



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

Reston, Virginia 20192

In Reply Refer To:
Mail Stop 415

March 10, 2017

Memorandum

OFFICE OF SURFACE WATER TECHNICAL MEMORANDUM 2017.06

SUBJECT: OSW Policy on Documentation of Zero-flow Measurements at Streamgages

The purpose of this memo is to establish zero-flow observations as valid flow measurements and provide guidelines for their documentation in the NWIS database for streamflow-records analysis.

Beginning June 30, 2017, all observations of zero flow are to be characterized as valid flow measurements and entered in the NWIS measurement database. Zero-flow observations made prior to June 30 are not subject to this policy.

Background

Water Science Center (WSC) personnel historically have made periodic observations of zero flow during site visits. These observations have been used / treated either as “measurements” (zero discharge entered in the database with a measurement number) or as site visits with no quantified discharge value (or measurement number), depending on policies established by each WSC. Prior to release of this Memorandum, limited OSW guidance was available (TWRI 3-A13, p. 12 recommends inclusion of observations of no flow in the measurement listing, but goes on to say that “observations of no flow are not numbered”).

WSC policies have been based on a variety of factors including the hydrologic interpretation of zero-flow observations (Is zero flow a “measurement” or a simply a site condition to be documented in the remarks?), whether the annual cost of streamgaging charged to the cooperator should count a zero-flow observation as one of the total number of “measurements” included in an operational agreement, and semantics (can zero-flow observations technically be considered “measurements,” since the hydrographer used no instrumentation to make a measurement?).

Statement of OSW Policy

From a technical and hydrologic perspective, an observation of zero flow is a meaningful flow condition that is being confirmed by the hydrographer during a site visit. Semantics aside, a zero-flow observation is a measurement—an excellent measurement—of flow at the time of

the visit. Typical zero-flow measurements are associated with dry stream channels. Sites with ponded conditions in the gage vicinity should be assigned a zero-flow value if there is no observed flow over the section control downstream.

Discrete observations of zero flow have statistical significance for streamflow characteristics and analysis of low-flow characteristics over time. Such observations should be documented as “measurements” and entered in the database for use by hydrologists in statistical and interpretive studies. OSW encourages digital-photograph documentation of the zero-flow condition, since no other instrumentation is involved with making the observation/measurement.

To avoid concerns from individual cooperators, WSCs may wish to acknowledge the possibility (and hydrologic value) of zero-flow observations during an annual water-year cycle and negotiate terms of streamgage operation accordingly.

Collection and Storage of Zero-flow Measurements in the National Water Information System

The USGS National Water Information System (NWIS) and Field Computing and Integration and Support (FCIS) Team have implemented tools needed to collect and document zero-flow observations as measurements. In NWIS and SVMobile, the code “observed zero flow” is now an available measurement method—selection of this code will result in the zero-flow observation being entered in the NWIS database as a measurement with an assigned measurement number; no gage height will be associated with the measurement, nor should one be specified by the hydrographer. The zero-flow observation will be permanently stored in the historic streamgage record and available for analysis by hydrologists and other investigators.

Summary

This policy memorandum clarifies and formalizes guidance provided in previously published USGS reports for the collection, storage and documentation of zero-flow measurements at streamgages.

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References Cited

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85-480, accessed June 3, 2013 at <http://pubs.er.usgs.gov/usgspubs/ofr/ofr85480> Office of Surface Water [<https://pubs.usgs.gov/of/1985/0480/report.pdf>]

Rantz, S.E., and others, 1982, Measurement and Computation of Streamflow: Volume 2. Computation of Discharge: U.S. Geological Survey Water Supply Paper 2175, accessed January 10, 2017 at [<https://pubs.usgs.gov/wsp/wsp2175/>]

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