



Tropical Update



5:00 PM EDT

Monday, November 4, 2024

Tropical Storm Rafael

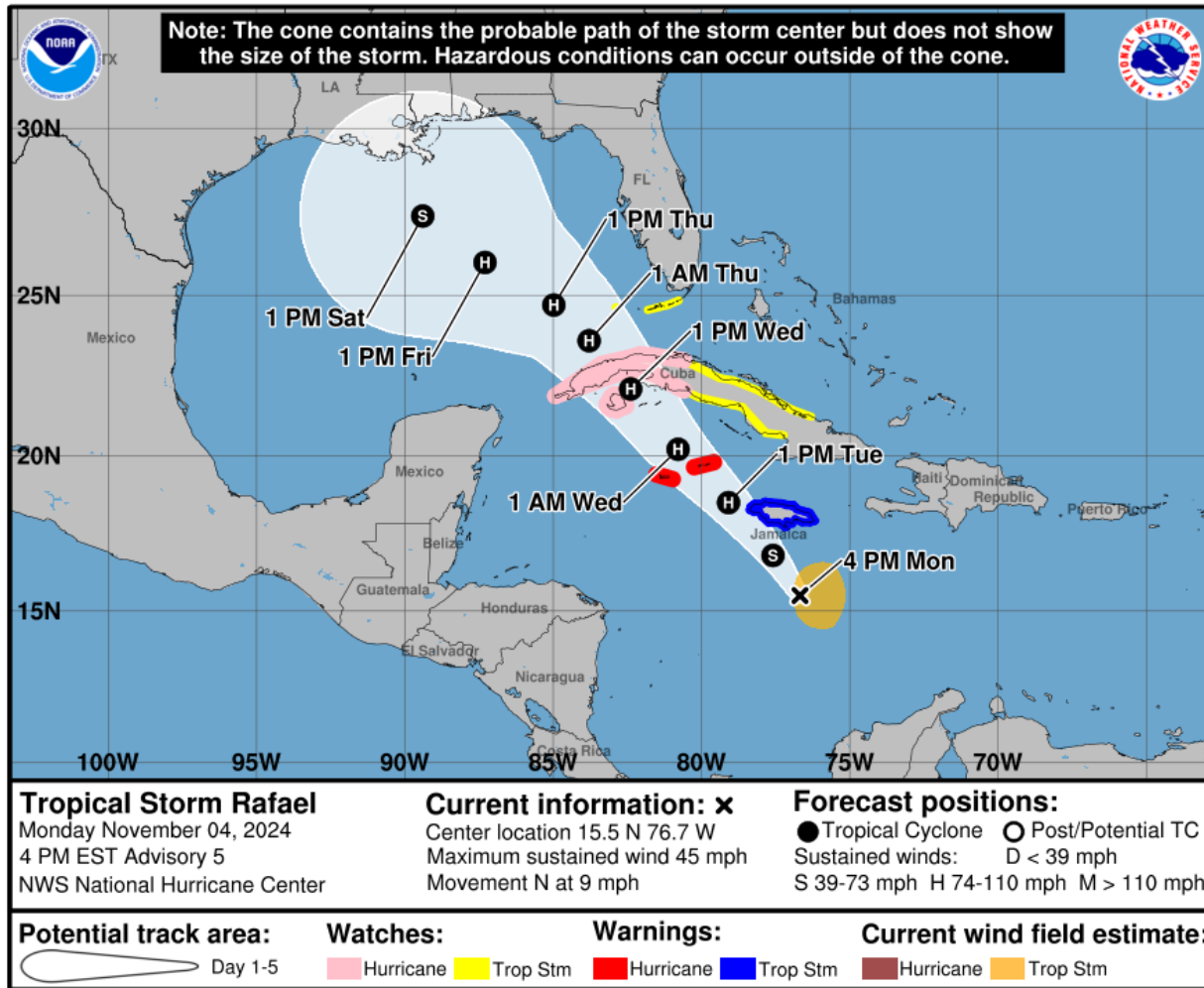
Tropical Storm Watches Issued for the Lower & Middle Florida Keys

This update is intended for government and emergency response officials, and is provided for informational and situational awareness purposes only. Forecast conditions are subject to change based on a variety of environmental factors. For additional information, or for any life safety concerns with an active weather event please contact your County Emergency Management or Public Safety Office, local National Weather Service forecast office, or visit the National Hurricane Center website at www.hurricanes.gov.



Tropical Storm Rafael

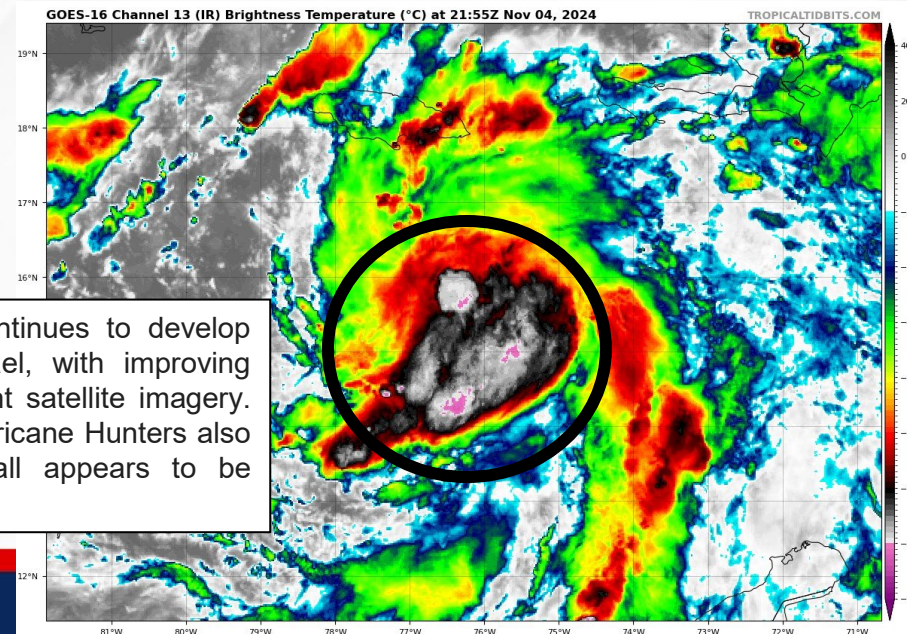
From the National Hurricane Center (NHC)



- **Location:** 175 miles S Kingston, Jamaica, 710 miles SSE of Key West
- **Maximum Sustained Winds:** 40 mph
- **Current Movement:** N at 9 mph
- **FL Watches/Warnings:**
 - **Tropical Storm Watch** in effect for the Lower & Middle Keys (Monroe County)

A northwestward motion is expected to begin later tonight and forecast to continue for the next few days. On the forecast track, the system is expected to move near Jamaica late tonight, be near or over the Cayman Islands late Tuesday, and approach Cuba on Wednesday. Atmospheric and oceanic conditions remain conducive over the Caribbean Sea, and Rafael is forecast to undergo steady to rapid strengthening is now forecast and the system is expected to become a hurricane on Tuesday south of the Cayman Islands.

Tropical storm-force winds extend outward up to 105 miles from the center of circulation.





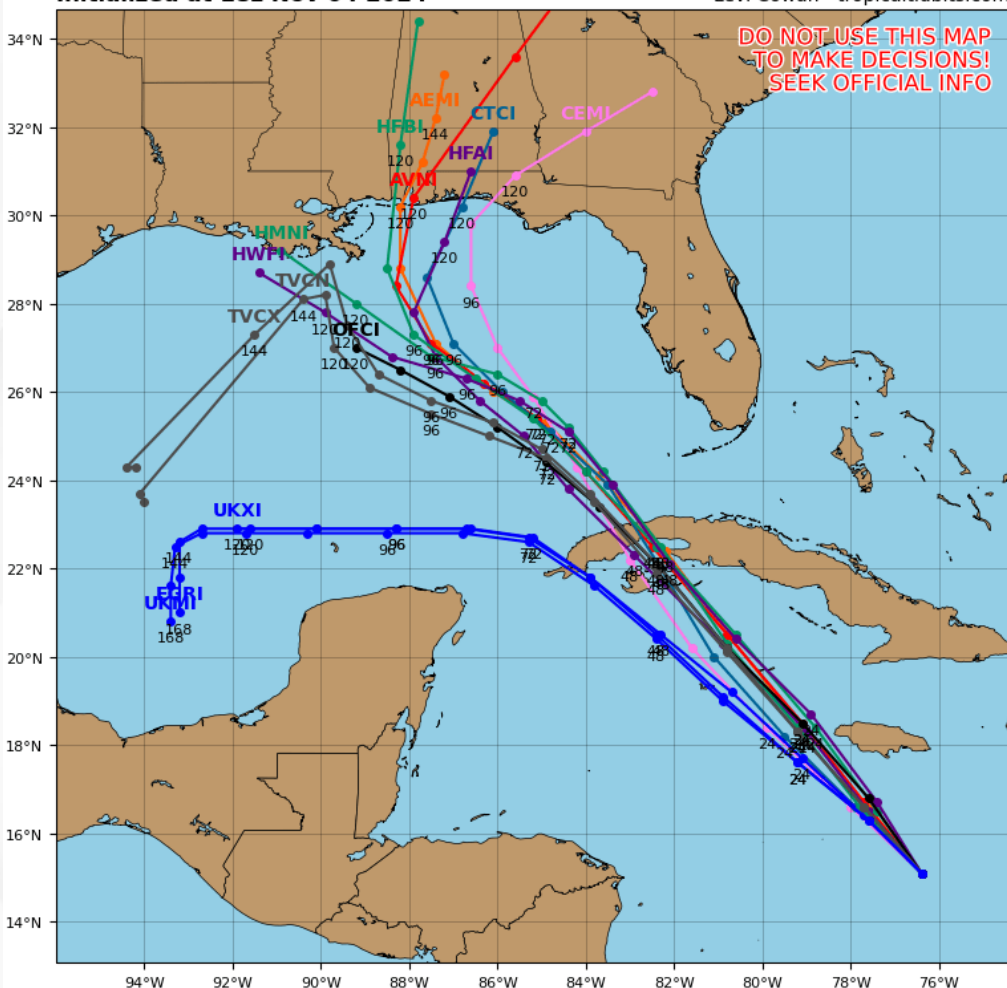
Forecast Computer Models – Next 5 Days

Tropical Storm Rafael

Tropical Storm EIGHTEEN Model Track Guidance

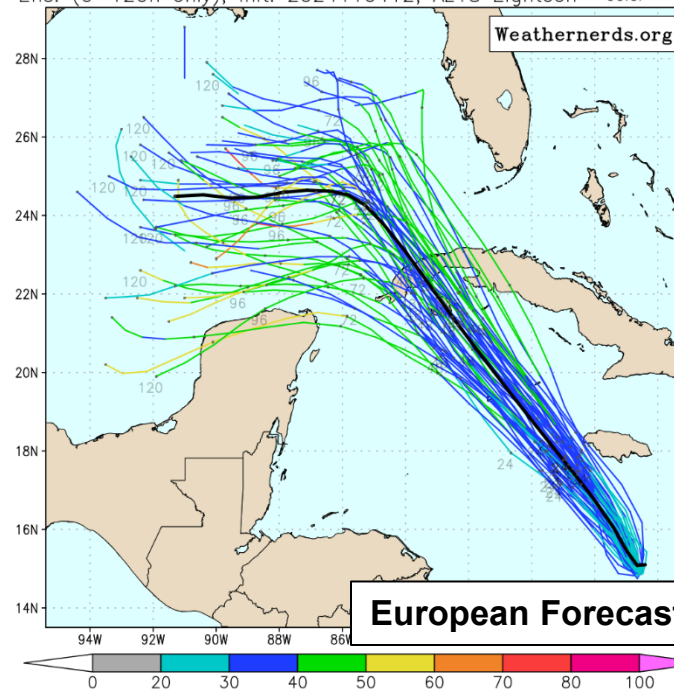
Initialized at 18z Nov 04 2024

Levi Cowan - tropicaltidbits.com



Computer forecast models continue to come to near-term agreement that Rafael will begin a northwestward motion later this evening and tonight, and that motion is forecast to continue during the next few days as an area of high pressure builds over the southwestern Atlantic and northeastern Caribbean. After Rafael moves across western Cuba on Wednesday, computer models show significant uncertainty after the 72-hour window in the central Gulf of Mexico. The discrepancies across the computer forecast models are due to the varying steering current projections and intensity of Rafael. Trends within the computer forecast models have shown that a more organized/stronger system would favor an east/right eventual track, whereas a more disorganized/weaker system would favor a west/left eventual track.

ECMWF Ens. (0–120h only), init: 2024110412, AL18 Eighteen color = max wind (kt)



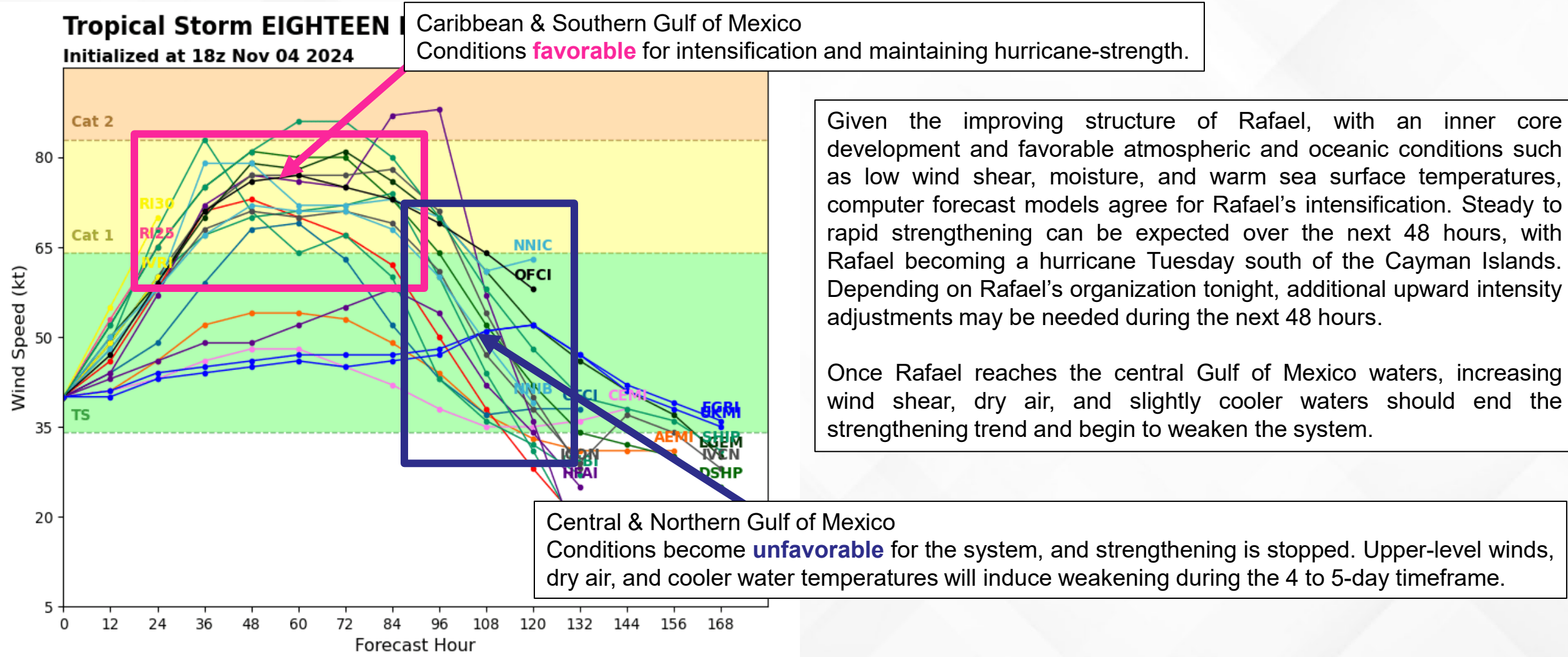
The European Forecast Model Ensemble has consistently shown a weaker system curving more west over the central Gulf of Mexico; the American Forecast Model Ensemble continues to show a more eastward solution, bringing the weakening Rafael to the northern Gulf Coast next weekend.

European Forecast Model Ensemble – Tropical Storm Rafael



Forecast Computer Models – Next 5 Days

Tropical Storm Rafael



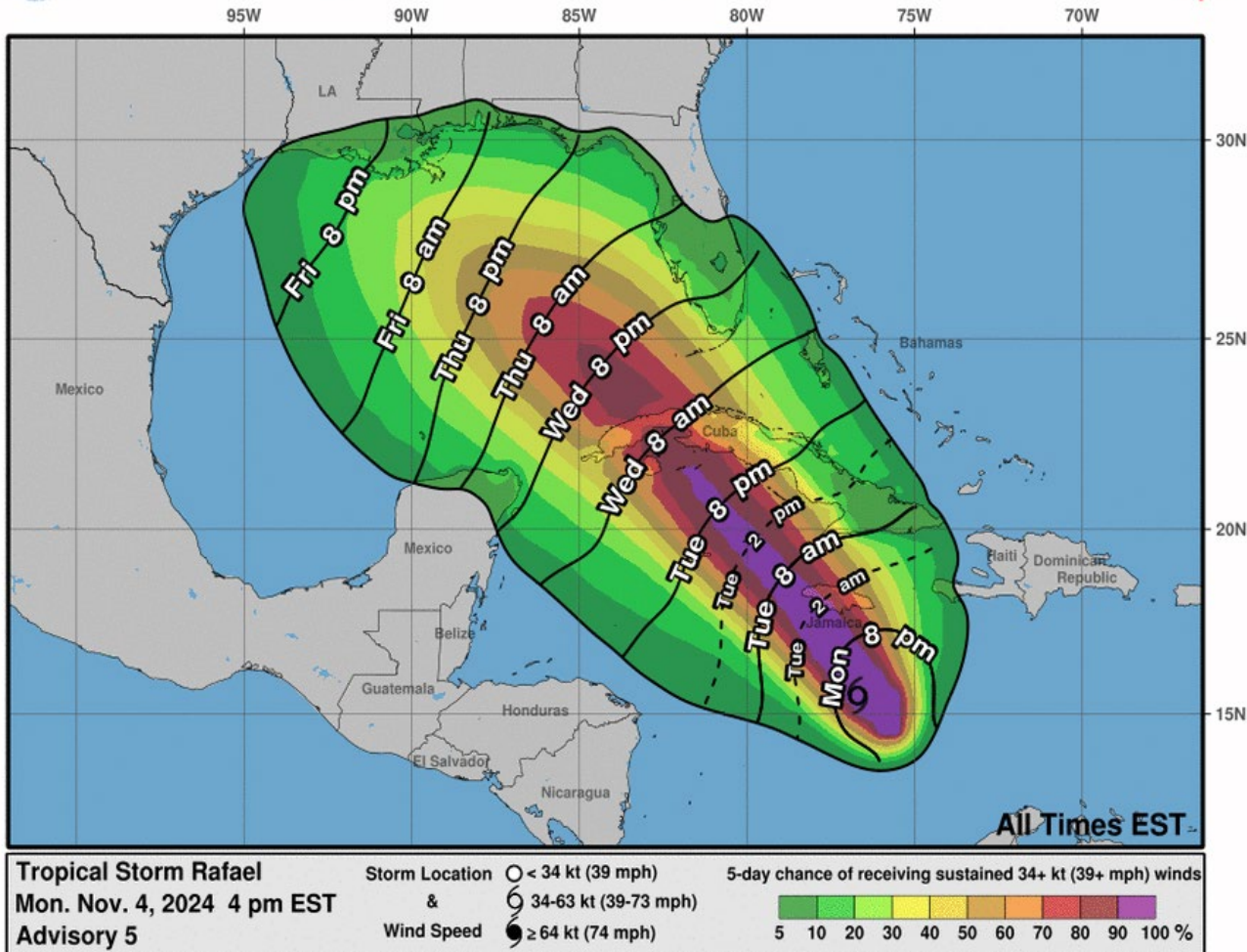


Wind Timing of Arrival

From the National Hurricane Center (NHC)



Most Likely Arrival Time of Tropical-Storm-Force Winds



- While the greatest probabilities (*shaded*) for tropical storm-force conditions are forecast to remain to the west of the Florida Peninsula, tropical storm-force conditions along the Lower and Middle Keys will be possible as Rafael moves northwestward over the southeastern Gulf of Mexico.
- Tropical storm-force conditions will most likely arrive along the Florida Keys during the daytime hours Wednesday.
- Tropical storm-force conditions could arrive as early as Tuesday night into early Wednesday morning along the Florida Keys
- This is a reminder that impacts can still extend well beyond the forecast cone! Additional changes to the track and timeline can be expected, and it is important not to focus on single model runs or solutions.
- As Rafael emerges over the central and northern Gulf of Mexico, stronger upper-level winds will likely displace much of the system's shower and thunderstorm activity east of its center (toward Florida's Gulf Coast). Locally gusty winds will be possible along many Florida coastlines through the week.



Key Messages

From the National Hurricane Center (NHC)



Key Messages for Tropical Storm Rafael

Advisory 5: 4:00 PM EST Mon Nov 04, 2024



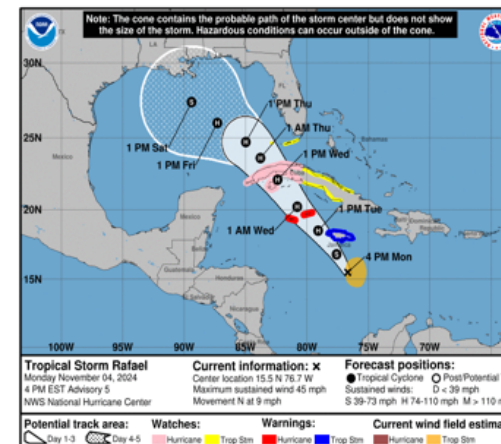
1. Rafael is forecast to be a hurricane when it passes near or over the Cayman Islands by Tuesday evening where damaging hurricane-force winds, a dangerous storm surge, and destructive waves are expected. Tropical storm conditions are expected in Jamaica tonight and Tuesday.

2. Additional strengthening is forecast before Rafael reaches western Cuba and the Isle of Youth on Wednesday where there is an increasing risk of a dangerous storm surge and damaging hurricane-force winds.

3. Tropical storm conditions are possible in the Lower and Middle Florida Keys beginning late Wednesday or Wednesday night.

4. It is too soon to determine what, if any, impacts Rafael could bring to portions of the northern Gulf coast. Residents in this area should regularly monitor updates to the forecast.

5. Rafael will bring areas of heavy rain to portions of the western Caribbean, including Jamaica and Cuba through mid-week, where flooding and landslides are possible. Heavy rainfall will spread into Florida and adjacent areas of the Southeast United States mid to late week.



For more information go to hurricanes.gov

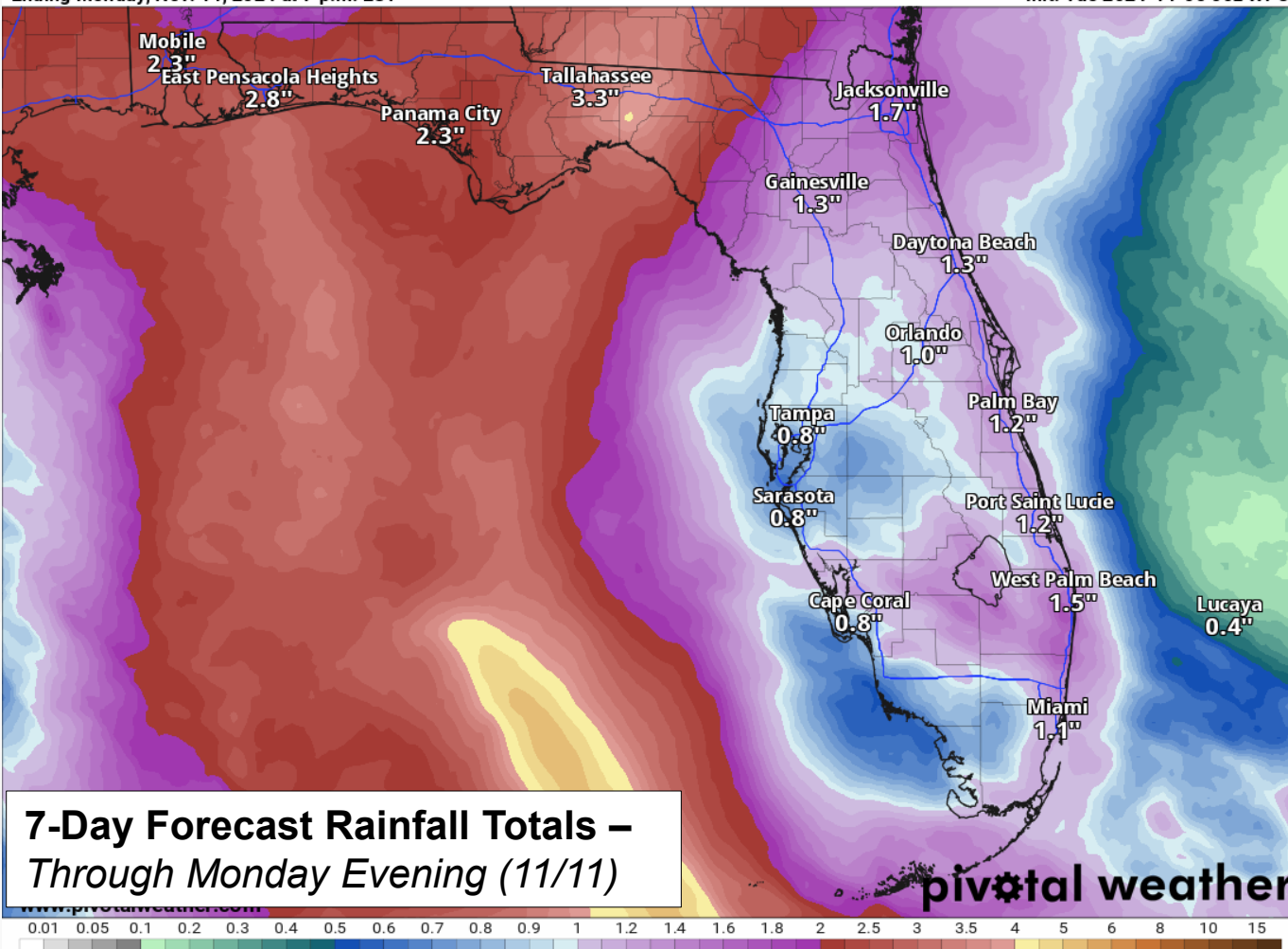


Rainfall Totals – Next 7 Days

From the Weather Prediction Center (WPC)

7-Day Precipitation (in)
Ending Monday, Nov. 11, 2024 at 7 p.m. EST

Init: Tue 2024-11-05 00z WPC



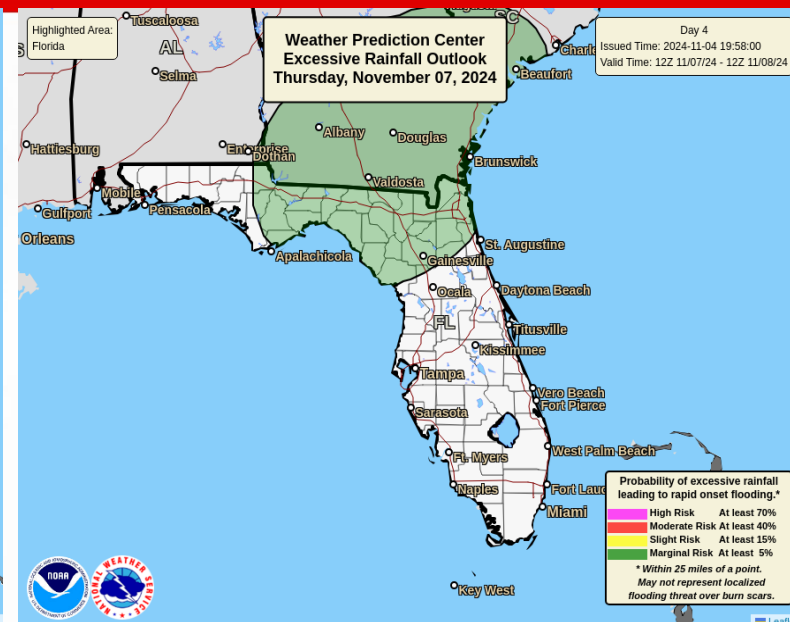
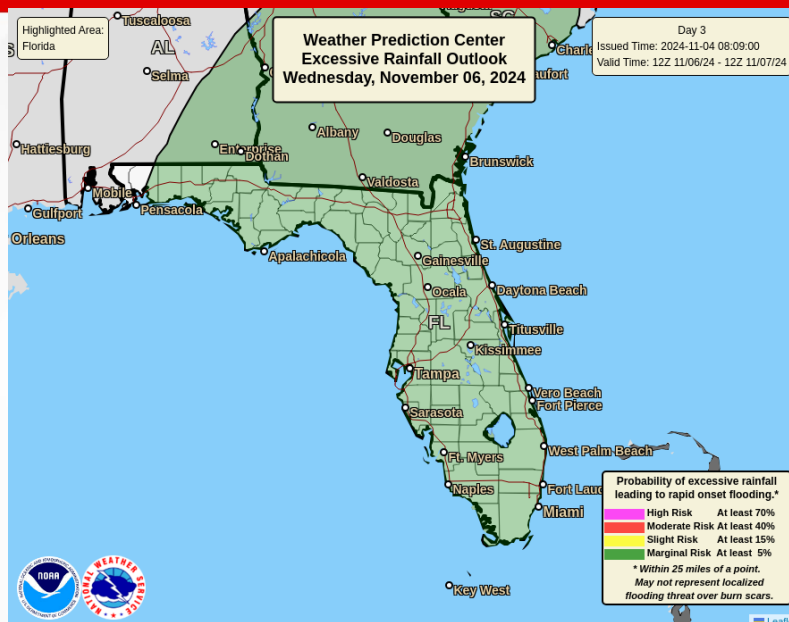
7-Day Forecast Rainfall Totals –
Through Monday Evening (11/11)

- Not much of a pattern shift can be expected across the Sunshine State over the next 1-3 days, with widely scattered rainfall totals.
- The continued trend for isolated to scattered showers will remain possible along the Florida East Coast through next week.
- Enough low-level moisture will support rainfall totals of 1-2" possible along the Southeast Florida Coast and South Florida; however, abundant amounts of mid-level dry air will suppress the extent of any thunderstorm activity through Tuesday.
- There is increasing potential for higher rain chances Wednesday and Thursday with locally heavy rain possible as the disturbance moves northward to northwestward along the Caribbean Sea and approaches the Gulf of Mexico.
- Exact rainfall totals and placement of heavy rainfall will remain **track dependent**; however, generally 2-3" of rain will be expected with locally higher amounts of 3-6" possible.



Flash Flooding – Wednesday & Thursday

From the Weather Prediction Center (WPC)

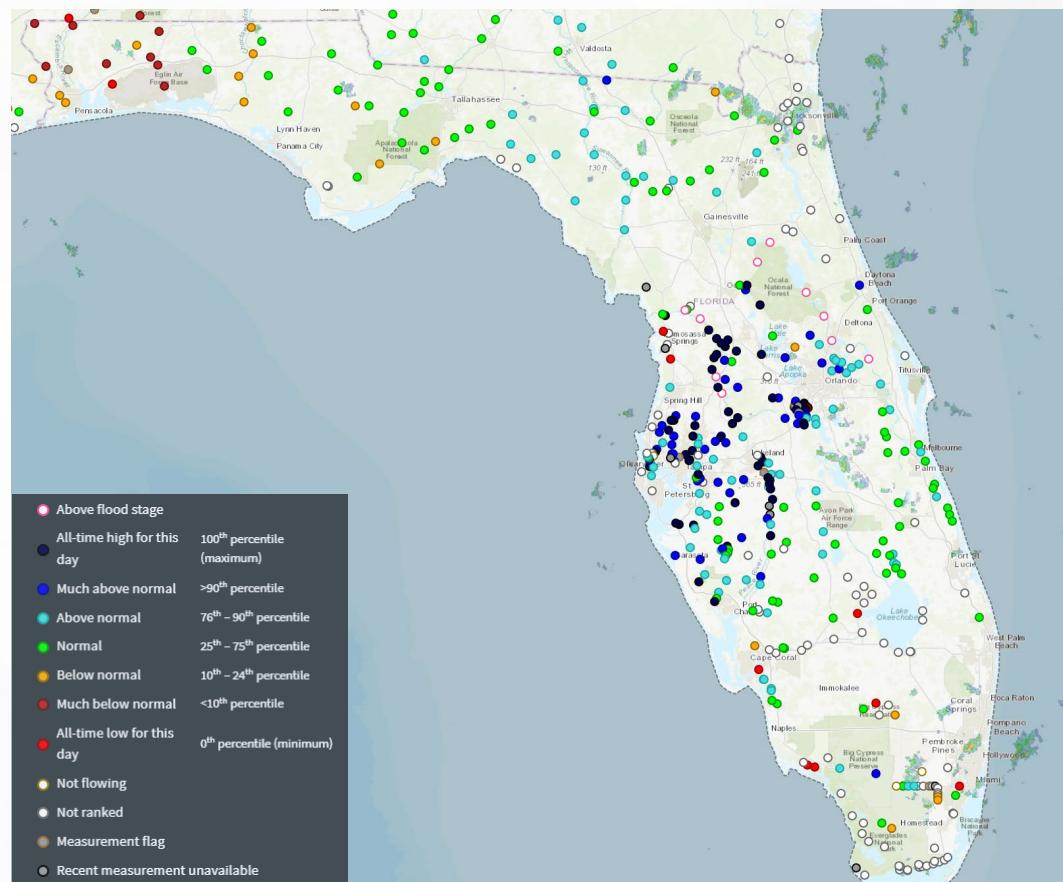
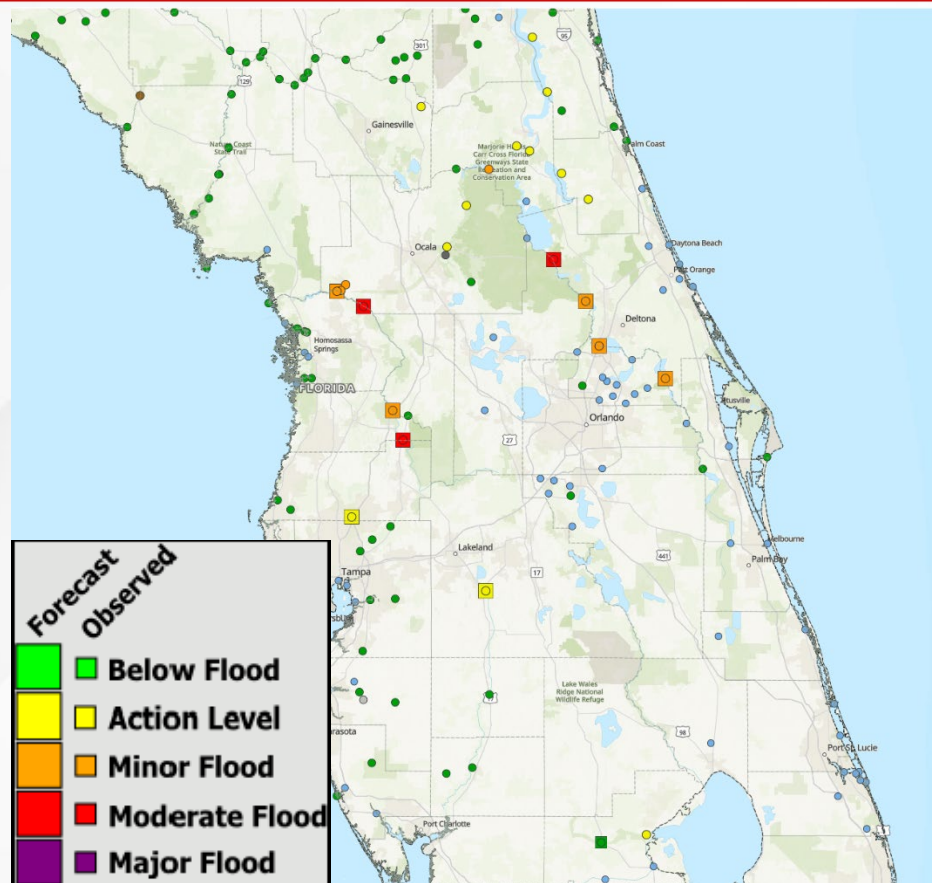


- Rain is on the way to recently dry portions of Florida beginning late Tuesday, peaking in intensity and coverage Wednesday through Thursday.
- Most of the initial rainfall across the Florida Panhandle and western Florida Big Bend will be beneficial; however, localized **nuisance flooding** will be possible if north-to-south training rainbands develop away from Tropical Storm Rafael.
- Rainfall totals continue to run above normal for this time of year along the I-4 corridor and central Florida Peninsula, courtesy of recent tropical systems; locally heavy rains will likely lead to a quicker onset to **flooding and ponding water** concerns along low-lying/poor drainage urban corridors.
- There is still some uncertainty on the exact location of the heaviest rainfall totals mid to late this week as the proximity to the Gulf of Mexico tropical cyclone will allow for some heavier and more concentrated shower and thunderstorm activity through the Peninsula. The Weather Prediction Center (WPC) is outlooking a **Marginal Risk (level 1 of 4) for Flash Flooding** nearly statewide Wednesday.
- The **Marginal Risk (level 1 of 4)** continues for North Florida on Thursday as a signal for locally heavy rainfall may lead to isolated enhancements to **nuisance flooding and ponding water**.
- Rainfall totals and the placement of these higher rainfall totals will likely change, depending on the evolution of Tropical Storm Rafael and its interaction with a frontal system later this week. *Updates to the rainfall forecasts and Excessive Rainfall Outlooks can be expected.*



River Flooding

From National Weather Service (NWS)

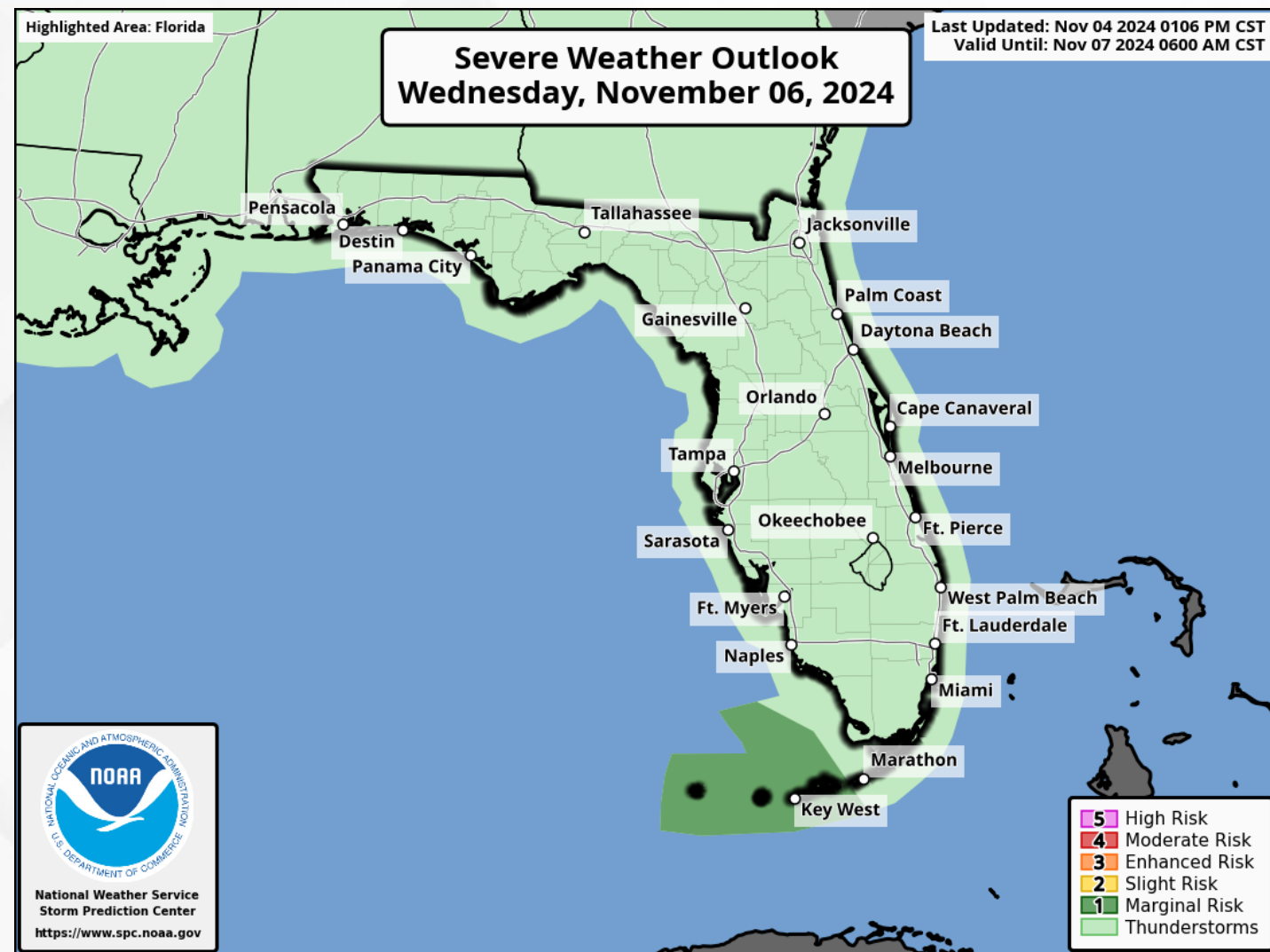


Minor to moderate riverine flooding continues across the Withlacoochee and St. Johns River basins in response to Hurricane Milton in early October. The upper portions of the Withlacoochee ([US 301 Trilby](#) and [Croom](#)) continued to see water levels very slowly decline, while lower portions of the river ([Holder near SR 200](#) and [Dunnellon](#)) continue to see water levels hold steady within a crest. The lower Withlacoochee can expect water levels to remain steady over the next day or so before beginning to very slowly decline. Similarly, the St. Johns River continues to see water levels at all forecast points ([Astor](#), [Lake Harney](#), [Deland](#) and [Sanford](#)) very slowly decline as onshore winds persist along tidal portions of the river, keeping discharge rates slow.



Isolated Tropical Tornadoes

From the Storm Prediction Center (SPC)



Understanding Severe Thunderstorm Risk Categories

THUNDERSTORMS (no label)	1 - MARGINAL (MRGL)	2 - SLIGHT (SLGT)	3 - ENHANCED (ENH)	4 - MODERATE (MDT)	5 - HIGH (HIGH)
No severe* thunderstorms expected	Isolated severe thunderstorms possible	Scattered severe storms possible	Numerous severe storms possible	Widespread severe storms likely	Widespread severe storms expected
Lightning/flooding threats exist with <u>all</u> thunderstorms	Limited in duration and/or coverage and/or intensity	Short-lived and/or not widespread, isolated intense storms possible	More persistent and/or widespread, a few intense	Long-lived, widespread and intense	Long-lived, very widespread and particularly intense

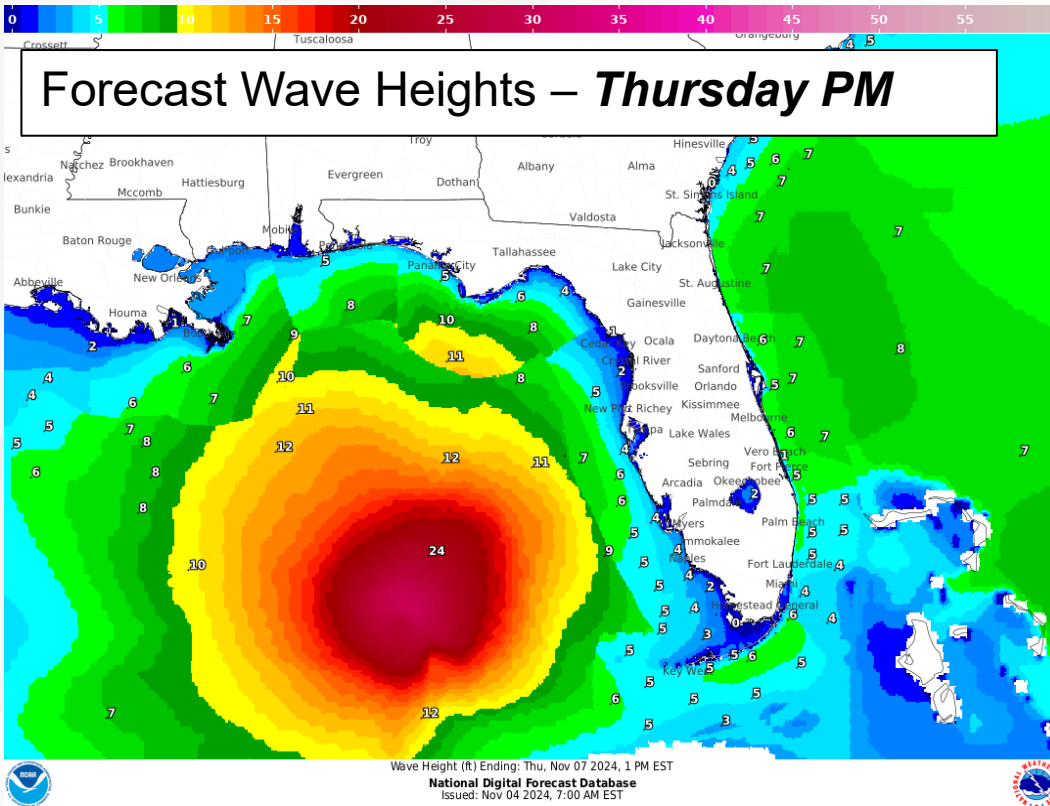
The Storm Prediction Center (SPC) has introduced a **Marginal Risk (level 1 of 5) Risk for Severe Weather** along the Florida Keys Wednesday into Thursday as Tropical Storm Rafael advances northwestward over the southeast Gulf of Mexico. While this track will keep the center of the tropical system well offshore the Florida Keys and South Florida, favorable wind fields will increase through the daytime hours, coupled with abundant tropical moisture, may lead to isolated waterspouts and tropical tornadoes to develop within Tropical Storm Rafael's outer rainbands.

There remains uncertainty within the forward speed/timing of the northward progression of the tropical system into the southeastern Gulf of Mexico; additional updates to the outlook may be warranted in future updates.



Forecast Wave Heights & Rip Currents

From the National Weather Service (NWS)



Forecast Wave Heights – **Thursday PM**

Florida Panhandle		Today	Tue	Wed	Thu	Fri	Sat	Sun
Rip Current								
Marine Hazard								

Florida West Coast		Today	Tue	Wed	Thu	Fri	Sat	Sun
High Surf								
Rip Current								
Marine Hazard								
Coastal Flood								

- An increase in **hazardous beach and coastal conditions** can be expected to develop across Southwest and West-Central Florida beaches beginning midweek as the system emerges from the northern Caribbean Sea and into the Gulf of Mexico.
- Wave heights of 2-4' can be expected for all beaches through Wednesday morning for the West Coast, but ocean swells will increase Wednesday evening and overnight.
- By Thursday morning, **wave heights of 4-7'** can be expected to extend from the Florida Keys and northward towards the Panhandle, with **large breaking waves upwards of 7-8'** in surf zone; *High Surf Advisories will be issued as conditions warrant.*
- A **high risk for rip currents** can likely be expected for all Florida West Coast beaches Wednesday and Thursday.



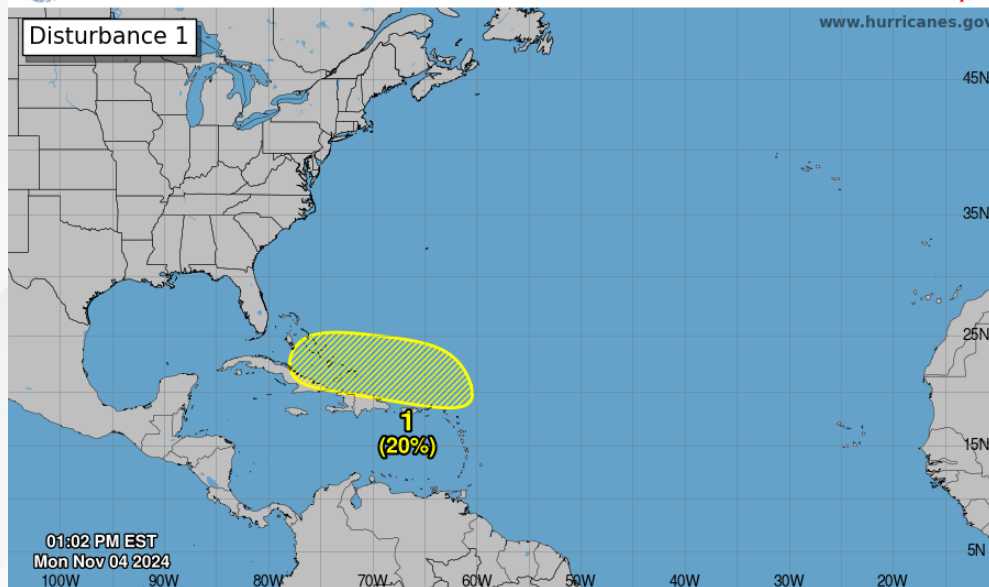
Tropical Weather Outlook

Disturbance 1 – Southwestern Atlantic



Seven-Day Graphical Tropical Weather Outlook

National Hurricane Center Miami, Florida



Current Disturbances and Seven-Day Cyclone Formation Chance: ✕ < 40% ✖ 40-60% ✖ > 60%
Tropical or Sub-Tropical Cyclone: ○ Depression ● Storm ● Hurricane
● Post-Tropical Cyclone or Remnants

Near 0%

48 Hour Formation



20%

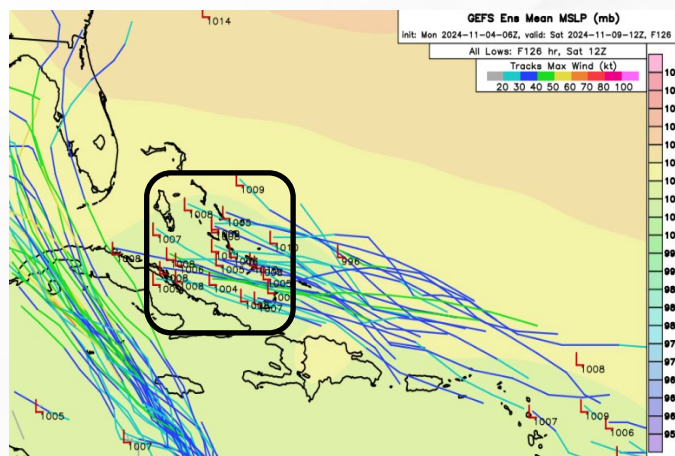
7 Day Formation

An area of low pressure could develop near the northern Leeward Islands in a few days. Some slow development of this system is possible after that time as it moves generally westward over the southwestern Atlantic.

This system poses no direct threat to Florida over the next 5 to 7 days; trends within the model guidance will continue to be monitored regarding the development of this area of disturbed weather later this week. Computer forecast models carry quite a bit of uncertainty with the formation and evolution of this potential disturbance.

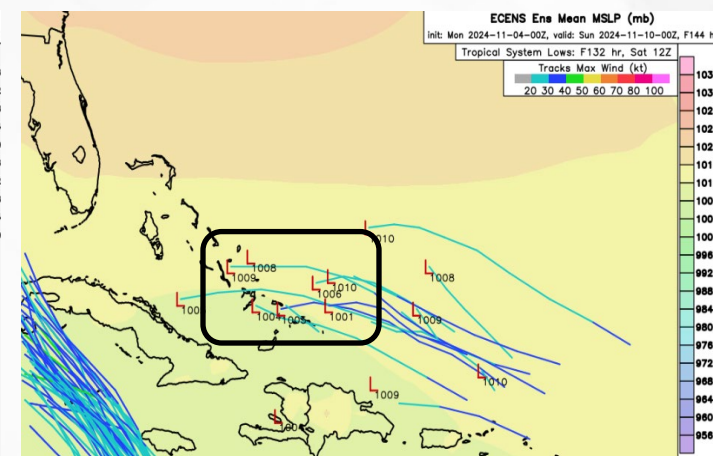
Chance of development through 48 hours...**low...near 0%**

Chance of development through 7 days...**low...20%**



American Model Ensemble

Valid: Saturday (11/9) Morning



European Model Ensemble

Valid: Saturday (11/9) Morning



Summary

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Tropical Storm Rafael:

- As of 4:00 PM EST, Tropical Depression Eighteen has strengthened into Tropical Storm Rafael.
- Rafael is currently located about 175 miles south of Kingston, Jamaica, or 710 miles south-southeast of Key West, Florida.
- A northwestward motion is expected to begin later tonight and forecast to continue for the next few days.
- On the forecast track, the system is expected to move near Jamaica late tonight, be near or over the Cayman Islands late Tuesday, and approach Cuba on Wednesday.
- Maximum sustained winds are now 40 mph. Atmospheric and oceanic conditions remain conducive over the Caribbean Sea, and Rafael is forecast to undergo steady to rapid strengthening is now forecast and the system is expected to become a hurricane on Tuesday south of the Cayman Islands.
- Tropical storm-force winds extend outward up to 105 miles from the center of circulation.
- **Tropical Storm Watches** are now in effect for the Lower and Middle Florida Keys (west of the Channel 5 Bridge through Key West and the Dry Tortugas).

Florida Outlook:

- Computer model guidance continues to show signs of better agreement regarding the system moving across the central and northern Caribbean Sea over the next couple of days.
 - Once the system moves beyond the Caribbean and enters the Gulf of Mexico by mid-to-late week, computer model guidance shows greater uncertainty regarding the evolution and movement of the system.
- The Storm Prediction Center (SPC) has introduced a Marginal Risk (level 1 of 5) Risk for Severe Weather along the Florida Keys Wednesday into Thursday as Tropical Storm Rafael advances northwestward over the southeast Gulf of Mexico.
 - While this track will keep the center of the tropical system well offshore the Florida Keys and South Florida, favorable wind fields will increase through the daytime hours, coupled with abundant tropical moisture, may lead to isolated waterspouts and tropical tornadoes to develop within Tropical Storm Rafael's outer rainbands.
- There is an increased potential for tropical moisture and elevated rain chances to develop across the southern Florida Peninsula on Wednesday and Thursday as the system moves into the northern Caribbean Sea and the southern Gulf of Mexico.
 - Widespread rainfall totals of 1-3" can be anticipated over the next 7 days, with locally higher totals of 3-6" possible. Rainfall totals still hold high uncertainty with the system and will remain dependent on the track and movement of the system.
- Increased tropical moisture and rain chances mid-to-late week have introduced the potential for locally heavy rainfall nearly statewide on Wednesday, and the Weather Prediction Center (WPC) is outlooking a Marginal Risk (level 1 of 4) for Flash Flooding.
 - The Weather Prediction Center (WPC) has maintained a Marginal Risk (level 1 of 4) for Flash Flooding on Thursday across portions of North Florida.
- Rivers, creeks and streams across Central Florida continue to flow at or above normal streamflows following the widespread heavy rainfall from Hurricanes Helene and Milton.
 - Minor to moderate riverine flooding continues for the Withlacoochee and St. Johns River basins as water levels hold steady or very slowly decline.

The next briefing packet will be issued Tuesday Morning. For the latest information, please visit the [National Hurricane Center website](#).



Tropical Update

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Created by:

Caitlyn Gillespie, Deputy State Meteorologist

Caitlyn.Gillespie@em.myflorida.com

State Meteorological Support Unit

Florida Division of Emergency Management

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