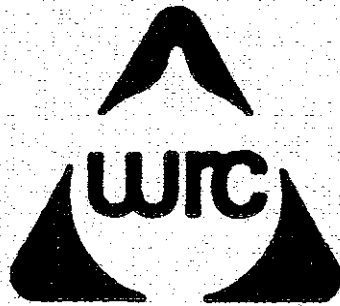


**PROCEEDINGS  
OF THE  
THIRD FEDERAL INTER-AGENCY  
SEDIMENTATION CONFERENCE  
1976**



**SEDIMENTATION COMMITTEE  
OF THE  
WATER RESOURCE COUNCIL**



ERRATA SHEET  
for  
Proceedings of the  
Third Federal Inter-Agency Sedimentation Conference

Table of Contents -- The authors shown for page 5-48 should be:  
R. F. Piest, C. E. Beer and R. G. Spomer

Page 1-41, 2nd paragraph, 4th line after "20 percent of" add  
"total load at"

Table 1, page 1-45 under symbol, place a decimal point before:

5th term = -.0024 BA  
15th term = +.1977 R3  
16th term = -.4013 SL3

Page 1-58 -- References

Vice, Guy and Ferguson, change 1973 to 1969

Page 4-120, Table 2, bottom figure of 3rd column, change 350 to 50

Page 4-125, Table 7, 3rd column, 1st figure, change +72 to +70

Page 4-125, middle paragraph, 6th line, change 69 to 70m  
middle paragraph, next to last line, change erosion to  
sediment yield

Page 4-146 (5) should have .73/N0 and .23 as exponents rather than  
as multipliers

Page 5-51 -- Ordinate values

Change 300 to 290  
290 to 285  
Mark out 295 and 285

Page 6-28 in abstract:  $u_b = 1.5\text{m/sec}$  (3.8 ft/sec)

should read:  $u_b = 1.0\text{m/sec}$  (3.2 ft/sec)

Page 6-37, 2nd paragraph, 2nd sentence: The word "accretion" should  
be "scour"

**PROCEEDINGS  
OF THE  
THIRD FEDERAL INTER-AGENCY  
SEDIMENTATION CONFERENCE  
1976**

**PARTICIPATING AGENCIES**

**Agricultural Research Service  
Bureau of Mines  
Bureau of Reclamation  
Corps of Engineers  
Environmental Protection Agency  
Federal Highway Administration  
Federal Power Commission  
Forest Service  
Geological Survey  
National Oceanic and Atmospheric Administration  
Soil Conservation Service  
Tennessee Valley Authority  
Water Resources Council**

**March 22-25, 1976**

**Denver, Colorado**

**Prepared by  
Sedimentation Committee  
Water Resources Council**

PROLOGUE  
BY  
JOHN N. HOLEMAN 1/

The sponsor of the Third Federal Inter-Agency Sedimentation Conference is the Sedimentation Committee, Water Resources Council (WRC). The two previous conferences sponsored by the Sedimentation Committee were held in Denver, Colorado, May 6-8, 1947, and in Jackson, Mississippi, January 28 - February 1, 1963. Proceedings of the two earlier conferences were published by the Bureau of Reclamation, U.S. Department of the Interior, in January 1948 and by the Agricultural Research Service, U.S. Department of Agriculture, Miscellaneous Publication No. 970, in June 1965, respectively.

History of the Sedimentation Committee

In the "early forties" the Departments of Agriculture, Army, and Interior set up a committee to coordinate work on water resources. It was called "Federal Inter-Agency River Basin Committee" and often referred to as "Firebrick." "Firebrick" found that cooperation and coordination were needed in technical fields related to water resources and so established subcommittees on sedimentation, hydrology, and economics. The first meeting of the Subcommittee on Sedimentation was held in May 1946 with representatives of Forest Service, Soil Conservation Service, Corps of Engineers, Bureau of Reclamation, Geological Survey and Federal Power Commission participating. Carl B. Brown, SCS, was elected the first chairman.

The Subcommittee on Sedimentation took over the duties and projects and replaced the earlier committee known as the "Interdepartmental Committee on Sediment Sampling and Sampling Technique." All federal agencies interested in sedimentation were invited to send representatives, and at the second meeting of the subcommittee, TVA, the Coast and Geodetic Survey, and the Office of Land Utilization of Interior began participation.

In May of 1954, President Eisenhower, by Executive order, directed that the Inter-Agency Committee on Water Resources be established. Thus "Firebrick" was replaced by a new organization nicknamed "Ice Water." In January of 1955, "Ice Water" (IACWR) granted a new charter for the

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1/ Chairman, Sedimentation Conference Planning Group and Geologist (Sedimentation), Engineering Division, Soil Conservation Service, USDA, Washington, D.C., 20250

continuation of the Subcommittee on Sedimentation under its auspices. In 1966, IACWR was superseded by the present parent organization, the Water Resources Council.

Interdepartmental collaboration in the field of sedimentation actually began in 1939 when the Departments of Agriculture, Army, and Interior joined in sponsoring a project for developing improved sediment-sampling equipment and methods for securing and analyzing sediment samples. This project was under the supervision of Professor E. W. Lane of the University of Iowa's Institute of Hydraulic Research. In 1948, this project was moved to Minneapolis to the University of Minnesota's St. Anthony Falls Hydraulics Laboratory where it is still supported by the Sedimentation Committee. Subsequent engineers-in-charge of the project have been Byron C. Colby and, currently, John T. Skinner.

Departments and agencies that recently have been active participants of the Sedimentation Committee, WRC, are:

Department of Agriculture

Agricultural Research Service

Forest Service

Soil Conservation Service

Department of Commerce

National Oceanic & Atmospheric Administration

Department of Defense

Department of the Army, Corps of Engineers

Department of the Interior

Bureau of Mines

Bureau of Reclamation

Geological Survey

Department of Transportation

Federal Highway Administration

Environmental Protection Agency

Federal Power Commission

Tennessee Valley Authority

Water Resources Council

#### Functions of the Committee

The functions of the Sedimentation Committee include:

1. Coordination between federal agencies in the collection, analysis, and interchange of sedimentation data.

2. Clarification of technical and related procedures that concern sedimentation work.
3. Standardization and development of technical terminology, equipment, criteria, and methodology.
4. Exchange of information on basic and applied research in the field of sedimentation.
5. Any other action in the sedimentation field that is of common interest to participating agencies that cannot be handled at the field level or by individual agencies.
6. Special assignments from the parent committee (WRC), collaboration with the Subcommittee on Hydrology, or other activities as circumstances may dictate.

#### How the Committee Operates

A distinctive characteristic of this committee as compared to most federal activities is: It has no permanent staff and no budget. Its officers consist of a chairman and a vice chairman. These duties are rotated among the member agencies. For example, in fiscal year 1975, EPA provided Robert E. Thronson as chairman. This year the duties of the chairman are being performed by David Gudgel of the Bureau of Reclamation. The facilities and services required in carrying out committee activities are contributed as needed by the participating agencies.

Much of the work is done outside of the meetings and other than that of the two officers is accomplished by special work groups composed of two or more individuals. Special work groups that have been active during 1975 are:

1. Work Group on Turbidity Criteria.
2. Work Group on Revision of Committee Charter.
3. Work Group on Third Federal Inter-Agency Conference on Sedimentation.

The Sedimentation Committee meets every other month normally and more often when necessary. It meets in Washington, D.C., at a federal office designated by the current chairman, usually at the Office of the Water Resources Council.

#### Activities

The committee has been active in many projects and undertakings, but just a few that may be of special interest to this group are:

The Sedimentation Bulletin No. 4, "Inventory of Published and Unpublished Sediment-Load Data in the United States, 1946 - 1950," was updated. Participating agencies submitted to the Geological Survey their inventory of sediment-load data from 1950 to 1960. This has been published as GS Water-Supply 1547, and copies have been distributed. It can be of help in obtaining or determining if there is available sediment-load data for a given area. Presently less definitive sources of sediment-load data sites are listed annually in the Notes on Sedimentation Activities as Appendix A.

Each spring all of the agencies submit to the chairman a summary of their sedimentation work undertaken in the United States during the preceding calendar year. These summaries are compiled as a report with the activities listed under 21 major drainage basins. This report, entitled "Notes of Sedimentation Activities, Calendar Year \_\_\_\_\_," is distributed by the committee chairman. The report provides a means of keeping informed on current sedimentation work of federal agencies in the different parts of the country.

Every 5 years all of the participating agencies collect reservoir sedimentation survey data obtained since the previous report. The next report will update USDA Miscellaneous Publication No. 1266, "Summary of Reservoir Sediment Deposition Surveys Made in the United States Through 1970." These data are sent to the Director of the USDA Sedimentation Laboratory at Oxford, Mississippi, where they are compiled. Both a bulletin and appendix containing all of the reservoir summary sheets have been published for the Committee by ARS. It is expected to be available in a couple of years for the period through 1975. Copies are sent to participating agencies for distribution. Reservoir sedimentation survey data are excellent sources for estimating sediment yields and in many places are our best basis for estimating sediment storage requirements above structures.

#### Committee Plans for the Conference

More than a year ago a work group was appointed to look into the need for a national conference on sedimentation similar to the 1947 and 1963 conferences sponsored by the Sedimentation Committee. In the 13 years since the last conference, there has been a large amount of research and development work. The work group recommended that a third conference be held in March 1976. This recommendation was accepted and the conference is scheduled for the last full week in March at Denver, Colorado. Letters of inquiry were sent out to many potential authors about presenting papers at this conference. The affirmative response was far greater than had been anticipated. More than 130 workers in sedimentation indicated a willingness to prepare and present papers at this Third Federal Inter-Agency Conference on Sedimentation -- more than could be worked into the schedule. The committee has accepted about 80 papers for publication in the proceedings. More than one-half of the papers published will be presented in summary form at the conference with time for questions and discussion.

### Other Activities

There are many other areas of activities of the committee that have not been included here. For example, the Interagency Sedimentation Project at St. Anthony Falls Laboratory which is supported by most agencies of the committee. The project has been making excellent progress in developing and testing automatic sediment sampling devices. The results of cooperative studies there have been incorporated in more than two dozen technical reports which have been widely distributed and used. This project alone could well be the subject of many informative discussions.

The Sedimentation Conference is planned as a form for discussion and the exchange of ideas. By publishing the papers prior to the conference, those attending the conference have the opportunity to preregister and read papers before-hand and thus make more time available to the meeting to raise questions or offer comments. This should lead to a livelier and more valuable exchange of information.

### The Planners

Members of the Sedimentation Committee who planned the Conference and others who were involved are:

#### Publication:

Murray L. Corry, Federal Highway Administration  
A. R. Robinson, Agricultural Research Service

#### Program:

Robert E. Thronson, Environmental Protection Agency  
Shapur A. Zanganeh, Corps of Engineers

#### Arrangements:

James K. Culbertson, Geological Survey  
David F. Gudgel, Bureau of Reclamation

#### Local Arrangements:

Ernest M. Pemberton, Bureau of Reclamation  
Carl F. Nordin, Jr., Geological Survey

#### Chairman:

John N. Holeman, Soil Conservation Service

Roster of Members  
SEDIMENTATION COMMITTEE  
WATER RESOURCES COUNCIL

DEPARTMENT OF AGRICULTURE

Agricultural Research Service - A. R. Robinson  
Forest Service - Marvin C. Meier  
Soil Conservation Service - John N. Holeman  
Soil Conservation Service - William F. Mildner (Alternate)

DEPARTMENT OF THE ARMY

Corps of Engineers - Edgar P. Story  
Corps of Engineers - S. A. Zanganeh (Alternate)

DEPARTMENT OF COMMERCE

National Oceanic & Atmospheric Admin. - Richard B. Perry  
National Oceanic & Atmospheric Admin. - David B. Duane (Alternate)

DEPARTMENT OF INTERIOR

Bureau of Reclamation - David F. Gudge  
Bureau of Mines - W. L. Dare  
Geological Survey - James K. Culbertson

DEPARTMENT OF TRANSPORTATION

Federal Highway Administration - Murray L. Corry  
Federal Highway Administration - D. C. Woo (Alternate)

ENVIRONMENTAL PROTECTION AGENCY - Robert E. Thronson  
ENVIRONMENTAL PROTECTION AGENCY - William C. Shilling (Alternate)

FEDERAL POWER COMMISSION - Shou-Shan Fan

TENNESSEE VALLEY AUTHORITY - Claude H. Smith  
TENNESSEE VALLEY AUTHORITY - Carl D. Eklund (Alternate)

WATER RESOURCES COUNCIL - Edward Cook

Technical Subcommittee  
SEDIMENTATION COMMITTEE  
WATER RESOURCES COUNCIL

FOREST SERVICE - Raymond M. Rice (Chairman), Arcata, CA  
AGRICULTURAL RESEARCH SERVICE - D. G. DeCoursey, Oxford, MS  
SOIL CONSERVATION SERVICE - E. M. Thorp, Lincoln, NE  
CORPS OF ENGINEERS - R. A. Livesey, Omaha, NE  
BUREAU OF RECLAMATION - E. M. Pemberton, Denver, CO  
GEOLOGICAL SURVEY - Paul C. Benedict, Menlo Park, CA  
ENVIRONMENTAL PROTECTION AGENCY - R. E. Thronson, Washington, D. C.  
TENNESSEE VALLEY AUTHORITY - C. D. Eklund, Knoxville, TN