

Disorganized Coastal Storm

November 10th and 11th, 2015

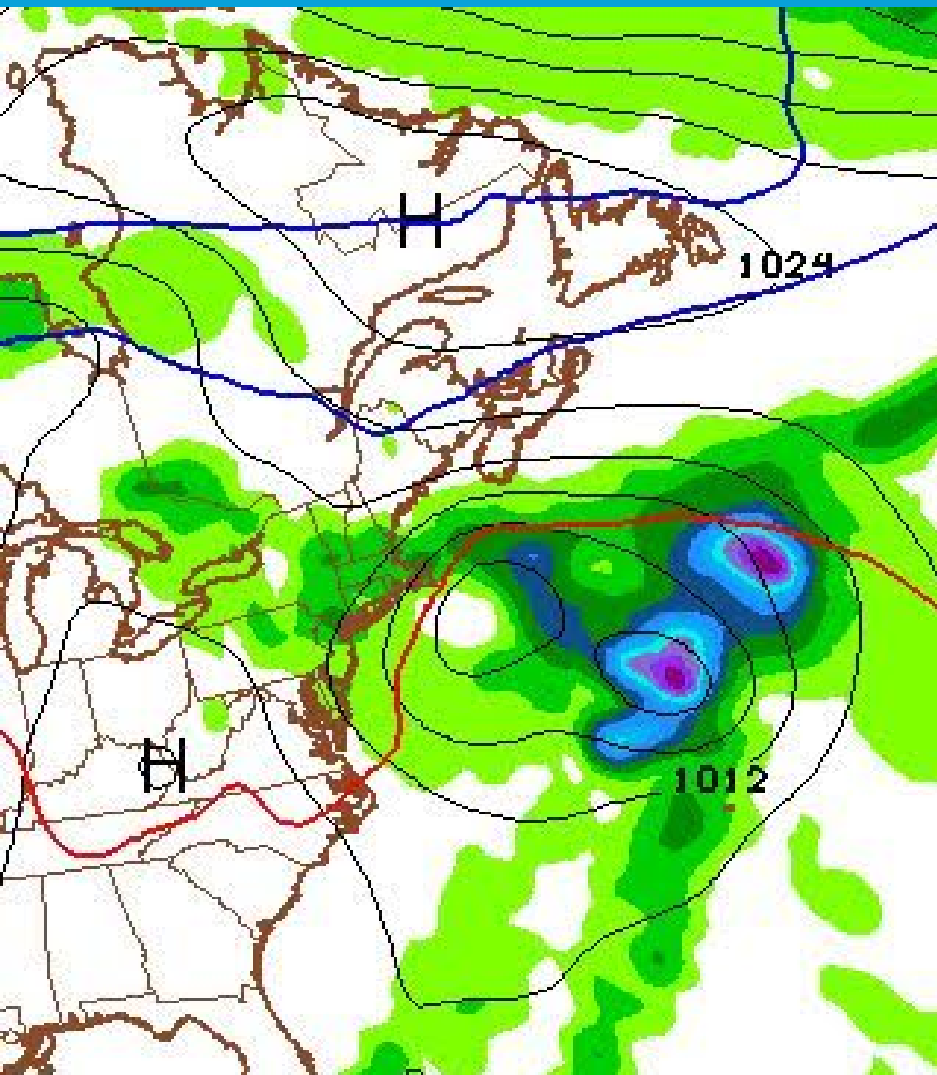
Hayden Frank

NOAA/National Weather Service

Taunton, MA

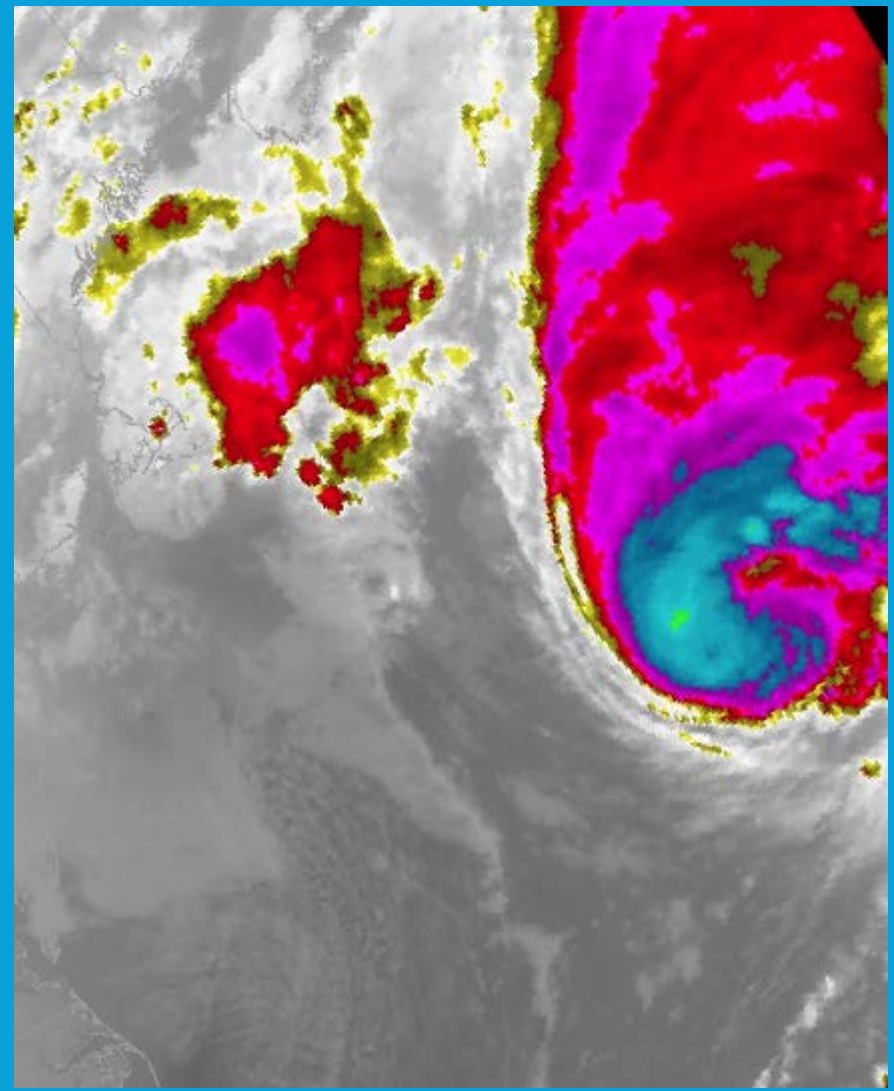


GFS Valid at 12z November 11th



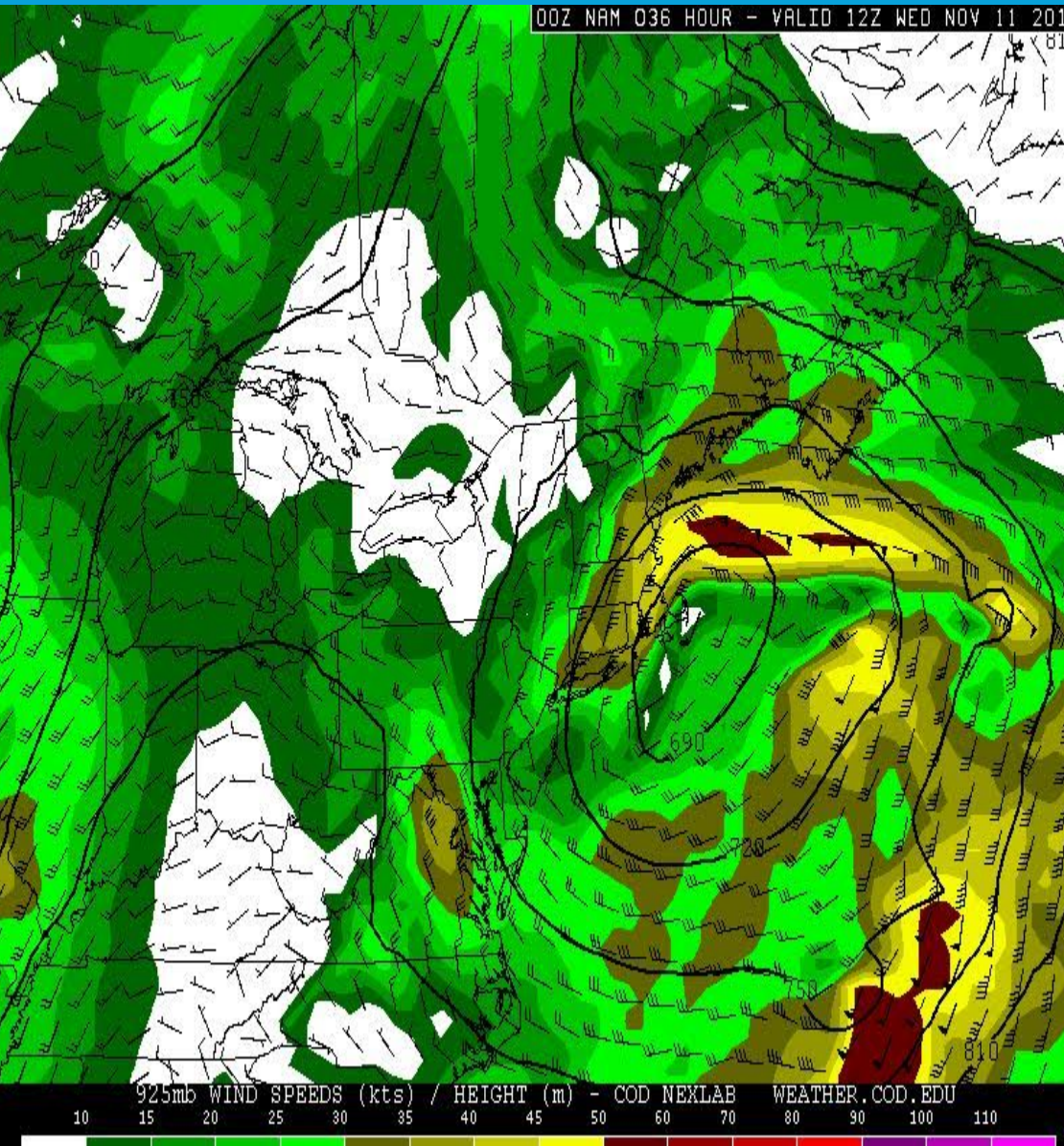
- GFS valid 12z on November 11th
- Surface low relatively weak
- Limited temp gradient/frontogenesis

Satellite Imagery at 12z November 11th



- Satellite Imagery at 12z
- Hurricane Kate robbing moisture from our coastal storm

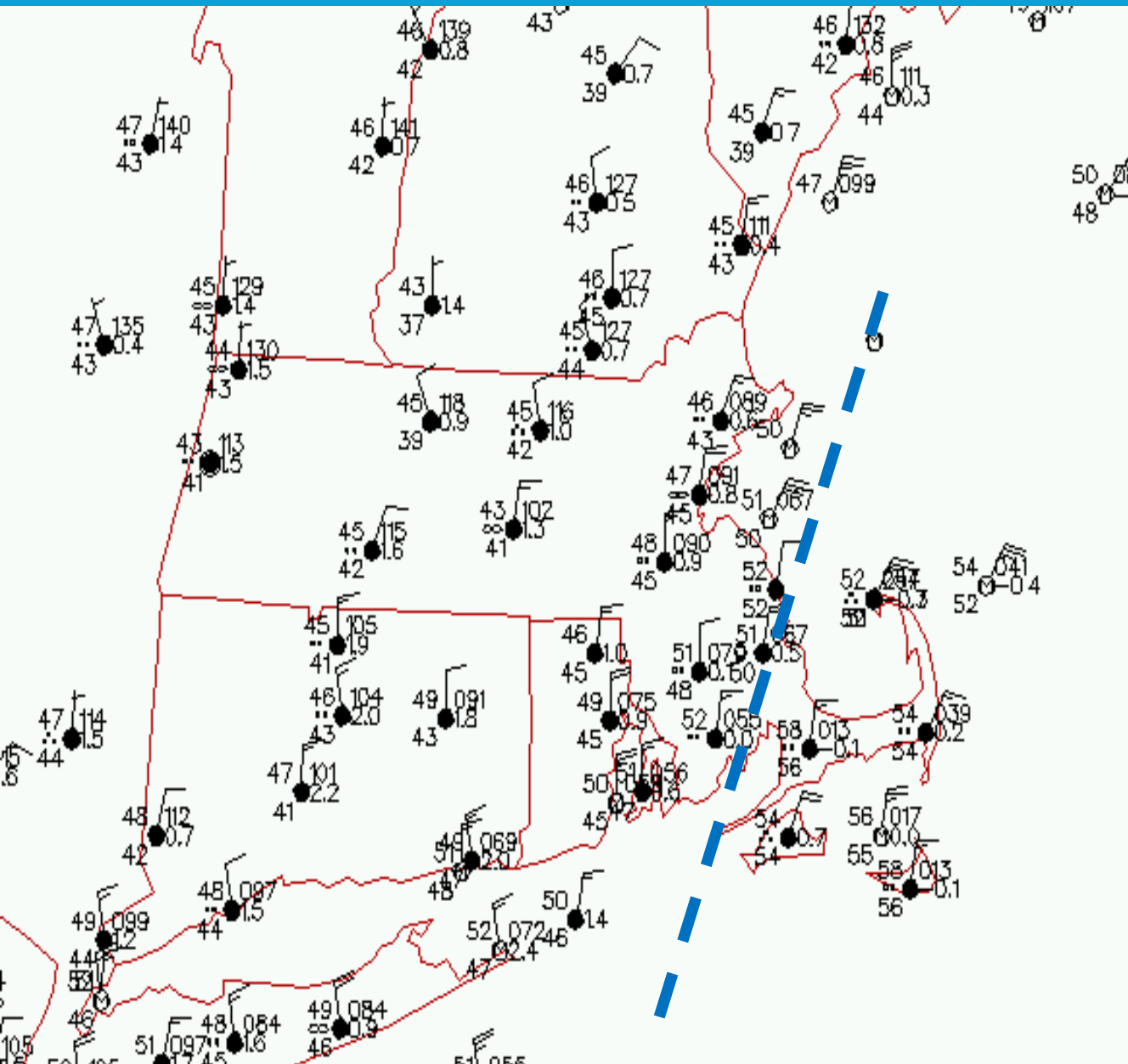
GFS 925MB Heights/Winds Valid 12z



925 MB Analysis

- North to Northeast at 40 to 50 knots along the coast
- Land/Sea Interface and subtle coastal front resulted in 1 to 2+ inch rainfall amounts across portions of Eastern Plymouth County
- Wind Advisory criteria confined to immediate coast

Subtle Coastal Front at 13z on November 11th



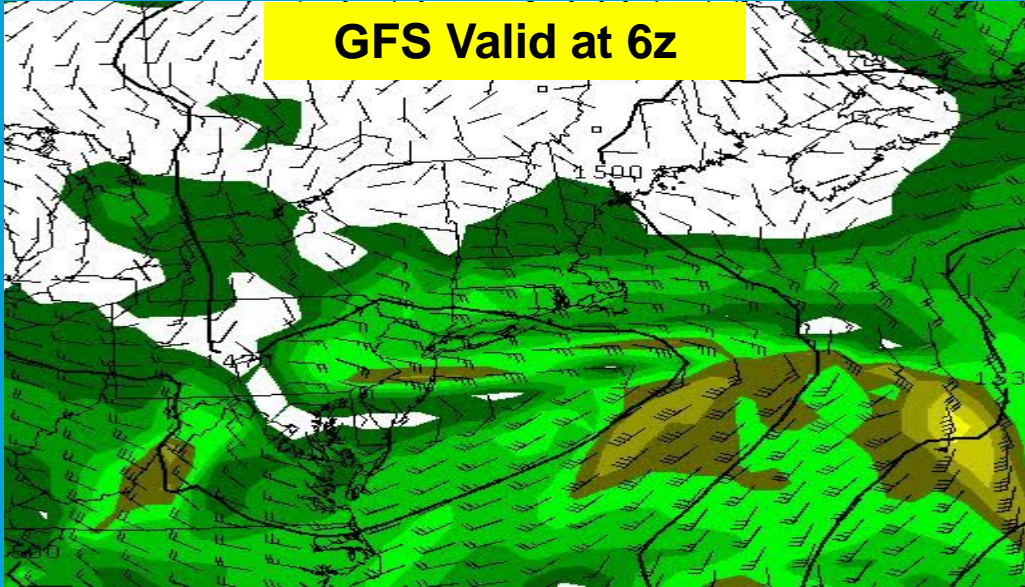
Surface Winds from 360 degrees north of boundary, while they were 020 to 030 degrees south of coastal front.

Temperatures in the upper 40s north of boundary with middle 50s south of front.

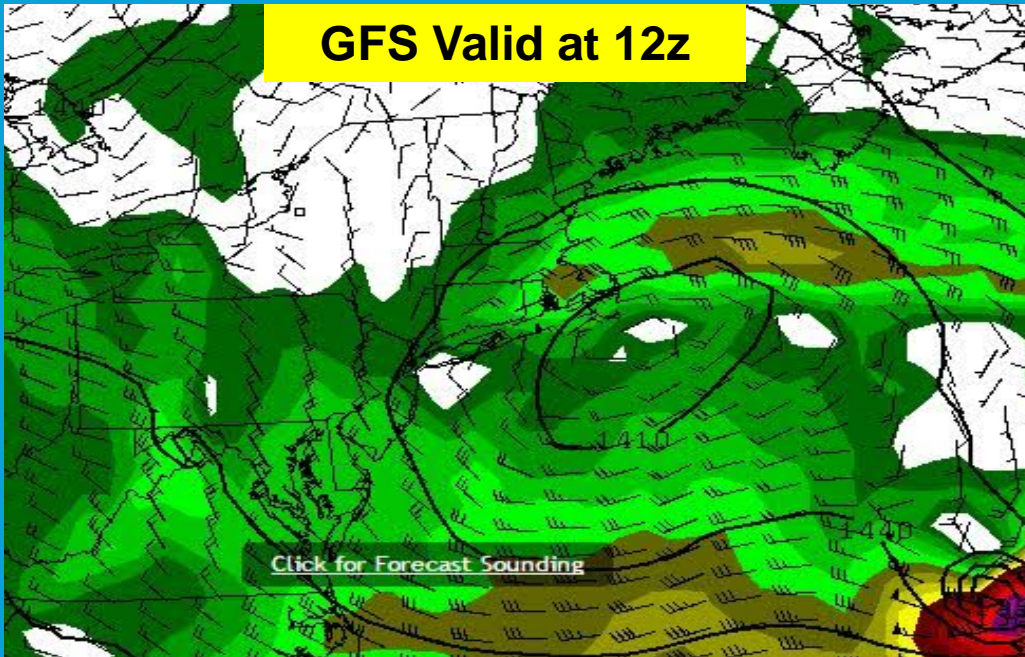
Land/Sea interface, coastal front, and surface temp differential lead to rainfall enhancement across Eastern Plymouth County.

GFS 850 MB Heights/Winds

GFS Valid at 6z



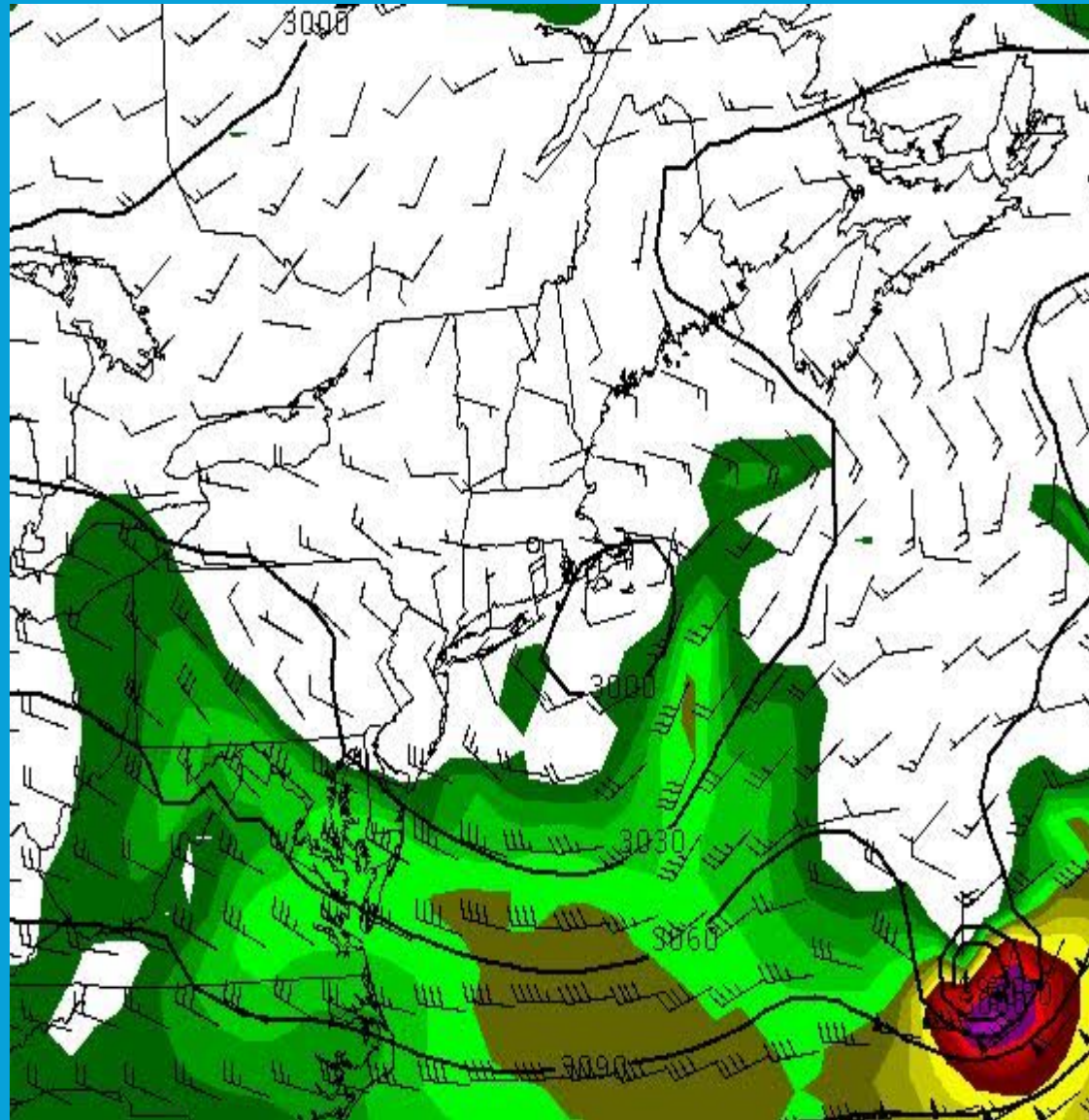
GFS Valid at 12z



Closed 850 MB Low

- **Modest 25 to 30 Knots of ENE flow mainly south of the MA turnpike and along the coast**
- **Band of heavier rain with 1 to 2.50" affected Cape Cod, just northwest of the 850 mb Low with better low level flow.**
- **Periods of disorganized showers across most other locations with lack of stronger mid level forcing/thermal gradient.**

GFS 700MB Heights/Winds Valid 12z

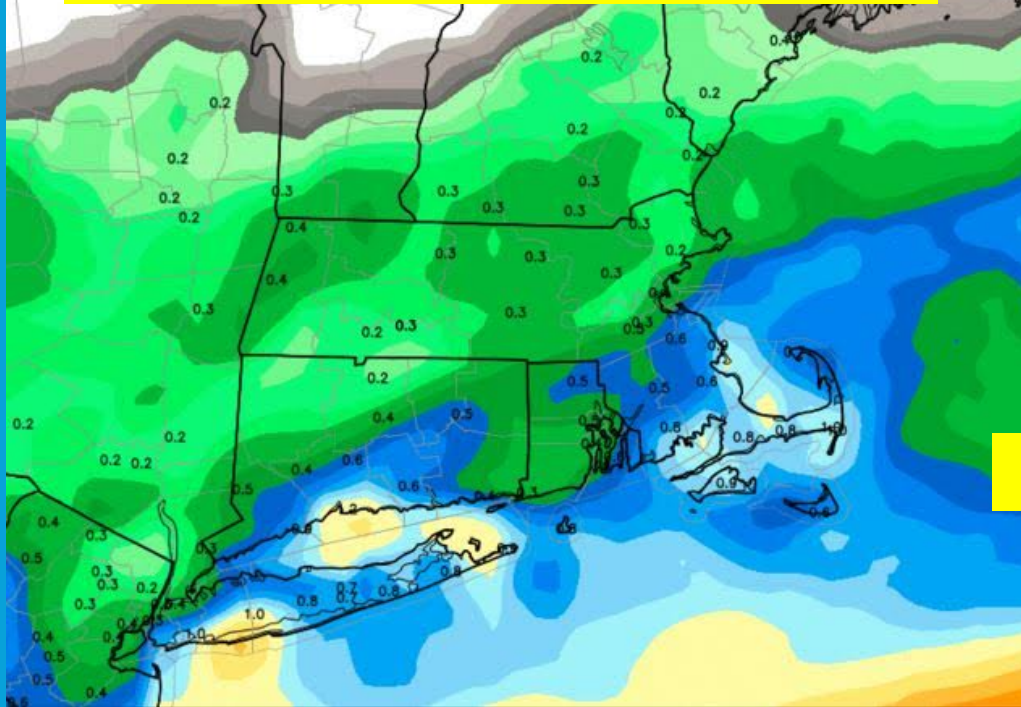


Closed 700 MB Low

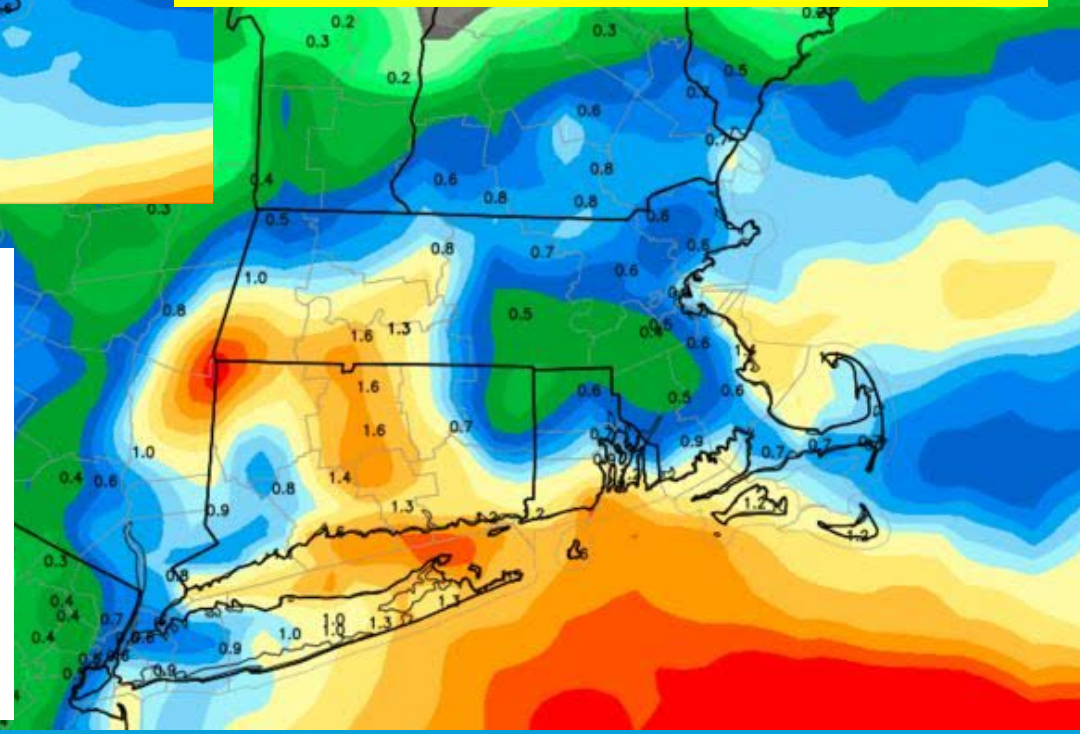
- Often a good sign for banding, but in this case very weak wind fields resulted in limited mid level forcing.
- 700 mb winds generally 15 knots or less.

Model QPF Bounced Around from Run to Run

ECMWF QPF from 00z Nov 10th

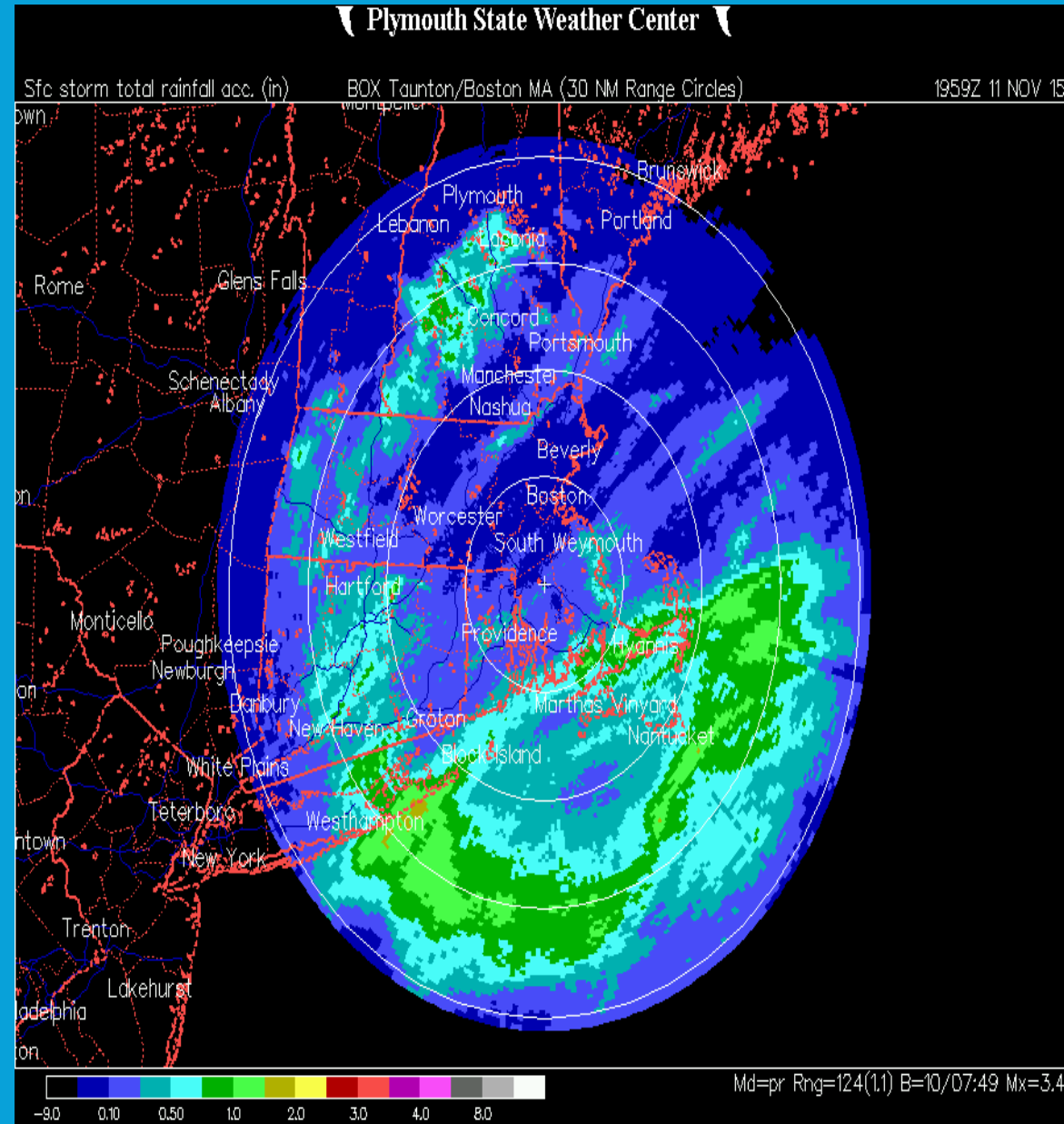


ECMWF QPF from 12z Nov 10th



- Model QPF quite variable from run to run, probably a result of uncertainty on Hurricane Kate and lack of a stronger thermal gradient we often see with our coastal storms.
- ECMWF just one example shown below, but model QPF is often one of the models worst fields, even though we rely on it so much.

Doppler Radar Rainfall Estimation from Coastal Storm



- 1 to 2.50 inches of rain across Cape and Islands, result of being just to the northwest of the 850 mb low with 30 knots of inflow.
- Another area of heavier rainfall occurred across Eastern Plymouth County, from land sea interface and coastal front.
- Lack of stronger mid level forcing, kept rainfall across the rest of the area between 0.25 and 0.75 inches

Rainfall Reports

MASSACHUSETTS

...BARNSTABLE COUNTY...				
CHATHAM	2.69	659 AM	11/12	CO-OP OBSERVER
WEST CHATHAM	2.37	953 AM	11/11	HAM RADIO
2 WSW MASHPEE	2.29	900 AM	11/12	COCORAHS
1 NNW YARMOUTH	2.07	800 AM	11/12	COCORAHS
1 W ORLEANS	2.06	700 AM	11/12	COCORAHS
1 SSW WAQUOIT	2.05	845 AM	11/12	COCORAHS
3 E FALMOUTH	2.04	700 AM	11/12	COCORAHS
2 SE EAST SANDWICH	2.01	700 AM	11/12	COCORAHS
EAST FALMOUTH	2.00	834 AM	11/12	NONE
SANDWICH	1.90	800 AM	11/12	COOP/NWS EMPLOYEE
2 SSE YARMOUTH	1.89	630 AM	11/12	COCORAHS
1 SW EASTHAM	1.84	700 AM	11/12	COCORAHS
3 ENE HARWICH	1.81	900 AM	11/12	COCORAHS
WEST FALMOUTH	1.78	947 AM	11/11	HAM RADIO
ESE EAST FALMOUTH	1.70	500 AM	11/12	COCORAHS
1 ESE EAST FALMOUTH	1.67	700 AM	11/12	COCORAHS
1 NW EAST FALMOUTH	1.66	655 AM	11/12	COCORAHS
1 E ORLEANS	1.64	945 AM	11/11	COCORAHS
1 NNW FALMOUTH	1.58	745 AM	11/12	COCORAHS
ORLEANS	1.46	946 AM	11/11	HAM RADIO
2 ESE BREWSTER	1.41	800 AM	11/12	COCORAHS
1 ENE NORTH FALMOUTH	1.30	513 AM	11/12	COCORAHS
1 NW WELLFLEET	1.18	800 AM	11/12	COCORAHS
2 WSW FALMOUTH	1.00	700 AM	11/11	COCORAHS
...DUKES COUNTY...				
2 WSW VINEYARD HAVEN	2.02	700 AM	11/12	COCORAHS
1 WSW VINEYARD HAVEN	1.92	700 AM	11/12	COCORAHS
...NANTUCKET COUNTY...				
2 E NANTUCKET	1.00	800 AM	11/12	COCORAHS
...NORFOLK COUNTY...				
QUINCY	1.10	1006 PM	11/11	GENERAL PUBLIC
...PLYMOUTH COUNTY...				
HINGHAM	1.66	945 AM	11/11	NONE
WEST WAREHAM	1.47	915 PM	11/11	TRAINED SPOTTER
3 WNW KINGSTON	1.38	700 AM	11/12	COCORAHS
2 ENE PEMBROKE	1.27	830 AM	11/12	COCORAHS
3 E MARSHFIELD	1.10	800 AM	11/12	COCORAHS
1 NNW ROCHESTER	1.07	700 AM	11/12	COCORAHS
1 NNE ABINGTON	1.06	700 AM	11/12	COCORAHS

Wind Reports

*****PEAK WIND GUST*****

LOCATION	MAX WIND GUST MPH	TIME/DATE OF MEASUREMENT	COMMENTS
MASSACHUSETTS			
...ANZ235...			
6 WSW CUTTYHUNK	48	1215 PM 11/11	MESONET
...ESSEX COUNTY...			
ROCKPORT	51	830 AM 11/11	HAM RADIO
...NANTUCKET COUNTY...			
SIASCONSET	46	429 AM 11/11	HAM RADIO
...PLYMOUTH COUNTY...			
SCITUATE	46	947 AM 11/11	HAM RADIO
RHODE ISLAND			
...WASHINGTON COUNTY...			
CHARLESTOWN	52	546 AM 11/11	HAM RADIO

*****SUSTAINED WIND*****

LOCATION	WIND SPEED MPH	TIME/DATE OF MEASUREMENT	COMMENTS
MASSACHUSETTS			
...ANZ235...			
6 WSW CUTTYHUNK	41	1215 PM 11/11	MESONET
...ANZ251...			
1 E FIRST CLIFF	37	835 AM 11/11	MESONET
...BARNSTABLE COUNTY...			
PROVINCETOWN	33	1135 AM 11/11	AIRPORT
...ESSEX COUNTY...			
1 ENE MARBLEHEAD LIG	34	845 AM 11/11	MESONET

Review of Disorganized Coastal Storm

- Rainfall amounts of 1-2.50 inches were confined to Eastern Plymouth County, Cape Cod and the Islands.
- Heavier rainfall amounts occurred across the southeast New England coast, where stronger low level forcing/land sea interface, and subtle coastal front were in play.
- Rainfall amounts across the rest of the region were generally between 0.25 and 0.75 inches. This likely a result of lack of stronger mid level forcing, relatively weak thermal gradient, and some moisture robbed by Hurricane Kate.
- North to northeast flow of 40 to 50 knots at 925 mb, confined marginal wind advisory criteria to the immediate Eastern MA coast.