

**NATIONAL WEATHER SERVICE MANUAL 10-950
DECEMBER 4, 2012**

**Operations and Services
Hydrologic Services Program, NWSPD 10-9**

DEFINITIONS AND GENERAL TERMINOLOGY

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Type of Issuance: Routine.

SUMMARY OF REVISIONS: This directive supersedes NWS Manual 10-950, "Definitions and General Terminology," dated November, 6 2010. The following revisions were made to this manual:

- 1) Clarifies Flood Categories to reflect that minor, moderate and/or major categories do not necessarily exist at all forecast locations.
- 2) Changed Flood Inundation Map to Forecast Flood Inundation Map, and updated definition.
- 3) Minor definition change to Forecast Issuance Stage
- 4) Updates Monitor Stage locations to include the state of Nevada.

(Signed)

November, 20 2012

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Definitions and General Terminology

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1. Introduction. This directive provides official definitions of key policy-related terminology used in the Hydrologic Services Program.

2. Definitions.

Action Stage - the stage which when reached by a rising stream, lake, or reservoir represents the level where the NWS or a partner/user needs to take some type of mitigation action in preparation for possible significant hydrologic activity. The appropriate action is usually defined in a weather forecast office (WFO) hydrologic services manual. Action stage can be the same as forecast issuance stage (see *forecast issuance stage*).

Bankfull Stage - an established gage height at a given location along a river or stream, above which a rise in water surface will cause the river or stream to overflow the lowest natural stream bank somewhere in the corresponding reach. The term “lowest bank” is however, not intended to apply to an unusually low place or a break in the natural bank through which the water inundates a small area. Bankfull stage is not necessarily the same as flood stage.

Critical Low Flow Threshold - the stage or flow at which a low water level begins to have significant negative impacts on a water-related concern (user community). These concerns can include, but are not limited to, water supply, agriculture, recreation, water quality, power generation, navigation, and environment. The threshold may vary through the year because each concern has its own time period when they are most impacted by low flow, as well as its own water level at which negative impacts of low flow begin. At a given time during the year, the highest stage or flow among all concerns at which low water begins to have a significant negative impact determines the critical low flow threshold for that time.

Data Point – in the context of hydrologic observations, a location on a river/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 (see *forecast point*).

Flash Flood - a rapid and extreme flow of high water into a normally dry area, or a rapid water level rise in a stream or creek above a predetermined flood level, beginning within six hours of the causative event (e.g., intense rainfall, dam failure, ice jam). However, the actual time threshold may vary in different parts of the country. Ongoing flooding can intensify to flash flooding in cases where intense rainfall results in a rapid surge of rising flood waters.

Flood - any high flow, overflow, or inundation by water which causes or threatens damage.

Flood Stage - an established gage height for a given location at which a rise in water surface level begins to impact lives, property, or commerce. The issuance of flood (and in some cases flash flood) warnings is linked to flood stage. Not necessarily the same as bankfull stage.

Flood Categories – terms defined for each forecast point which describe or categorize the severity of flood impacts in the corresponding river/stream reach. The severity of flooding at a given stage is not necessarily the same at all locations along a river reach due to varying channel/bank characteristics or presence of levees on portions of the reach. Therefore, the upper and lower stages for a given flood category are usually associated with water levels corresponding to the most significant flood impacts somewhere in the reach. The flood categories used in the NWS are (see Figure 1):

Minor Flooding - minimal or no property damage, but possibly some public threat (e.g., inundation of roads).

Moderate Flooding - some inundation of structures and roads near stream. Some evacuations of people and/or transfer of property to higher elevations.

Major Flooding - extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations.

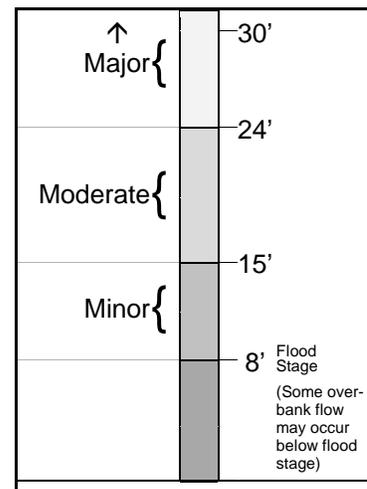


Figure 1. Stage - flood category relationship.

Record Flooding - flooding which equals or exceeds the highest stage or discharge observed at a given site during the period of record. The highest stage on record is not necessarily above the other three flood categories – it may be within any of them or even less than the lowest, particularly if the period of record is short (e.g., a few years).

Note: minor, moderate, major flood categories do not necessarily exist for all forecast points. For example, a location with a permanent levee may begin to experience impacts at moderate flooding.

Flood Forecast Inundation Map - A flood forecast inundation map provides an estimate of the areal extent of flood waters and depth of flooding for a specified area relative to a real-time flood forecast. This estimate is contingent on a given flood forecast of the stage, flow, and flood wave. There are a variety of mapping techniques and approaches that may be utilized to estimate the extent and depth of the flooding. The technical approach is determined by the complexity of topography, hydrology, bathymetry, hydrography, hydraulics, and geospatial analyses.

Forecast Issuance Stage - the stage which, when reached, or forecast to be reached, by a rising stream, represents the level where RFCs need to begin issuing forecasts for a non-routine (flood-only) forecast point. This stage is coordinated between WFO and RFC personnel and is not necessarily the same as action stage. The needs of WFO/RFC partners and other users are considered in determining this stage.

Forecast Point - a location along a river or stream for which hydrologic forecast and warning services are provided by a WFO. The observed/forecast stage or discharge for a given forecast point can be assumed to represent conditions in a given reach (see *reach*).

Gage Datum - a horizontal surface used as a zero point for measurement of stage or gage height. This surface usually is located slightly below the lowest point of the stream bottom such that the gage height is usually slightly greater than the maximum depth of water. Because the gage datum is not an actual physical object, the datum is usually defined by specifying the elevations of permanent reference marks such as bridge abutments and survey monuments, and the gage is set to agree with the reference marks. Gage datum is a local datum that is maintained independently of any national geodetic datum. However, if the elevation of the gage datum relative to the national datum (North American Vertical Datum of 1988 or National Geodetic Vertical Datum of 1929) has been determined, then the gage readings can be converted to elevations above the national datum by adding the elevation of the gage datum to the gage reading.

Hydrometeorology - an interdisciplinary science involving the study and analysis of the inter-relationships between the atmospheric and land phases of water as it moves through the hydrologic cycle.

Monitor Stage - For non-leveed streams, the stage at which initial action must be taken by concerned interests (e.g. livestock warning, removal of equipment from lowest overflow areas, or general surveillance). This level may produce overbank flows sufficient to cause minor flooding of low-lying lands and local roads. For leveed streams, the stage at which patrol of flood control levees by the responsible levee maintaining agency becomes mandatory, or the stage at which

flow occurs into bypass areas from project overflow weirs. “Monitor Stage” is only used in the States of California and Nevada.

Reach - a section of river or stream between an upstream and downstream location, for which the stage or flow measured at a point somewhere along the section (e.g., gaging station or forecast point) is representative of conditions in that section of river or stream.

Stage - the level of the water surface of a river or stream above an established datum at a given location.