NWS JAX Lunch-and-Learn Series
April 2025

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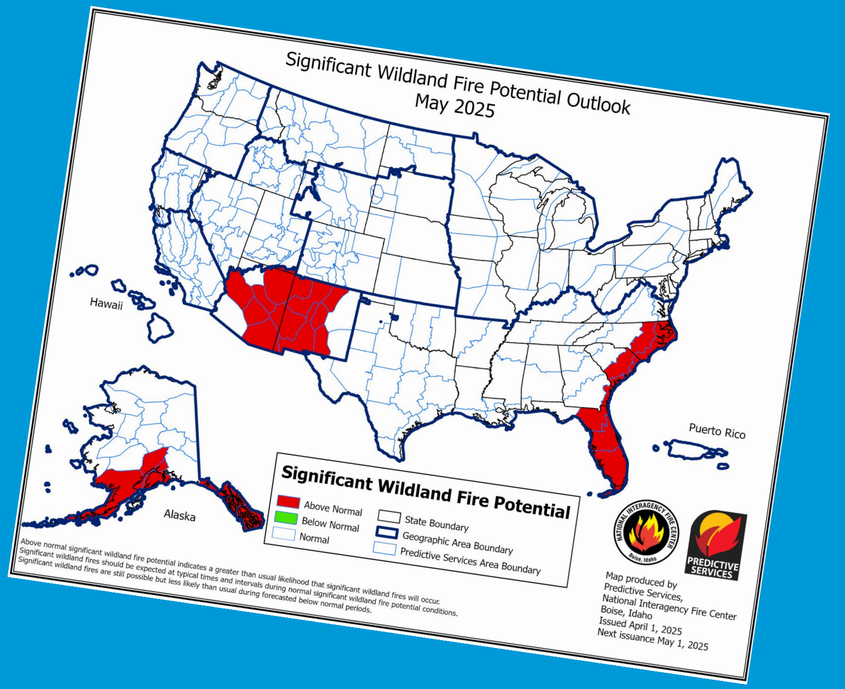
Fire Weather: Basics, Tools, & Outlook

Flood Risk Tools & Products

Climate Trend Tools



Fire Weather: Basics, Tools, & Outlook

Wildfire Ingredients

Weather

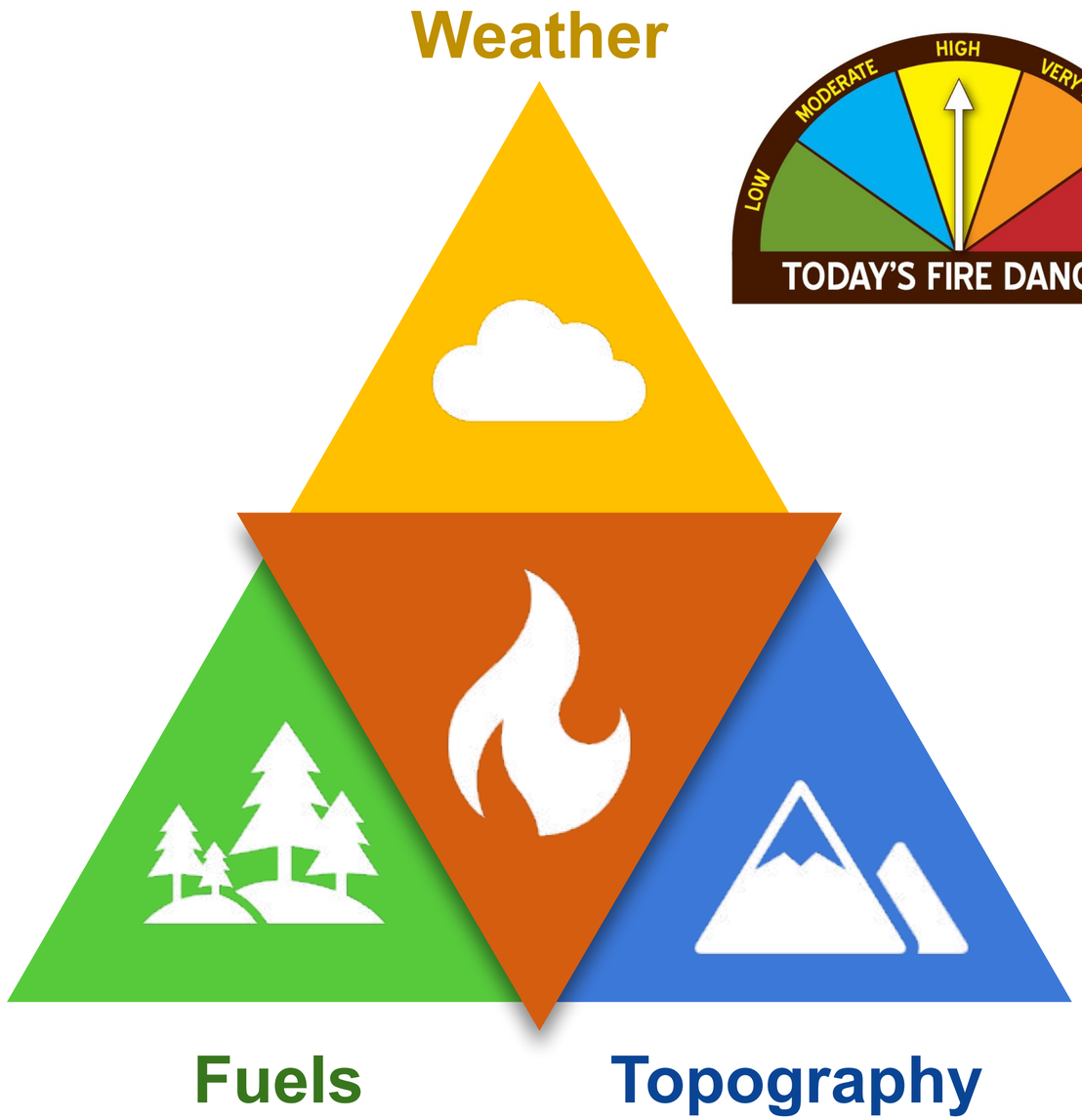
Wind, Humidity, & Instability

Fuels

Types, Dryness, Load, Continuity

Topography

Fuel types, Wind Patterns, Aspects



Wildfire “Seasonality”

Winter [Jan - Feb]

Dry Season

frosts & freeze events dry out fine fuels (grasses)

Prescribed Fire Activity Increases to control Fuel Loading

Spring [Mar - May]

Peak Fire Activity

Dry fuels, late season fronts, Warming Temps

Summer [Jun - Sep]

Rainy Season

High humidity and daily thunderstorms reduce wildfire risk

Fall [Oct - Dec]

Secondary Peak

If drier than usual conditions close out summer, a secondary peak in fire activity can occur

Wildfire: Key Weather Variables

High Temperatures | Dry out fuels quickly and increase in fire intensity

Low Humidity | Leads to drier fuels and increases the rate of fire spread

Wind | Drives fire spread, spotting potential (distances), sudden wind direction changes affects firefighter safety

Atmospheric Stability | Unstable conditions (rising air) helps ventilate fires and can promote extreme fire behavior

Communicating Critical Fire Weather Conditions

1-3+ Days Before

Fire Weather Watch

- Low Humidity, Strong Winds and Receptive Fuels are **LIKELY** to align across an area
- Issued by individual Fire Zones

12-24 hours Before

Red Flag Warnings

- Low Humidity, Strong Winds and Receptive Fuels **EXPECTED**
- Allows lead time for land management agencies to provide mutual aid, pre-position assets, and stage resources

What are the Red Flag thresholds?

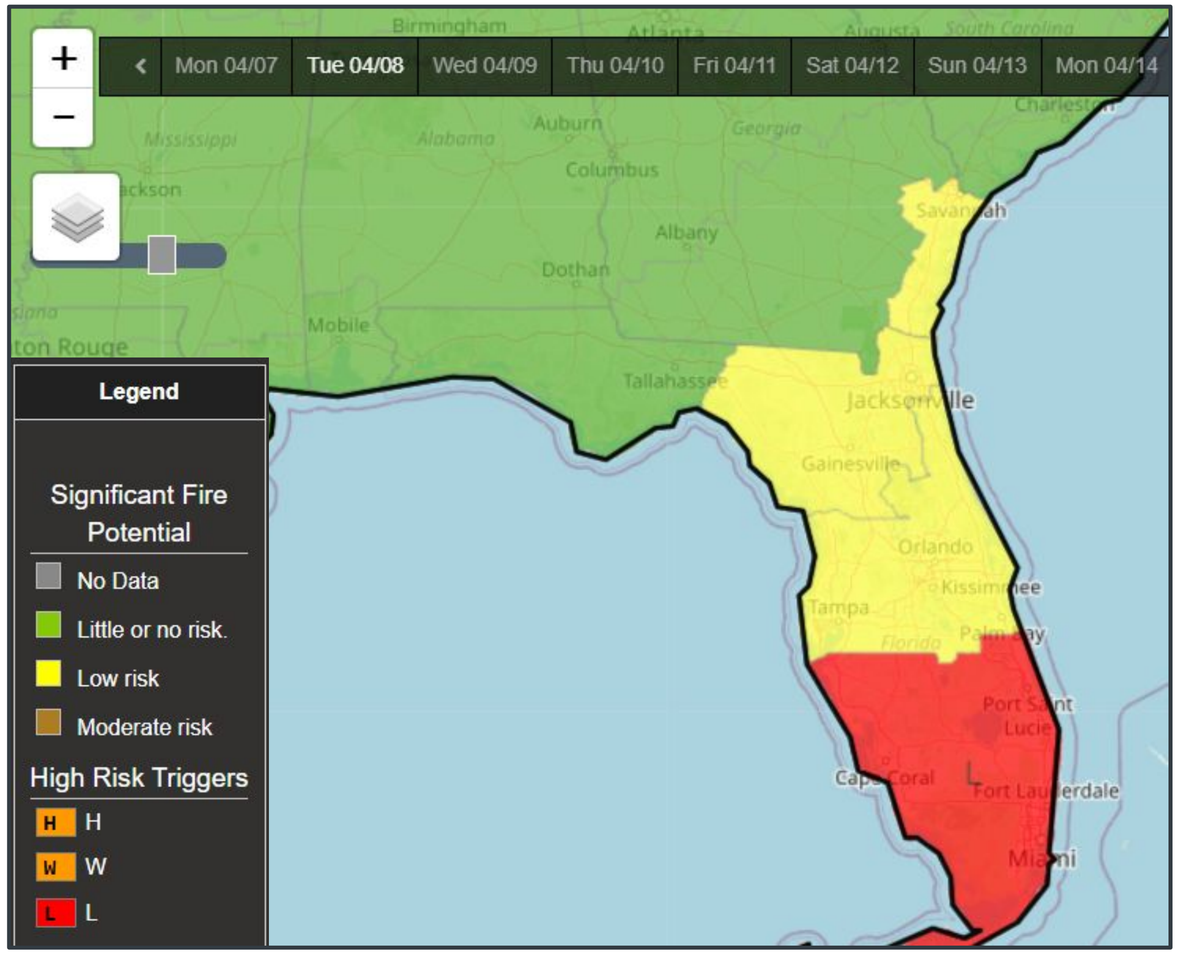
Thresholds Vary Regionally

Southeast GA

- Wind: 15+ MPH or Gusts 25+ mph
- Humidity: 25% or lower
- Fuel: 10-hour Fuel Moisture under 6%

Northeast FL

- Wind: 15+ MPH (gusts not considered)
- Humidity: 28% or lower
- Fuel: Fire Potential “Moderate” or “High” Risk



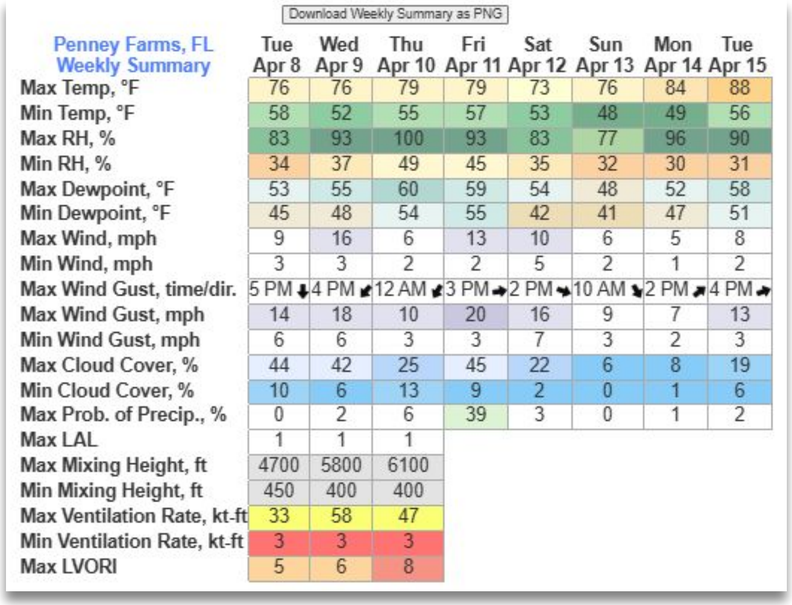
Available Fire Weather Intelligence (at your disposal)

Fire Weather Hub

https://www.weather.gov/jax/fire

Forecasts, Guidance, Fuel, and Outlook intel

Fire Weather Dashboard



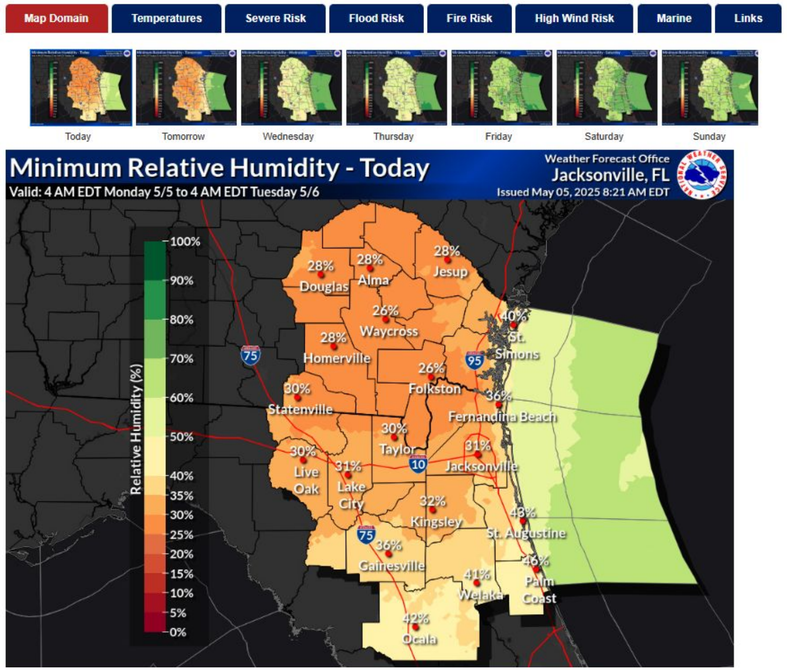
Penney Farms, FL Weekly Summary

	Tue Apr 8	Wed Apr 9	Thu Apr 10	Fri Apr 11	Sat Apr 12	Sun Apr 13	Mon Apr 14	Tue Apr 15
Max Temp, °F	76	76	79	79	73	76	84	88
Min Temp, °F	58	52	55	57	53	48	49	56
Max RH, %	83	93	100	93	83	77	96	90
Min RH, %	34	37	49	45	35	32	30	31
Max Dewpoint, °F	53	55	60	59	54	48	52	58
Min Dewpoint, °F	45	48	54	55	42	41	47	51
Max Wind, mph	9	16	6	13	10	6	5	8
Min Wind, mph	3	3	2	2	5	2	1	2
Max Wind Gust, time/dir.	5 PM ↓	4 PM ↙	12 AM ↙	3 PM →	2 PM ↘	10 AM ↘	2 PM ↗	4 PM →
Max Wind Gust, mph	14	18	10	20	16	9	7	13
Min Wind Gust, mph	6	6	3	3	7	3	2	3
Max Cloud Cover, %	44	42	25	45	22	6	8	19
Min Cloud Cover, %	10	6	13	9	2	0	1	6
Max Prob. of Precip., %	0	2	6	39	3	0	1	2
Max LAL	1	1	1					
Max Mixing Height, ft	4700	5800	6100					
Min Mixing Height, ft	450	400	400					
Max Ventilation Rate, kt-ft	33	58	47					
Min Ventilation Rate, kt-ft	3	3	3					
Max LVORI	5	6	8					

https://www.weather.gov/jax/fire

Located under Fire Weather Support

Probabilistic Fire Weather Intel



https://www.weather.gov/jax/graphics

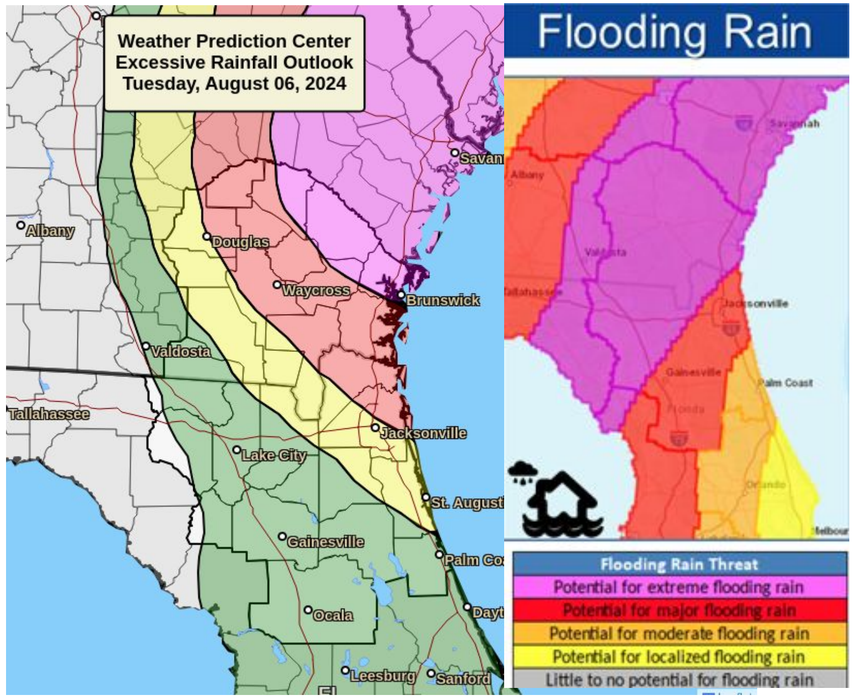
Assess Wind and Low Humidity Chance

Flood Risk Tools & Products

Communicating Flooding Rainfall Risk

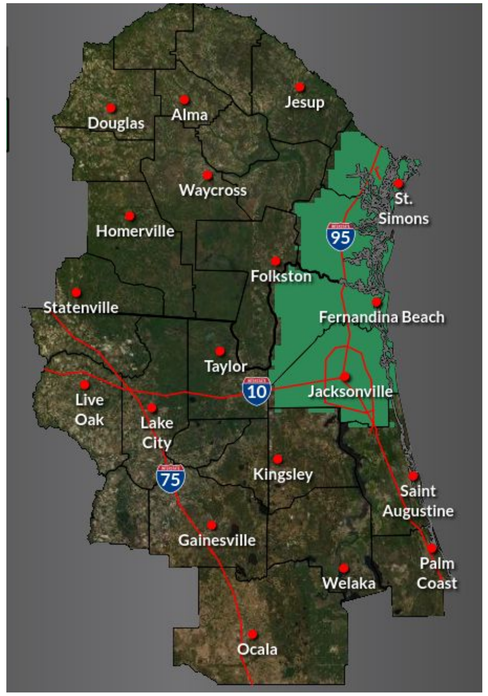
Days in Advance

Excessive Rainfall Outlooks



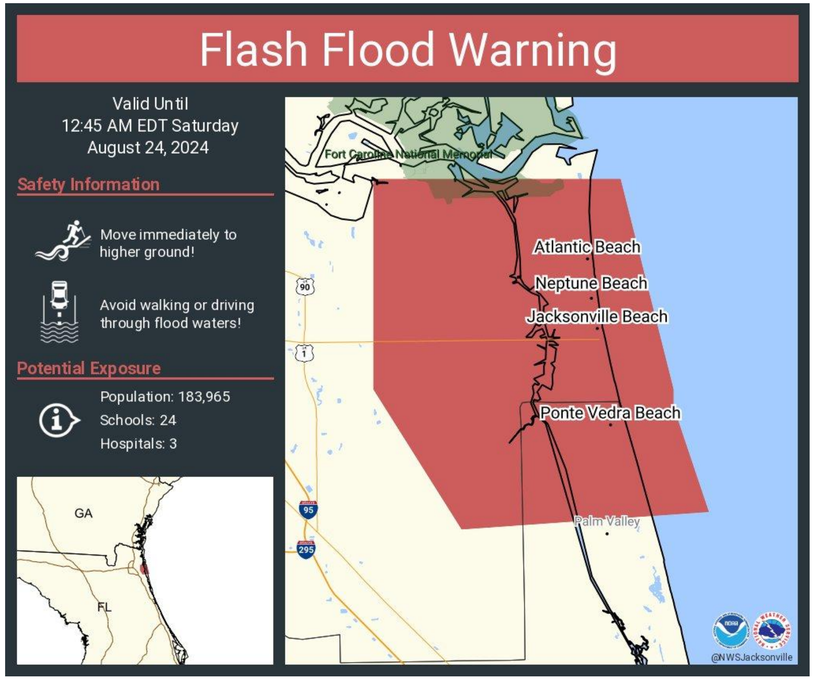
1-2 Days in Advance

Flood Watches



Imminent Flooding

Flood Warnings

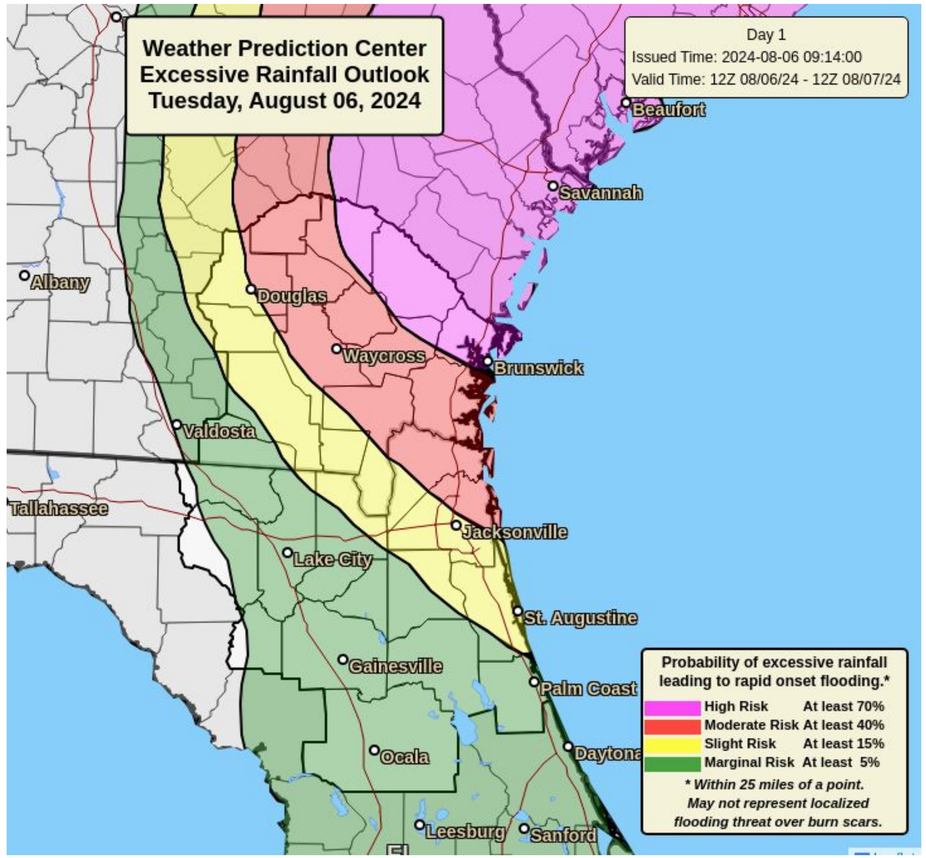


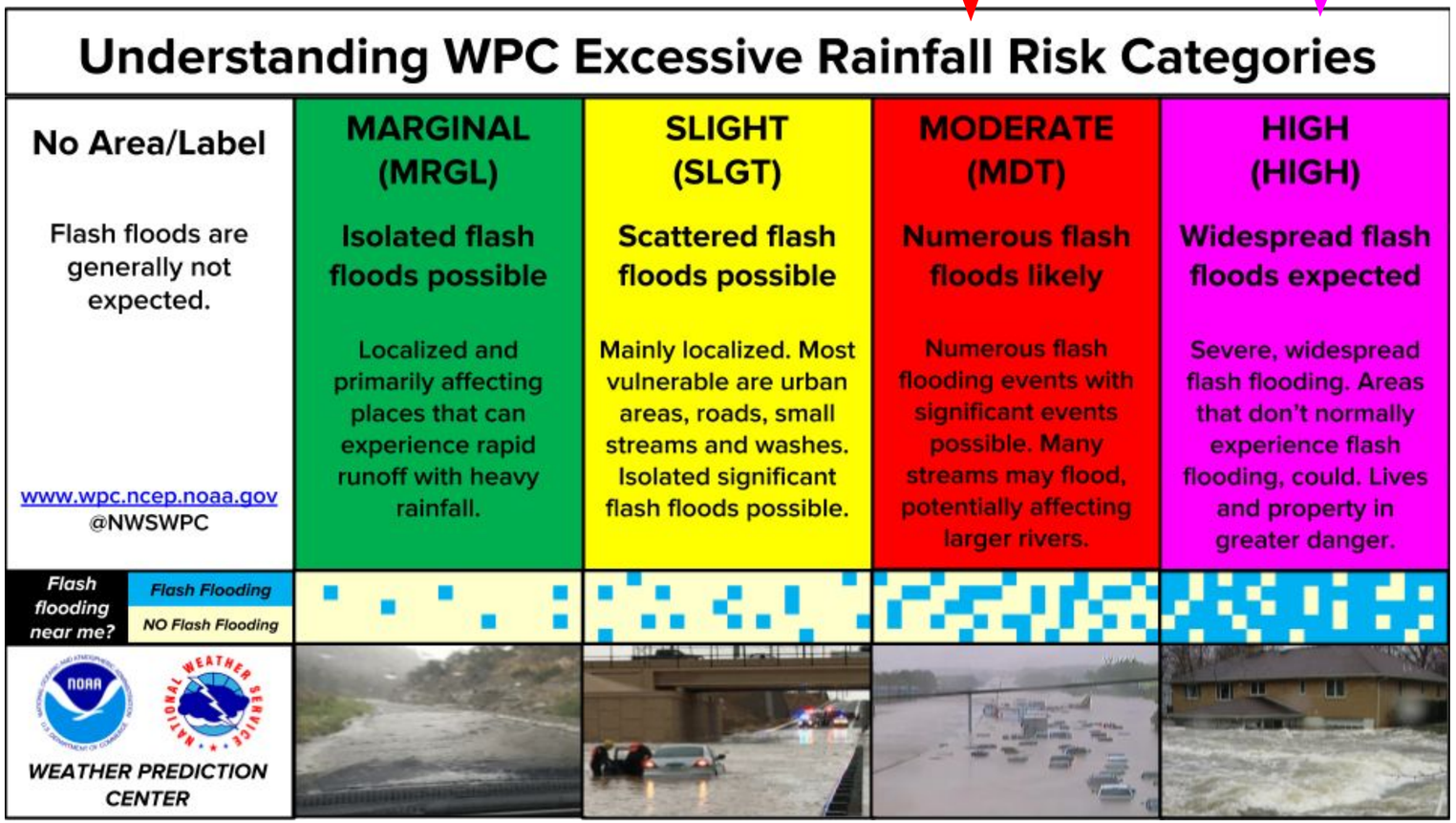
Excessive Rainfall Outlooks

https://www.wpc.ncep.noaa.gov

Only issued 19 times for NWS JAX area over past 8 years

Only issued 6 times for NWS JAX area over past 8 years (all for Tropical Cyclones)





Flood Products

Product	Meaning & Issuance Timing	WEA Activation
Flood Advisory	• Elevated stream flow, ponding water, rainfall accumulation warrants public attention – nuisance flooding • Imminent hazard	NO
Flood Watch	• Elevated confidence of Flash Flood Guidance being exceeded • Issued hours to days in advance of threat – confidence driven	NO
Flood Warning	• Rainfall flooding imminent or expected with a more gradual accumulation of flood water that threatens property • Flooding imminent seek elevated shelter immediately	NO

Flash Flood Warnings

BASE
No WEA

CONSIDERABLE
WEA
1-2 Rescues

CATASTROPHIC
WEA
Swift Water Rescues

- ➔ Fast accumulation of water that threatens life & property
- ➔ Seek elevated shelter immediately
- ➔ Warning forecaster assigns flash flood severity - Coordination with emergency responders needed

Flash Flood Warnings

BASE
No WEA

CONSIDERABLE
WEA
1-2 Rescues

CATASTROPHIC
WEA
Swift Water Rescues

➔ Base Flash Flood Warning

➔ Rapid rise of flood water is expected to threaten life & property

➔ Does NOT Activate WEA

Flash Flood Warnings

BASE
No WEA

CONSIDERABLE
WEA
1-2 Rescues

CATASTROPHIC
WEA
Swift Water Rescues

➔ Considerable Tag: 1-2 Rescues

➔ Activates WEA

Flash Flood Warnings

BASE
No WEA

→

CONSIDERABLE
WEA
1-2 Rescues

→

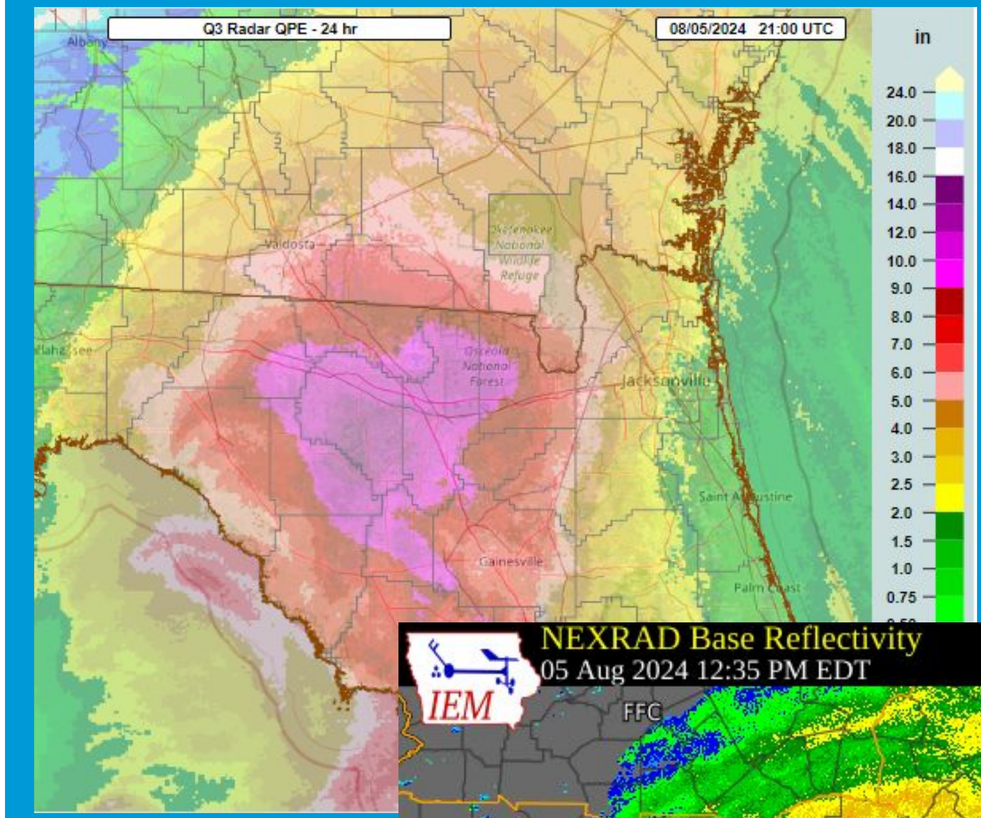
CATASTROPHIC
WEA
Swift Water Rescues

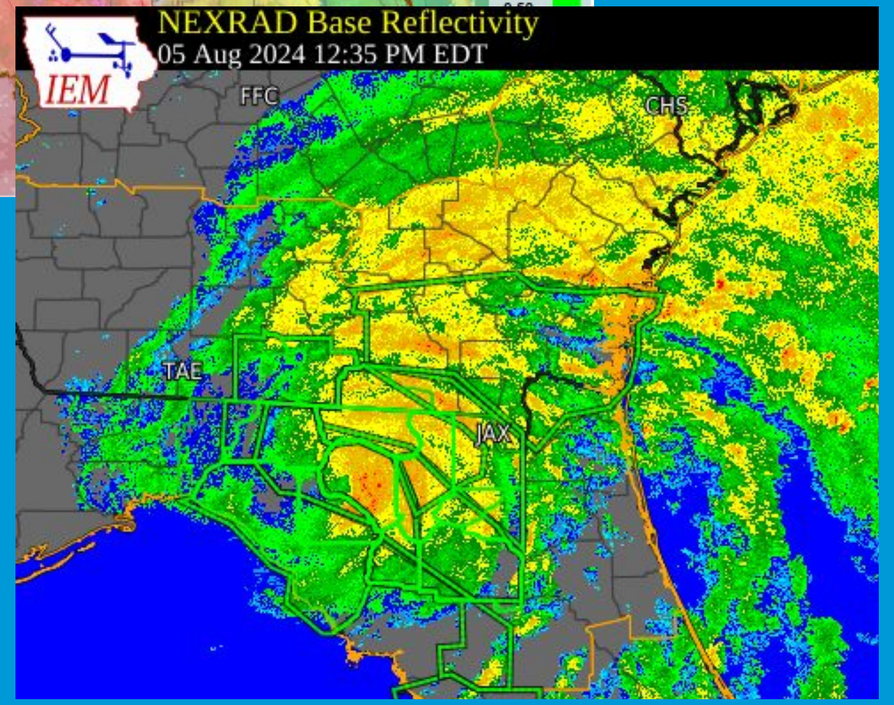
- ➔ Catastrophic Tag: Rare, violent flash floods that place people in danger due to rapidly rising flood waters.
- ➔ Activates WEA
- ➔ If severe threat to life & catastrophic damage, can include phrase FLASH FLOOD EMERGENCY
- ➔ Examples: Multiple swift water rescues, stream gages rising to major levels, total dam failure

2024 Debby Flooding Rain Impacts
Image c/o Jeff Davis EM

Flash Flood Warnings: Issuance Paradigm

- New for 2025: NWS JAX will issue **Flash Flood** Warnings during Thunderstorm Events (in lieu of Flood Warnings)
- More logical ramp-up for life-threatening flash flooding and ability to utilize WEA
- Flood Warnings will still be used as needed for post-thunderstorm impacts and gradually receding flood Situations



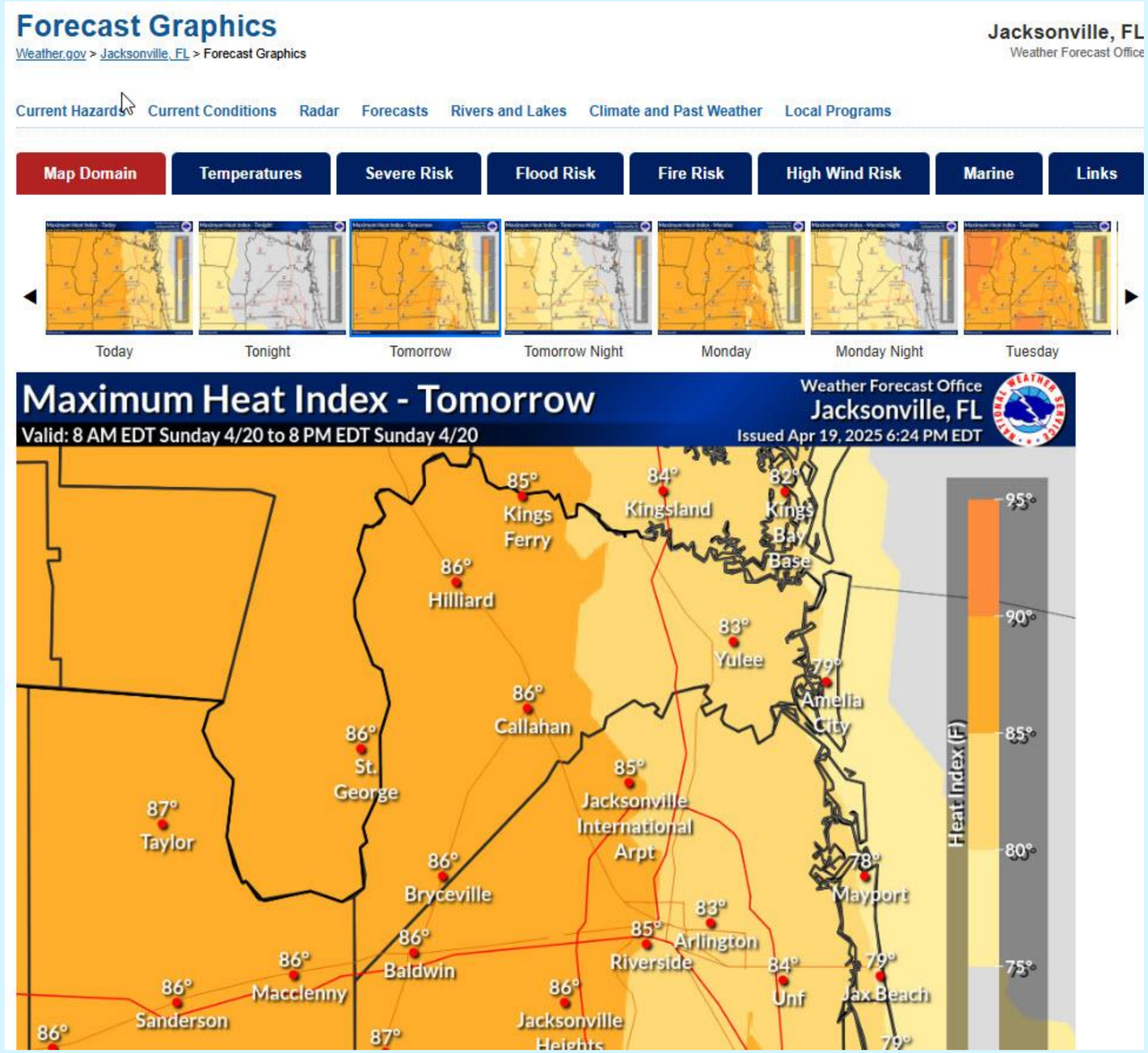


Debby 2024 Rainfall & Flash Flood Warnings

New NWS JAX Graphics Hub - regional & local

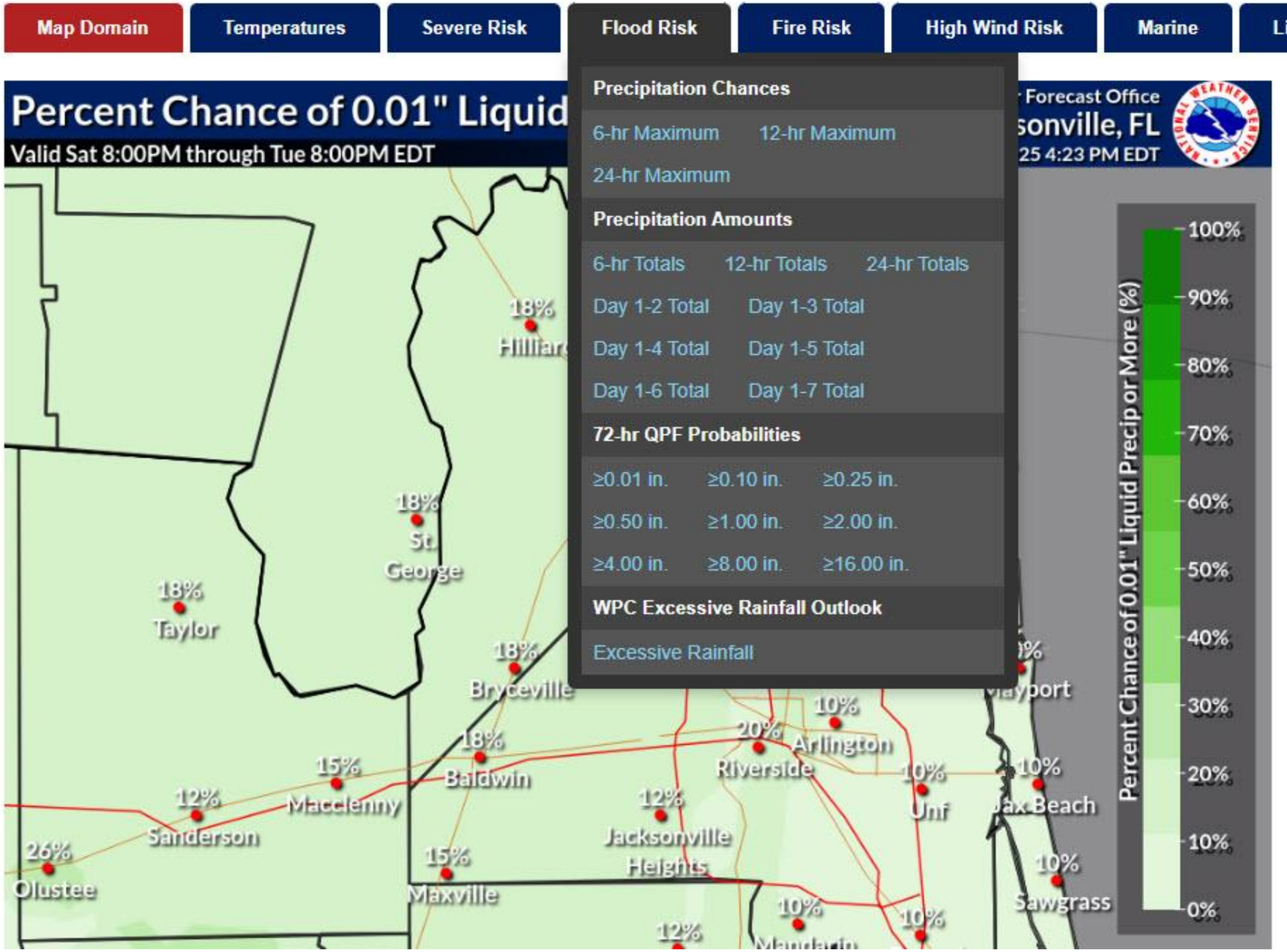
JAX Graphics

https://www.weather.gov/jax/graphics



New NWS JAX Graphics Hub

JAX Graphics



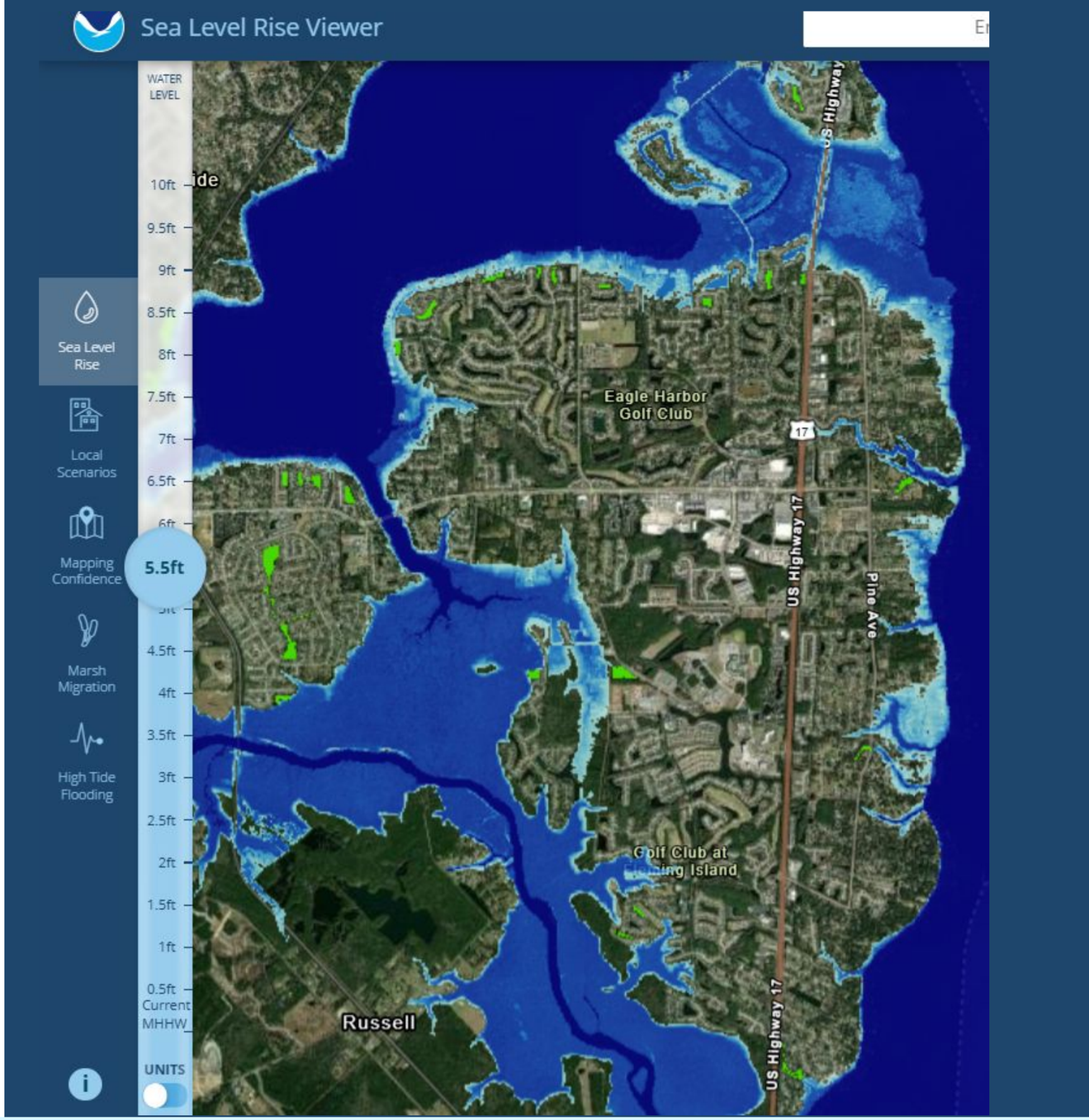
Climate Trend Tools

Sea Level Rise Viewer

- ➔ Helps visualize “What Gets Wet” with coastal flooding & sea level rise
- ➔ Indication of storm surge inundation potential

SEA LEVEL VIEWER

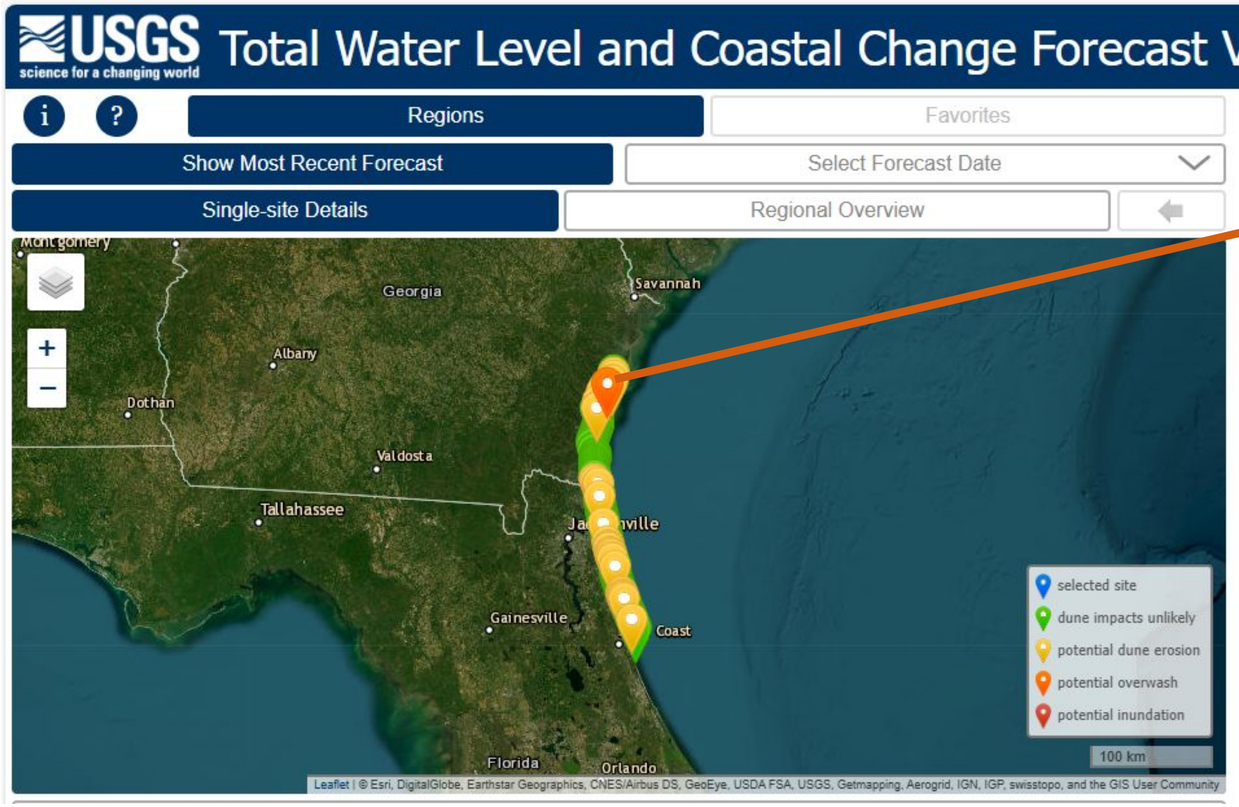
https://coast.noaa.gov/digitalcoast/tools/slr.html

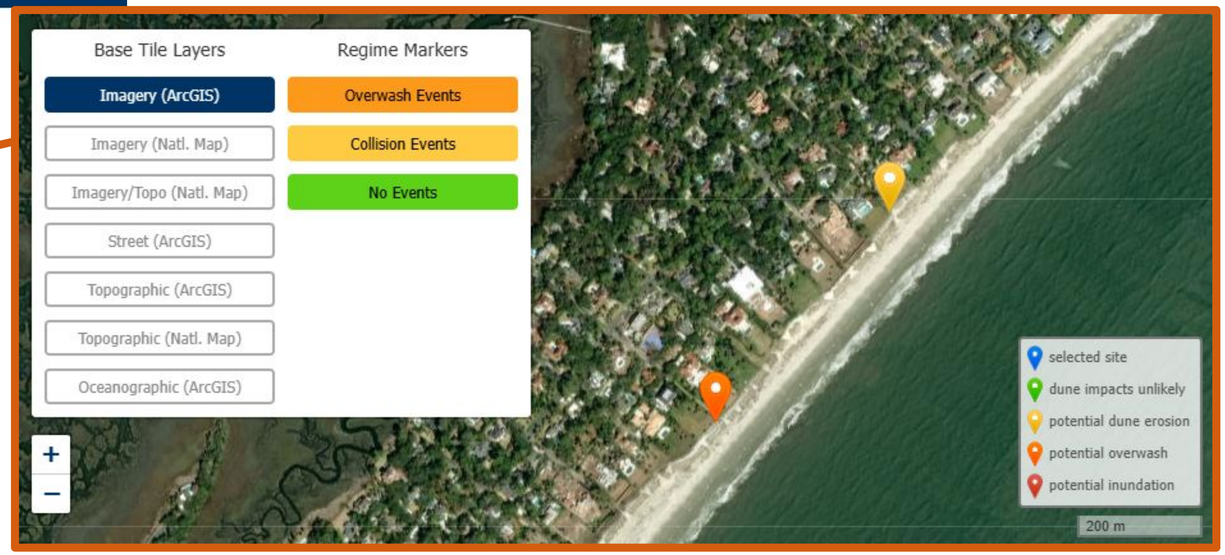


Coastal Vulnerability Assessment Tool

- ➔ Event driven - combination of tides, surge & wave runup
- ➔ Output is estimate of elevation where ocean meets coast & provides guidance on potential erosion & flooding

Coastal Vulnerability





https://coastal.er.usgs.gov/development/gittens/hurricanes/research/twlviewer/

Flood Frequency Terms

200 year ARI or 0.5% AEP are different ways to describe the SAME event

Average Recurrence Interval (ARI)

- Average time between floods of a certain size
- Large, infrequent floods have higher ARIs than smaller floods|
- A 200 year ARI flood will occur, on average, every 200 years
- A 200 year ARI flood has a 1-in-200 chance of occurring in a given year

Annual Exceedance Probability (AEP)

- Probability of a certain size flood in a single year
- AEP is the inverse of ARI
- **200 year ARI = 1-in-200 chance of occurring in a given year = 1/200 = 0.005 x 100 = 0.50% AEP**

Atlas Project

- Locations specific precipitation frequency estimates (1 in XXXX year flood)
- Can help with flood water mitigation projects

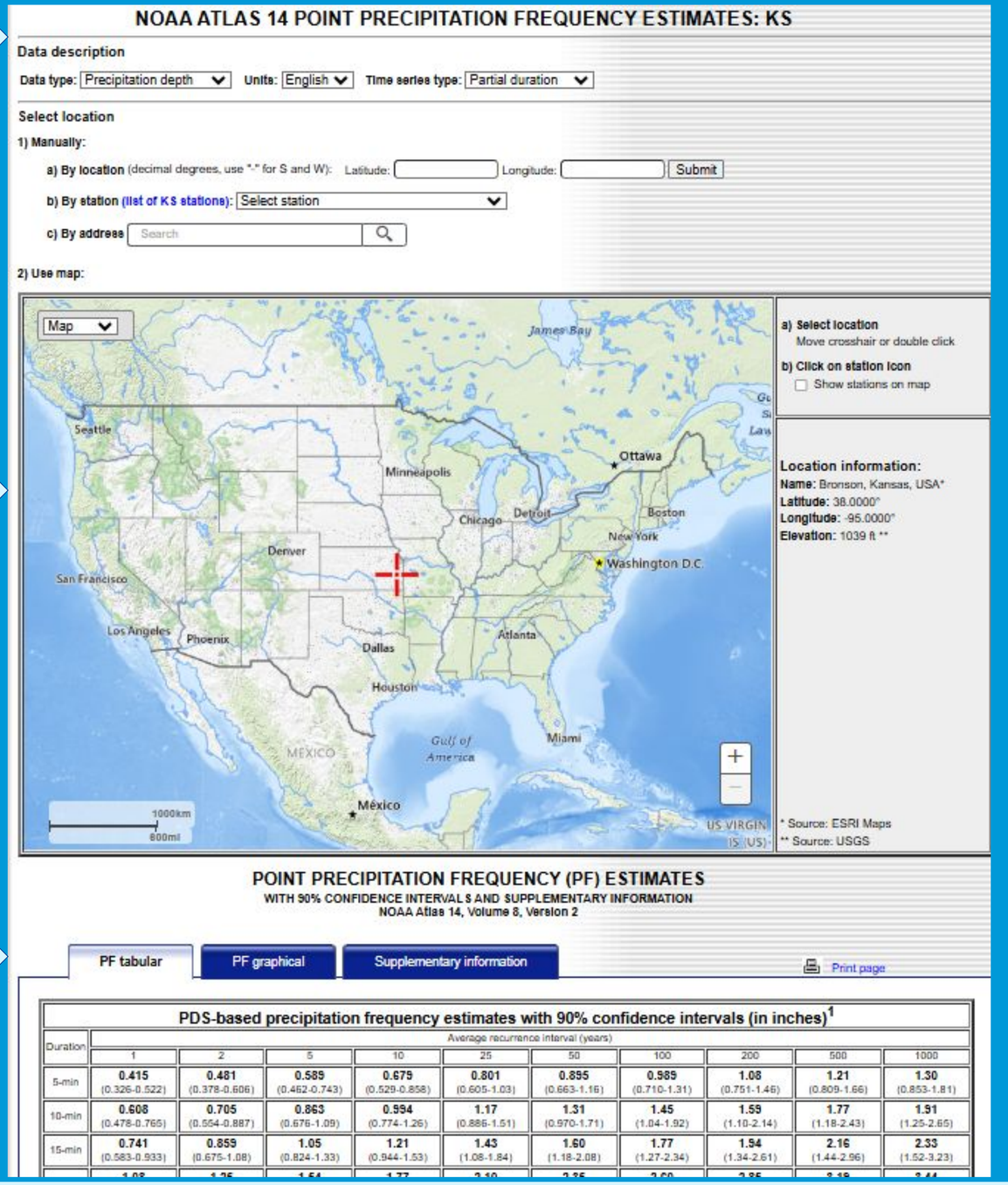
ATLAS 14

https://hdsc.nws.noaa.gov/pfds/pfds_map_cont.html

Data Request

Choose Location

Output



Data Description Parameters:

Data Type: **Precipitation Depth** (Accumulation) Time Series Type: **Partial Duration**

PF tabular | PF graphical | Supplementary information

PDS-based precipitation frequency estimates with 90% confidence inte

Duration	Average recurrence interval (years)						
	1	2	5	10	25	50	100
5-min	**0.545** (0.447-0.666)	**0.627** (0.514-0.767)	**0.760** (0.620-0.932)	**0.868** (0.704-1.07)	**1.01** (0.790-1.29)	**1.12** (0.856-1.45)	**1.23** (0.905-1.64)
10-min	**0.798** (0.654-0.975)	**0.919** (0.752-1.12)	**1.11** (0.908-1.36)	**1.27** (1.03-1.57)	**1.48** (1.16-1.88)	**1.65** (1.25-2.13)	**1.80** (1.32-2.40)
15-min	**0.973** (0.798-1.19)	**1.12** (0.917-1.37)	**1.36** (1.11-1.66)	**1.55** (1.26-1.91)	**1.81** (1.41-2.30)	**2.01** (1.53-2.59)	**2.20** (1.62-2.92)
30-min	**1.44** (1.18-1.76)	**1.67**	**2.04**	**2.33**	**2.74**	**3.04**	**3.34** (2.45-4.42)
60-min	**1.92** (1.57-2.34)						**4.55** (3.35-6.09)
2-hr	**2.40** (1.98-2.90)						**5.77** (4.29-7.69)
3-hr	**2.68** (2.23-3.23)						**6.66** (4.99-8.88)
6-hr	**3.14** (2.63-3.75)	**3.55** (2.97-4.25)	**4.34** (3.62-5.21)	**5.10** (4.22-6.15)	**6.30** (5.11-8.06)	**7.34** (5.78-9.51)	**8.50** (6.43-11.3)
12-hr	**3.57** (3.02-4.24)	**4.15** (3.50-4.93)	**5.24** (4.40-6.23)	**6.26** (5.23-7.49)	**7.85** (6.41-9.96)	**9.22** (7.30-11.8)	**10.7** (8.17-14.1)

1.55” = Median

(1.26-1.91) = 90 percent confidence range

1.26” = 5th percentile

1.19 = 95th percentile

Interpretation

Rainfall accumulation of 1.55” in 15 minutes has a recurrence interval of 10 years at this location.

Data Description Parameters:

Data Type: **Precipitation Depth** (Accumulation) Time Series Type: **Annual Maximum**

PF tabular | PF graphical | Supplementary information

AMS-based precipitation frequency estimates with 90% confidence inte

Duration	Annual exceedance probability (1/years)					
	1/2	1/5	1/10	1/25	1/50	1/100
5-min	**0.586** (0.480-0.716)	**0.743** (0.607-0.911)	**0.860** (0.697-1.06)	**1.01** (0.787-1.28)	**1.12** (0.855-1.45)	**1.23** (0.904-1.64)
10-min	**0.858** (0.703-1.05)	**1.09** (0.888-1.33)	**1.26** (1.02-1.55)	**1.48** (1.15-1.88)	**1.64** (1.25-2.12)	**1.80** (1.32-2.39)
15-min	**1.05** (0.857-1.28)	**1.33** (1.08-1.63)	**1.54** (1.25-1.89)	**1.80** (1.40-2.29)	**2.00** (1.53-2.59)	**2.20** (1.62-2.92)
30-min	**1.55** (1.27-1.90)	**1.99** (1.62-2.44)	**2.31** (1.88-2.85)	**2.73** (2.12-3.46)	**3.03** (2.31-3.91)	**3.34** (2.45-4.42)
60-min	**2.05** (1.68-2.51)	**2.59** (2.12-3.18)	**3.02** (2.45-3.72)	**3.61** (2.83-4.62)	**4.07** (3.11-5.30)	**4.55** (3.35-6.08)
2-hr	**2.55** (2.11-3.09)					
3-hr	**2.84** (2.36-3.43)					
6-hr	**3.34** (2.79-3.99)					
12-hr	**3.85** (3.25-4.57)					

Interpretation

60 minute rainfall accumulation of 3.61” is a 1 in 25 year event at this location, or has a 4% chance of occurrence in any given year.

3.61” = Median

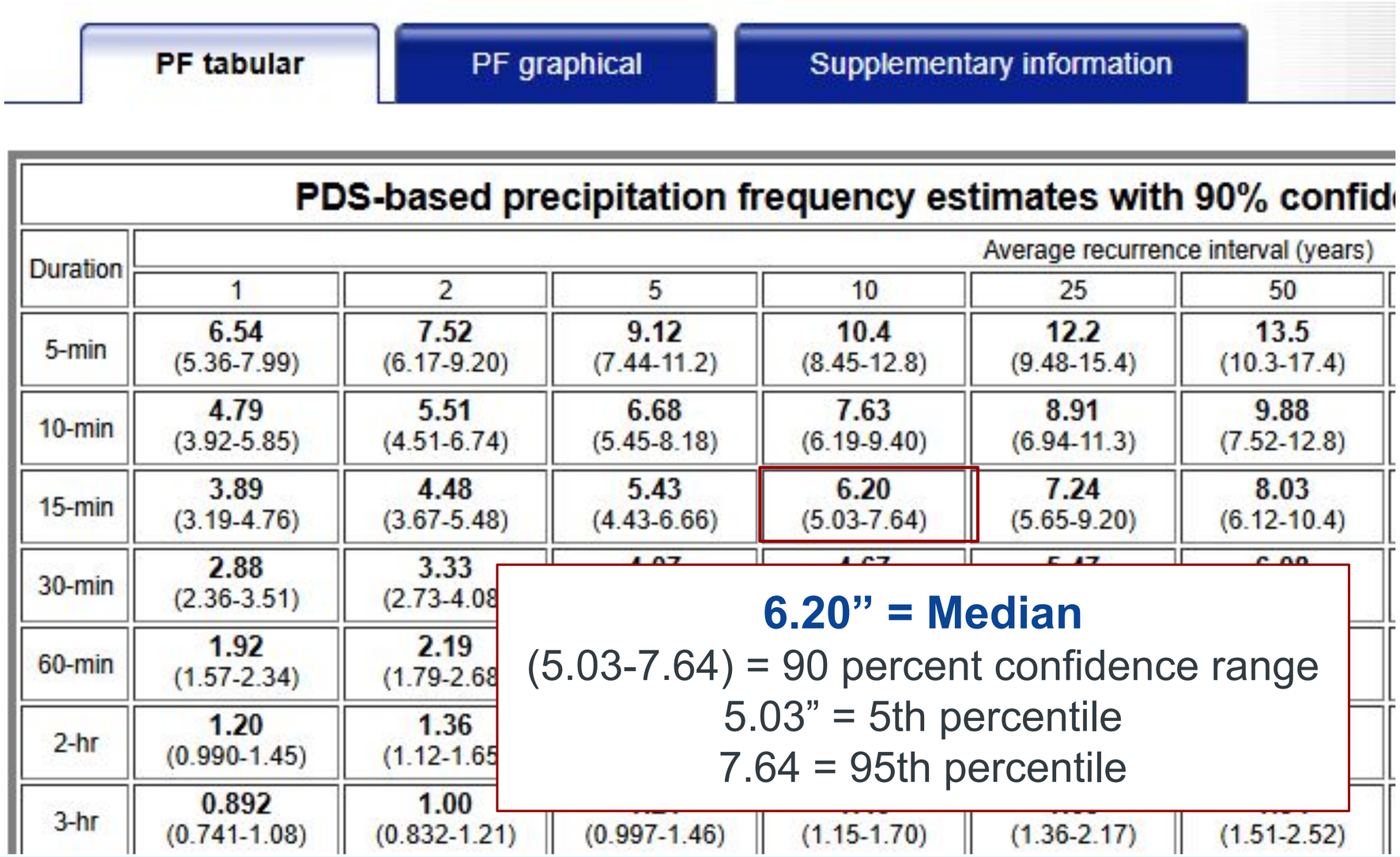
(2.83-4.62) = 90 percent confidence range

2.83” = 5th percentile

4.62 = 95th percentile

Data Description Parameters:

Data Type: **Precipitation Intensity** (Hourly Rate) Time Series Type: **Partial Duration**



PF tabular | PF graphical | Supplementary information

PDS-based precipitation frequency estimates with 90% confid

Duration	Average recurrence interval (years)					
	1	2	5	10	25	50
5-min	**6.54** (5.36-7.99)	**7.52** (6.17-9.20)	**9.12** (7.44-11.2)	**10.4** (8.45-12.8)	**12.2** (9.48-15.4)	**13.5** (10.3-17.4)
10-min	**4.79** (3.92-5.85)	**5.51** (4.51-6.74)	**6.68** (5.45-8.18)	**7.63** (6.19-9.40)	**8.91** (6.94-11.3)	**9.88** (7.52-12.8)
15-min	**3.89** (3.19-4.76)	**4.48** (3.67-5.48)	**5.43** (4.43-6.66)	**6.20** (5.03-7.64)	**7.24** (5.65-9.20)	**8.03** (6.12-10.4)
30-min	**2.88** (2.36-3.51)	**3.33** (2.73-4.08				
60-min	**1.92** (1.57-2.34)	**2.19** (1.79-2.68				
2-hr	**1.20** (0.990-1.45)	**1.36** (1.12-1.65				
3-hr	**0.892** (0.741-1.08)	**1.00** (0.832-1.21)	(0.997-1.46)	(1.15-1.70)	(1.36-2.17)	(1.51-2.52)

6.20” = Median

(5.03-7.64) = 90 percent confidence range

5.03” = 5th percentile

7.64 = 95th percentile

Interpretation

A rainfall rate of 6.20” in 15 minutes has a recurrence interval of 10 years at this location.

Data Description Parameters:

Data Type: **Precipitation Intensity** (Hourly Rate) Time Series Type: **Annual Maximum**

PF tabular | PF graphical | Supplementary information

AMS-based precipitation frequency estimates with 90% confidence interv

Duration	Annual exceedance probability (1/years)					
	1/2	1/5	1/10	1/25	1/50	1/100
5-min	**7.03** (5.76-8.59)	**8.92** (7.28-10.9)	**10.3** (8.36-12.7)	**12.1** (9.44-15.4)	**13.5** (10.3-17.4)	**14.8** (10.8-19.6)
10-min	**5.15** (4.22-6.29)	**6.53** (5.33-8.00)	**7.55** (6.13-9.30)	**8.88** (6.91-11.3)	**9.86** (7.51-12.7)	**10.8** (7.94-14.4)
15-min	**4.18** (3.43-5.12)	**5.31** (4.33-6.50)	**6.14** (4.98-7.56)	**7.22** (5.62-9.15)	**8.02** (6.10-10.3)	**8.80** (6.46-11.7)
30-min	**3.10** (2.54-3.79)	**3.98** (3.25-4.87)	**4.62** (3.75-5.69)	**5.45** (4.24-6.91)	**6.07** (4.62-7.83)	**6.67** (4.89-8.84)
60-min	**2.05** (1.68	**2.59**	**3.02**	**3.61**	**4.07**	**4.55** (3.35-6.08)
2-hr	**1.** (1.05					**2.88** (2.15-3.84)
3-hr	**0.** (0.785					**2.22** (1.66-2.96)
6-hr	**0.** (0.466					**1.42** (1.07-1.88)

4.62” = Median

(3.75-5.69) = 90 percent confidence range

3.75” = 5th percentile

5.69 = 95th percentile

Interpretation

A 30 minute rainfall rate of 4.62” is a 1 in 10 year event at this location, or has a 10% chance of occurrence in any given year.

Atlas 14 Now → Atlas 15 in 2026

https://water.noaa.gov/about/atlas15

- ➔ Presented as Exceedance Probabilities
- ➔ Spatially continuous coverage over the U.S.
- ➔ Will account for future temporal trends (through 2100)

Annual Exceedance Probability (%)							
☐	**Duration**	**50%** ☐	**20%** ☐	**10%** ☐	**4%** ☐	**2%** ☐	**1%** ☐
☐	60 minutes	**0.499** (0.446 - 0.549)	**0.729** (0.64 - 0.818)	**0.919** (0.793 - 1.05)	**1.21** (1.02 - 1.41)	**1.48** (1.22 - 1.75)	**1.79** (1.45 - 2.16)
☐	120 minutes	**0.619** (0.563 - 0.675)	**0.841** (0.747 - 0.937)	**1.01** (0.888 - 1.15)	**1.3** (1.11 - 1.51)	**1.56** (1.31 - 1.84)	**1.86** (1.53 - 2.24)
☐	3 hours	**0.71** (0.649 - 0.771)	**0.951** (0.851 - 1.06)	**1.14** (1 - 1.28)	**1.43** (1.23 - 1.64)	**1.68** (1.42 - 1.96)	**1.97** (1.64 - 2.35)
☐	6 hours	**0.89** (0.817 - 0.966)	**1.18** (1.07 - 1.31)	**1.4** (1.25 - 1.57)	**1.71** (1.5 - 1.95)	**1.96** (1.69 - 2.26)	**2.23** (1.9 - 2.62)

Atlas Job Sheets - NWS JAX DSS Page

NWS Jacksonville Decision Support Services

Immediate Support

NWS Jacksonville Operations
904-741-4370 extension 1

NWS Jacksonville Briefing

NWSChat2.0 by Slack
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About NWSChat

NWS Jacksonville

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Forecast Options (Choose Location)

- Point Forecast Dashboard
- Marine Dashboard
- Fire Weather Dashboard
- SPOT Forecast Request

Products & Services

- NWS JAX Met Watch (Met Watch Job Sheet)
- Graphical Hazardous Weather Outlook
- Regional Probabilistic Forecast Graphics (Job Sheet)
  Graphics of SE Georgia & NE Florida
- Local Probabilistic Forecast Graphics (Job Sheet)
  Downscaled, county level forecast graphics
- Atlas Precipitation Frequency Analysis (Job Sheet)

JAX DSS

Takeaways

Fire Weather: Basics, Tools, & Outlook

Significant Wildfire Risk Apr/May
Reduces in June - wet season

Flood Risk Tools & Products

Excessive Rain Outlooks
Flood & Flash Flood Products
More Flash Flood Warnings

Climate Trend Tools

Coastal Vulnerability Tool
Sea Level Rise Viewer
Atlas Precipitation Frequency

Working Together to Save Lives

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NWS JAX DECISION SUPPORT SERVICES

Planning forecasts, SPOTs,

Event Support Options

JAX DSS

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