

The 2023 Hurricane Season Forecast

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Introduction

Seasonal hurricane forecasts are usually generated at the national level, not locally. In past years, residents living in the Meadows, Florida referred to forecasts issued by the NOAA (National Oceanic and Atmospheric Administration) Climate Prediction Center. This year, residents have two new forecast options: First, a national/Sarasota, Florida forecast issued by the Sarasota Climate Adaption Center (CAC); and Second -- and for the first time -- a forecast for the Meadows generated in the Meadows.

2023 National/Sarasota Hurricane Forecast: On April 4th, the CAC issued their **national** forecast for the upcoming 2023 hurricane season. *That forecast calls for 13 to 18 named storms, 5 to 8 Hurricanes, and 2 to 3 major hurricanes.* The CAC's particular concerns for the **Sarasota** area are their expectations that 1) *sea level rise*, 2) *storm surge*, and 3) *extreme precipitation* will be more severe when the next tropical cyclone forms in the Gulf of Mexico. First-quarter 2023 atmospheric and sea temperature increases, and unprecedented Gulf of Mexico sea level rise gives credence to the CAC concerns. The CAC's estimated timing for Gulf of Mexico cyclonic storms to develop is: Possibly one hurricane very early in the season, then a respite until October and November.

2023 Meadows, Florida Hurricane Forecast: Based on the CAC national forecast, the odds appear favorable that Meadow's residents will experience at minimum one tropical storm and one hurricane – category 1-2. Although El Nino is projected to dominate the Atlantic Basin during the season, the influence of record-high CO2 absorption in the atmosphere and consistent above-normal Gulf of Mexico surface sea temperatures may be overriding factors, and storms that do enter the Gulf from the Caribbean Sea could intensify faster than in past years and take aim at Sarasota and Manatee counties. However, because of the Meadow's altitude above sea level (approximately 25 feet), residents don't need to be concerned about sea level rise or storm surge, but they most certainly should prepare for the possibility of *extreme precipitation (flooding)* events and damaging winds when storms do form!

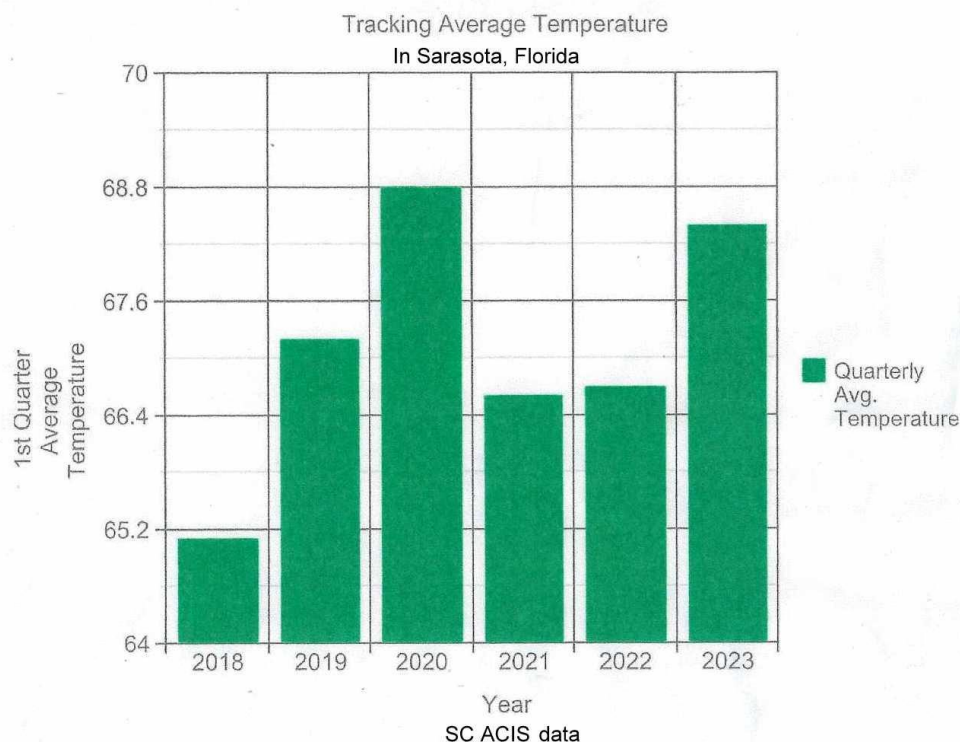
The rationale for the 2023 extreme precipitation forecast for both the Sarasota area in general, and for the Meadows, follows.

Forecast Rationale

General: Personal weather/climate information that is necessary to make forecasts about the number of tropical cyclones, the severity of these storms, sea level rise, and storm surge is not available for this study. However, there is sufficient temperature and precipitation data for both Sarasota and the Meadows to substantiate the present thinking that extreme

precipitation events – the type that can produce widespread flooding -- will be more frequent this year in both communities. It makes little difference whether these events evolve from tropical cyclones or from low-pressure systems that can develop at any time of the year because the key stimulus is rising atmospheric temperature --which triggers the events. Through the evaluation of recent temperature trends, and understanding the relationship between rising temperature and precipitation, reasonable future trends (forecasts) come into focus.

Sarasota-Bradenton Area: The following graph and discussion will help explain the CAC concern that extreme precipitation events will be more frequent and produce more rainfall during the 2023 hurricane season.



Note: The average temperatures shown in this graph were obtained from the National Weather Service (NOAA) weather data base SC ACIS located at the Sarasota-Bradenton International Airport.

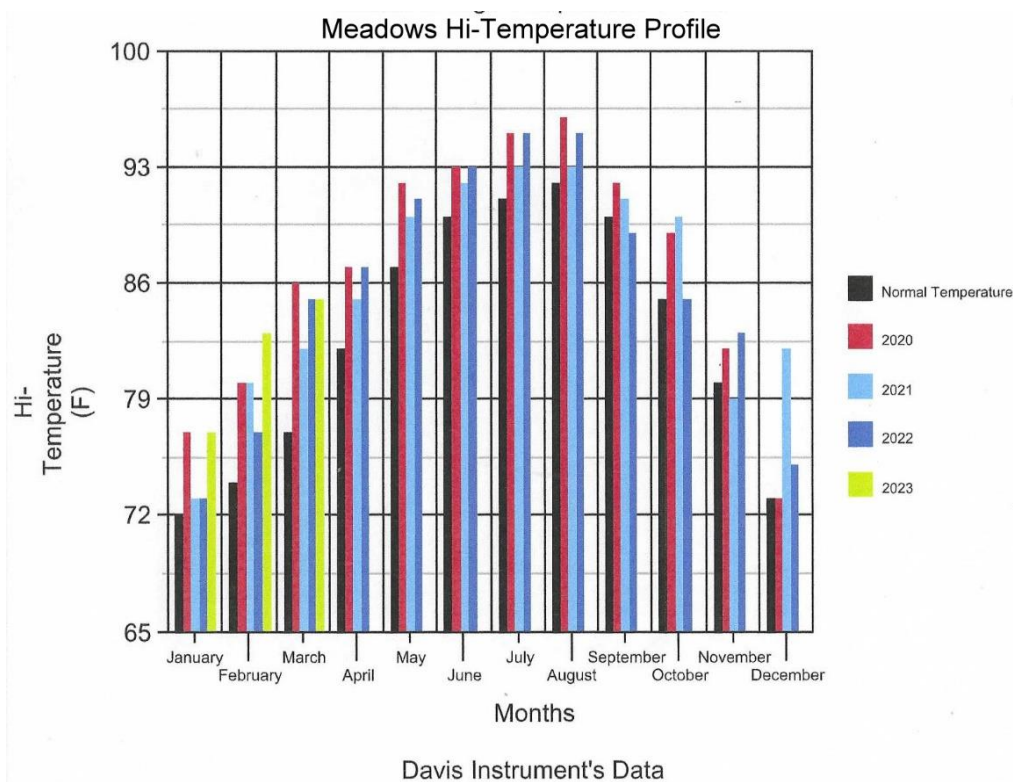
This graph illustrates that quarterly average temperatures, which geographically represent Sarasota and Manatee counties, increased significantly from 2018 to 2019, and again from 2019 to 2020. The latter two temperatures represent the highest average yearly temperatures ever recorded locally! The greatest concern to those making future weather forecasts this year is the major quarterly temperature increase from 2022 to 2023 that is highlighted by this graph. Should this year's first-quarter temperature trend continue year-long, 2023 will enter the record books as one of the three warmest years in our area, and the potential will exist for large rainfall events to occur at any time during the year. The following explains why this is a realistic conclusion: *As the*

atmosphere warms, more water evaporates (to the atmosphere) from oceans, rivers, lakes, and soils, ultimately leading to increased precipitation. For each 1.8-degree Fahrenheit (F) rise in temperature, there is a corresponding 7% increase in atmospheric water vapor. Therefore, when weather conditions lead to a precipitation event, there is even more moisture available to produce more robust, damaging storms.

And Mother Nature didn't waste any time validating this year's precipitation forecast. In fact, the first of the anticipated large precipitation events just occurred (04/17/2023) in Sarasota when a record one-day rainfall of 2.48 inches was recorded (for the date) at the Sarasota-Bradenton International Airport!

How did this happen? Crunching the numbers, a 4% increase (above normal) in 2023 first-quarter temperatures translates to an approximate 10% increase in the amount of moisture absorbed in the atmosphere. And sure enough, a record one-day rainfall was recorded just two weeks into the second quarter!

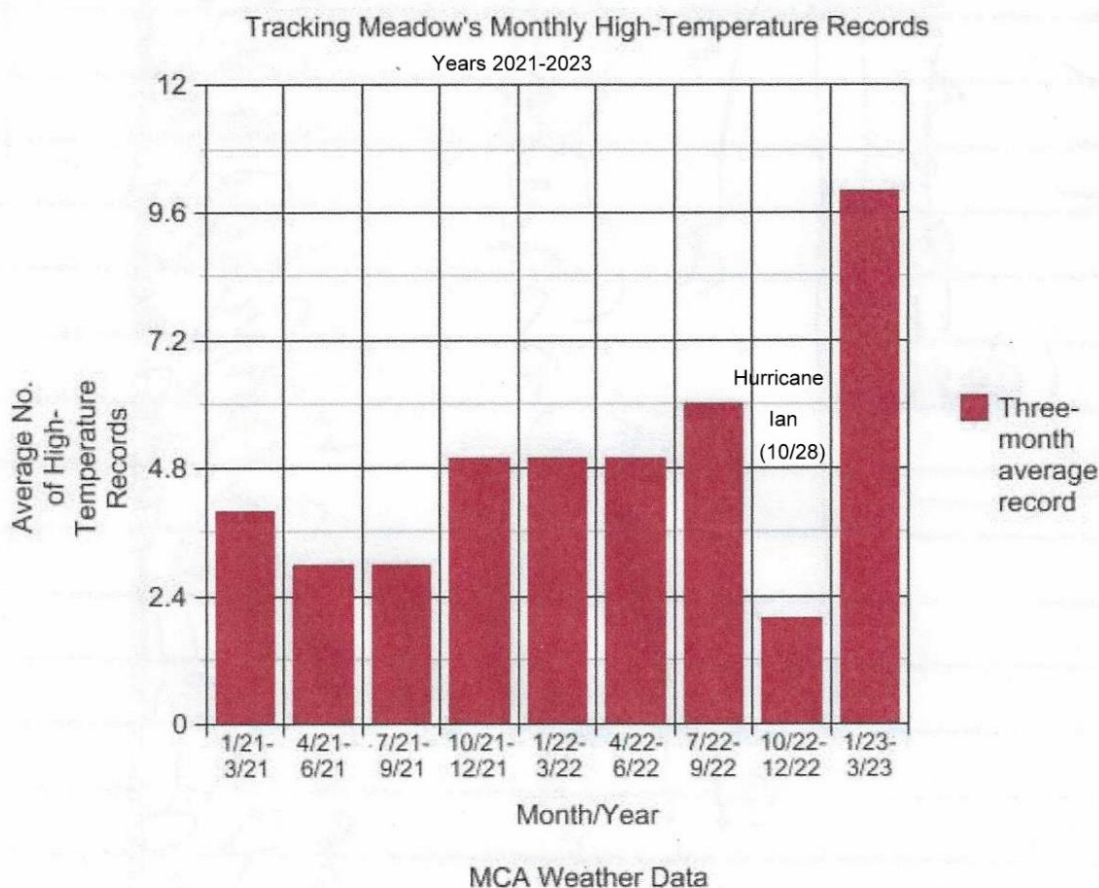
The Meadows: The colorful Hi-Temperature bar graph below represents **average temperature** data measured in the Meadows over a period of thirty-nine months. The data was obtained from the weather station located at the Community Center. This is the same weather station that generates the temperature and rainfall data that highlights the monthly Meadoword weather column.



One conclusion from this graph is that daytime temperatures have consistently been above normal for the past three-plus years. In fact, in only two months out of thirty-nine – Sept. 2022 and Nov. 2021 -- where temperatures below normal! This is significant because it says that the atmosphere's 'green-house effect' is super-charged, and has been for some time. And, we know from past experience that such an atmosphere can lead to larger, and more frequent moisture-producing storms resulting in above normal rainy seasons. Such was the case in 2018, 2019, and 2020.

A second conclusion, derived from the three green-colored bars representing January, February, and March 2023 temperatures, relates to precipitation event severity – might these events lead to tornadoes, flooding rainfall, and damaging winds? Note that these three temperatures are not just higher than the monthly norm (black bars), but are significantly higher, indicating that future precipitation events may be even more extreme than the weather-related events experienced in the Meadows last fall when Hurricane Ian came calling!

The last graph (below) illustrates the Meadow's monthly high-temperature **records** presented by yearly quarter from the first quarter of 2021 through the first quarter of 2023. These are the same records that are listed each month in the Meadoword weather column.



This graph not only reinforces the conclusion made previously about precipitation event severity, but it also illustrates it with greater clarity. The graph demonstrates that the monthly high-temperature records gradually increase from January 1st 2021 until Oct. 2022 when there is a large decline (due to the influence of Hurricane Ian and Tropical Storm Nicole) that continued until year's end.

Then there is a huge jump in the number of temperature records during the first-quarter of 2023! This graph not only substantiates the large first-quarter 2023 temperature increase seen in the first Meadows graph, but reveals that these were abnormal increases reinforcing the conclusion that future precipitation events may be more severe than those occurring during the 2022 storms!

Final Words: Please remember that the preceding forecasts are based upon the assumption that the first quarter 2023 average temperature trend continues throughout the year! Note: That assumption was generally valid for the previous five years.