



# GROUND WATER ATLAS OF THE UNITED STATES

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U.S. Geological Survey

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## FOREWORD

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Ground water is one of the Nation's most precious natural resources. The Ground Water Atlas of the United States describes the location, extent, and geologic and hydrologic characteristics of the most productive aquifers in the United States, from which we derive the ground water that is the supply source for more than half of the people of this country. The Atlas is written so that those who are not hydrologists can gain an understanding of the occurrence, movement, and quality of ground water. The Atlas summarizes in one publication the most important ground-water information that has been collected over many years by the U.S. Geological Survey, other Federal agencies, and State and local water-management agencies. The hidden nature of ground water and the complexity of the underground systems that govern the flow and quality of ground water make this volume a critical addition to our understanding and stewardship of our Nation's ground-water resources.



BRUCE BABBITT  
Secretary of the Interior



## PREFACE

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The Ground Water Atlas of the United States presents a comprehensive summary of the Nation's ground-water resources and is a basic reference for the location, geography, geology, and hydrologic characteristics of the major aquifers in the Nation. The information was collected by the U.S. Geological Survey and other agencies during the course of many years of study. Results of the Regional Aquifer-System Analysis Program, a systematic study of the Nation's major aquifers by the U.S. Geological Survey, were used as a major, but not exclusive, source of information of the Atlas.

The Atlas, which is designed in a graphical format that is supported by descriptive discussions, includes 13 chapters, each representing areas that collectively cover the 50 States and Puerto Rico, as well as the U.S. Virgin Islands. Each chapter of the Atlas presents and describes hydrogeologic and hydrologic conditions for the major aquifers in each regional area. The scale of the Atlas does not allow portrayal of minor features of the geology or hydrology of each aquifer presented, nor does it include detailed discussion of minor aquifers. Those readers who seek detailed local information for the aquifers will find extensive lists of references at the end of each chapter. The introductory chapter in this volume presents an overview of ground-water conditions Nationwide and gives an example of an aquifer in each of six hydrogeologic settings.



Charles G. Groat  
Director, U.S. Geological Survey

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*James A. Miller 1999*

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## CONVERSION FACTORS

For readers who prefer to use the International System (SI) units, rather than the inch-pound terms used in this report, the following conversion factors may be used:

<i>Multiply inch-pound units</i>	<i>By</i>	<i>To obtain (SI) metric units</i>
<b>Length</b>		
inch (in)	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
<b>Area</b>		
square mile (mi <sup>2</sup> )	2.590	square kilometer (km <sup>2</sup> )
<b>Volume</b>		
acre-foot (acre-ft)	1,233	cubic meter (m <sup>3</sup> )
<b>Flow</b>		
gallon per minute (gal/min)	0.06308	liter per second (L/s)
million gallons per day (Mgal/d)	0.04381	cubic meter per second (m <sup>3</sup> /s)
billion gallons per day (Bgal/d)	3.785	million cubic meters per day (Mm <sup>3</sup> /d)
cubic foot per second (ft <sup>3</sup> /s)	0.02832	cubic meter per second (m <sup>3</sup> /s)
acre-foot per year (acre-ft/yr)	0.00003909	cubic meter per second (m <sup>3</sup> /s)
<b>Transmissivity</b>		
foot squared per day (ft <sup>2</sup> /d)	0.0929	meter squared per day (m <sup>2</sup> /d)
<b>Temperature</b>		
degree Fahrenheit (°F)	$5/9(^{\circ}\text{F}-32)=^{\circ}\text{C}$	degree Celsius (°C)

Sea Level: In this report, "sea level" refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)—a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called "Mean Sea Level". This datum has not been extended to Hawaii, Puerto Rico, or the Virgin Islands. Local datums are therefore used in these areas.

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The Atlas originated from the ideas of James A. Miller, Eugene P. Patten and Robert L. Laney, formerly of the Office of Ground Water. However, the uniqueness and high technical quality of the book are due to the hard work and dedication of the authors and cartographers whose names appear on the contents page of each chapter.

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