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February 4, 2010

Memorandum

OFFICE OF SURFACE WATER TECHNICAL MEMORANDUM 2010.03. and OFFICE OF WATER QUALITY TECHNICAL MEMORANDUM 2010.05

SUBJECT: Policy for the mandatory storage of discrete sediment data and selected metadata in the National Water Information System, and availability of SedLOGIN software to assist in data entry

The purposes of this memorandum are to:

1. Establish policy, effective immediately, for the mandatory storage of discrete suspended-sediment, bedload, and bottom-material sample data, and specific metadata in the National Water Information System (NWIS), Water-Quality Database (QWDATA),

2. Announce the availability and key attributes of the SedLOGIN software, including limitations of its use, mandatory parameter codes for entering discrete sediment-related samples and results into QWDATA, and

3. Encourage use of SedLOGIN to submit sediment samples and metadata collected as part of sediment programs for analyses at U.S. Geological Survey (USGS) sediment laboratories.

BACKGROUND

The USGS Water Resources Discipline (WRD) has long required the storage of USGS computed daily-value sediment data in NWIS Automated Data Processing System (ADAPS) and data from discrete suspended-sediment particle-size samples into QWDATA. The bulk of discrete sediment data produced by the WRD, comprised of suspended-sediment concentrations from daily or more frequent manual samples usually collected by observers, and samples collected by automatic samplers, have not been routinely entered into QWDATA nor have important metadata, such as method of sample collection, and the type of sampler used to collect the sample. Additionally, few bedload or bottom-material samples and associated metadata have been routinely entered into QWDATA. These discrete sediment data and selected metadata have intrinsic value and should be permanently and publically available.

A number of factors have recently converged to enable relatively efficient entry of these data in QWDATA, including advances in NWIS software; development of QWDX software (https://qwdx.cr.usgs.gov/) for transferring laboratory data to the local

QWDATA systems; and most recently, development of the SedLOGIN software allowing hydrographers to enter sample data and field results for use by the receiving USGS sediment laboratory, as well as for direct storage of metadata in QWDATA.

MANDATORY STORAGE OF DISCRETE SEDIMENT AND METADATA

Policy: Effective immediately, all new data from discrete suspended-sediment, bedload, and bottom-material samples collected by methods described by Edwards and Glysson (1999), Nolan and others (2005), and Gray and others (2008), and selected metadata as described in this memorandum, must be stored in QWDATA, including replicate samples with environmental or quality-control medium codes. This includes physical samples collected by hydrographers, observers, and by automated means. Entry in QWDATA of such data produced prior to this memorandum is encouraged but is not mandatory.

It is the responsibility of the USGS office submitting sediment samples for laboratory analyses to ensure that all mandatory data are stored in the NWIS. Computed time series of sediment concentrations and loads using the methods of Rasmussen and others (2009), Koltun and others (2006), or Porterfield (1972) should continue to be stored in ADAPS.

Mandatory Metadata: Entry of the following metadata parameters in QWDATA is mandatory (all of these data can be entered in QWDATA via SedLOGIN; via output from SLEDS; or via direct entry into QWDATA):

For suspended-sediment, bottom-material, and bedload samples, parameter codes:

- 82398, sampling method (code); and
- 84164, sampler type (code).

For bedload samples, parameter codes (refer to OSW Technical Memorandum 92.06):

- 00009, location in cross section, distance from left bank looking downstream (feet);
- 82073, starting time of measurement, 24 hour clock, hour-minute (hhmm);
- 82074, ending time of measurement, 24 hour clock, hour-minute (hhmm);
- 04120, rest time on bed for bedload sample (seconds); and
- 30333, bag mesh size, bedload sampler (millimeters).

For any applicable sediment sample, when available, parameter codes:

- 00061, instantaneous discharge (cubic feet per second);
- 00010, water temperature (degree Celsius);
- 00063, number of sampling points (verticals in composite) (count);
- 04118, composited samples in cross-sectional bedload measurement (number);
- 04119, verticals in composite sample (number);
- 04121, horizontal width of vertical (for a sample in a composite) (feet); and
- 04117, tether line used for collecting sample (0=no, 1=yes).

AVAILABILITY OF SedLOGIN TO ASSIST IN DATA ENTRY

SedLOGIN Access: SedLOGIN is accessible through the QWDX web-browser interface at: **https://qwdx.cr.usgs.gov/**. All SedLOGIN users must be registered in QWDX, as either a Field user or a LocalDBA user. A [local] NWIS QW-database administrator who is not yet registered in QWDX should send an e-mail to the QWDX Administrators (GS-W QWDX Admin), requesting to be registered as a LocalDBA for their Water Science Center's customer code(s). Field users not yet registered in QWDX can request their LocalDBA to register them.

Users logged into the web-browser interface of QWDX will see a menu button to enter SedLOGIN. SedLOGIN is documented in an on-line user's manual, available at: https://qwdx.cr.usgs.gov/uo/labxfer/help/sedlog_help.html.

Limitations of Use of SedLOGIN: Hydrographers are encouraged to use SedLOGIN for all appropriate types of sediment samples because it increases the efficiency of data management for both hydrographers and laboratory personnel, reduces duplication of effort, and reduces errors in transcribing sample information. However, there are limitations of SedLOGIN's use, as follows:

- SedLOGIN can be used only with USGS sediment laboratories, which use the Sediment Laboratory Environmental Data Systems (SLEDS) software. These labs need SLEDS version 5.71 or higher to handle SedLOGIN data.

- SedLOGIN need not be used to enter sediment and metadata that are collected as part of a water-quality sample set, such as those collected as part of the NASQAN and NAWQA programs. Under these circumstances, it is usually more expedient to enter sediment-sample data into QWDATA along with the other water-quality sample data.

- SedLOGIN handles suspended-sediment, bottom material, and bedload samples, but does not yet handle total-sediment samples. Because total-sediment samples are rarely collected, it is doubtful that SedLOGIN will be enhanced in the near future to accommodate them.

- SedLOGIN does not yet accommodate parameters for depth to top or bottom of sample, which are needed when a single vertical requires more than one container when using a P-series suspended-sediment sampler (US P-61 and US P-63). These samples should be logged into QWDATA by hand, and shipped to the sediment laboratory in the "old" way, without the use of SedLOGIN. It is likely that SedLOGIN will be enhanced in the near future to include data from points in a vertical.

SedLOGIN Synopsis: SedLOGIN expedites the task of data entry into USGS databases while ensuring that critical metadata are entered for all sediment samples. Project-specific information and default values are specified in SedLOGIN, and subsequently used for all data entered for that project. The software makes extensive use of pick-lists to minimize the need for manual typing. SedLOGIN is a mechanism for one-time data

entry, eliminating the need for laboratories to hand-enter sample information already keyed into SedLOGIN by a hydrographer.

SedLOGIN handles suspended-sediment samples collected with isokinetic samplers by the Equal-Discharge-Increment (EDI) and Equal-Width Increment (EWI) methods in cross-sections as well as samples collected by observers or automatic samplers, or other non-isokinetic methods. Information for each sample collected as part of an EDI cross section is stored in QWDATA. Mean EDI or EWI concentration values for each cross section are computed by SLEDS and stored in QWDATA. For multiple cross-section transits, the user may also choose to compute and store a mean concentration determined from the mean concentrations of the individual cross-section transits. The Analysis Status (ASTAT) code in QWDATA will identify which sample records are available to the public via NWISWeb. Results from bedload and bottom-material samples submitted for individual analyses will also be stored in QWDATA.

SedLOGIN automates the following tasks:

- A sediment laboratory analytical request (SLAR) form is generated for printing and including with shipment of associated samples to the sediment laboratory,

- The data on the SLAR form are made available electronically and automatically to the receiving sediment laboratory to expedite the sample login process, and minimize data entry (and data-entry errors) by the laboratory,

- Mandatory and other metadata keyed into SedLOGIN by the hydrographer are automatically uploaded to QWDX, and can be subsequently loaded into QWDATA either manually or by using an automated process. The NWIS database administrator should verify their QWDX setup if automatic storage in QWDATA is desired. Instructions for setting up automated processes are described in http://water.usgs.gov/usgs/owq/WaQI/WaQI08.14.pdf

Data are entered into SedLOGIN in datasets that together describe all samples in a shipment of samples to a sediment laboratory. When a shipment's dataset is submitted to SedLOGIN, the software produces one or more SLAR forms (usually depending on the number of station sample sets included in the shipment), which the user must print out and ship along with the sediment samples to the laboratory. The pre-SedLOGIN SLAR form, which typically was completed by hand, is no longer needed when SedLOGIN is used. When submitted to SedLOGIN, the mandatory sample and field-parameter information is immediately transferred to QWDX as "field data," from where it can be downloaded for entry into QWDATA. The “qwenter” option of the batch-entry program within QWDATA can be used to create new samples, which replaces the need for manual "sample login" into QWDATA. Sample information is also transmitted electronically to the receiving sediment laboratory, eliminating the need for hand-entry of data into the laboratory’s database. Laboratory analytical results are transferred through QWDX at a later time, after the lab performs the requested analyses.

It is anticipated that the use of the SedLOGIN software will greatly streamline the data-management workflow for USGS sediment hydrographers resulting in entry of substantially more discrete sediment and metadata with fewer errors and less human resources. Thus, we encourage the use of SedLOGIN for sediment and metadata entry into our USGS databases.

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RELEVANT PUBLICATIONS:

Edwards, T. E.; Glysson, G. D., 1999, Field methods for collection of fluvial sediment. U.S. Geological Survey Techniques of Water-Resources Investigations Book 3, Chapter C2, 89p. (http://water.usgs.gov/osw/techniques/Edwards-TWRI.pdf).

Gray, J.R., Glysson, G.D., and Edwards, T.E., 2008, Suspended-sediment samplers and sampling methods, in, Sediment transport measurements, in, Marcelo Garcia, ed., Sedimentation Engineering – Processes, Measurements, Modeling, and Practice, American Society of Civil Engineers Manual 110, Chapter 5.3, pp. 320-339.

Nolan, K.M., Gray, J.R., and Glysson, G.D., 2005, Introduction to suspended-sediment sampling: U.S. Geological Survey Scientific Investigations Report 2005-5077, available on CD-ROM and at: http://pubs.er.usgs.gov/pubs/sir/sir20055077.

Office of Surface Water Technical Memorandum No. 93.01, Summary of Documentation that Describes Instrumentation and Field Methods for Collecting Sediment Data (http://water.usgs.gov/admin/memo/SW/sw93.01.html).

Office of Surface Water Technical Memorandum No. 92.06, New parameter codes for bedload data (http://water.usgs.gov/admin/memo/SW/sw92.06.html).

Office of Surface Water Technical Memorandum No. 90.08, Policy and Guidelines for the Collection and Publication of Bedload Data (http://water.usgs.gov/admin/memo/SW/sw90.08.html).

Office of Surface Water Technical Memorandum No. 2004.01, Water Resources Discipline Policy on Storage and Publication of Fluvial-Sediment Data with Updated Method Codes (http://water.usgs.gov/admin/memo/SW/sw04.01.html).

Koltun, G.F., Eberle, M., Gray, J.R., Glysson, G.D., 2006, User's manual for the Graphical Constituent Loading Analysis System (GCLAS), U.S. Geological Survey Techniques and Methods, 4-C1, 51 p. (http://pubs.er.usgs.gov/usgspubs/tm/tm4C1).

Porterfield, George, 1972, Computation of fluvial-sediment discharge: U.S. Geological Survey Techniques of Water-Resources Investigations of the United States Geological Survey, Book 3, Chapter C3, 66 p. (http://water.usgs.gov/pubs/twri/twri3-c3/).

Rasmussen, P. P.; Gray, J, R.; Glysson, G. D.; Ziegler, A. C. 2009.. Guidelines and Procedures for Computing Time-Series Suspended-Sediment Concentrations and Loads from In-stream Turbidity-Sensor and Streamflow Data. U.S. Geological Survey Techniques and Methods Report 3 C4 (http://pubs.usgs.gov/twri/twri3-c4/html/toc.html).