STATION DESCRIPTION

A station description identifies the location, history, and operation of a gaging station. A complete description is prepared for each new station. The description is revised when changes in location or operation warrant. Otherwise, no changes are made to the description on an annual basis. The description outlined here is consistent with that recommended for a streamflow gage. Additional categories of information are needed if sediment data are also collected at the station. Categories that may need additional input for a sediment station are marked by an asterisk (*).

Heading:	Station number, station name
*Location:	Latitude and longitude, county, hydrologic unit code (HUC), and references to local towns and roads. Also, include local site location, such as, "on right bank, downstream side of pier." Describe sediment sampling location if different from the gage.
*Establishment:	Give date station was established and date when sediment sampling began.
Drainage area:	Give contributing area, also include non-contributing drainage area, if appropriate.
Basin Description:	A brief description of the drainage basin. Include descriptors of the hydrologic and/or the sediment characteristics at the gage. Consider the following descriptors: basin shape, channel gradient, basin aspect; approximate extremes in elevation; general topography of the drainage; vegetation cover (general types and density); the lithology; sediment sources (types of dominate erosion processes, channel stability, bed material, etc.); and major land uses. Identify average annual precipitation, the type of the precipitation, and the temporal distribution of large storms. Describe the normal sources of runoff encountered at the station. Identify any conditions in the basin that may alter the hydrologic regime (including sediment characteristics and discharge) through time (e.g. major construction, urbanization, change in agriculture, mining, and forest fires). Include dates if known.

*Gage Equipment:	The types of shelter and equipment operated at the station. Define any equipment changes made and dates of changes. Give pertinent data such as elevations of reference points in the gage, location and elevations of outside and inside gage. State any unusual relations among reference points. If references have been moved, give history. Describe intakes for stage and history of problems. Describe the intake environment of the pumping sampler, including elevation above the bed and condition around the intake after significant changes in stage. Location of box sampler and type of equipment. If sampler has moved, give history.
*History:	If station has been moved, list the moves chronologically and the old station number(s). Include moves of staff gage or other reference points not given elsewhere. List types of records collected, period of data collection, and frequency of sampling. At suspended-sediment stations, include other data collected such as water temperature and size distribution of bed material. For sediment stations, identify sampling schedule by observer, pumping sampler, and USGS personnel.
Reference and Bench Marks:	Location, elevation, dates of leveling Datum of gage and source
Controls:	Location of control at various flows. Describe bed and banks. Identify tendency for shifts, if appropriate.
Discharge Measurement:	Location of wading measurement section and limiting conditions (gage heights or channel characteristics) for using the section.

2

*Sediment Measurements:	Special sampling instructions. Define timing relation of suspended-sediment concentration peak and streamflow peak, if known. Location of wading measurement section and limiting conditions (gage height or other reference) for using the section. Acceptable sampling procedures and samplers should be specified. Location of high-water measurement section(s), equipment (including sampler used), channel conditions at the section, number of channels, and any pertinent warnings or special instructions. Sampling equipment stored at the gage. Location of bedload and bed-material sampling sites and methods used, if appropriate.
Floods:	Give maximum and unusual flood statistics. Include location of indirect measurements.
Point of zero flow:	Include stage and dates.
*Winter flow:	Conditions and data-collection program in winter if different from other seasons.
Regulation/ Diversions:	If known, include dates when regulation or diversion went into effect, manager (e.g. agency), and the general operating schedule.
*Accuracy:	Estimate of accuracy for different ranges of flow for those data types collected at the station.
*Cooperator:	Name(s), include surface water and sediment.
*Purpose:	State the purpose for data collection at this site. Emphasize if the purpose is to monitor effects of land use or other modifications in the basin.

Land Ownership:	Identify land ownership; include how permission to use site was obtained. Identify location of letter or other form of agreement.
*Observer:	Name, address, phone number of observer, and any information necessary to continued good cooperation and data collection.
Road log and/or map:	Sufficient directions to allow one, unfamiliar with the site, to find it in low or high-water conditions. Include special instructions or access problems at the station.
*Photographs:	Photographs may be useful in identifying unusual conditions at the gage or in the drainage basin. Photos of the intake environment for the pumping sampler and the bed-material sampling site (or the bed material) may also be useful.

Name and date of compiler or revision:

SEDIMENT FIELD NOTES

Sediment Field Notes are records of visits to a station. They should thoroughly describe the equipment and methods used as well as relevant conditions or changes. The OFFICE OF SURFACE WATER TECHNICAL MEMORANDUM NO. 90.08 contains a complete list of the required data for bedload sampling information. It is essential that the Notes be complete because information from the Notes is referred to when the sediment record and sediment station analysis are prepared.

<u>For Stations Where Only Suspended-Sediment is Sampled</u>:

Essential:

- Heading information:
  - Date
  - Station number
  - Station name
  - Party
- Discharge information:
  - Gage height
  - Discharge
  - Time
  - Width
  - Area
  - Velocity
  - Location of measurement
- Suspended-sediment sampling information:
  - Time
  - Sampling location
  - Gage height
  - Method (EDI, EWI, etc.)
  - Number of bottles collected
  - Number of verticals
  - Stationing of verticals
  - Number and location of point samples in vertical (if appropriate)
  - Sampler type
  - Nozzle size
  - Number of bottles collected for particle size
  - Bottles visually inspected for sand
  - PS-69 information
    - Number of bottles filled
    - Sampler working properly? (Yes or No). Explain if "No"
    - Condition of intake (clear, clogged, etc.)
    - Timing of samples

Observer information:
- Contacted?
- Number of cases exchanged
- Instructions
- Bottles checked? (Yes or No)

Other information:
- Temperature - air and water
- Stream stage (steady, falling, rising, and rate of change)
- Stream conditions (clear, muddy, boils, waves, etc.)
- Weather
- Remarks

Optional:

Water-quality field-measurement information:
- Specific conductance
- pH
- Alkalinity
- Acidity
- Dissolved oxygen
- Bacteria

<u>For Stations Where Bed Material is Sampled, the Form Should Include:</u>

Bed-material sampling information:
- Time
- Gage height
- Location
- Number of samples
- Sampler type
- Sampling environment (bar, etc.)
- Stations
- Sample stratification (surface, subsurface)
- Particle counting:
  - Method
  - Location
  - Environment
  - Number of particles counted
  - Dimensions of each particle (or intermediate diameter)

For Stations Where Bedload is Sampled, the form should include the following in addition to the information for suspended-sediment samples:

Time
Gage height
Sampler type
  Bag mesh size
  Tetherline (Yes or No)
Sampling method (UWI, MEWI, SEWI)
Sample locations
Number of samples (in composite and total)
Number of sampling verticals and locations
Number of composites in the measurement
Time on bottom at each sampling vertical
Channel width
Effective width
Bed-material - observed
Observation of zero bedload

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
INSPECTION SHEET

Sta. No. _____ Date _____

Station _____

Party _____ Disch _____

Width _____ Area _____ Vel. _____ Time _____ G.H. _____

SUSPENDED-SEDIMENT SAMPLES: Wading, cable, ice, boat, upstream, downstream, side bridge ____ feet, miles above, below gage and _____

Sampler: D-43, D-49, DH-48, DH-59, P-46, P-61, Other _____

Method	Time	G.H.	No. of Vert.	No. of Bottles	Stations

Nozzle size ____ in.

Air ____ °C at _____

Water ____ °C at _____

Weather _____

Flow _____

Turbidity _____

BED-MATERIAL SAMPLES: Time _____ G.H. _____ No. samples _____

Sampler _____ Wading, cable, ice, boat, upstream, downstream side bridge _____ feet, miles, above, below gage and _____

Stations _____

Stage: Steady, rising, falling, peak Peak G.H. _____

OBSERVER: Contacted-yes __ no __ Cases-in ____ out ____ res. _____

REMARKS _____

Example of form that can be used for suspended-sediment and bed-material sampling.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
INSPECTION SHEET

Sta. No._____ Date _____
Station _____
Party _____ Disch. _____
Width _____ Area _____ Vel. _____ Time _____ G.H. _____
BEDLOAD: Wading, cable, boat, upstream, downstream, side bridge
_____ feet, miles, above, below gage and _____
Zero bedload observed: yes ____ no ____ Bag mesh size _____
Sampler type: _____ Method: _____
Tetherline: yes _____ no _____ Water Temperature: _____ °C
Gage Height: Begin _____ End _____ REW @ sta. _____ LEW @ sta. _____

Sample Number	Time	Vertical Station	Depth	Seconds on Bottom	Carton or Composite Number

Total No. verticals _____ Total No. samples _____
Stream conditions - Stage: Steady, rising, falling, peak
Rate of change: _____
Flow: Smooth, turbulent, other _____
Channel width:_____ Effective width _____
Remarks: _____
_____
_____
_____

Example of form that can be used for bedload sampling.

SEDIMENT DATA PROCESSING

Sediment and associated streamflow data are compiled to produce sediment records for individual sites. The records generally include tables of periodic measurements, daily values, or both. A sediment record may also include tables for two or more types of transported sediment, such as suspended sediment, bedload, bed material, and total sediment.

The following guidelines for processing sediment data are modified from Book 3, Chapter C3 (Porterfield, 1972) and Book 5, Chapter C1 (Guy, 1969) of the series of "Techniques of Water-Resources Investigations of the U.S. Geological Survey."

Data Processing for Tables of Periodic Measurements

Data processing of periodic measurements consists of four steps; tabulation, evaluation, editing, and verification.

a. Tabulation: Data for each measurement are tabulated on an appropriate form according to type of sediment (suspended sediment, bedload, bed material, or total sediment). Examples of data for an individual table and parameter reporting order are:

   1. Suspended-sediment table: Date, time, water discharge, water temperature, suspended-sediment concentration, suspended-sediment discharge, and suspended-sediment particle-size distribution.

   2. Bedload table: A complete listing of data required for bedload samples is contained in the OFFICE OF SURFACE WATER TECHNICAL MEMORANDUM NO. 90.08, but in general the table should include: Date, time, sampling method, sampler type, width increment of sample, number of composites, number of samples in composite, number of sampling points, sample location in cross section, water discharge, water temperature, bedload discharge, and bedload particle-size distribution. A "REMARKS" statement should be included to define hydrologic conditions and appropriate information describing sampling conditions.

   3. Bed-material table: Date, time, number of sampling points, water discharge, water temperature, and bed-material particle-size distribution.

   4. Total sediment table: Date, time, water discharge, water temperature, total sediment concentration, total sediment discharge, and total sediment particle-size distribution. A "REMARKS" statement should be included to define hydrologic conditions and appropriate information describing sampling conditions.

Valid total sediment data can only be obtained under limited hydrologic and sampling conditions. Total sediment concentration can be obtained from samples collected in a contracted-width section (turbulence flume) or from samples that are integrated through the total stream depth. Samples are usually collected with standard suspended-sediment samplers. Optimum hydrologic and sampling conditions may result when:

a. Plane-bed conditions exist (bed forms may cause sampling errors).
b. Sediment particles are less than 4 mm in diameter.
c. Velocity and turbulence is sufficient to suspend most bed particles.
d. The sampler nozzle can be placed flush with the stream bed.

b. Evaluation: Field notes and laboratory analysis forms should be examined to determine if correct sampling equipment and techniques were used, if sampling conditions were acceptable, if samples were damaged during shipping or analysis, and if documentation is available regarding sample integrity. The data should be compared with appropriate historical data to determine whether data for the current year appear reasonable.

Water-discharge data (gage heights, shifts, corrections, and discharges) should be reviewed.

Criteria for questioning the integrity of individual samples include:

1. Unacceptable sampling conditions.

2. Use of improper equipment or techniques.

3. Container damage or loss of sample.

4. Illegible or incorrect information on field notes, shipping forms, or sample container.

5. Presence of unusually large particles in sample or an unusually large amount of sand-size material.

6. Overfilled sample container (The sample weight or volume should not exceed the design weight or volume of a given sample container).

7. Sample contamination.

8. Excessive length of time between date of sample collection and date of analysis (special storage precautions may be needed if samples are stored for periods exceeding six months).

9. Specific conductance of sample is not reasonable if compared with the specific conductance of other samples or with hydrologic conditions.

10. Incorrect compositing or analysis.

11. Computation errors.

12. Concentration or particle-size distribution of sample is not reasonable when compared with analyses of duplicate samples.

Data that are not considered suitable for entry into NWIS should be flagged.

c. Editing: After the data have been evaluated, editing may be required to satisfy WRD or NWIS requirements. Editing generally consists of deleting or revising data from a computer file or form.

d. Verification: Data entered in NWIS should be verified by comparing the values on the entry form with data retrieved from NWIS.

Data Processing for Tables of Daily Values

Daily records of sediment concentrations and discharges are prepared for sites where sufficient sediment-concentration and water-discharge data are obtained to justify computation of daily sediment discharge. Data processing generally includes the following steps:

1. A checklist is used to document the completion of each processing step.

2. Field notes, laboratory analyses, and water-discharge data are reviewed.

3. Cross-section and single-vertical data are processed to determine cross-section/box coefficients (Porterfield, 1972, p. 12-16).

4. Concentration data are plotted on a chart to develop a temporal concentration curve (a concentration curve may not be required for periods of low discharge or concentration).

5. A continuous concentration curve is drawn through the plotted concentration data using established principles of sediment transport. Concentration data are usually plotted on a graph of stage or water discharge.

6. The concentration curve is reviewed.

7. Daily mean concentrations are computed for days where subdivision is not required. Cross-section/box coefficients are applied where appropriate.

8. Daily mean concentration and daily sediment discharge are computed for days where subdivision is required (Porterfield, 1972, p. 48). Cross-section/box coefficients are applied where appropriate.

9. Daily mean concentrations and/or daily sediment discharges are estimated for periods where concentration or water discharge data are insufficient to compute daily values. Several common methods for estimating daily values include the use of sediment-transport curves, visual comparison of the discharge during estimated periods with discharge-sediment relationships for periods when discharge and concentration are well-defined, and hydrographic comparison.

10. Computations and estimates are checked and reviewed.

11. Daily mean concentrations and daily sediment discharge values are entered in NWIS. If sediment discharges are estimated, an estimate of daily mean concentration is usually not entered in NWIS.

12. Data entered in NWIS are verified by comparing entry values with values retrieved from NWIS.

References Cited

Guy, H. P., 1969, Laboratory theory and methods for sediment analysis: U.S. Geological Survey Techniques of Water-Resources Investigations, Book 5, Chapter C1, 58 p.

Porterfield, George, 1972, Computation of fluvial sediment discharge: U.S. Geological Survey Techniques of Water-Resources Investigations, Book 3, Chapter C3, 66 p.

SEDIMENT RECORD REQUIREMENTS AND REVIEW FORM

RECORD REQUIREMENTS

The record requirements for individual sediment records vary according to the amount and types of data obtained. A record will generally include data that are representative of instantaneous measurements and/or daily values. A sediment record for an individual station contains three primary groups: original data, a graph of temporal concentration, and processed material. Although computer processing of some steps may alter the checklist, each sediment record should include, in folders or binders, material in the following categories as appropriate for either a daily or periodic station:

1. Field notes
2. Laboratory analyses
3. Graph of temporal concentration data
4. Tabulation of sediment discharge measurements and box coefficient samples
5. Sediment transport curve, if appropriate
6. Work sheets and final tables of particle-size data
7. List of ancillary data such as water temperature or turbidity
8. Computations, worksheets, and final tables of daily mean concentration and daily sediment discharge with identification of days requiring subdivision or estimation
9. Checklist, copy of station description, and dated copy of the station analysis

CHECKLIST FOR PERIODIC SEDIMENT RECORDS

Data Type(s) *		Initials/date Comp.	Check	Review
____	1. Data compilation			
	a. Field notes assembled, including individual sample notes and tabulation of sediment discharge measurements	_____	_____	_____
	b. Laboratory forms assembled	_____	_____	_____
____	2. Evaluation			
	a. Sediment field notes	_____	_____	_____
	1. Analysis	_____	_____	_____
	2. Validity of sampling technique established	_____	_____	_____
	b. Computed laboratory forms	_____	_____	_____
	c. Streamflow measurements			
	1. Instantaneous-discharge measurements	_____	_____	_____
	2. Daily mean discharge	_____	_____	_____
	d. Concentration/discharge notes and sampling procedures	_____	_____	_____
	e. Size-analysis data	_____	_____	_____
	f. Data compiled in chronological order	_____	_____	_____
____	3. Edit and revise data	_____	_____	_____
____	4. Verification of data in NWIS	_____	_____	_____

* Sediment data may include the following types:

SSC suspended-sediment concentration
TSC total sediment concentration
BLQ bedload discharge
BLD bedload size distribution
BMD bed material size distribution
___ other data _____

CHECKLIST FOR DAILY SEDIMENT RECORDS

Initials/date			
Comp.	Check	Review	
			DATA COMPILATION
_____	_____	_____	Compile and assess sediment field notes for use in data evaluation in subsequent steps
_____	_____	_____	Compile laboratory data
_____	_____	_____	Prepare list of sediment-discharge measurements for samples collected by USGS and observer
			LABORATORY ANALYSES
			Review of laboratory analyses
_____	_____	_____	Dates and times match shipping logs
_____	_____	_____	Assess specific conductance among samples, if applicable
_____	_____	_____	Evaluate sample weights for improper samples
_____	_____	_____	Review laboratory notes regarding sample deficiencies
_____	_____	_____	Review analyses for proper computation and abnormal cross-sectional variation
			Particle-size analyses tabulated
_____	_____	_____	Suspended sediment
_____	_____	_____	Bed material
_____	_____	_____	Bedload
_____	_____	_____	Total sediment
_____	_____	_____	List water-temperature data, if applicable
_____	_____	_____	List concentration-turbidity data, if applicable

COMPUTATION OF SUSPENDED-SEDIMENT RECORD

_____ _____ _____ Determine calibration (box) coefficients

_____ _____ _____ Plot of coefficients with time and/or streamflow

_____ _____ _____ Plot concentration values on gage height/discharge trace

_____ _____ _____ Draw and review concentration curve

_____ _____ _____ Check continuity September 30 to October 1

_____ _____ _____ Indicate calibration (box) coefficients on chart (table/file)

_____ _____ _____ Compute and list daily mean concentration and daily sediment discharge for days where subdivision is not required

_____ _____ _____ Compute and list daily mean concentration and daily sediment discharge for days where subdivision is required

_____ _____ _____ List days where data are insufficient to compute the daily values by normal procedures

_____ _____ _____ Transport curves drawn, if applicable

_____ _____ _____ Instantaneous concentration and water discharge

_____ _____ _____ Daily mean sediment discharge and daily mean streamflow

_____ _____ _____ Comparisons made with curves from previous years

_____ _____ _____ Computations and estimates checked and reviewed

_____ _____ _____ Daily mean concentrations and daily sediment discharge values are entered into NWIS

_____ _____ _____ Verification of data entry into NWIS by comparing listed values with those retrieved from NWIS.

ANCILLARY DOCUMENTS

_____ _____ _____ Station analysis written

_____ _____ _____ Station description written or updated

GENERAL RECORD REVIEW

_____ Records reviewed in the office

_____ Records reviewed by District sediment specialist

SEDIMENT STATION ANALYSIS

The sediment station analysis is a summary of the sediment activities at the station for a given year. The analysis describes the coverage of sampling, the types of samples and sampling, changes that might affect sediment transport or the record, and the methods and reasoning used to compute the record. A reviewer should be able to determine from the Analysis the adequacy of the activities in defining the record and in accomplishing the purpose of the station.

Sediment Station Analysis
Station Number and Name
Date

Essential

A. Records Collected at Station

1. Streamflow
2. Temperature
3. Water Quality
4. Sediment
   a. Suspended Load
   b. Bed Material
   c. Bedload
5. Purpose

Example: Daily streamflow record has been collected from Oct. 1, 1979, to the present. A water-quality monitor continuously from Oct. 1, 1982, through Sept. 30, 1987. Suspended sediment has been collected from Oct. 1, 1983, to the present. The purpose for obtaining a sediment record at this station is to evaluate the effects of erosion controls implemented in 1987.

B. Equipment

1. Types
2. Location
3. Changes
4. Dates of changes

Example: Sediment-sampling box is installed on downstream side of bridge at station 55. Box contains an A-reel and a D-49 sampler. Box was at station 72 from Oct. 1, 1983, to June 16, 1986.

C. Sampling Program

1. Frequency
2. Type of sampling
3. Laboratory used

Example: Pumping sampler collected samples daily when streamflow was less than 500 ft^3/s and every 4 hours when streamflow was greater than 500 ft^3/s. Cross-section samples were collected by wading at streamflows less than 200 ft^3/s and by sampling from bridge at greater flows. EWI method was used in both cases. Samples were analyzed by the Pennsylvania District laboratory in Harrisburg.

D. Observer

1. Name
2. Dates
3. Changes
4. Problems

Example: Walter Brown (10/83-04/90) was the observer until April 15 at which time he moved and was replaced by Oscar Smith. Walter's sampling was considered good. Sand grains were noted in Oscar's samples, and his technique was suspect until July 10 when his technique was reviewed by USGS personnel. Duplicate samples were collected by USGS personnel to verify Oscar's samples.

E. Data Summary

1. Number of samples collected by:
   a. Observer
   b. Pumping sampler
   c. USGS personnel
2. Number of sediment-discharge measurements
   a. Suspended sediment
   b. Bedload
3. Number of bed-material samples
4. Number of size analyses
   a. Total range
   b. Sand breaks
5. Number of visits by field personnel
6. Streamflow
   a. Maximum for year
   b. Maximum sampled by:
      1) Observer
      2) Pumping sampler
      3) USGS personnel

7. Range of concentrations sampled by:
   a. Observer
   b. Pumping sampler
   c. USGS personnel
8. Periods of missing record

Example:

Suspended-sediment samples	
Observer single vertical	254
USGS single vertical	12
USGS cross section	9
Bed-material samples	5
Complete particle-size analyses	6
Sand breaks	57
Visits by USGS	18
Streamflow	
Maximum for year (ft^3/s)	3,020
Maximum sampled by:	
Observer (ft^3/s)	2,710
USGS (ft^3/s)	1,850
Range of concentrations sampled by	
Observer (mg/L)	2 - 1,500
USGS (mg/L)	5 - 1,280
Periods of missing record	none

F. Sediment-discharge computations

1. Methods used to compute discharges
   a. Hand plotted
   b. Computer generated (computer program used)
   c. Use of transport curve
   d. Estimated periods
   e. Subdivided days
   f. Knowledge of history of concentration peak preceding, coinciding, or following streamflow peak.

Example: Suspended-sediment concentrations were plotted by hand on the A-35 chart, October 1 to June 9. A smooth curve was then drawn on the basis of plotted values. If a considerable difference in concentration among bottles of a sample existed, major weight was given to the bottle that best agreed with the preceding and following samples.

For those peaks not adequately defined, the concentration curve was drawn using a sediment-transport curve for trend. The transport curve was developed using the twenty-one sediment discharge measurements obtained at streamflows ranging from 9.1 to 1850 ft^3/s while concentrations ranged from 2 to 4,290 mg/L. Various

box samples and observer samples were also used on the transport curve. Eighteen days were subdivided and discharges were computed by digitizing the curve using hourly concentrations applied to unit values of streamflow stored on the Prime computer. Concentrations for June 10 to September 30 were interpolated between samples. No curve was drawn for this period.

G. Box Coefficients

1. Range of coefficients used
2. Basis and method for applying coefficients
   a. Streamflow
   b. Concentration
   c. Time

Example: Box Coefficients of 0.85 to 1.50 were used to compute the record. For flows less than 20 ft^3/s, a coefficient of 1.0 was used throughout the year. A relation between the coefficient and streamflow was used to estimate coefficients for flows greater than 300 ft^3/s. At flows between 20 and 300 ft^3/s, the coefficient was adjusted by time on the basis of samples.

H. Size analysis (suspended sediment)

1. Number
2. Streamflow
3. Concentration

Example: Six complete particle-size analyses were done during the year. The streamflow for these samples ranged from 125 to 942 ft^3/s and the concentrations ranged from 112 to 3,420 mg/L. Also, 19 sand breaks were done from samples taken at streamflows ranging from 82 to 754 ft^3/s and whose concentrations ranged from 56 to 950 mg/L.

I. Other computations

1. Bedload
2. Bed material

Example: Five bed-material measurements, six Helley-Smith bedload measurements, and seven observations of no bedload moving were made during the year. Bedload was computed from the bed-material samples using the Meyer-Peter-Muller equation. A new rating was

developed based on these measurements. Helley-Smith samples were not used in developing the rating due to poor sampling conditions that caused the sampler to overmeasure. All samples were analyzed for particle-size distribution.

J. Remarks

1. Evaluation of record
2. Effects of sediment transport by upstream land use
3. Other observations pertinent to the record
4. Location of laboratory records
5. Adequacy of sampling program for station purpose
6. Suggestions for improvement

Example: Record is considered good. Opening of iron mine 20 miles upstream in June may have changed the relation between streamflow and suspended-sediment discharge. Original laboratory analyses are stored by the Harrisburg laboratory. Worksheet copies of analyses are kept in sediment file. Sampling was sufficient for determining effects of mine. More sampling is needed during snowmelt.

K. Preparer and Reviewer

Give the names of the persons who prepared and reviewed the station analysis at the end of the analysis

Non-Essential

The following are not essential to describing the sediment activities for the year but are recommended to provide an understanding of the basin and sediment-transport history and to make the person operating the gage think about what in the basin might affect sedimentation. These are included in some sediment-station analyses but could be made a part of the station description. They probably would have to be written only once and could be filed in the current station folder if not made part of the station analysis or station description. Placing this information in the station analysis or the station description is preferred.

A. Basin Characteristics

1. Drainage area
2. Dams
3. Topography
4. Land use
5. Physiography

Example: The drainage area of the South River above the station is 1,243 mi^2. Most of the headwaters are forested, but the lower basin is intensively farmed. The population in the basin is 75,552 (1990); the main city, Noneville, has 43,956 people. The topography is mostly rolling hills in the upper basin and flat prairie in the lower basin. The elevation ranges from 350 to 1,240 ft. Besides farming, other land uses that might affect erosion and sediment transport are coal mining in the northwest part of the basin about 32 miles above the station and logging in the headwaters. About 1,500 acres of the forested area were burned in 1987. The river is about 62 miles long and meanders after leaving the hill areas. Its tributaries are small.

B. Channel at Gage

1. Width
2. Bank height
3. Bars
4. Evidence of erosion or deposition

Example: The channel is straight for 1,000 ft above and below the gage. The right bank above the gage is eroding. The banks rarely exceed 12 ft and the channel is 500 ft wide at the gage. A gravel bar exists about 200 ft downstream from the gage. Overflow is directed onto a wide flood plain.

C. Summary of Record

1. Period
2. Streamflow
3. Load
4. Yield
5. Double-mass plot of annual streamflow and sediment load

Example:

Period	Streamflow	Load (Tons)	Yield (T/mi^2)
1975	1,379,137	486,692.7	291
1976	1,165,266	355,821	213
etc.			

The above summary is particularly helpful to someone working on the entire record. It is better to have this information in one place rather than to have to search in the individual annual volumes.

PUBLICATION FORMAT FOR SEDIMENT DATA

Sediment and associated streamflow data obtained by Water Resources Division (WRD) are published annually in State or Regional reports to provide basic data information to interested parties outside of the U.S. Geological Survey (USGS). Publication formats for these annual reports should be uniform and consistent, wherever possible.

Basic guidelines for organizing and reporting WRD sediment data are described in "WRD Data Reports Preparation Guide" (Novak, 1985). Instructions on the order of reporting water data for the preparation of State data reports are given in "Preparation of Water-Resources Data Reports" (USGS, 1976). Recent implementation of the National Water Information System (NWIS-1) and requirements for the reporting of additional types of sediment data, however, have resulted in a need to modify and clarify the guidelines presented in the 1976 and 1985 reports. This memorandum restates key parts of the previous reports and provides interim guidelines for the publication of sediment data.

The following guidelines for publication of sediment data in annual WRD data reports are modified from the 1985 edition of the "WRD Data Reports Preparation Guide," the 1976 report "Preparation of Water-Resources Data Reports," and Office of Surface Water Technical Memorandum No. 90.08.

Records to be Published

a. All sediment data collected at surface-water stations and miscellaneous or project sites should be published.

b. Data inadvertently omitted from the previous water-year reports should be combined with current data for the site. If no current data are being reported, then the data may be published alone.

Procedures for Retrieval of Data for Publication

a. Instructions for retrieving daily values for publication are given in "National Water Information System User's Manual," v. 2, Chapter 3, Automated Data Processing System (Dempster, 1990).

b. Instructions for retrieving sediment data (other than daily values) for publication are given in "National Water Information System 90.1 User's Manual," v. 2, Chapter 2 (Maddy and others, 1990).

CHECKLIST FOR PERIODIC SEDIMENT RECORDS

Data Type(s) *		Initials/date Comp.	Check	Review
____	1. Data compilation			
	a. Field notes assembled, including individual sample notes and tabulation of sediment discharge measurements	_____	_____	_____
	b. Laboratory forms assembled	_____	_____	_____
____	2. Evaluation			
	a. Sediment field notes	_____	_____	_____
	1. Analysis	_____	_____	_____
	2. Validity of sampling technique established	_____	_____	_____
	b. Computed laboratory forms	_____	_____	_____
	c. Streamflow measurements			
	1. Instantaneous-discharge measurements	_____	_____	_____
	2. Daily mean discharge	_____	_____	_____
	d. Concentration/discharge notes and sampling procedures	_____	_____	_____
	e. Size-analysis data	_____	_____	_____
	f. Data compiled in chronological order	_____	_____	_____
____	3. Edit and revise data	_____	_____	_____
____	4. Verification of data in NWIS	_____	_____	_____

* Sediment data may include the following types:

SSC suspended-sediment concentration
TSC total sediment concentration
BLQ bedload discharge
BLD bedload size distribution
BMD bed material size distribution
___ other data _____

SEDIMENT STATION ANALYSIS

The sediment station analysis is a summary of the sediment activities at the station for a given year. The analysis describes the coverage of sampling, the types of samples and sampling, changes that might affect sediment transport or the record, and the methods and reasoning used to compute the record. A reviewer should be able to determine from the Analysis the adequacy of the activities in defining the record and in accomplishing the purpose of the station.

Sediment Station Analysis
Station Number and Name
Date

Essential

A. Records Collected at Station

1. Streamflow
2. Temperature
3. Water Quality
4. Sediment
   a. Suspended Load
   b. Bed Material
   c. Bedload
5. Purpose

Example: Daily streamflow record has been collected from Oct. 1, 1979, to the present. A water-quality monitor continuously from Oct. 1, 1982, through Sept. 30, 1987. Suspended sediment has been collected from Oct. 1, 1983, to the present. The purpose for obtaining a sediment record at this station is to evaluate the effects of erosion controls implemented in 1987.

B. Equipment

1. Types
2. Location
3. Changes
4. Dates of changes

Example: Sediment-sampling box is installed on downstream side of bridge at station 55. Box contains an A-reel and a D-49 sampler. Box was at station 72 from Oct. 1, 1983, to June 16, 1986.