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Operations and Services
Hydrological Services Program, NWSPD 10-9
RIVER FORECAST CENTER REPORTING

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SUMMARY OF REVISIONS: This directive supersedes NWS Instruction 10-914, “*River Forecast Center Reporting*,” dated January 22, 2014. Changes made to reflect the NWS Headquarters reorganization effective April 1, 2015.

<u>Signed</u>	<u>3/22/2017</u>
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River Forecast Center Reporting

<u>Table of Contents:</u>	<u>Page</u>
1. Introduction.....	2
2. Relationship to National River Location Database.....	3
3. River Forecast Services Description Information.....	3

Appendix

A. IHFS-DB Fields Required to Describe RFC Hydrologic Forecast Services.... A-1

1. Introduction. Centrally collected logistical information describing the hydrologic forecast services provided by National Weather Service (NWS) River Forecast Centers (RFC), including where and when they are provided, is needed to support agency operations and manage the Water Resources Services Program. The goal of collecting this information is to have it readily accessible in a centralized location – the National River Location Database (NRLDB) – for future use whenever local, regional, and national information on NWS water resources services is needed. This logistical information, coupled with comprehensive river forecast verification information, quantifies the benefits of NWS water resources services and the efficiency at which those services are delivered, thus aiding decisions on resource allocation, research directions, and implementation strategies.

Basic location information (e.g., latitude, longitude, flood stage) for most forecast locations in an RFC’s Integrated Hydrologic Forecasting System Database (IHFS-DB) is obtained from the IHFS-DBs at supported NWS Weather Forecast Offices (WFOs). The fields WFOs are required to populate in their IHFS-DB are listed in [NWS Instruction 10-924, Weather Forecast Office Hydrologic Reporting](#). Quality control of the information in each RFC’s IHFS-DB is a collaborative effort between the RFC and its supported WFOs. For example, if a WFO updates the latitude and longitude for a location in its IHFS-DB, it will notify the RFC responsible for that location. Similarly, RFCs and WFOs should collaborate in determining the historical and forecast services information to be entered in their respective portions of the IHFS-DB.

This directive provides instructions to RFCs on population and maintenance of database tables and fields storing information pertaining to their forecast services for all river/stream, lake, and reservoir locations in their IHFS-DB. It applies to all such locations used in RFC forecast services or for supporting those services. These locations are sometimes separated into two categories – forecast points and data points, which are specifically defined in [NWS Instruction 10-950, Definitions and General Terminology](#) as:

- a) Forecast Points – locations along a river or stream for which hydrologic forecast and/or warning services are provided by a WFO.

- b) Data Points – locations along a river or stream for which observed data is input to RFC or WFO hydrologic forecast procedures, or included in public hydrologic products. Flood forecasts and warnings are not issued for data points.

Fully populating, maintaining, and ensuring the accuracy of the database tables and fields storing forecast services information for both types of points will be the responsibility of each RFC.

2. Relationship to National River Location Database. Locations for which NWS hydrologic forecasts are produced for river/streams, lakes, and reservoirs can be grouped into three general categories according to where the forecast generation process occurs (i.e., model execution and forecaster review) and the point of issuance for the official forecast:

- a) Forecasts are generated and issued by RFCs for use by partners and other users (e.g., water supply forecasts).
- b) Forecasts are initially generated by RFCs and then forwarded in river forecast (e.g., RVF) products to WFOs for official issuance and inclusion in event-based hydrologic products (outlook/watch/warning/advisory) when necessary. These are the most common type of forecast location. If a category (a) location is also a WFO forecast point (e.g., has flood forecasts issued for it), it also qualifies as a category (b) location. WFO site-specific points supported by an RFC also fall into this category.
- c) Forecasts are generated and issued by WFOs for use by partners and other users (i.e., non-RFC supported forecast points).

This directive applies to logistical information on RFC forecast services for river/stream, lake, and reservoir locations falling into categories (a) and (b) above. The forecast information may be generated using a deterministic model, water supply procedure, or ensemble modeling system.

The National River Location Database (NRLDB) is populated when an automatically executed script on the NWS Advanced Weather Interactive Processing System (AWIPS) accesses (1) forecast services tables for category (a) and (b) locations from each RFC's IHFS and (2) station reference tables for category (b) and (c) locations from each supported WFO's IHFS. The combined information is then stored as a national database. At a later date, WFOs will be responsible for populating forecast services tables for their category (c) locations.

3. River Forecast Services Description Information. Appendix A identifies the required database fields to be populated which give a complete description of RFC forecast services provided for a specific location. Each RFC should ensure the descriptive information stored in the database on river forecast services is current and accurate for each river location. Maintenance of this database should be conducted at a minimum of once a year to ensure all data is up-to-date, and updates should be made within 30 days after significant events such as the discontinuation of a forecast service. When an RFC adds a new river forecast or data point, or when a new service is added or modified for an existing point, the RFC should populate the appropriate hydrologic forecast services fields of IHFS-DB as identified in Appendix A within 60 days of when the service change is implemented.

APPENDIX A

IHFS-DB Fields Required to Describe RFC Hydrologic Forecast Services

The logistical information in the database fields identified below summarizes the attributes of NWS services for specific river/stream/lake/reservoir locations. These database fields need to be populated for all gaging stations used by the NWS that measure water levels (e.g. for rivers, reservoirs), regardless of who owns the gage. Details regarding populating these database fields in the IHFS-DB can be found in the users guide located on the [RFC Field Support Group web page](#) (click on [Forecast Services Users Guide](#)). Note: for fields that are not pertinent to a given data/forecast point, and/or the required data are unavailable, “None” or “other” may be entered.

The Data Point Service table holds information regarding locations on a river/stream for which observed data is input to RFC or WFO hydrologic forecast procedures, or included in public hydrologic products. For the purposes of logistical verification, all locations along a river or stream for which hydrologic forecast and warning services are provided (i.e., forecast points) should be included as a data service. The attributes for Data Point Services are identified in Table 1.

Note (1): columns that are primary keys have a double line boundary

Table 1: (FcstPtService) Data Point Service Attributes:

Column Name	Type	Column Description
Lid	Varchar	location id
flood_thres	Float	A single user defined flood threshold (e.g., flood stage) used in conjunction with exceed_prob (see next row) to estimate the frequency in which this threshold is exceeded
exceed_prob	int2	From a historical analysis, the probability of exceeding the user defined flood threshold (see previous row) during a given year. ¹ (%)
Service_type	Varchar	Service type (data or forecast service)
anal_start_date	Date	Start date for the historical analysis used to compute the exceedance probability for a given flood threshold ²
anal_end_date	Date	End date for the historical analysis used to compute the exceedance probability for a given flood threshold ²
impl_date	Date	Date observed data first used as input to RFC hydrologic procedures ³
web_date	Date	Date observed hydrograph first available on web through AHPS ³
verif_resp_type	Varchar	Verification response type
drainage_area	Float	Drainage area of basin (units are mi ²)

¹ For example, for a gage with a 40 year record, if it went above the flood threshold (e.g., flood stage) during 20 of those years, the annual exceedance probability would be 50%.

² If date is unknown, leave as a null value.

³ If date is unknown, use best available estimate (e.g., date RFC opened) or leave as a null value.

The Deterministic Forecast Service table holds all forecast points for which a single-value forecast is produced. The attributes to describe Deterministic Forecast Services are shown in Table 2.

Note (1): columns that are primary keys have a double line boundary

Table 2: (FcstPtDeterm) Deterministic Forecast Services Attributes

Column Name	Type	Column Description
Lid	Varchar	location id
snow_method	Varchar	Snow computational method for the segment
hydrol_method	Varchar	Hydrologic computation method for the segment
Reservoir_model	Varchar	Reservoir model for the segment
Upstream_seg	Varchar	Location id of upstream point - may be forecast or data point. If point is a headwater point, then this value is set to 'xxxxx'. If more than one upstream point is being routed down to this location, set this value to 'multiple.'
Hydraul_method	Varchar	Routing computational method for the segment
def_issue_crit	Varchar	Minimum issuance criteria for the forecast service
hours_qpf	int2	Hours of QPF normally used in streamflow forecast
Frequpd_normal	Varchar	Normal operations update frequency
Frequpd_flood	Varchar	Flood operations update frequency (typical)
Frequpd_drought	Varchar	Drought operations update frequency (typical)
fcst_horizon	Varchar	Forecast horizon (typical)
hours_qtf	int2	Hours of temperature forecast normally used in streamflow forecast
hours_qzf	int2	Hours of freezing level forecast normally used in streamflow forecast
num_elev_zones	int2	Number of elevation zones in mountainous area - may be 1, 2 or 3; else should be set to 1
consumptive_use	Varchar	Indicates consumptive use model is used for the segment (Y or N)
Channel_loss	Varchar	Indicates channel loss model is used for the segment (Y or N)
fcst_gen_method	Varchar	Forecast generation method (i.e., IFPS or batch)
impl_date	Date	Date service was first produced ¹
web_date	Date	Date official forecast hydrograph first available on AHPS website ¹
var_usage	Varchar	Is VAR used for this segment (Y or N)

¹ If date is unknown, use best available estimate or leave as a null value.

The Water Supply Service table holds all forecast points for which water supply forecasts are provided. The attributes to describe Water Supply Forecast Services are shown in Table 3.

Note (1): columns that are primary keys have a double line boundary

Table 3: (FcstPtWatSup) Water Supply Forecast Services Attributes

Column Name	Type	Column Description
Lid	Varchar	location id
watsup_method	Varchar	Computational method used to produce the water supply forecast
watsup_coord_agency	Varchar	Coordinating agency for the water supply forecast
frequpd_normal	Varchar	Normal operations period of issuance
period_req	Varchar	Forecast period (e.g., April-July)
watsup_crit	Varchar	Water supply criteria or interest
watsup_resp_agency	Varchar	Agency(s) responsible for issuing the water supply forecast
customer_desc	Varchar	Description of partners and other users interested in the water supply forecast Names of partners and other users interested in the water supply forecast (list all, separated by commas)
impl_date	Date	Date service was first produced ¹
web_date	Date	Date graphical products first available on web ¹

¹ If date is unknown, use best available estimate (e.g., date RFC opened) or leave as a null value.

The Ensemble Forecast Service table holds all forecast points for which ensemble forecasting is used to generate forecasts and associated uncertainty information. The attributes to describe Ensemble Forecast Services are shown in Table 4.

Note (1): columns that are primary keys have a double line boundary

Table 4: (FcstPtEsp) Ensemble Forecast Services Attributes

Column Name	Type	Column Description
lid	Varchar	Location id
snow_method	Varchar	Snow computation method for the segment
hydrol_method	Varchar	Hydrologic computation method for the segment
reservoir_model	Varchar	Reservoir model for the segment
upstream_seg	Varchar	Location id of upstream point - may be forecast or data point. If point is a headwater point, then this value is set to 'xxxxx'. If more than one upstream point is being routed down to this location, set this value to 'multiple.'
hydraul_method	Varchar	Routing computation method for the segment
flowtype	Varchar	Flow type
fcsttype	Varchar	Forecast time horizon type (typical)
frequpd_normal	Varchar	Normal operations period of issuance
frequpd_flood	Varchar	Flood operations period of issuance (typical)
frequpd_drought	Varchar	Drought operations period of issuance (typical)
fcst_horizon	Varchar	Forecast horizon (typical)
nummonclim	int2	Number of months climatological forecasts are used in streamflow forecast 0 – N/A
numdayhyd	int2	Number of days hydrometeorological forecasts are used in streamflow forecast 0 – N/A
num_elev_zones	int2	Number of elevation zones in mountainous area may be 1,2 or 3 else should be set to 1
consumptive_use	Varchar	Indicates consumptive use model is used for the segment (Y or N)
channel_loss	Varchar	Indicates channel loss model is used for the segment (Y or N)
post_processor	Varchar	Post processing model used to create the forecast
impl_date	Date	Date service was first produced
external_date	Date	Date product first available the external partners and other users ¹
web_date	Date	Date graphical products first available on web ¹
var_usage	Varchar	Is VAR used for this station (Y or N)

¹ If date is unknown, use best available estimate (e.g., date RFC opened) or leave as a null value.