Department of Commerce • National Oceanic & Atmospheric Administration • National Weather Service

NATIONAL WEATHER SERVICE INSTRUCTION 10-503
AUGUST 26, 2020

Operations and Services
Public Weather Services, NWSPD 10-5

WFO PUBLIC WEATHER FORECAST PRODUCTS SPECIFICATIONS

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Type of Issuance: Routine – Admin Update

SUMMARY OF REVISIONS: This directive supersedes NWSI 10-503, "*WFO Public Weather Forecast Products Specification,"* dated August 26, 2020. This is an administrative update made only to change all references of "Gulf of Mexico" to "Gulf of America". No content changes were made with this update, and the effective date was not affected.

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Director
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WFO Public Weather Forecast Products Specification

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1 Introduction

This procedural directive provides product specifications for the Area Forecast Discussion (AFD), Area Forecast Matrices (AFM), Point Forecast Matrices (PFM), Recreation Report (REC), State Forecast Product (SFP), Tabular State Forecast Product (SFT) and the Zone Forecast Product (ZFP) public products issued by the National Weather Service (NWS) Weather Forecast Offices (WFOs) and Weather Service Offices (WSOs). Specifications include the guidelines associated with this product, detailed content, and format for the product type.

The NWS is transitioning from providing weather forecast and warning information primarily via scheduled text products, to providing more detailed information derived from a digital forecast database. Digital forecast products dictated by events may be in the form of text, tabular, or graphics. While most products described or referenced in this instruction are prepared by automated formatters extracting information from a digital forecast database, others are created using a mixture of manual preparation and product formatters.

1.1 Product Preparation

All derived text products issued from digital databases will be formatted using Graphical Forecast Editor (GFE) based text formatters.

1.2 Formatters

Formatters that reside within the GFE software are designed to produce output that is within the defined formats of products specified below within this directive. Alternative formatters other than GFE should also produce products within the prescribed formats and use of these formatters will be documented with and cleared through the appropriate NWS Regional Headquarters.

1.3 Consistency of Information

Forecast collaboration is essential in the forecast process to ensure consistency in both public grid- and text-based products. WFOs/WSOs are responsible for ensuring their forecast grids used to produce the text products will be as uniform as possible between adjacent County Warning and Forecast Areas (CWFAs) and within a CWFA.

1.4 Updates and Corrections

Derived text products will be updated and corrected between expected issuances when the on-duty forecast team believes the current product is not representative, or an error is detected.

1.5 Product Format and Specification

The product format and specification documents are intended to give direction to the formatters developed to produce each product. The specifications will also facilitate proper ingestion and decoding of text products by NWS users and partners.

2 Area Forecast Discussion (product category AFD)

2.1 Mission Connection

The AFD is a semi-technical product primarily used as a means to explain the scientific rationale behind a forecast and to summarize watches, warnings and/or advisories in effect. This highly visible product is used to convey forecast and watch/warning/advisory information primarily to federal agencies, weather sensitive officials, and the media. The AFD is also useful for coordination among WFOs/WSOs and River Forecast Centers (RFCs), National Centers, and Center Weather Service Unit (CWSUs). The forecast insight provided in the AFD is beyond that which can be found in other NWS products.

2.2 Issuance Criteria

The AFD is issued at least twice a day by all WFOs/WSOs in accordance with the mandatory Zone Forecast Product (ZFP) issuances. If applicable, additional AFDs should be issued to provide reasoning for forecast updates or to provide an explanation of rapidly-evolving mesoscale trends.
WFOs/WSOs should issue AFDs within the 2-hour period preceding or 1-hour period following the release of the ZFP. AFDs should be issued within 1-hour prior to, or after updated forecast packages.

2.3 Valid Product and Expiration

AFDs are valid from time of release until the next complete update. AFDs do not contain a product expiration time.

2.4 Content

The AFD consists of two primary sections: a narrative description of forecast information and reasoning, and a summary of public, marine and fire weather outlook/watch/warning/advisory issuances. The discussions should focus on the most significant weather issues affecting a WFO's/WSO's geographic area of responsibility during the seven day forecast period. Emphasis should be placed on those forecast periods where outlooks/watches/warnings/advisories are in effect, proposed, or are being considered. The narrative content of this product should be professional and remain focused on the meteorology. All wording is now in mixed case. Editorial comments are inappropriate.

a. Narrative Discussion. The narrative discussion is a concise explanation of forecast reasoning and should express the deliberations made by the WFO/WSO

forecast team, as well as consensus decisions with adjacent offices, RFCs, and National Centers. Use of data sources, such as the Weather Surveillance Radar 88 Doppler (WSR-88D), Automated Surface Observing Systems, Profiler, satellite, local and national models, and local and national analysis are encouraged. The discussion should emphasize significant aspects of the forecast such as:

(1) Identification of the most significant hydrometeorological weather affecting the geographical area of responsibility during the 7- day forecast period;

(2) Identification of the forecast problem(s)-of-the-day and explanation of their solution(s);

(3) An indication of forecast team confidence and probabilistic guidance on weather possibilities not found in other products;

(4) Reasoning behind watch/warning/advisory issuance;

(5) Differences in model guidance and an indication as to which model appears the most correct and why;

(6) Reasoning for varying significantly from automated model output guidance products;

(7) Reasons for significant changes from the previous forecast;

(8) Expected timing of events such as beginning or ending of precipitation and degree of uncertainty;

(9) A brief review of the synoptic situation; and

(10) If any section is updated, the overall product should be reviewed for internal consistency and that the mandatory elements, at a minimum, are refreshed.

b. Watch/Warning/Advisory Block. The Watch/Warning/Advisory Block (see Appendix A, section 1 for an example) is used to summarize public, fire weather and marine long duration hazardous weather contained in the associated forecast package. Include the watch/warning/advisory block in all AFDs in a separate section after the narrative discussion.

(1) Hurricanes and Tropical Storms. WFOs/WSOs will also include watches and warnings for hurricanes and tropical storms affecting their geographic area of responsibility.

(2) Exclusions. WFOs/WSOs should not list short duration warnings (of a few hours or less) for convective and flood events; including severe thunderstorm, tornado watches and warnings, and flash flood and flood warnings.

No formal coding schemes for the watch/warning/advisory block are required, but formal coding may be used in this section as produced by the IFPS process which extracts hazard information from the digital database. The areas affected may be described geographically and/or by forecast zones. Well known contractions are permitted in this section. If zones are not referenced, the geographical description should be detailed enough to allow for an accurate interpretation of the referenced area. For example, instead of just "NRN," add a fraction or delineate with reference to station identifiers and/or prominent topographic features (such as "NRN QTR" or "NRN MO N OF MO RVR"). If topographic features are used without zone references, their approximate location within the state should be given. An example without zones would be "MT SHASTA SISKIYOU AREA OF XTRM NRN CA."

When no public and marine watch/warning/advisory information is needed, use the word "NONE."

c. Preliminary Point Temperatures and Probability Of Precipitation (POPs). At regional discretion, the forecaster may include preliminary point forecasts of temperatures and/or POPs for key locations following the narrative (see section 2.3.5 for specific format).

d. Use of Contractions. AFDs should be composed in plain language using complete words. Limited use of contractions is permitted (e.g., to avoid repetition of lengthy terms, or to allow forecasters to save time by expressing their thoughts more concisely) under the following two circumstances:

(1) All contractions will come from the United States Aeronautical Contractions Handbook 7340.1[x], where “x” is the most recent version. NWS contractions should be used as a first choice. If an NWS contraction cannot be found for a particular term, a contraction from other sources within the handbook is permitted (see Appendix C).

Contractions should be well-known by the user community (e.g., PAC NW for Pacific Northwest, TSTMS for thunderstorms, etc.).

2.5 Format

The AFD is a single segment narrative product. At a minimum, a mandatory discussion identifier is used to organize the narrative discussion. Various other topic dividers may be used to organize, clarify, and allow for automatic retrieval of information from the product. When these optional section identifiers are used, they should be entered exactly as shown below using the same spelling, beginning with a period (.), and followed by three periods (...). The information that follows may either be on the same line or on subsequent lines (See Figure 1).

2.5.1 Narrative and Use of Topic Dividers

The narrative is primarily a free form text section. However, topic dividers are used to highlight the text which follows, and allow for automatic retrieval of program specific information. If used, there will be no deviation from exact spelling and format. Each topic will be followed by a double ampersand "&&" and a line feed to indicate the end of the section.

To begin the AFD narrative section, either use introductory topic divider format (a), or divider format (b) below (also See Figure 1).

a. .DISCUSSION...
or
b. .SHORT TERM [Time Period]... **and** .LONG TERM [Time Period]...
(used in conjunction with one another)

All other topic dividers are optional, and should be included as appropriate. The following is a comprehensive list of the topic dividers:

- .UPDATE...[*Insert brief reason for forecast update. Provide additional details within .SHORT TERM/.LONG TERM or .DISCUSSION sections*]
- .PREV DISCUSSION [HHMM]…[*Append previous AFDs (or significant portions thereof. Do not include delimiters or the Watch/Warning/Advisory Blocks from the previous AFDs]*
- .SYNOPSIS...[*Insert brief weather depiction & movement of systems*]
- .MARINE…[*Insert marine weather /sea state information*
- .AVIATION...[*Insert aviation weather/ceiling and visibility information*]
- .FIRE WEATHER...[*Insert fire weather information/low relative humidity, strong wind, dry lightning.*]
- .HYDROLOGY...[*Insert hydrologic information/QPF, rivers*]
- .CLIMATE...[*Insert climatological information/records, long range outlook*]
- .PRELIMINARY POINT TEMPS/POPS...[*Insert temp/POP data - use plain language site names for easy identification*]

Topic dividers should be logically ordered *beneath* the mandatory introductory dividers based on the significance of the information. However, there are *two exceptions* as follows:

(1) If ".SYNOPSIS…" is used, it should be ordered *above* the mandatory introductory divider as a broad overview to the discussion that follows.

(2) If ".UPDATE…" is used, it should be ordered *above* the mandatory introductory divider to ensure it is not overlooked by the reader. If the update also refers to the

synopsis portion, the ".UPDATE…" may be placed above the ".SYNOPSIS…" section as appropriate.

When a WFO/WSO generates preliminary point temps/pops, the ".PRELIMINARY POINT TEMPS/POPS..." should be the *final* topic divider.

2.5.2 Watch/Warning/Advisory Block

The Watch/Warning/Advisory Block is a list of the active hazards and the areas affected. This section will be formatted as follows:

"`.XXX WATCHES/WARNINGS/ADVISORIES...`" beginning at the left margin and one blank line below the last line of the text, where XXX is the modernized three letter identifier of the issuing office. If a WFO's//WSO's County Warning and Forecast Area (CWFA) falls entirely within one state, the use of state identifications are not necessary. If a WFO's/WSO's CWFA covers multiple states, begin a new line with the two-letter state identification followed by three dots (...) and the list of watches, warnings and advisories applicable to that state. (See Figure 1 for format example).

FXaaii cccc ddhhmm	***WMO heading***
AFDxxx	***AWIPS ID***
Product Format	Description of Entry
AREA FORECAST DISCUSSION (see section 5.3.3 for exceptions)	***(MND/NWS Product Name)***
NATIONAL WEATHER SERVICE city state	***(Issuing Office or Agency)***
time am/pm time_zone day mon dd yyyy	***(Issuing Time/Date)***
...[headline to highlight any topical forecast information]...	(***Topical Headline - Optional)***
.UPDATE…	***(Optional, but if used it should appear above the introductory divider and may***
&&	***appear above .SYNOPSIS as appropriate)***
.SYNOPSIS…	***(Optional, but if used it should appear above the introductory divider)***
&&	
.DISCUSSION...	
.SHORT TERM [time period]…	
.LONG TERM [time period]…	
[insert narrative text]	
&&	
.MARINE...	***(Optional)***
&&	
.AVIATION...	***(Optional)***
&&	
.FIRE WEATHER...	***(Optional)***
&&	
.HYDROLOGY...	***(Optional)***
&&	

.CLIMATE... ***(Optional)***
&&

.PREV DISCUSSION... ***(Optional)***
&&

.PRELIMINARY POINT TEMPS/POPS... ***(Optional)***
site name ttt ttt ttt ttt / ppp ppp ppp ppp
site name ttt ttt ttt ttt / ppp ppp ppp ppp etc...
&&

.[XXX] WATCHES/WARNINGS/ADVISORIES...***(where XXX=issuing office 3-letter identifier)***
[watch, warning, advisory information and associated locations or enter the word "**NONE**" followed by a period]

OR...*FOR MULTIPLE STATES USE THE FOLLOWING FORMAT*:

[ST]...[watch, warning, advisory information and associated locations or **NONE**]. ***(where ST = two letter state ID)***
[ST]...[watch, warning, advisory information and associated locations or **NONE**].

$$
Name/Initials/Forecaster ID(s) ***(Optional)***

Figure 1. Area Forecast Discussion Product Format.

2.6 Updates and Corrections

AFDs should be updated between regular issuances to explain major changes to the forecast, to provide a technical explanation of mesoscale trends, or supply information which may be of particular interest to users. A previous AFD (or significant portions of a previous AFD) may be appended to the update to provide background information and a more thorough discussion of the entire forecast. For clarity, the issuance time of the previous AFD should also be included. WFOs/WSOs will correct AFDs for format and grammatical errors as required.

3 Area Forecast Matrices (product category AFM)

3.1 Mission Connection

The Area Forecast Matrices (AFM) product displays various forecasted weather parameters conditions within each zone in the WFO/WSO CWFA through Day 7. Forecasts for these parameters are at 3-hour, 6-hour, and/or 12-hour intervals. The AFM is intended for use by large volume users and the general public. The AFM allows for rapid visual scanning of a large number of forecast parameters/values using a quasi-static matrix format. The forecast data is decodable by computers for creating derived products. Information in the AFM is provided to users as supplemental detail and/or higher resolution zone-based forecast detail than can be found in other NWS derived text products.

3.2 Issuance Criteria

The AFM is an optional product and, if utilized, should be issued anytime the digital database is updated to reflect changing conditions. The AFM serves as an areal matrix "push" product of NWS forecast information. If issued by an office, the AFM should be generated twice daily to meet this need and to remove the outdated first period of the forecast. Times for AFM issuance will be established by the WFOs/WSOs to best serve user needs.

The AFM will be updated and corrected when the on-duty forecast team believes the current forecast is not representative, or when format or content errors are detected. When the AFM is updated, all forecast parameters prior to the update time (to the nearest three-hour period) are removed from the product. Occasionally, a forecast may need a correction. In these instances, the automated AFM product is replaced with the corrected version.

WFOs/WSOs may delay the morning and/or afternoon issuance of the AFM until after the NHC issues its advisories. In these circumstances, the AFM should be issued as soon as reasonably possible, but not later than 1.5 hours after receiving the NHC message. If a WFO/WSO chooses to issue the AFM at the normal times (e.g. 4 am and 4 pm), then the WFO/WSO should also update these products as soon as reasonably possible, but not later than 1.5 hours after receiving the NHC message.

3.3 Valid and Product Expiration Time

The AFM is valid from the time of release through Day 7. The AFM expires when a new AFM is issued. Using default duration of 12 hours ensures overlap with newer product issuances.

3.4 Format Link

https://www.weather.gov/media/notification/dir/AFM_Format.pdf

3.5 Product Specification Document Link

https://www.weather.gov/media/notification/dir/AFM_Specifications.pdf

4 Point Forecast Matrices (product category PFM)

4.1 Mission Connection

The Point Forecast Matrices (PFM) product displays various forecasted weather parameters for verification points, significant cities, and any other pre-defined points within a WFOs/WSOs CWFA through Day 7. Forecasts for these parameters are at 3-hour, 6-hour, and/or 12-hour intervals. The PFM is intended for use by large volume users and by the general public. The PFM allows for rapid visual scanning of a large number of forecast parameters/values using a quasi-static matrix format. The forecast data is decodable by computers for creating derived products. Information in the PFM is provided to users as supplemental detail and/or higher resolution point forecast detail than can be found in other NWS-derived text products.

4.2 Issuance Criteria

The PFM will be issued anytime the digital database is updated to reflect changing conditions. The PFM serves as a point matrix “push” product of NWS forecast information, so at a minimum, the PFM will be generated at least twice daily to meet this need and to remove the outdated first period of the forecast. Times for PFM issuance will be established by the WFOs/WSOs to best serve its user needs. The PFM will be updated and corrected when the on-duty forecast team believes the current forecast is not representative, or when format or content errors are detected. When the PFM is updated, all forecast parameters prior to the update time (to the nearest three-hour period) are removed from the product. Occasionally, a forecast may need a correction. In these instances, the automated PFM product is replaced with the corrected

version.

WFOs/WSOs may delay the morning and/or afternoon issuance of the PFM until after the NHC issues its advisories. In these circumstances, the PFM should be issued as soon as reasonably possible, but not later than 1.5 hours after receiving the NHC message. If a WFO/WSO chooses to issue the PFM at the normal times (e.g. 4 am and 4 pm), then the WFO/WSO should also update these products as soon as reasonably possible, but not later than 1.5 hours after receiving the NHC message.

4.3 Valid and Product Expiration Time

The PFM is valid from the time of release through Day 7 and expires when a new PFM is issued. Use of a default duration of 12 hours ensures overlap with newer product issuances.

4.4 Format Link

https://www.weather.gov/media/notification/dir/PFM_Format.pdf

4.5 Product Specification Document Link

https://www.weather.gov/media/notification/dir/PFM_Specifications.pdf

5 Recreation Report (product category REC)

5.1 Mission Connection

The Recreation Report (REC) relays reports on conditions for resorts and recreational areas. This report, which may also contain forecast information, is for the general public.

5.2 Issuance Criteria

The REC does not have mandatory issuance criteria. Issuance criteria should be determined based upon user needs. The REC is a non-scheduled product issued on an as needed basis. Release times should be determined locally based upon user needs.

5.3 Valid and Product Expiration Time

RECs are valid from the time of release until the next issuance. The REC product expiration time is determined locally.

5.4 Content

The REC may contain the entire range of meteorological variables, e.g., sky cover, weather, wind, temperature, snow depth, tides, water temperature, etc. Specific content should be determined based upon user needs.

5.5 Format

The REC is a free-form text product.

```
SXaaii cccc ddhhmm                                  (WMO Heading)
RECxxx                                              (AWIPS ID)
stZ................                                 (UGC:Zone, if applicable)
```

```
RECREATION FORECAST (or similar)                    (MND)
NATIONAL WEATHER SERVICE city st                    (Issuing Office)
time am/pm time_zone day mmm dd yyyy                (Issuing time and date)

                  [TEXT}

$$                                                  (UGC Delimiter)

Name/Initials/Fcstr ID                              (Optional)
```

Figure 2. Recreational Forecast Generic Format.

6 State Forecast Product (product category SFP)

6.1 Mission Connection

The SFP is an optional product. It is a general five-day public forecast of hydrometeorological conditions across the state (or part of the state) in which a WFO/WSO resides. The SFP uses the discrete period format.

6.2 Issuance Criteria

The SFP is an optional product that may be issued twice daily in addition to the Tabular State Forecast Product. The SFP should be issued in conjunction with, and within one hour of, ZFP releases.

6.3 Valid and Product Expiration Time

The SFP is valid from the time of release through Day 5. The SFP expires when a new SFP is issued.

6.4 Format Link

https://www.weather.gov/media/notification/dir/SFP_Format.pdf

6.5 Product Specification Document Link

https://www.weather.gov/media/notification/dir/SFP_Specifications.pdf

7 Tabular State Forecast Product (product category SFT)

7.1 Mission Connection

The SFT is a tabular public forecast of hydrometeorological conditions at specific locations over a WFO's/WSO's geographic area of responsibility and/or an entire state through Day 7. While the forecast area typically includes part of one or more states, designated WFOs/WSOs issue the SFT for specified locations to adequately represent forecast conditions across one entire state. In some locations, generation of entire state SFTs will become available when fully supported by automated software.

7.2 Issuance Criteria

The SFT is a snapshot of primary weather information through seven days. This, in combination with information in other derived products, can add value to the decision making process. The SFT will be issued at any time the digital database is updated. At a minimum, the SFT will be generated twice daily along with the ZFP.

7.3 Valid and Product Expiration Time

The SFT is valid from the time of release through Day 7. The SFT expires when a new SFT is issued.

7.4 Format Link

https://www.weather.gov/media/notification/dir/SFT_Format.pdf

7.5 Product Specification Document Link

https://www.weather.gov/media/notification/dir/SFT_Specifications.pdf

8 Zone Forecast Product (product category ZFP)

8.1 Mission Connection

The Zone Forecast Product (ZFP) provides expected weather conditions within each zone (during a specified time period) of a WFO's/WSO's CWFA. A zone is a geographic location that has sufficient climatological and meteorological homogeneity to allow a single forecast to serve as the forecast for that area. The ZFP is a text product issued for a seven-day period. Zones may be grouped together based on similar meteorological conditions and potential weather hazards.

8.2 Issuance Criteria

The ZFP will be issued anytime the digital database is updated to reflect changing conditions. In the Alaska Region, offices issuing the ZFP will update the text product anytime the digital database is updated to reflect changing conditions. The ZFP also serves as a "push" product of NWS forecast information, so at a minimum, the ZFP will be generated twice daily to meet this need and to remove the outdated first period of the forecast. The exception to this policy will be in the Alaska Region, where the ZFP is updated as conditions warrant. Times for ZFP issuance will be established by the WFOs/WSOs to best serve its user needs.

WFOs/WSOs may delay the morning and/or afternoon issuance of the ZFP until after the National Hurricane Center (NHC) issues its advisories. In these circumstances, the ZFP should be issued as soon as reasonably possible, but not later than 1.5 hours after receiving the NHC message. If a WFO/WSO chooses to issue the ZFP at the normal times (e.g. 4 am and 4 pm), then the WFO/WSO should also update these products as soon as reasonably possible, but not later than 1.5 hours after receiving the NHC message.

8.3 Valid and Expiration Time

The ZFP is valid from the time of release through Day 7. The ZFP expires when a new ZFP is issued. Use of a default duration of 12 hours ensures overlap with newer product issuances.

8.4 Format Link

https://www.weather.gov/media/notification/dir/ZFP_Format.pdf

8.5 Product Specification Document Link

https://www.weather.gov/media/notification/dir/ZFP_Specifications.pdf

Appendix A Product Examples

Area Forecast Discussion Example

Area Forecast Discussion
National Weather Service Taunton MA
1011 PM EDT Tue Apr 4 2017

.SYNOPSIS...
Scattered showers, along with areas of drizzle and fog, will persist this evening. Weak high pressure will cross the region Wednesday. Another potent low pressure will move up the eastern seaboard, bringing another soaking rain to our region. Scattered showers will linger Friday into early Saturday. High pressure will bring drier conditions Saturday night through Monday.

&&

.NEAR TERM /UNTIL 6 AM WEDNESDAY MORNING/...

1010 pm update...

Potent shortwave/cold pool aloft was sweeping across the region with a brief cluster of showers moving across the region, some of which contained brief locally heavy rainfall. There also was a cluster of elevated thunderstorms moving along the RI coast in an area of elevated instability. SPC meso- analysis indicating about 500 j/kg of MUCape which is being aided by the cold pool aloft despite shallow low level inversion. Not expecting severe weather, but will have to see if some embedded t-storms are able to survive onto the south coast of Massachusetts.

Otherwise, the bulk of this activity should move off the coast over the next few hours as shortwave/cold pool departs. Still may see few hit or miss showers, but should see risk for precipitation diminish toward daybreak. Areas of fog and low clouds will persist with temps remaining in the upper 30s to the lower 40s.

&&

.SHORT TERM /6 AM WEDNESDAY MORNING THROUGH WEDNESDAY NIGHT/...
Low pressure from today continues to move away from our region to the south of Nova Scotia. Closer to home, a weak high pressure ridge arrives during Wednesday afternoon and evening. Expecting light north winds to result, with a few gusts up to 25 mph possible during the morning.

Clouds will linger through most of the day, especially near and north of the Mass Pike. More clouds return Wednesday night as the next low pressure begins to approach our region. Winds will also shift to east to northeast by Wednesday night. Should start to see leading edge of light rain approach after midnight.

Daytime highs should be below normal Wednesday, with near normal low temperatures Wednesday night.

&&

.LONG TERM /THURSDAY THROUGH TUESDAY/...
*/ Highlights...

- Moderate to heavy rain around Thursday afternoon - evening
- FLOOD WATCH from 8 AM Thursday to 2 PM Friday
- Cool, clammy Friday into Saturday, gradual improvement
- Warming trend from Sunday onward beneath mainly high pressure

*/ Overview...

Pattern seemingly buckles into next week. Broader troughing over the N Pacific persists from which individual impulses through the stout Pacific jet crash into the W CONUS, weaken over the mountains, only to undergo lee cyclogenesis into the Plains. However, indications of a weakening onshore Pacific flow as the pattern buckles over the N Atlantic with a series of cut-off lows yields preferential ridging over the E CONUS. So a shift from the recent active weather pattern to one that is warmer and drier. The 6-10 and 8-14 day outlooks from the folks at the Climate Prediction Center advertising above-average temperatures and potentially drier conditions are no surprise. But nothing is yet certain as we`ve seen this late Winter into early Spring, nothing has been ordinary.

*/ Discussion...

Thursday...

Soaking, potentially flooding rain, for the afternoon into evening timeframe. In brevity, roughly around +2 standard deviations above normal, strong southerly low level inflow of precipitable waters of 1.0 to 1.5 inches ahead of a mature to dying phase cyclone evolving across the Ohio River Valley with the surface low undergoing rapid pressure falls as high as 3 mb per hour. Convergent, frontogenetic focus along attendant frontal boundaries to the low beneath the main mid level impulse and diffluence aloft, subsequently yielding robust deep layer forcing.

While the robust nature of individual forecast models differ, there is a consistent signal of a sub-tropical connection of high theta-e air converging into S/E New England undergoing ascent and forcing. Good agreement on the timing of outcomes for the afternoon into the evening timeframe. Some indication of weak instability within the conditionally unstable profile aloft above shallow cooler air per cold air damming ahead of the low. Can not rule out a rumble of thunder. Overall, a progressive, quick thump of rain falling mainly within a 6-hour period.

However nailing down with greater specificity the area of heaviest rainfall coincident with lift/forcing mechanisms is

challenging. SREF / GEFS punching out an average of 1 inch storm-total rainfall amounts over much of S New England. CIPS analogs per the 04.0z GFS suggesting via both mean and median around 1.75 inches for S/E areas of New England inclusive of MA, RI, and CT. Ensemble members waver from the interior/W to the S/E, as well as the areal extent. Overall believe some areas of focus with be associated with the E upslope along with additional convergent focus on E slopes of high terrain.

Given discussion above on a highly anomalous event coupled with the recent soaking rains, going with the issuance of a Flood Watch from 8 AM Thursday through 2 PM Friday to account for delayed river rises. That`s the driving message. While amounts are difficult to nail down with high confidence at this time, the bigger message here is simply given antecedent rains the past few days resulting in swollen basins and forecasting an add on of an inch or more for spots, there are certainly going to be some impacts with respect to flooding.

There are other points to consider:

1.) MODERATE TO HEAVY RAIN DURING THE THURSDAY PM COMMUTE. Reduced visibility with tire spray plus rain along with ponding of water on roadways. It is going to be simply a mess for those having to travel.

2.) EASTERLY WINDS, potentially strong to damaging. With a shallow, cool boundary-layer airmass resulting in an inversion at the surface with 60 to 70 mph E flow just above, mixing of faster winds to the surface are limited. However, given impressive cyclone deepening, we could reach wind advisory criteria simply via sustained wind of 30 mph or greater. Yet, can not rule out that with moderate to heavy rain that we see some mechanical mixing / precipitation drag of faster winds to the surface. A percentage of the 60 to 70 mph flow mixing down, there is the potential for damaging winds. A close eye for the high terrain and along the coast, adding to hazards being considered for the Thursday PM commute.

3.) COASTAL FLOODING. A 1.0 to 1.5 foot surge is forecast around high tide for E coastal MA around 9 pm Thursday. With tides running low, and given the short duration event, not expecting much in the way of coastal impacts.

Thursday night through Saturday...

Cool, remaining damp. Dry slot wraps into the occlusion during the evening hours, low clouds persist as wet weather concludes. The low spins across the area with moisture trowaling cyclonically rearward. Comma-head precipitation along with weak cold air advection, though with occlusion warmer air wrapping in as the low becomes stacked and chokes off, should see some showers even wet snowflakes persist over N/W areas of MA and CT with wet snowflakes possible for high terrain albeit not thinking any accumulation. A westerly wind, downsloping, the remaining region should for the most part remain dry under low

clouds. Thinking cooler conditions prevail for the period. Over time, the low occluding with drier air wrapping in, expect less wet weather impacts along with an increasing potential of clearing and seeing some sunshine.

Sunday onward...

Warming trend. An ensemble approach, the buckled pattern across the N Atlantic along with broad troughing into the W CONUS yields stout ridging over the E CONUS. SW flow prevailing along the nose of which we may have to watch for some wet weather outcomes per convergent forcing of available moisture along the mid level warm front, other- wise some nice days coupled with diffusing frontal boundaries and showery weather becoming washed out within prevailing ridging and drier air over the region. Going to keep the PoPs low. Moderating temperatures over time.

&&

.AVIATION /02Z WEDNESDAY THROUGH SUNDAY/...
Forecaster Confidence Levels...

Low - less than 30 percent.
Moderate - 30 to 60 percent.
High - greater than 60 percent.

Short Term /through Wednesday Night/...

0z update...

Tonight...Moderate confidence.
Confident of IFR-LIFR with dense fog / lower ceilings. However lower confidence with respect to 1/4SM FG. Focus on E/SE MA and RI terminals overnight as winds become light out of the N. SCT SHRA / DZ for the 0-6z period initially. Seemingly only the CT River Valley is spared IFR visibility. All other terminals at least 1-2SM BR.

Wednesday...Moderate confidence.
MVFR-IFR cigs / vsby eroding E during the morning. Improving VFR gradually as N winds gusts up to 20 to 25 kts along E coastal areas briefly before diminishing.

Wednesday night...Moderate confidence.
MVFR-VFR cigs during the evening, trending to MVFR-IFR cigs after midnight. Areas of -RA after midnight with MVFR vsbys.

KBOS Terminal...Closely watching for dense fog development. Will prevail 1/2SM FG with lingering impacts into the AM push. Lower confidence with respect to 1/4SM FG, however should that confidence increase, will issue an AWW accordingly.

KBDL Terminal...Prevailing with IFR-LIFR cigs but visibility should remain above 3SM BR. Low confidence concerning IFR visibility but will be closely watching. Could be some impacts during the AM push

especially with respect to low IFR-LIFR cigs.

Outlook /Thursday through Sunday/...Moderate confidence.

Thursday into Thursday night...

IFR-LIFR with -RA/RA with pockets of +RA. Subsequent IFR visibility impacts. Low risk TSRA. However some overnight improvement to VFR across the S/E is possible. Strong E winds, potentially gusting to 40 kts, sustained to 30 kts. Height of winds around 0z Friday. Winds turn southerly, gradually diminish into Friday morning.

Friday into Saturday...

MVFR-IFR mix. Improving with time. Lower conditions holding out the longest for the high terrain. Southerly winds turning westerly. -RA lingering with MVFR-IFR. Risk of -SN for high terrain.

Sunday...

VFR. Diminishing W winds becoming light. Perhaps a sea-breeze along the coast.

&&

.MARINE...
Forecaster Confidence Levels...

Low - less than 30 percent.
Moderate - 30 to 60 percent.
High - greater than 60 percent.

Short Term /through Wednesday Night/...High confidence.

7 pm update...

Winds continue to diminish. Last of the GALE WARNINGS have been converted to SMALL CRAFT ADVISORIES. Areas of fog, showers and a risk for a few embedded thunderstorms will reduce vsbys at times tonight, especially across the southern coastal waters.

N-NE winds gusting to 20-25 kt on the eastern waters early Wednesday, then diminishing but remain N-NE, with light N-NW winds on the southern waters. Winds shift to E on all waters during Wednesday night, with gusts increasing to around 25 kt after midnight on the southern outer waters. With persistent onshore flow, seas will remain at or above 5 ft on the open waters.

Outlook /Thursday through Sunday/...

Thursday into Friday...

Deep low pressure across the interior will usher strong easterly winds to gale force over the waters Thursday into Thursday night. Waves of 8 to 12 feet forecast with gusts up to 40 kts, perhaps

higher. Moderate to heavy rain with a low risk of thunderstorms.

Saturday into Sunday...

Conditions improve as high pressure builds into the waters allowing both winds and seas to subside. Should see the conclusion of any headlines.

&&

.HYDROLOGY...
The Taunton River at Bridgewater and Pawcatuck River at Westerly are expected to remain in flood for much of this work week given today`s rainfall, and the expected additional rainfall on Thursday. Therefore, Flood Warnings remain in effect for these two forecast locations.

Also keeping a close eye on the Pawtuxet River at Cranston. The river has slowed its rate of rise over the past few hours, however there is still a chance that this location could climb to or just over flood stage tonight. There are a few additional gaged rivers that will be above Action Stage tonight, but are expected to remain below Flood Stage through Wed.

The following web site has more details:

https:/water.weather.gov/ahps2/index.php?wfo=box

Second weather system affects the area during Thu. Models show plume of moisture originating from the Gulf of America and Atlantic pushing northward towards and into southern New England. Deeper moisture looks to be over our area between 15Z Thu and 00Z Fri. Models show precipitable water over southern New England maxing out at 1 to 1.25 inches, with high low level theta-e airmass on an easterly becoming south wind. This points another round of moderate to locally heavy rainfall. During the daytime on Thu, anticipating a widespread 1 to 1.5 inches of rain with the potential for higher amounts up to 2 inches.

If it had been dry, this amount of rainfall would be limited to producing poor drainage issues. However, this rainfall will be occurring on the heels of two very recent soaking rain events, the one from today, and the earlier rain/snow event on 3/31 into 4/1. Rivers are running at elevated levels. This puts our area at a greater risk for multiple rivers and streams going into minor flood. In addition, this rainfall may produce substantial poor drainage flooding.

With this in mind, going with a Flood Watch for Thursday thru midday Friday. The heaviest rainfall is expected to be wrapping up Thursday evening which will allow the threat for poor-drainage flooding to diminish. However, some area waterways will take additional time, potentially into Friday, to go into flood.

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.BOX WATCHES/WARNINGS/ADVISORIES...

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CT...Flood Watch from Thursday morning through Friday afternoon for
     CTZ002>004.
MA...Flood Watch from Thursday morning through Friday afternoon for
     MAZ002>024-026.
RI...Flood Watch from Thursday morning through Friday afternoon for
     RIZ001>008.
MARINE...Small Craft Advisory until 6 PM EDT Wednesday for ANZ235-237.
     Small Craft Advisory until 6 AM EDT Thursday for ANZ250-251-
     254-255.
     Small Craft Advisory until midnight EDT Wednesday night for
     ANZ256.

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Recreational Report (REC) Examples

Fort Peck Lake Recreational Forecast

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SXUS45 KGGW 160939
RECGGW

Fort Peck Lake Recreation Forecast
National Weather Service Glasgow MT
339 AM MDT Mon Mar 16 2020

MTZ017-022-023-170000-
Dam Area of Fort Peck-Duck Creek-York Island-Haxby Point-
339 AM MDT Mon Mar 16 2020

.TODAY...Highs 25 to 30. West winds 10 to 15 mph.
.TONIGHT...Lows 10 to 15. West winds around 10 mph with gusts to
around 20 mph in the evening becoming light.
.TUESDAY...Highs around 40. Light and variable winds becoming
southeast around 10 mph with gusts to around 20 mph in the late
morning and afternoon.
.TUESDAY NIGHT...Lows around 20. Light and variable winds
becoming north around 10 mph in the late evening.

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MTZ022-023-170000-
Dry Arm Area of Fort Peck-Rock Creek-Nelson Creek-Timber Creek-
339 AM MDT Mon Mar 16 2020

.TODAY...Highs around 30. West winds around 10 mph. Gusts up to
20 mph in the afternoon.
.TONIGHT...Lows 10 to 15. Light and variable winds.
.TUESDAY...Highs 40 to 45. Light and variable winds.
.TUESDAY NIGHT...Lows 20 to 25. Light and variable winds.

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MTZ016-017-021-022-170000-
West End of Fort Peck-The Pines-Hell Creek-UL Bend-Crooked Creek-
339 AM MDT Mon Mar 16 2020

.TODAY...Highs 25 to 30. Light and variable winds becoming west
around 10 mph with gusts to around 20 mph in the late morning and
afternoon.
.TONIGHT...Lows 10 to 15. Light and variable winds.
.TUESDAY...Highs 40 to 45. Light and variable winds becoming
south around 10 mph with gusts to around 20 mph in the afternoon.
.TUESDAY NIGHT...Lows 20 to 25. Light and variable winds becoming
northwest around 10 mph with gusts to around 20 mph after
midnight. A slight chance of light snow after midnight. A slight
chance of freezing rain and light snow late.

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Mount Rainier Recreational Forecast

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SXUS46 KSEW 161144
RECSEW

Mount Rainier Recreational Forecast
National Weather Service Seattle WA
444 AM PDT Mon Mar 16 2020

.SYNOPSIS...Dry easterly flow aloft Monday becoming northerly
Tuesday and Wednesday. Low level offshore flow Monday becoming
light Tuesday. Next upper level low dropping south out of the Gulf
of Alaska moving by offshore Friday into the weekend but not far
enough to the west to keep a chance of showers out of the
forecast.

&&

.MONDAY...Sunny. Freezing level near 4000 feet increasing to 6500
feet in the afternoon.
.MONDAY NIGHT...Clear. Freezing level near 7000 feet.
.TUESDAY...Mostly sunny. Freezing level near 7000 feet.
.TUESDAY NIGHT...Mostly cloudy. Freezing level near 6000 feet
decreasing to 5000 feet after midnight.
.WEDNESDAY...Mostly sunny. Freezing level near 5000 feet.

&&

Temperature and wind forecasts for selected locations.

                        Mon    Mon    Tue    Tue    Wed
                             Night         Night

Summit    (14411 FT)      2      6      5      3      4
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                     NE 20   N 15  NW 10  NE 10   N 15

Camp Muir(10188 FT)     22     26     23     19     20
                      E 15  NE 10   W  5   E 10  NW  5

Paradise  (5420 FT)     40     26     41     20     37
                     NE 15  NW  5  NW  5  NW  5  NW  5

Longmire  (2760 FT)     50     32     49     27     45
                      E 10  NE  5  SW  5   E  5  SW  5

++ Temperatures and wind for the summit and Camp Muir are average
   conditions expected in the free air at those elevations.
++ Temperatures for Paradise and Longmire are the expected highs and
   lows. Wind is the average wind expected during that period.

.Extended Forecast...

.WEDNESDAY NIGHT...Mostly cloudy in the evening then becoming
partly cloudy. Freezing level near 5500 feet.
.THURSDAY...Mostly sunny. Freezing level near 5000 feet.
.THURSDAY NIGHT...Mostly cloudy with a slight chance of showers.
Snow level near 4500 feet.
.FRIDAY...Mostly cloudy. A slight chance of showers. Snow level
near 4000 feet.
.FRIDAY NIGHT...Mostly cloudy. A chance of showers. Snow
level near 4000 feet.
.SATURDAY...Partly sunny. A slight chance of showers. Snow level
near 2500 feet increasing to 4000 feet in the afternoon.
.SATURDAY NIGHT...Mostly cloudy with a chance of showers. Snow
level near 3500 feet.
.SUNDAY...Mostly cloudy with a chance of showers. Snow level near
3000 feet increasing to 4000 feet in the afternoon.
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Appendix B Federal Meteorological Handbook No. 1

The following web link will access the latest edition of Federal Meteorological Handbook No. 1 (FMH-1), "Surface Weather Observations and Reports" which embodies the United States conversion to the World Meteorological Organization's (WMO) Aviation Routine Weather Report/Aviation Selected Special Weather (METAR/SPECI) code formats. It was compiled under the auspices of the Office of the Federal Coordinator for Meteorological Services and Supporting Research (OFCM) and embodies the work of meteorological code experts from the United States Departments of Commerce, Transportation, Defense, and Energy. The FMH-1 incorporates all of the United States' exceptions to the international METAR/SPECI format standard that is prescribed in the WMO Publication No. 306 on Meteorological Codes.

FMH-1, Surface Weather Observations and Reports and Related Pen and Ink Changes: https://www.icams-portal.gov/resources/ofcm/fmh/FMH1/fmh1_2019.pdf.

Appendix C US Department of Transportation FAA 7340.1[x] Contractions

The following web link will access the list of official USA-AERONAUTICAL CONTRACTIONS. These approved word and phrase contractions are used by personnel of the Federal Aviation Administration (FAA). This list is also used by other agencies (including the NWS) that provide air traffic control, communications, weather, charting, and associated services.

FAA Contractions: http://www.faa.gov/documentLibrary/media/Order/CNT.pdf