What is NWM 5-Day Max FIM Forecast?

NWM 5-Day Max FIM Forecast depicts the inundation extent of the peak National Water Model (NWM) streamflow forecast over the next 5 days where the NWM is producing flows that meet or exceed the high water threshold for a given river reach. This service is derived from the medium-range configuration of the NWM over the contiguous U.S., showing reaches with peak flow at or above high water thresholds. High water thresholds (which vary by region) and Annual Exceedance Probabilities (AEPs) are derived using the 40-year NWM v2.1 reanalysis simulation. NWM 5-Day Max FIM Forecast differs from NWM Analysis and Assimilation FIM in that it is a forecast FIM and does not depict flooding in real-time. While NWM 5-Day Max FIM Forecast is a forecast service like the RFC 5-Day Max FIM Forecast, it differs in that it is fully automated from rainfall to inundation mapping. It encompasses the total density of the stream network (3.4 million miles of streams), giving it the advantage of covering all of CONUS.
How is NWM 5-Day Max FIM Forecast Obtained?

NWM 5-Day Max FIM Forecast uses the NWM Analysis and Assimilation FIM configuration as initial conditions. It ingests meteorological forcing data from the Global Forecast System [GFS] model, taking rainfall from GFS for the upcoming 5 days and running it through a rainfall-runoff simulation to create a flood forecast. The FIM depicted by this service represents the maximum extent of inundation during this 5-day period. This means that, unlike RFC 5-Day Max FIM Forecast, the human aspect is not present: there is no human decision-making because streamflow from rainfall is automatically computed to produce forecasted streamflow and FIM. The Quantitative Precipitation Forecast [QPF] forcing for each NWM 5-Day FIM Forecast comes from the GFS instead of the RFC QPF which forces the RFC 5-Day FIM forecasts. All analysis and forecast configurations benefit from including over 5,000 reservoirs, with the CONUS short- and medium-range forecasts ingesting RFC-supplied forecasts of reservoir outflow at several hundred locations.

Limitations

Because a forecaster is not involved in the decision-making process regarding the forecast, a Quality Control [QC] limitation exists. Therefore, use the RFC FIM instead [if its limitations are mitigated], where available downstream of AHPS locations.

When to Use NWM 5-Day Max FIM Forecast Service

Because NWM 5-Day Max FIM Forecast is available everywhere, not just downstream of AHPS sites, it is a good choice when looking at areas not covered by the RFC domain. NWM forecast FIM is also a valuable tool to communicate uncertainty and/or extremes in the rainfall forecast. E.g., “If it were to rain an inch over this watershed, the FIM extent could be as much as the NWM 5-day FIM Forecast. However, we believe the rainfall will not be that intense, and the FIM extent is more likely to match the RFC 5-day FIM Forecast.

Considerations

While NWM ANA FIM, RFC 5-Day Max FIM Forecast, and NWM 5-Day Max FIM Forecast are all individual services, the only real difference is where the flows are coming from. For all three, the actual HAND model is the same; it just depends on what flow is fed into the HAND model. This means that if there’s a problem with the DEM data in an area, it will show up in all three services in the exact same way.