



Tropical Update



4:00 PM EDT

Wednesday, November 6, 2024

Major Hurricane Rafael

Rafael Nearing Landfall In Western Cuba

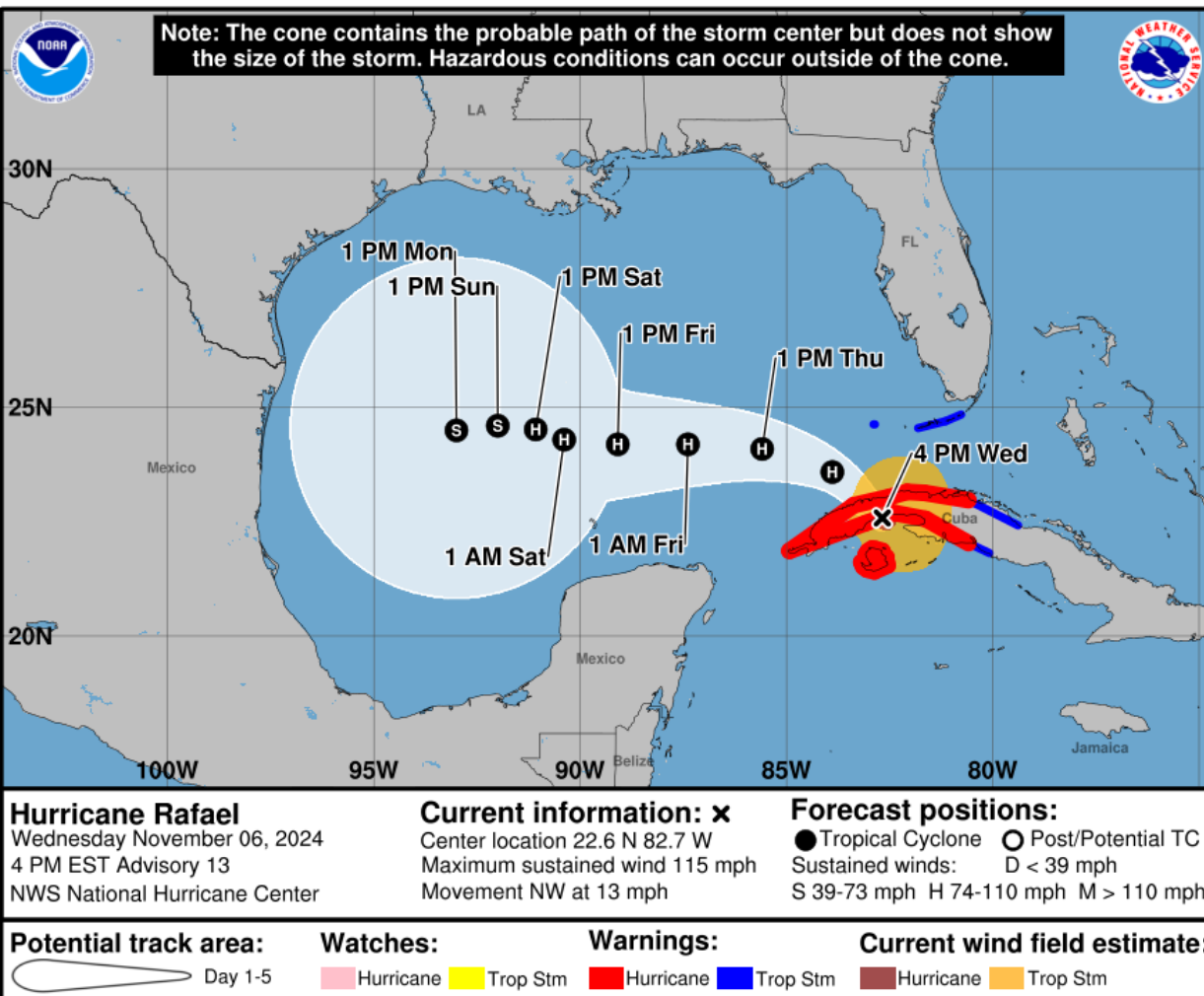
Marginal to Slight Risk For Flash Flooding Across North Florida South to the I-4 Corridor and Along the Keys Today; A Couple of Brief Tropical Tornadoes Remain Possible Along the Southwest Coast and Keys Within Outer Bands of Rafael

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.



Major Hurricane Rafael

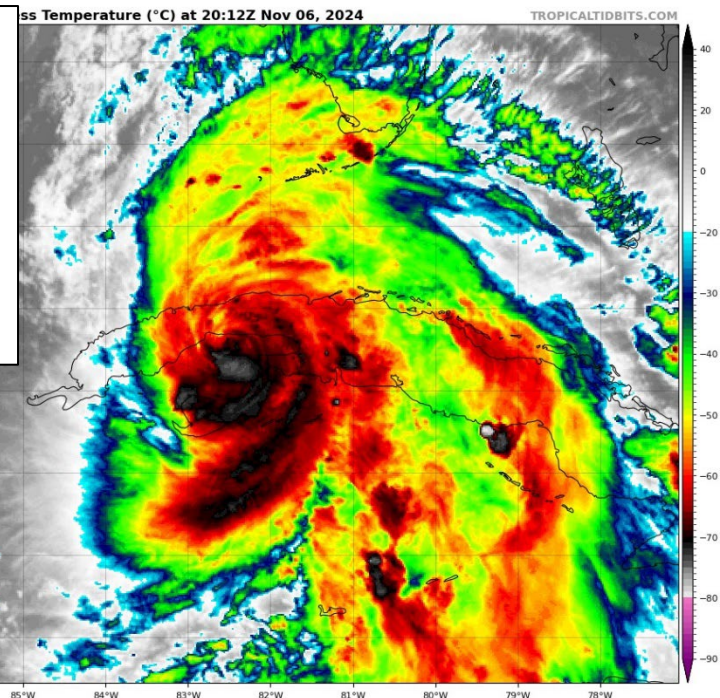
From the National Hurricane Center (NHC)



- **Location:** 45 miles SSW of Havana, Cuba; 180 miles SSW of Key West, Florida
- **Maximum Sustained Winds:** 115 mph (Category 3)
- **Current Movement:** NW at 13 mph
- **FL Watches/Warnings:**
 - **Tropical Storm Warning** in effect for the Lower & Middle Keys (Monroe County)

A general northwestward motion is anticipated tonight. A slower west-northwestward to westward motion is expected Friday through the weekend. On the forecast track, Rafael is expected to cross Cuba this evening, and emerge over the southeastern Gulf of Mexico later this evening or tonight. Rafael is forecast to move over the southern Gulf of Mexico this weekend. Little change in strength is expected before Rafael makes landfall in western Cuba. Some weakening is forecast while Rafael crosses western Cuba, but the storm is forecast to remain a hurricane over the southeastern Gulf of Mexico.

After the last advisory, satellite presentation of Rafael continued to improve this afternoon with the eye becoming quite distinct around midday in geostationary imagery. However, over the past few hours it appears an eyewall replacement cycle is underway as the eye has become less distinct in satellite imagery and radar data has shown the erosion of the smaller inner-eyewall.





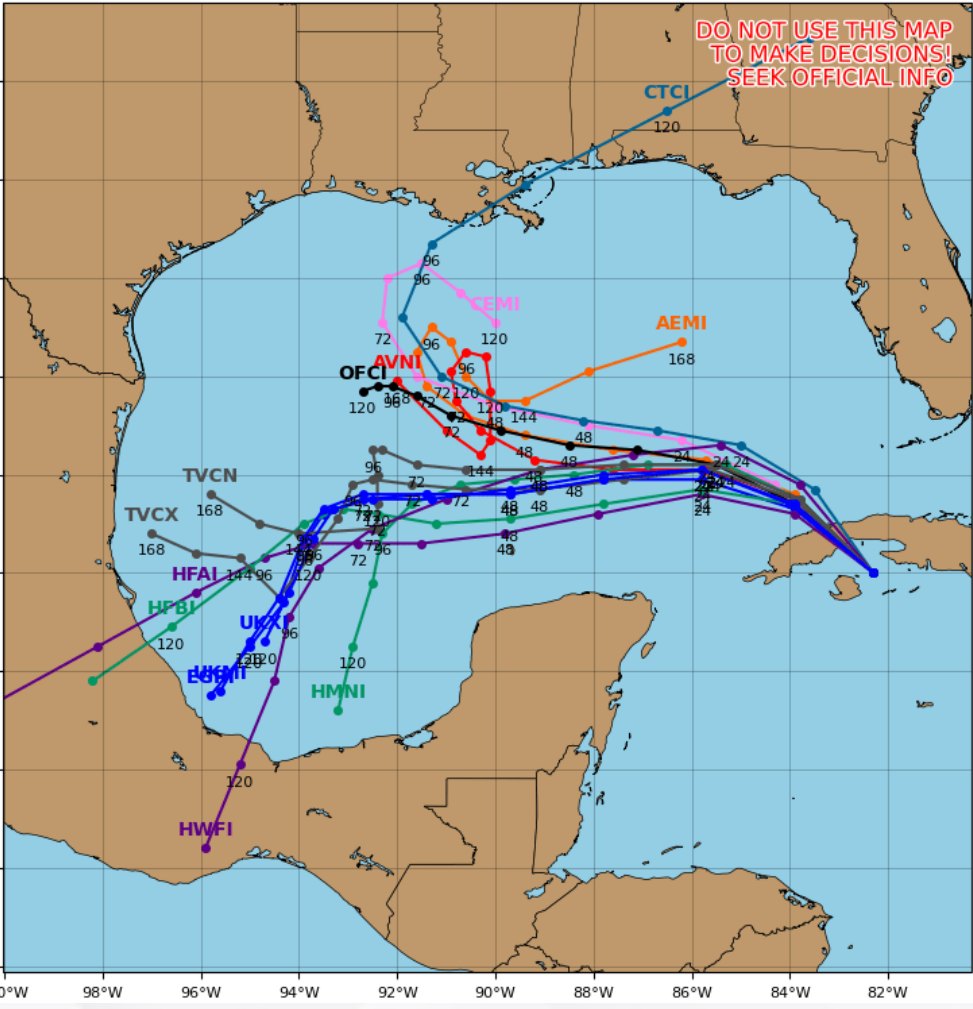
Forecast Computer Models – Next 5 Days

Major Hurricane Rafael

Hurricane RAFAEL Model Track Guidance

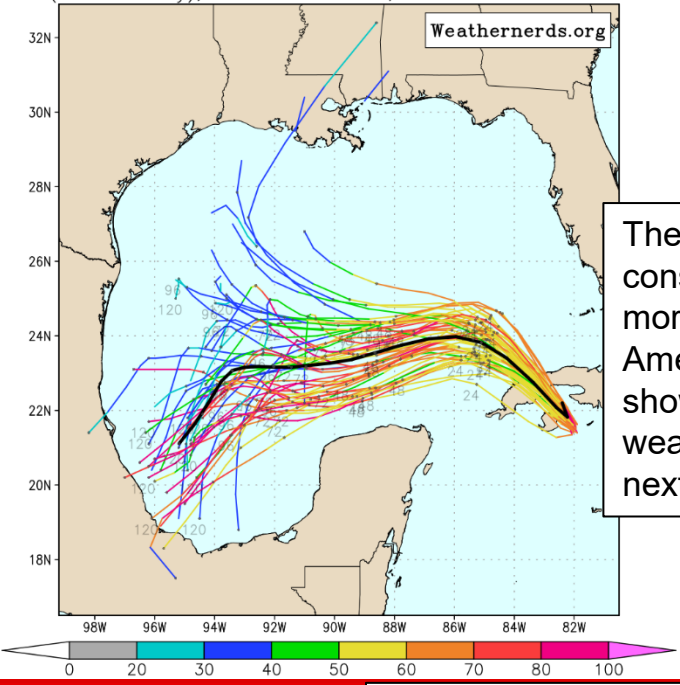
Initialized at 18z Nov 06 2024

Levi Cowan - tropicaltidbits.com



Rafael is expected to continue moving around the southwestern side of an area of high pressure over the southwestern Atlantic during the next 12-24 hours or so. Once Rafael emerges north of Cuba and into the southeastern Gulf of Mexico, computer forecast models continue to come into better agreement during the 12 to 48-hour timeframe that the center of Rafael should turn more westward over the southern Gulf of Mexico as the high pressure system builds westward along the northern Gulf Coast and eastern Gulf of Mexico. After the 48-72-hour timeframe, there remains some significant spread in the model guidance, due to the variability in how fast or how slow Rafael will shear apart.

ECMWF Ens. (0–120h only), init: 2024110612, AL18 Rafael color = max wind (kt)



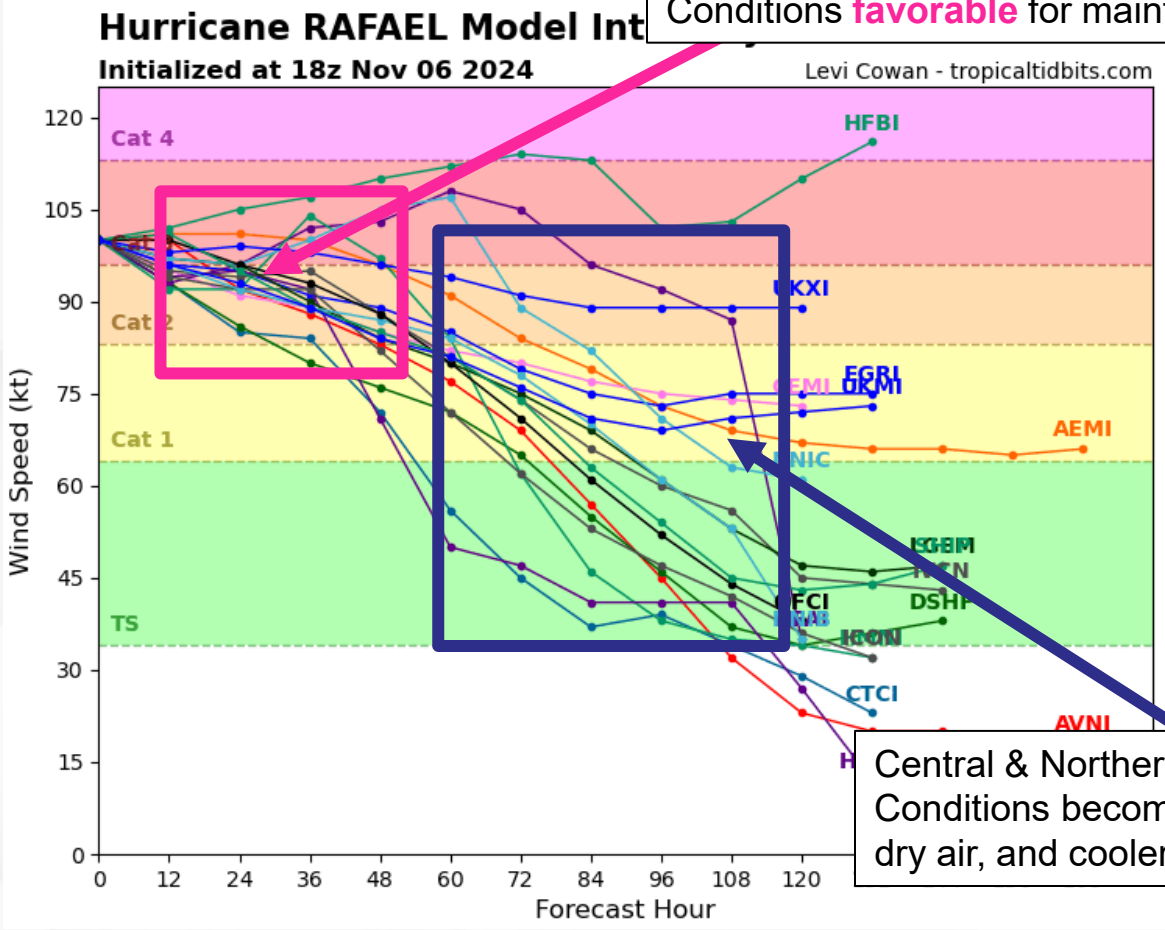
The European Forecast Model Ensemble has consistently shown a weaker system curving more west over the central Gulf of Mexico; the American Forecast Model Ensemble continues to show a more eastward solution, bringing the weakening Rafael to the northern Gulf Coast next weekend.



Forecast Computer Models – Next 5 Days

Major Hurricane Rafael

Caribbean & Southern Gulf of Mexico
Conditions **favorable** for maintaining hurricane-strength.



Little change in strength is expected before Rafael makes landfall in western Cuba within the next hour or so. Some weakening is expected as the storm crosses Cuba, but Rafael is likely to remain a hurricane over the southeastern and southern Gulf of Mexico during the next few days. As Rafael moves through the central Gulf of Mexico, computer forecast models are in good agreement that increasing wind shear, significantly drier air, and cooler water temperatures will likely lead to Rafael weakening and eventually dissipating.

Central & Northern Gulf of Mexico
Conditions become **unfavorable** for the system, and strengthening is stopped. Upper-level winds, dry air, and cooler water temperatures will induce weakening during the 3 to 5-day timeframe.

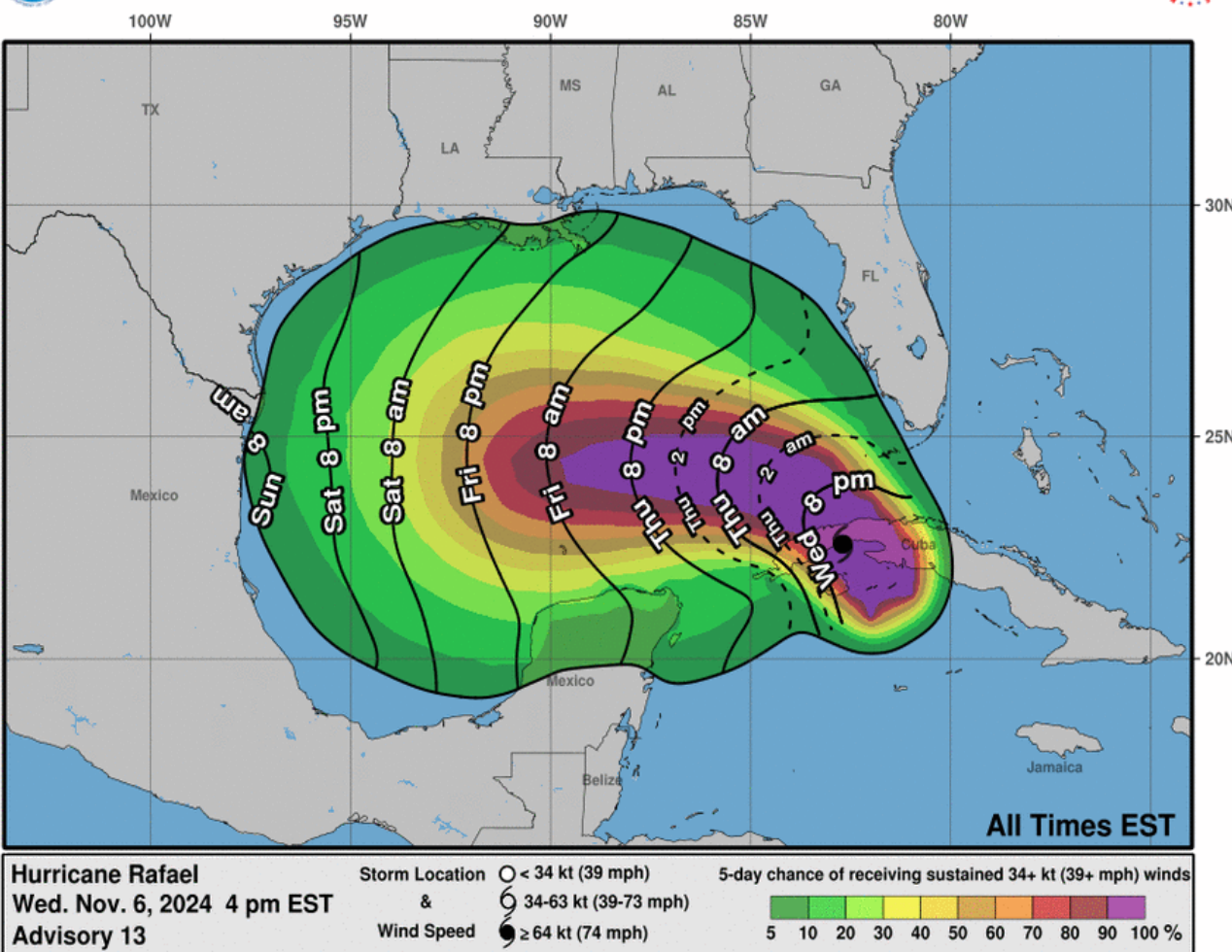


Wind Timing of Arrival

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.
- Rafael is a lopsided system with most of its thunderstorm activity and gusty winds displaced east of its center; trends within the size of the wind field will continue to be monitored as Rafael emerges over the southeastern Gulf of Mexico as localized tropical storm-force conditions may brush the Southwest Florida Coast.
- Tropical storm-force conditions will most likely arrive along the Florida Keys late this evening into the overnight hours.
- Tropical storm-force conditions could arrive as early as this evening hours along the Florida Keys.



Key Messages

From the National Hurricane Center (NHC)



Key Messages for Hurricane Rafael

Advisory 13: 4:00 PM EST Wed Nov 06, 2024

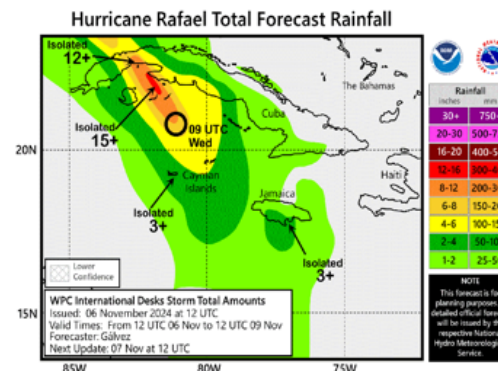
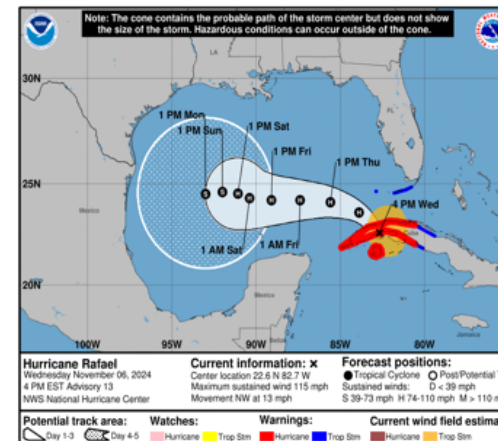


1. Rafael is forecast to cross western Cuba as a major hurricane this afternoon and evening. A hurricane warning is in effect for this region, where a life-threatening storm surge, damaging hurricane-force winds, and destructive waves are expected.

2. Tropical-storm-force winds, especially in gusts, are expected in the Lower and Middle Florida Keys beginning later today and tonight.

3. Rafael will bring areas of heavy rain to the Cayman Islands and western Cuba through Thursday. Flash flooding and mudslides are expected in areas of higher terrain in western Cuba.

4. Rafael is forecast to meander over the south-central Gulf of Mexico this weekend and early next week. Interests in the southern and southwestern Gulf of Mexico should monitor the progress of this system.



For more information go to hurricanes.gov



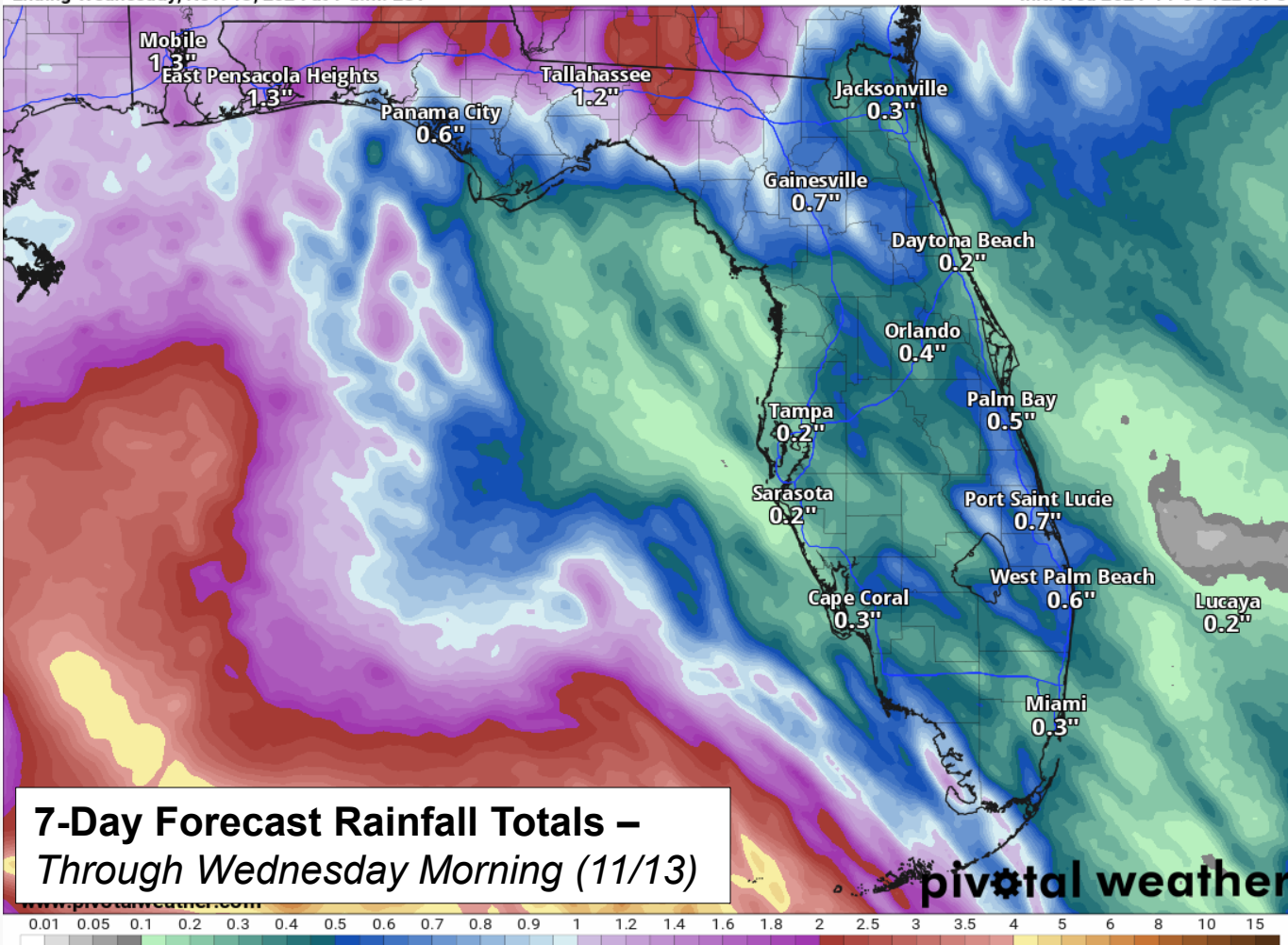
Rainfall Totals – Next 7 Days

From the Weather Prediction Center (WPC)

7-Day Precipitation (in)

Ending Wednesday, Nov. 13, 2024 at 7 a.m. EST

Init: Wed 2024-11-06 12z WPC

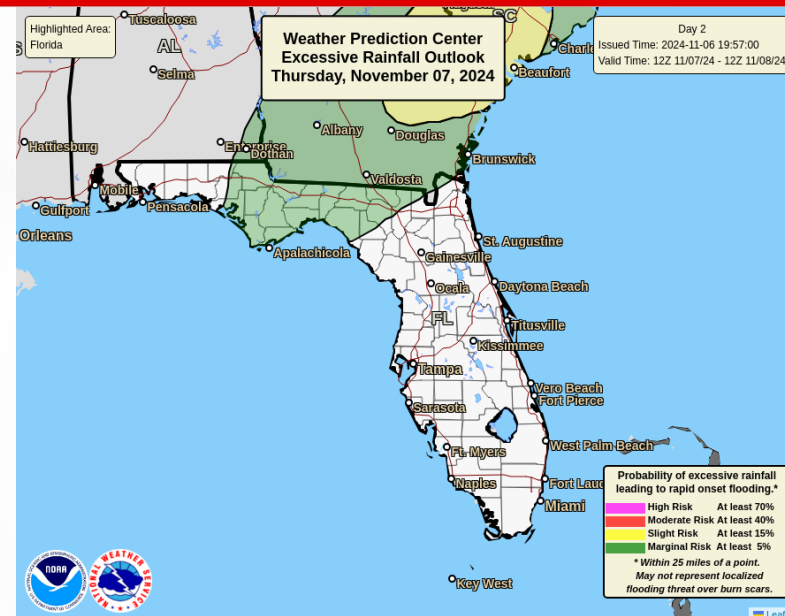
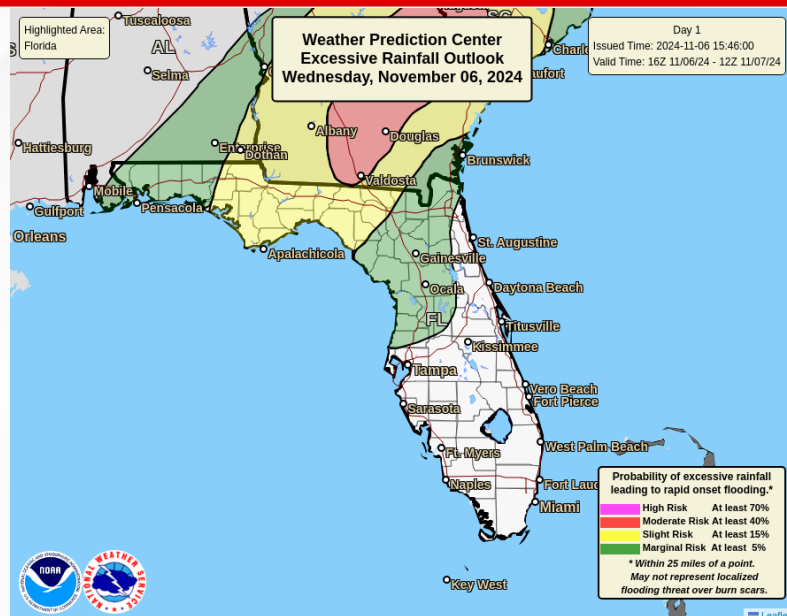


- Rain chances will begin to increase along the Florida Keys this morning (70-85% chance of rain), becoming increasingly scattered and widespread further north across South and Central Florida (30-60% chance of rain) and North Florida (55-85% chance of rain) throughout the day.
- Exact rainfall totals and the placement of heavy rainfall will remain **track dependent**; however, generally 1-6" of rain can be expected with locally higher amounts upwards of 6-8" possible, primarily north of the I-4 corridor and through the Florida Panhandle and along the Southwest Coast and Keys.
- The heaviest rainfall totals over the next 7-day forecast period appears to reside along and north of the I-10 corridor to the I-75 corridor, Suwannee River Valley, Southwest Coast, and along the Keys courtesy of Rafael and the approaching frontal system.



Flash Flooding – Wednesday & Thursday

From the Weather Prediction Center (WPC)



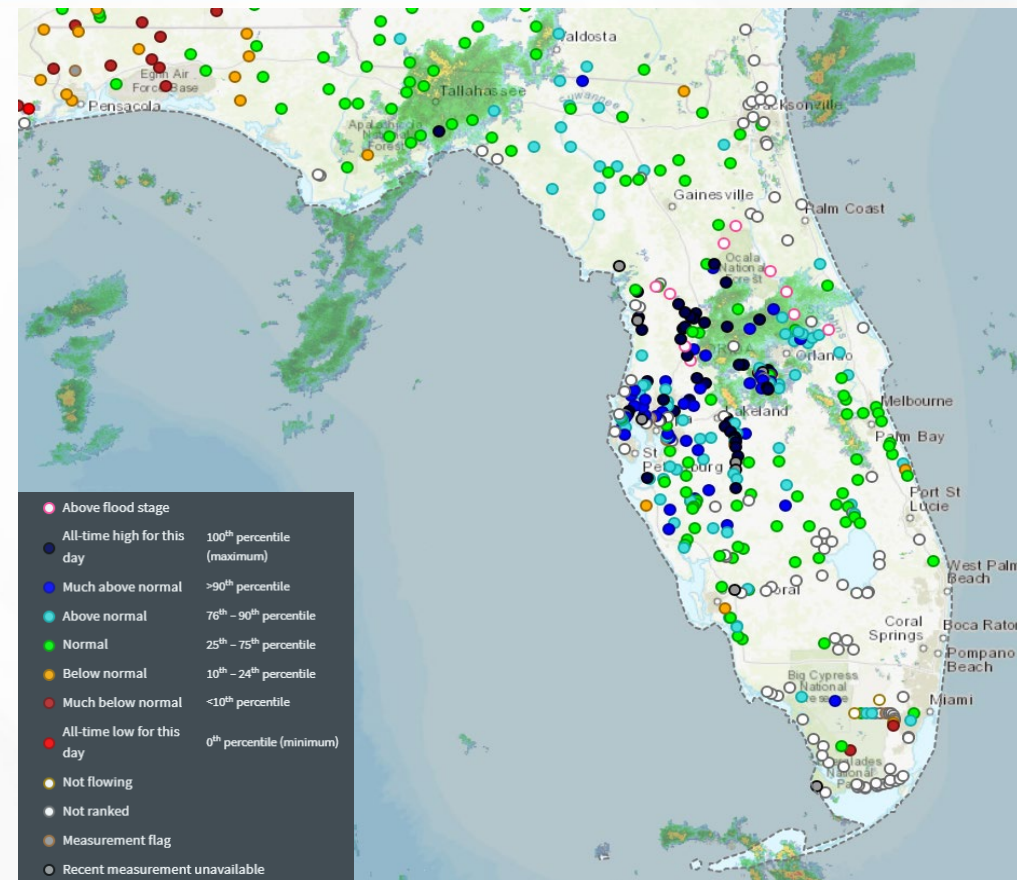
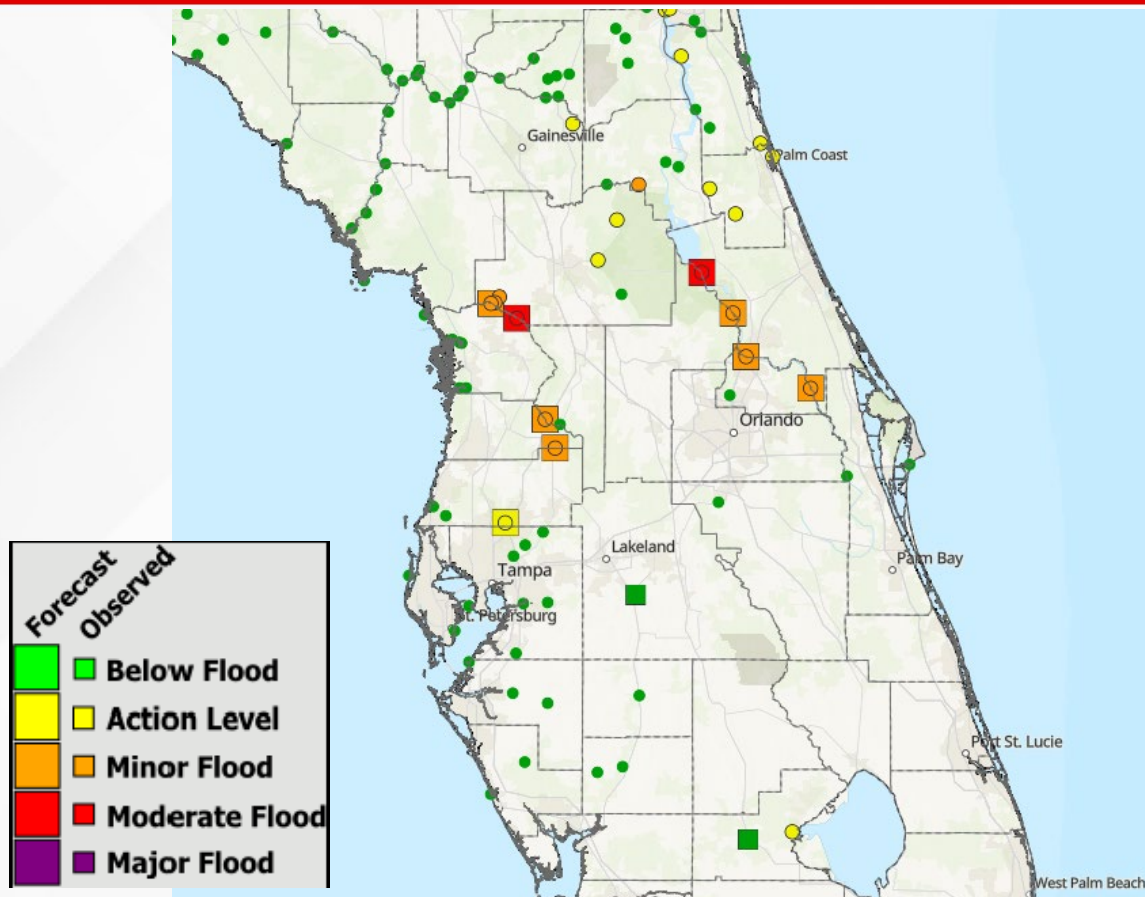
- Scattered to widespread showers and embedded thunderstorms have already begun across the state as deep moisture surges northward, peaking in intensity and coverage later today through Thursday.
- Most of the initial rainfall across the Florida Panhandle and western Florida Big Bend will be beneficial; however, localized **nuisance flooding** will be possible if north-to-south training rainbands develop away from Hurricane 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.
- The Weather Prediction Center (WPC) is now outlooking **Slight Risk (level 2 of 4) for Flash Flooding** along the Eastern Panhandle and through the Big Bend to the I-75 corridor with a **Marginal Risk (level 1 of 4)** extending across the rest of North Florida and southward to the I-4 Corridor through the rest of today and tonight.
- **Flood Watches** have been expanded further southward to include Madison and inland Jefferson counties.
- The **Marginal Risk (level 1 of 4)** continues across the Eastern Panhandle through the Big Bend to the I-75 corridor 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 may change, depending on the evolution of Hurricane Rafael and its interaction with a frontal system later this week.
Updates to the rainfall forecasts and Excessive Rainfall Outlooks will be possible.

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River Flooding

From National Weather Service (NWS)

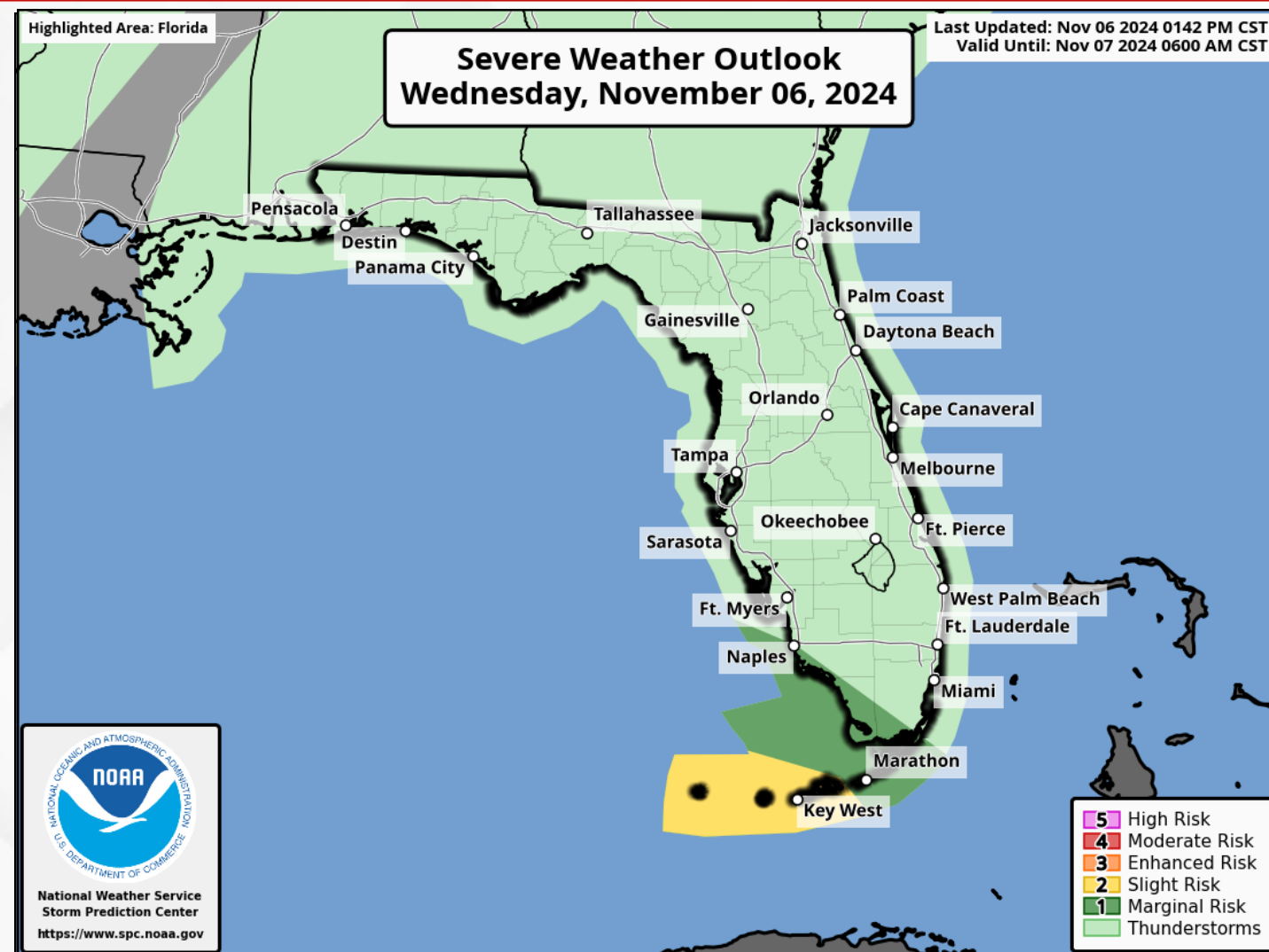


Minor to moderate riverine flooding continues across the Withlacoochee and St. Johns River basins in response to Hurricane Milton in early October. The upper portions of the Withlacoochee ([US 301 Trilby](#) and [Croom](#)) continued to see water levels very slowly decline, while lower portions of the 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](#)) hold steady or 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

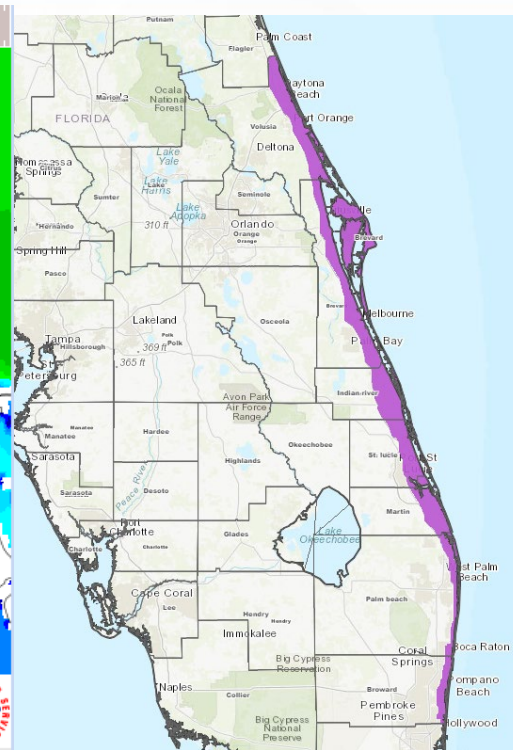
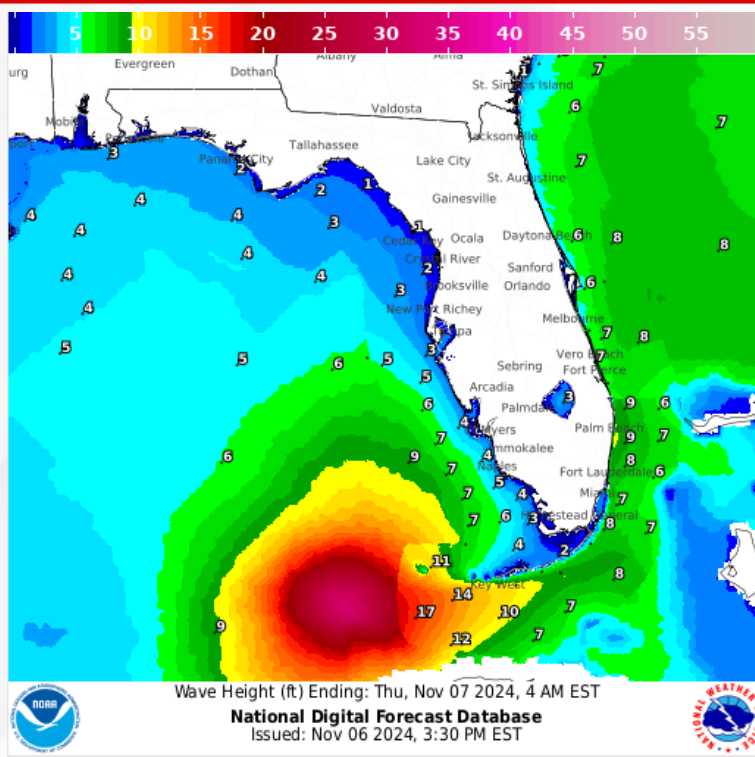
THUNDERSTORMS (no label)	1 - MARGINAL (MRGL)	2 - SLIGHT (SLGT)	3 - ENHANCED (ENH)	4 - MODERATE (MDT)	5 - HIGH (HIGH)
No severe* thunderstorms expected	Isolated severe thunderstorms possible	Scattered severe storms possible	Numerous severe storms possible	Widespread severe storms likely	Widespread severe 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) continues the risk for isolated tropical tornadoes along the Lower and Middle Florida Keys with a **Slight Risk (level 2 of 5)** along the Lower and Middle Florida Keys and A **Marginal Risk (level 1 of 5)** has been expanded into additional portions of the Upper Keys and Southwest Florida as any outer rainbands from Rafael move onshore. Atmospheric conditions, coupled with daytime heating, appear conducive for a few waterspouts and these may move across land as tornadoes. The overall threat looks to diminish tonight as favorable conditions subside and thunderstorm activity recedes to the Gulf of Mexico waters.



Forecast Wave Heights & Rip Currents

From the National Weather Service (NWS)



North Florida Gulf Coast		Today	Thu	Fri	Sat	Sun	Mon	Tue
Rip Current								
Marine Hazard								

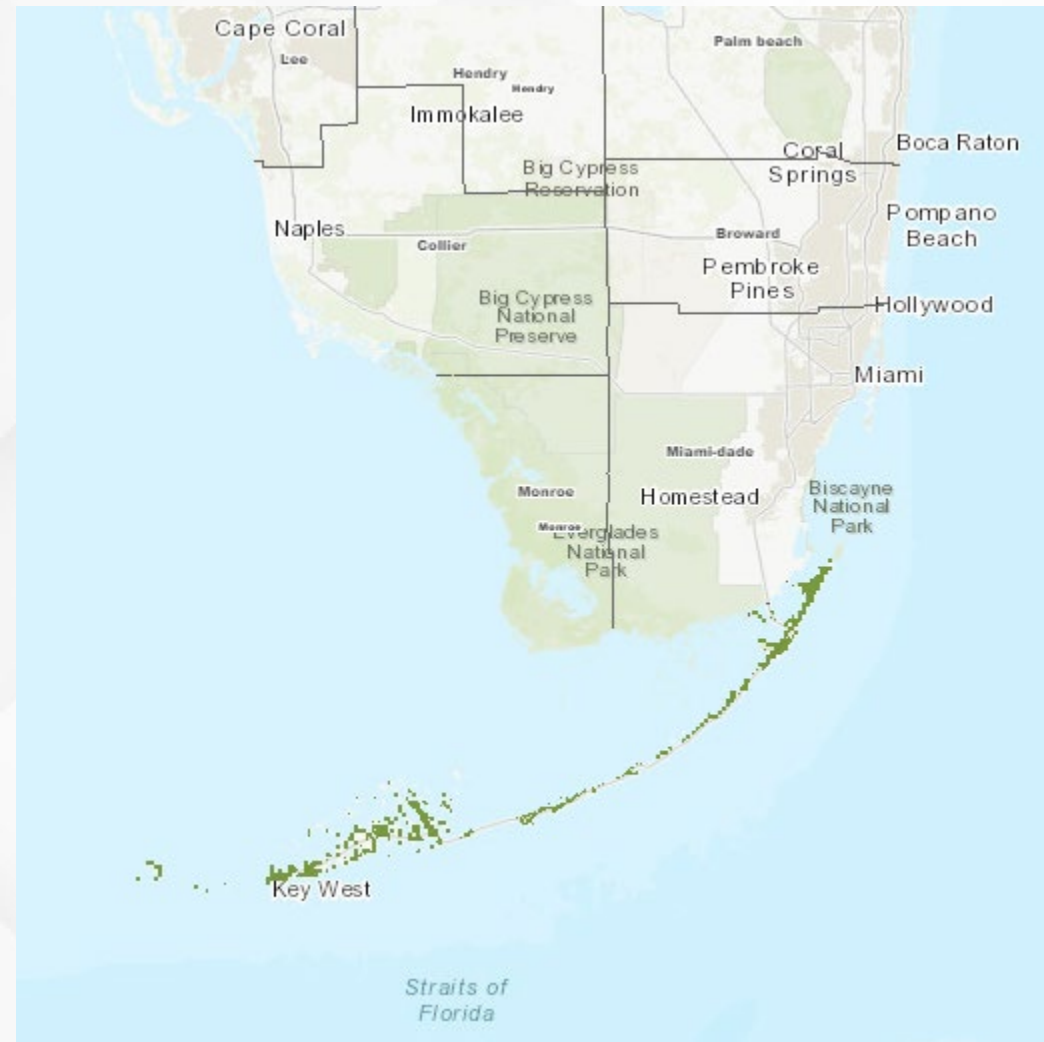
Florida West Coast		Today	Thu	Fri	Sat	Sun	Mon	Tue
High Surf								
Rip Current								
Marine Hazard								

- Deteriorating beach and marine conditions can be expected through the week along many Florida coastlines, with **High Surf Advisories** in effect along portions of the Florida East Coast. Large breaking waves of 5-8' can be expected in the surf zone, with locally higher breakers possible. Breakers of 7-10' will be possible along the Southeast Florida Coast through Thursday evening.
- Additional High Surf Advisories will be issued as conditions warrant along Florida Panhandle and Gulf Coast beaches later this week and into the weekend.
- A **high risk of rip currents** will largely linger through the remainder of the week.



Coastal Flooding Potential

From the National Weather Service (NWS)



A **Coastal Flood Statement** remains in effect along the Florida Keys. **Coastal flooding**, with potential saltwater flooding, for oceanside portions of the Florida Keys is forecast Wednesday and Wednesday night. Water levels could reach up to 2' above normally dry ground, or about 1' higher than recent high tides.

As Rafael continue to trek northwestward over the central and northern Gulf, onshore flow along portions of the Florida Panhandle and Big Bend will continue to be monitored. As tides have already been running in elevated levels, onshore wind and large swells may lead to instances of **coastal flooding**; however, trends will continue to be monitored.

Coastal Flood Advisories remain in place along tidal portions of the St. Johns River Basin as breezy onshore winds trapping tides in the basin leads to instances of **minor coastal flooding** near and at times of high tide.

Coastal Flood Watch, Warning, and Advisories will be issued as conditions warrant.



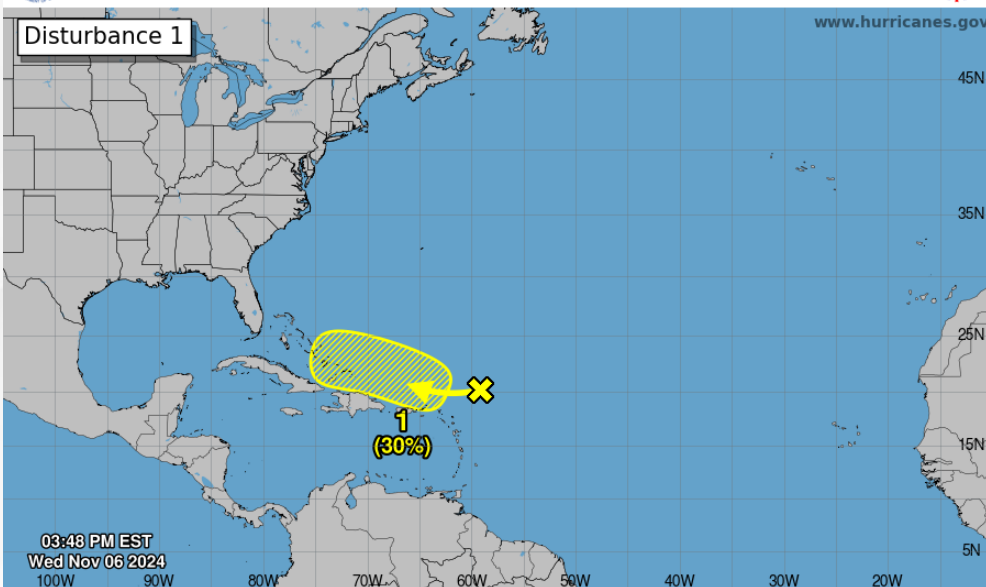
Tropical Weather Outlook

Disturbance 1 – Southwestern Atlantic



Seven-Day Graphical Tropical Weather Outlook

National Hurricane Center Miami, Florida

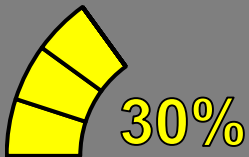


Current Disturbances and Seven-Day Cyclone Formation Chance: < 40% 40-60% > 60%
Tropical or Sub-Tropical Cyclone: Depression Storm Hurricane
 Post-Tropical Cyclone or Remnants



20%

48 Hour Formation



30%

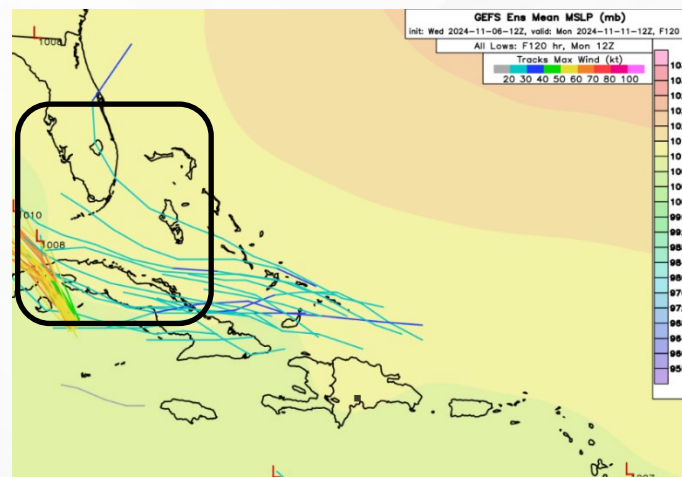
7 Day Formation

A trough of low pressure is producing an area of disorganized showers and thunderstorms a few hundred miles east-northeast of the Leeward Islands. This system is expected to move generally westward during the next few days, and an area of low pressure could form near the northern Leeward Islands tonight or Thursday. Afterward, some gradual development of this system is possible toward the end of the week and into the early part of the weekend while it moves near or to the north of the Virgin Islands and Puerto Rico, and approaches the Southeast Bahamas

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.

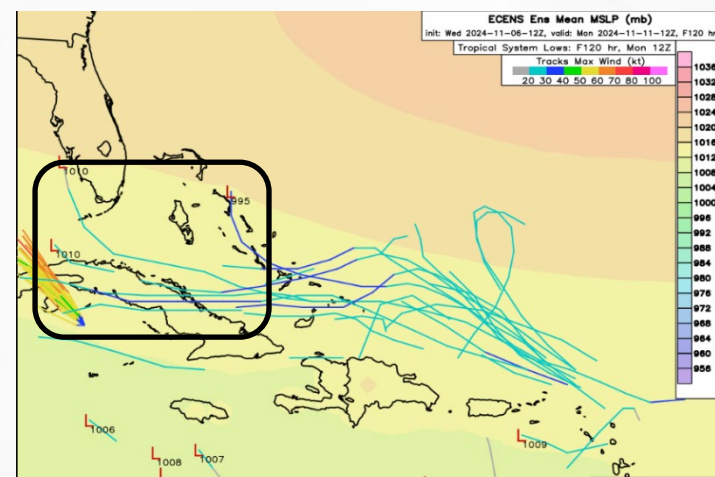
Chance of development through 48 hours...**low...20%**

Chance of development through 7 days...**low...30%**



American Model Ensemble

Valid: Monday (11/11) Morning



European Model Ensemble

Valid: Monday (11/11) Morning



Summary

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Major Hurricane Rafael:

- As of 4:00 PM EST, Rafael is currently located about 45 miles SSW of Havana, Cuba and 180 miles south-southwest of Key West, Florida and moving northwestward at 13 mph.
- A general northwestward motion is anticipated tonight, followed by a slower west-northwestward to westward motion expected Friday through the weekend.
- On the forecast track, Rafael is expected to cross Cuba this evening, and emerge over the southeastern Gulf of Mexico later this evening or tonight.
- Rafael is forecast to move over the southern Gulf of Mexico this weekend.
- Maximum sustained winds are near 115 mph, making Rafael a Category 3 hurricane.
- Little change in strength is expected before Rafael makes landfall in western Cuba.
- Some weakening is forecast while Rafael crosses western Cuba, but the storm is forecast to remain a hurricane over the southeastern Gulf of Mexico.
- **Tropical Storm Warnings** remain 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 Rafael's near-term forecast track within the next 24 to 48-hour timeframe.
 - Once the system emerges over the southeastern Gulf of Mexico tonight into Thursday, computer model guidance shows greater uncertainty regarding the evolution and movement of the system.
- The Storm Prediction Center (SPC) maintains the **Slight Risk (level 2 of 5) for isolated tropical tornadoes** along the Lower and Middle Florida Keys, with a **Marginal Risk (level 1 of 5)** extending along the far southwestern Florida Peninsula late this morning into late this evening.
 - 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.
- Rain chances will begin to increase along the Florida Keys this morning, becoming increasingly scattered and widespread further north across the rest of the state throughout the day.
- Exact rainfall totals and the placement of heavy rainfall will remain track dependent; however, generally 1-4" of rain can be expected with locally higher amounts upwards of 6-8" possible, primarily north of the I-4 corridor and through the Florida Panhandle and along the Southwest Coast and Keys.
- The heaviest rainfall totals over the next 7-day forecast period appears to reside along and north of the I-10 corridor to the I-75 corridor, Suwannee River Valley, Southwest Coast, and along the Keys courtesy of Rafael and the approaching frontal system.
- **Flood Watches** have been expanded further southward to include Madison and inland Jefferson counties
- The Weather Prediction Center (WPC) is now outlooking **Slight Risk (level 2 of 4) for Flash Flooding** along the Eastern Panhandle and through the Big Bend to the I-75 corridor with a **Marginal Risk (level 1 of 4)** extending across the rest of North Florida and southward to the I-4 Corridor through the today and tonight. The **Marginal Risk (level 1 of 4)** continues for eastern Panhandle through the Big Bend to the I-75 corridor, Thursday as a signal for locally heavy rainfall may lead to isolated enhancements to nuisance flooding and ponding water.
- 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.
- A **Coastal Flood Statement** remains in effect along the Florida Keys. Coastal flooding, with potential saltwater flooding, for oceanside portions of the Florida Keys is forecast today and tonight. Water levels could reach up to 2' above normally dry ground, or about 1' higher than recent high tides.

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



Tropical Update

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State Meteorological Support Unit

Florida Division of Emergency Management

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