino and La Nina weather pattern cycles. An example of this year-to-year variation is presented in Figure 3-1 for the total annual rainfall for the Charlotte Harbor Proper Basin.

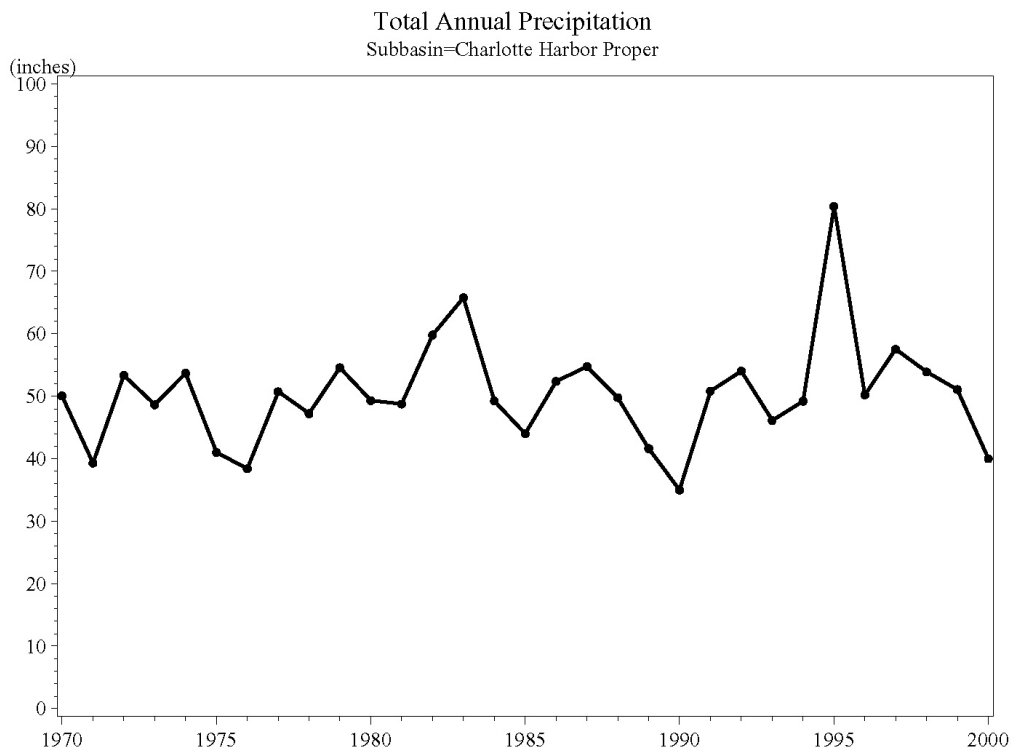


Figure 3-1 Total annual precipitation for the Charlotte Harbor Proper Basin for the rainfall period of record for this basin.

The total rainfall varied by as much as 100% between the wet years and dry years, and very large changes were observed at short time intervals. For example, the total Charlotte Harbor Proper rainfall varied from over 80 inches in 1995 to less than 50 inches in the following year.

Intra-annual Rainfall Variation

Although there were no overall trends in rainfall over the years, the total rainfall amount for the Charlotte Harbor Basins did vary predictably within each year following the expected Florida wet season/dry season pattern. An example of this year-to-year variation is presented in Figure 3-2 for the distribution of monthly rainfall totals for the specific period of record for the Charlotte Harbor Proper Basin. Rainfall for this basin follows the typical cycle of median of less than 2 inches per month for the winter and spring dry season to a median of over 7 inches per month for the summer and fall wet season.

This figure is an example figure from the "POR Rainfall Trends" appendix included on the report CD, and these figures are available for each basin and period of record tested.

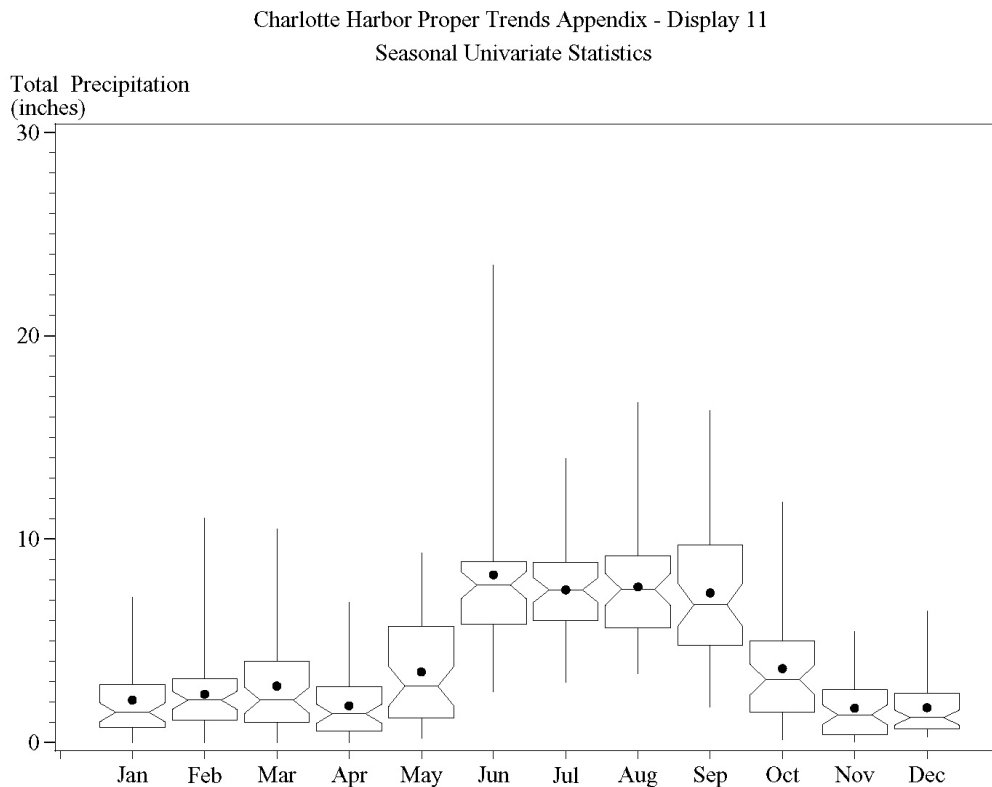


Figure 3-2 Example intra-annual variation in rainfall for the distribution of monthly total rainfall for the Charlotte Harbor Proper basin over the specific rainfall data period of record for this basin.

Conclusions Regarding Rainfall Variation

The results of the comprehensive rainfall analyses indicated that there were no overall trends in rainfall for the rainfall data period of record (approximately 1950's to 2000) or for the period of record for which water quality trends were tested (approximately 1980's to 2000). The results also indicated that rainfall varied greatly from year-to-year, and it varied in a relatively predictable fashion within each year.

Based on these observations, it is unlikely that any trends observed in the surface water quality data for the basins of the Charlotte Harbor study area can be attributed to changes in rainfall alone.