Measurement and Computation of Streamflow: Volume 1. Measurement of Stage and Discharge

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PREFACE

The science and, in part, art of stream gaging has evolved through the years, largely from the collective experiences and innovations of its practitioners. The earliest truly comprehensive manual on stream-gaging procedures and equipment, based on techniques developed up to that time, was published in 1943 by the Geological Survey as Water-Supply Paper 888, "Stream-Gaging Procedures," by D. M. Corbett and others. That report was an instant classic; it was received enthusiastically by the hydraulic-engineering profession throughout the world and became a major training document for at least two generations of stream gagers, hydrologists, and hydraulic engineers, both in the United States and abroad.

The need for updating Water-Supply Paper 888 has been obvious for some time as a result of later developments in stream-gaging techniques and equipment. Furthermore, it has been felt for some time that the scope of that report should be expanded to cover not only the newer field techniques but also the office procedures required to produce a published annual record of stream discharge. In recognition of those needs, the Geological Survey has sporadically produced supplementary reports that update the description of specific techniques and equipment or that describe specific field or office procedures not covered by Water-Supply Paper 888. These reports—some administrative, some open-file, and others in the published series titled "Techniques of Water-Resources Investigations"—are fragmentary in the sense that they deal only with selected aspects of the broad subject of stream gaging. Similar, but less detailed, reports on selected topics have also been produced by international agencies in the form of Technical Notes by the World Meteorological Organization and in the form of Recommendations and Standards by the International Standards Organization.

The present report evolved from that background. Its two volumes provide a comprehensive compilation of time-tested techniques presented as an up-to-date (1980) standardized manual of stream-gaging procedures.

Acknowledgments.—The material presented in the manual is based on the work of many hydraulic engineers and technicians, each of whom has contributed to the current state-of-the-art in the measurement and computation of streamflow. Many of those who contributed directly to the manual are listed in the references appended to each chapter. However, the authors wish to acknowledge a special group of colleagues who have made major contributions to this manual in the form of written (cited) methods and techniques, significant suggestions for correction and revision of the manuscript and illus-

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[Article headings are listed in the table of contents only in the volume of the manual in which they occur, but all chapter titles for the two volumes are listed in both volumes A complete index covering both volumes of the manual appears in each volume]

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CONVERSION FACTORS

[Factors for converting inch-pound to metric units are shown to four significant figures However, in the text the metric equivalents, where shown, are carried only to the number of significant figures consistent with the values for the English units.]

Inch-pound	*Multiply by—*	*Metric*
acres	4.047×10^{3}	m^2 (square meters)
acre-ft (acre-feet)	1.233×10^{3}	m^3 (cubic meters)
acre-ft/yr (acre feet per year)	1.233×10^{3}	m^3/yr (cubic meters per year)
ft (feet)	3.048×10^{-1}	m (meters)
ft/hr (feet per hour)	3.048×10^{-1}	m/hr (meters per hour)
ft/s (feet per second)	3.048×10^{-1}	m/s (meters per second)
ft^3/s (cubic feet per second)	2.832×10^{-2}	m^3/s (cubic meters per second)
in (inches)	2.540×10	mm (millimeters)
lb (pounds)	4.536×10^{-1}	kg (kilograms)
mi (miles)	1.609	km (kilometers)
mi^2 (square miles)	2.590	km^2 (square kilometers)
oz (ounces)	2.835×10^{-2}	kg (kilograms)