BIBLIOGRAPHY OF THE EDWARDS AQUIFER, TEXAS, THROUGH 1993

Compiled by Julie A. Menard

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CONTENTS

FIGURE

TABLE

CONVERSION FACTORS

Multiply	By	To obtain
acre-foot (acre-ft)	0.001233	cubic hectometer
mile (mi)	1.609	kilometer
square mile (mi^2)	2.590	square kilometer

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Abstract

The bibliography comprises 1,022 multidisciplinary references to technical and general literature for the three regions of the Edwards aquifer, Texas—San Antonio area; Barton Springs segment, Austin area; and northern segment, Austin area. The references in the bibliography were compiled from computerized data bases and from published bibliographies and reports. Dates of references range from the late 1800's through 1993. Subject and author indexes are included.

INTRODUCTION

The highly productive Edwards aquifer is the sole source of water for more than 1 million people in San Antonio and for farmers and ranchers in central Texas. The aquifer is home to approximately 40 species of unique aquatic life. Springs flowing from the aquifer supply base flow to meet downstream water requirements, sustain federally listed endangered species, and provide recreation for residents and tourists. The economic and environmental importance of the aquifer to the region has resulted in numerous studies, reports, and articles involving a wide variety of topics pertaining to the aquifer during the past 100 years or so.

The references were compiled in support of a study by the Center for Research in Water Resources (CRWR), University of Texas at Austin. The CRWR study concerned the technical feasibility of augmenting the flows of Comal and San Marcos Springs, the major natural discharge features of the Edwards aquifer (McKinney and Sharp, 1995).

Purpose and Scope

The purpose of this multidisciplinary bibliography of the Edwards aquifer is to provide references to technical and general literature concerning the Edwards aquifer and the effects of human activity on its natural resources. The bibliography comprises 1,022 references for books, journal and magazine articles, conference proceedings, abstracts, technical reports, master's theses, doctoral dissertations, maps, regulatory actions, videos, and newspaper and newsletter articles dating from the late 1800's through 1993. The bibliography also includes references to electronic publications in AP (Associated Press) News and BNA (Bureau of National Affairs) Daily News from Washington.

Description of the Edwards Aquifer

The Edwards aquifer is a cavernous limestone reservoir in central Texas that lies along the Balcones escarpment, a line of low hills that locally separates the vast Great Plains physiographic province from the Coastal Plains (fig. 1). The aquifer is composed of Cretaceous-age limestone that is extensively faulted and fractured. The aquifer crops out along its northern and western boundaries. The aquifer dips toward the coast, and its buried southern and eastern boundaries mark the beginning of a zone of transition from freshwater to saline water. Water enters the aquifer as recharge in outcrop areas and leaves the aquifer by pumping and as natural discharge from several springs, including Comal, San Marcos, and Barton Springs. Differences in hydrogeologic characteristics and persistent groundwater-flow divides allow division of the Edwards aquifer into three distinct regions—the San Antonio area; the Barton Springs segment, Austin area; and the northern segment, Austin area.

The Edwards aquifer, San Antonio area, was the first aquifer in the Nation to be designated a sole-source aquifer (U.S. Environmental Protection Agency, 1975) under the Safe Drinking Water Act of 1974. The San Antonio area is the largest and most productive region of the Edwards aquifer. Withdrawals for all uses in 1992 were estimated to be 327,200 acre-ft (Bader and others, 1993, table 5.1). The San Antonio area stretches about 180 mi from Brackettville in Kinney County to

Figure 1. Location of the Edwards aquifer, Texas.

Kyle in Hays County, varies from about 5 to 30 mi in width, and has an areal extent of about 3,100 mi^2. Water recharging the Edwards aquifer in the area originates as base flow or storm runoff north of the aquifer in the Nueces, San Antonio, and Guadalupe River Basins. The coastward-flowing streams lose much of their flow to the aquifer as they cross the faulted, fractured, highly permeable outcrop areas of the aquifer. Once in the aquifer, water flows northeast toward Comal and San Marcos Springs along a series of southwest-to-northeast trending faults that generally parallel the Balcones escarpment. The large water-yielding and transmitting characteristics of the Edwards aquifer, San Antonio area, result from a network of open fractures and solution channels associated with the faults.

Although the Barton Springs and northern segments of the Edwards aquifer, Austin area, yield and transmit less water than the aquifer in the San Antonio area, both are important to central Texas. The Barton Springs segment, although not a source of municipal water supply for Austin, is a vital source of supply in rural areas and was designated a sole-source aquifer in 1988 (U.S. Environmental Protection Agency, 1988). The Texas Natural Resource Conservation Commission has named the Barton Springs segment of the Edwards aquifer the most pollution-prone aquifer in the State (Texas Water Commission, 1989). Underlying approximately 140 mi^2, the Barton Springs segment extends from Kyle in Hays County to the Colorado River in downtown Austin. The watersheds of six creeks provide recharge to the aquifer in the area. Natural discharge occurs mainly from Barton Springs in Austin's Zilker Park.

The northern segment of the Edwards aquifer, north of the Colorado River, underlies parts of Travis and Williamson Counties and terminates in Bell County. The northern segment, with an areal extent of about 640 mi^2, supplies water to thousands of people in small but rapidly growing towns such as Round Rock and Georgetown.

Sources of Related Information

Other bibliographies on the Edwards aquifer provide important references, some of which are peripheral to the Edwards aquifer and, therefore, not included herein. A bibliography of the Edwards aquifer in the San Marcos area provides many annotated references and abstracts to biological, hydrological, limnological, recreational, and historical publications (Saunders, 1992). A bibliography prepared for the city of San Antonio has references and abstracts concerning pollution, hydrogeology, and runoff associated with the Edwards aquifer and other limestone aquifers (Metcalf & Eddy, Inc., 1976). Finally, a list of Edwards aquifer references, available in the University of Texas at Austin Walter Geology Library, groups the references by document type and includes library call numbers (Trombatori, 1992).

Approach

The references comprising the bibliography were compiled from a computer search of numerous data bases and a manual search of published bibliographies and reports. The data bases searched (table 1) were selected by conducting a preliminary search to identify the data bases with the most information on the Edwards aquifer. The bulk of the references are from GeoRef and Water Resources Abstracts. ProCite© Personal Bibliographic Software, Inc., software was used to manage and format the bibliography and to generate subject and author indexes. References in related bibliographies and in key reports were read, and relevant reports not provided by the computerized search were added to the bibliography.

Some terms in the subject index originated from the data-base producers. References added to the bibliography from print sources were indexed. Many of the terms were modified or deleted to improve subject access to the references. Additionally, headings and subheadings were created to consolidate related concepts. Modification and indexing decisions were guided by authoritative thesauri: Water Resources Thesaurus (U.S. Office of Water Research and Technology, 1980) and GeoRef Thesaurus and Guide to Indexing (Palmer, 1986).

Organization of References

The references are numbered consecutively and organized by discipline and subdiscipline. Under each discipline and subdiscipline heading, the entries are in alphabetical order by primary author or organization. Multiple references by an author are arranged chronologically. Subject and author indexes, at the back of the bibliography, refer to the references by number. No attempt was made to edit these references or define abbreviations. Extensive efforts have been made to ensure that the majority of the references are correct.

Table 1. List of bibliographic data bases searched[1]

Data base	Time period	Description
Aerospace Database	1962 to 1993	Worldwide coverage of aerospace literature.
Agricola	1970 to 1993	Comprehensive worldwide coverage of agricultural literature. Provided by the U.S. National Agricultural Library.
AP News	1984 to 1993	Worldwide coverage of general interest news. Provided by the Associated Press.
Biosis Previews®	1969 to 1993	Comprehensive worldwide coverage of biological literature.
BNA Daily News from Washington	1990 to 1993	Comprehensive worldwide coverage of government activities and news. Provided by Bureau of National Affairs.
CA Search®	1967 to 1993	Comprehensive worldwide coverage of chemistry literature. Provided by the Chemical Abstracts Service.
Dissertation Abstracts Online	1861 to 1993	Provides access to American, Canadian, and European dissertations and master's theses. Provided by University Microfilms International.
Ei Compendex * Plus™	1970 to 1993	Worldwide coverage of engineering and technology literature. Provided by Ei Engineering Information Inc.
Energy Science and Technology	1974 to 1993	Comprehensive worldwide coverage of energy literature. Provided by the Department of Energy.
Federal Register	1988 to 1993	Comprehensive coverage of official federal regulatory actions. Provided by the National Standards Association.
GeoRef	1785 to 1993	Comprehensive worldwide coverage of geosciences literature. Provided by the American Geological Institute.
GPO Publications Reference File	1971 to 1993	Coverage of U.S. Federal government publications. Provided by the U.S. Government Printing Office.
Magazine Index™	1959 to March 1970, 1973 to 1993	Covers over 500 popular magazines. Provided by the Information Access Co.
McGraw-Hill Publications Online	1985 to 1993	Provides the complete text to McGraw-Hill Publications. Provided by McGraw-Hill, Inc.
Medline®	1964 to 1993	Comprehensive source for biomedical literature. Provided by the U.S. National Library of Medicine.
Newspaper & Periodical Abstracts	1988 to 1993	Covers U.S. newspapers and periodicals. Provided by the University Microfilms International/Data Courier.
Pascal	1973 to 1993	International coverage of multidisciplinary topics. Provided by the Centre National de la Recherche Scientifique/Institute de l'Information Scientifique et Technique.
Pts Promt™	1972 to 1993	International multi-industry information. Provided by Predicasts.
Toxline®	--	Source for toxicology information. Provided by the U.S. National Library of Medicine.
Water Resources Abstracts	1968 to 1993	Extensive coverage of hydrology literature. Provided by the U.S. Geological Survey.
Zoological Record Online®	1978 to 1993	Comprehensive worldwide source for zoological literature. Provided by BIOSIS.

[1] From Dialog Information Services, Inc.

However, because of the manner in which they were compiled, some references might contain errors or might be incomplete.

Overlap in subject matter exists between certain disciplines and subdisciplines. When a reference applies to more than one discipline or subdiscipline, it is categorized under the predominant discipline or subdiscipline represented. Discipline and subdiscipline categories that conclude with "See also" references direct users to discipline and subdiscipline categories under which related references are listed. References that apply to more than two disciplines are categorized under "Overview Studies."

Some references contain a set of descriptors that originated from either the data-base producers or the compiler of this bibliography. The descriptors are included to help the reader ascertain the subject content of a particular reference or references. Descriptors were deleted from references where the descriptors also appeared in the titles of the references. The geologic names used in this report (mainly in the descriptors) were determined from several sources and might not necessarily follow the usage of the U.S. Geological Survey.

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Author Index