

**National Weather Service (NWS) Service Description Document (SDD)
Experimental National Water Center (NWC) Visualization Services
July 2022**

Part I - Mission Connection

1. Service Description:

- A. The NWS Office of Water Prediction (OWP) is providing the experimental National Water Center (NWC) Visualization Services consisting of geospatial representations of river network information. These services are described in the “Public Handbook : National Water Center Visualizations”:
https://www.weather.gov/media/owp/operations/Public_Handbook_NWC_Visualization_Services.pdf.
- i. In a future release of NWC visualizations, flood inundation mapping (FIM) services will be included; at this time no FIM services are proposed for Experimental status.
- B. A detailed description of the suite of visualizations, including update frequency and methodology developed by the OWP, is provided in the “Public Handbook: NWC Visualization Services” (link above).
- C. The prototype period for the set of visualizations, which ended on December 1, 2021, provided feedback on the new, expanded, or enhanced prototype visualizations, which has been updated based on user requests from earlier versions 1.0 to 1.5, as noted in Part II - Technical Details of Standards.
- D. The experimental period to collect feedback will initiate with version 2.0 of the NWC Visualization Services.

2. Purpose/Intended Use:

- A. These experimental visualization services are intended to provide public users access to a suite of visualization services developed by OWP and previously available to the internal NWS water community. These dynamic services leverage forecasts from the NWS River Forecast Centers (RFCs) and the National Water Model (NWM) and are used to build a national common operating picture for water resources.
- B. Following the assessment of the experimental service, OWP plans to operationally implement all or a subset of the services, which are described in the handbook.

3. Presentation Format:

- A. These experimental visualization services are accessible by any one of these methods.
 - 1. externally via the landing page: <https://www.weather.gov/owp/operations>. Under “NWC Visualization Services”, the icon and link on this landing page provide access to:
 - a. the National GIS Map Viewer (direct access method described further

- below in 3.A.2)
 - b. the Hydrologic Visualization and Inundation Services (HydroVIS) (direct access method described further below in 3.A.3)
 - 2. externally via the [experimental NWS National GIS Map Viewer \(the “Viewer”\)](#)
 - a. Water Theme: <https://viewer.geospatial.weather.gov/water>
 - 3. externally via the cloud-based HydroVIS through the user’s own GIS application. To identify the URL for your application:
 - a. Explore information at <https://maps.water.noaa.gov/server/rest/services>
 - b. and review the services listed in the folders, or
 - c. Reference the NWC Visualization Services Public Handbook, go to the page with the service of interest, and use the link under "Service URL".
 - B. Samples of these experimental visualization services are available in the handbook:
 - 1. https://www.weather.gov/media/owp/operations/Public_Handbook_NWC_Visualization_Services.pdf
4. Audience/Users:
- A. The experimental NWC Visualization Services will be available to all RFCs, the Weather Prediction Center (WPC), and Weather Forecast Offices (WFOs). Experimental services as described in the handbook will be publicly available to core partners and the general public for feedback.
 - B. Users of these experimental visualization services may access the service to evaluate, confirm, or share visualizations of the Advanced Hydrologic Prediction Services (AHPS), RFC forecasts, and NWM guidance.
 - C. Please review Part II - Technical Details of Standards, and the Public Handbook, for a list of services.
5. Feedback Method:
- a. User feedback is extremely important to improve the development of the experimental NWC Visualization Services. Responses will help identify whether enhancements are needed prior to making the proposed services operational.
 - b. Survey feedback on the proposed services (as described in the Handbook of NWC Visualization Services), as well as direct feedback from RFCs, WPC, and select WFOs, and others will be collected through December 31, 2022 via online survey at:
- https://www.surveymonkey.com/r/Exp_NWCVisSvcs_2022

Part II - Technical Details of Standards

The Handbook: “NWC Visualization Services”, which provides descriptions, update frequencies, and methodologies for all currently available NWC Visualization Services, is available at:

https://www.weather.gov/media/owp/operations/Public_Handbook_NWC_Visualization_Services.pdf

During the prototype period, user feedback, which was collected pertaining to version 1.0, resulted in a number of enhancements and additions listed below.

- **v1.1**
 - Improved prediction performance of inundation services by implementing composite mapping method
 - Added NWM AnA Snow Depth service
 - Added NWM AnA SWE service
 - Added NWM AnA Low Flow Anomaly service
 - Added NWM SRF Bankfull Arrival Time service
 - Added NWM SRF Peak Flow Arrival Time service
 - Added NWM SRF Bankfull Probability service
 - Merged services that depicted forecasts for multiple valid time ranges
 - Added NWM MRF Peak Flow Arrival Time service
 - Added NWM MRF Bankfull Probability service
- **v1.2**
 - Added NWS Regions service
 - Added RFC Boundary service
 - Added WFO/HSA Boundary service
 - Added NWM Hawaii Flowlines service
 - Added NWM AnA High Flow Magnitude service for Hawaii
 - Added NWM AnA 7-Day Low Soil Moisture Anomaly service
 - Added NWM SRF High Flow Magnitude service for Hawaii
- **v1.3**
 - Removed Reference and Valid Times from all Service Descriptions and added information to service attributes
 - Updated all gridded Map Services to Image Services
 - Added NWM AnA Past 24 Hour Snow Melt service
 - Added NWM AnA Past 72 Hour SWE service
- **v1.4**
 - Updated algorithm of AHPS Max Stage service to more accurately capture trend
 - Added NWM SRF Rapid Onset Flooding service
 - Added NWM SRF Accumulated Precipitation service for Hawaii
 - Updated algorithm of NWM MRF Probabilistic service

- **v1.5**
 - Added NWM Streamflow Anomaly Analysis service
 - Added NWM High Flow Magnitude Analysis - Puerto Rico/U.S. Virgin Islands service
 - Added NWM Soil Moisture Ice Content Analysis service
 - Added NWM Low Soil Temperature Analysis service
 - Added NWM 48-Hour Max High Flow Magnitude Forecast - Puerto Rico/U.S. Virgin Islands service
 - Added NWM Bankfull Arrival Time Forecast – Hawaii service
 - Added NWM Short-Range Forecast Water Management service
 - Added NWM NAM-Nest HIRESW WRF-ARW 48-Hour Accumulated Precipitation Forecast - Puerto Rico/U.S. Virgin Islands service
 - Added NWM 7-Day Average Low Flow Forecast service
 - Added NWM 10-Day Rapid Onset Flooding Forecast service
 - Added NWM Medium-Range Forecast Water Management service
 - Added RFC Basins reference service
 - Added NWM Flowlines - Puerto Rico/U.S. Virgin Islands reference service
 - Added NOHRSC Flight Lines reference service
 - Fixed AHPS Max Stage Forecast service datum issues
 - Updated NWM Low Flow Analysis service to allow it to run with fewer model output files
 - Updated NWM 48-Hour Max High Flow Magnitude Forecast – Hawaii service to adjust forecast length
 - Changed NWM 12-Hour Bankfull Probability Forecast service to use the percent agreement between the last 7 runs of the NWM short-range forecast.
 - Updated NWM 18-Hour Rapid Onset Flooding Forecast to only display stream orders 4 and below, added a summary layer, and adjusted the symbology
 - Updated NAM-Nest HIRESW WRF-ARW 48-Hour Accumulated Precipitation Forecast – Hawaii service to adjust forecast length
 - Changed NWM 5-Day Bankfull Probability Forecast service to represent the percent agreement between the 7 members of the NWM medium-range forecast.
 - Changed RFC Replace & Route 5-Day Max Streamflow Forecast service to only show reaches downstream of gauges with action or greater forecasts
 - Updated NWM Flowlines reference service to NWM v2.1
 - Updated NWM Waterbodies reference service to NWM v2.1

- **v2.0**
 - Updated dissemination system to leverage cloud technologies. Services are now available via the cloud-based Hydrologic Visualization and Inundation Services (HydroVIS) system
 - Subset of v1.5 services to focus on core capabilities informing NWC operations
 - Refined RFC Maximum Streamflow Forecast service
 - Updated derivation of “bankfull” threshold across contiguous U.S. to use regional recurrence flows
 - Replaced the term “bankfull” with “high water”

- Added Past 14-Day High Flow Magnitude service
- Added Rapid Onset Flooding Probability Forecast services

Please refer to the handbook for a more detailed description of these changes.