



**United States Department of the Interior
U.S. GEOLOGICAL SURVEY**

Reston, Virginia 20192

In Reply Refer To:
Mail Stop 415

August 28, 2017

Memorandum

OFFICE OF SURFACE WATER TECHNICAL MEMORANDUM 2017.11

SUBJECT: Policy on Storage and Display of Operational Stage and Discharge Data

The purpose of this memo is to clarify USGS policy that all discharge and stage time series data publicly displayed on NWISWeb must follow established procedures for collection, processing, and approval; operational display of discharge or stage data that has not been quality assured will only be allowed internally within the USGS for 120 days. Beginning September 30, 2017, all discharge and stage time series data displayed to cooperators or the general public must be fully quality assured and approved within the timeframes required by Continuous Records Processing Policy guidelines. Stage and discharge data displayed prior to September 30, 2017 are not subject to this memo.

Background

[OSW Technical Memo 2006.01](#) established policy for the collection, processing and display of precipitation data and set a precedent by allowing the temporary display (currently up to 120 days) of data so long as: 1) the equipment being used is calibrated annually, 2) the record is routinely scrutinized for erroneous data, and 3) data displays are accompanied by a disclaimer stating that the data have not been fully quality assured. On June 11, 2012, [OSW Informational and Technical Note 2012.05](#) defined operational data as "...parameters typically collected by the USGS for the purposes of supporting short-term operational needs of the data network (for example precipitation at some locations) or parameters measured to facilitate the computation of another parameter of interest (for example, stage is used in the computations of streamflow)." Absent from the guidance in Technical Note 2012.05 was an unambiguous definition stating that the accepted and approved purpose of all operational data (except for precipitation) was to serve internal USGS objectives, such as providing surveillance information needed to trigger other operational activities (for example, the timing of water-quality sampling or flow measurements).

Since 2012, Water Science Center (WSC) interpretation of the term “operational data” has evolved to include the temporary display of non-quality assured data (including surrogates) to external users for 120 days on an increasingly routine basis. This interpretation exceeds the narrowly-defined policy articulated by OSW Memo 2006.01 and the intended policy/clarifications announced in OSW note 2012.05. In addition, these data often are stored indefinitely in our NWIS database. Display and storage of such data (even when not directly accessible by the public after 120 days) have often occurred with no plans for handling subsequent requests for those data, quality-assuring them at a later date, or deleting them from the system as would otherwise be required.

Station-specific text on the NWISWeb site pages (or other explanatory information) does not get stored with the data. Further, our database does not currently allow us to distinguish varying levels of data quality. Finally, USGS policy does not allow us to display data preferentially (as a service) to any single entity (cooperator or other). Under these circumstances, the potential for unintended degradation of the database is high and the lower quality data might be applied inappropriately to uses presuming less uncertainty.

The desirability of variable quality data standards for stage and discharge is, indeed, an open question. The USGS has long contended successfully with other data providers who do not adhere to the high standards of the USGS. Yet, the availability of inexpensive instrumentation, the ease of sharing such data, and the proliferation of data collection for short-term purposes presents many new challenges that need to be considered strategically. Foremost among the challenges would be to quantify the numerical uncertainty of the data in a way that reflects the quantity and quality of field observations, measurements and computational procedures employed by the USGS. However, presentation of data of varying quality is a decision that must be made formally at the WMA level rather than arbitrarily by individual WSCs or their projects through the public display of “operational data”.

General statement of policy

Beginning September 30, 2017, all publicly displayed discharge and stage time series data (standalone values including stream or reservoir stage, or stage values needed for surrogate use in the computation of discharge) are considered to be primary data that must be fully quality assured and approved for publication and permanent archival in NWISWeb. Stage and discharge data collected prior to September 30, 2017 are not subject to this policy.

In AQUARIUS, "**primary**" data are any data that are fully quality assured, regardless of publication status. A "**publish**" setting in AQUARIUS triggers data flow to NWISWeb. Time-series data that are non-primary and have the AQUARIUS publish setting will be displayed for 120-days (which will be allowed only for temporary precipitation data).

In accordance with this policy statement and the AQUARIUS framework, all stage and discharge data are now considered to be primary data and must be quality assured and

approved (permanently available on NWISWeb), subject to the existing constraint wherein provisional data older than 3 years are not available for retrieval on NWISWeb.

This policy was developed to specifically address problems noted during technical reviews with display of stage and discharge time-series data. Although the scope of this policy is specific to stage and discharge, other parameters displayed publicly on NWISWeb are not exempt from required minimum levels of quality assurance and quality control. Consult your Water Science Field Team discipline specialist with questions about other parameters. Stage and discharge data collected by other entities and used for comparison/consistency with USGS data may continue to be displayed internally.

With implementation of this policy, some WaterAlert subscriptions may be broken when we discontinue hosting data heretofore displayed on NWISWeb. WSCs must alert subscribers to sites removed from display as follows:

- A standard notification statement must immediately accompany the NWISWeb real-time display of temporary data affected by this memo as follows:
 - **[Parameter] data for this station will not be displayed after [September 30, 2017].** Documented routine inspections and other quality assurance measures are not being performed to make the data consistent with current USGS standards for archival, retrieval, or future use in general scientific or interpretive studies.
- A list of sites for which the USGS will no longer publicly serve data should be sent to David Yancey (dkyancey@usgs.gov), who will query the WaterAlert subscription database and notify all subscribers.

Quality Assurance of Discharge and Stage Data

Discharge data computed, stored, and displayed on NWISWeb should adhere to existing official USGS policies, technical manuals, and standard record-processing procedures; ongoing maintenance of rating curves based on routine site visits and discharge measurements are required. Stage-only data and stage data collected for the purpose of computing discharge should also adhere to all previous official policy and technical manuals, which includes, but is not limited to, the following:

- All stations must be properly established in NWIS and have a standard station description.
- Field equipment must meet minimum accuracy requirements established by policy (see [OSW Technical Memo 96.05](#)).
- In addition to the recording instrument, field sites must be equipped with reference gages and sufficient reference marks to maintain datum.
- Routine levels are required and should be compliant with procedures outlined in [OSW Technical Memo 2011.05](#) and [Techniques and Methods Report Book 3, Chapter A19](#), "Levels at gaging stations."

- Peak verification is required per [OSW Technical Memo 2014.06](#).
- Routine site visits (at least 6/year) should be made to document site conditions and proper equipment operation.
- Corrections are applied as necessary (gage height, datum, and other).
- Erroneous record is removed. Gage height record not used as a surrogate for discharge may be estimated, if necessary, to provide a complete record when stage is the final product, but only for short periods of missing/erroneous data. Appropriate periods for estimating gage height (where stage or elevation are the product) include record gaps during a recession (predictable trend) or instances in which the gage is overtopped briefly during an event (or is otherwise missing) and the peak has been verified by a high-water mark or an independent peak stage recorder such as a crest-stage gage. Any estimation of gage heights should be defensible and carefully documented.
- Station analyses describing all records processing and decision information used to finalize the record are developed.
- **Continuous Records Processing** procedures and timelines as prescribed by the latest policy memo ([WRD Policy Memo 2010.02](#)) or future procedures for time-series records implemented in the Aquarius framework should be adhered to.

Summary

In conclusion, instantaneous values of stage and discharge time series are considered important USGS products that should always be quality assured in accordance with existing policies to ensure accurate information is being provided to our cooperators and the public. Stage and discharge are classified as primary data parameters that are never provided externally on NWISWeb without quality assurance and approval, even if they are subsequently deleted from the database.

Robert R. Mason, Jr.
Chief, Office of Surface Water

References Cited

- Kenney, T.A., 2010, Levels at gaging stations: U.S. Geological Survey Techniques and Methods 3-A19, 60 p., <https://pubs.usgs.gov/tm/tm3A19/>
- Office of Surface Water Technical Memorandum No. 96.05, Policy Concerning Accuracy of Stage Data, <https://water.usgs.gov/admin/memo/SW/sw96.05.html>
- Office of Surface Water Technical Memorandum No. 2006.01, Collection, Quality Assurance, and Presentation of Precipitation Data, https://water.usgs.gov/admin/memo/SW/OSW_2006-01_Revised_02122010.pdf

Office of Surface Water Technical Memorandum No. 2011.05, Policy on leveling procedures at streamgages and announcement of the publication Techniques and Methods Report Book 3, Section A19 "Levels at gaging stations,"

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