

Definitions of “Groundwater Basin”

Well known text books

Refereed journal scientific publications

Science glossaries

US Geological Survey reports/maps of area

CA Agency publications

Other reports cited – not peer-reviewed

Definitions of “Groundwater Basin”

Refereed Publication

Freeze and Witherspoon (1979)

“A groundwater basin is a three-dimensional closed system that contains the entire flow paths followed by all the water recharging the basin.”

Water Resources Research Vol. 3, No. 2 p. 624

No Definition Found in the following Text and Reference

Books, Primers, and Glossaries from 1932-2002 :

1. Outline of Methods for Estimating Ground-Water Supplies, Meinzer (1932)
2. Ground Water, C.F.Tolman (1937)
3. General Introduction and Hydrologic Definitions, Langbein and Iseri (1960)
4. Hydrogeology, Davis and DeWiest (1966)
5. Definitions of Selected Ground-Water Terms- Revisions and Conceptual Refinements, Lohman and others (1972)
6. Concepts and Models in Groundwater Hydrology, Domenico (1972)
7. Groundwater, Freeze and Cherry (1979)
8. Groundwater Manual, Dept. of Interior (1977, 1981)
9. Introducing Groundwater, Price, (1985)
10. Quantitative Hydrogeology, de Marsily (1986)
11. The Water Encyclopedia, van der Leeden et al. 1990
12. Physical and Chemical Hydrogeology, Domenico and Schwartz (1990, 1998)
13. Handbook of Hydrology, Maidment ed. (1992)
14. Applied Groundwater Modeling, Anderson and Woessner (1992)
15. Basic Ground-Water Hydrology, Heath (1993,1998)
16. Ground-water Hydrology and Hydraulics, McWhorter and Sunada (1995)
17. Water Resources Handbook, Mays ed. (1996)
18. The Handbook of Groundwater Engineering, Delleur ed. (1998)
19. Principles of Hydrogeology, Hudak, (2000)
20. Introduction to Hydrogeology, Deming (2002)

Text Books

Fetter (1994, 2001)

“Ground-water basin. A rather vague designation pertaining to a ground-water reservoir that is more or less separate from neighboring ground-water reservoirs. A ground-water basin could be separated from adjacent basins by geologic boundaries or by hydrologic boundaries.”

Applied Hydrogeology p. 555

Text Books

Todd (1959, 1980)

“ A groundwater basin may be defined as a hydrogeologic unit containing one large aquifer or several connected and interrelated aquifers.* Such a basin may or may not coincide with a physiographic unit.”

*In practice the term groundwater basin is loosely defined; however, it implies an area containing a groundwater reservoir capable of furnishing a substantial water supply.

Groundwater Hydrology p. 47

Glossary Texts

Bates and Jackson (1987)

“Ground-water basin (a) A subsurface structure having the character of a basin with respect to the collection, retention, and outflow of water. (b) An aquifer or system of aquifers, whether basin-shaped or not, that has reasonably well defined boundaries and more or less defined areas of recharge and discharge.”

Glossary of Geology p. 292

California Statewide Reports

Schneider (1977)

Definitions

“Groundwater Basin – there is no single, widely-accepted definition.”

*Groundwater Rights in California,
Background and issues, Staff paper No. 2,
p. 98.*

California DWR Bulletin 118-80

Appendix A – Definitions (p. 59)

“Ground water basin – see p. 8.”

Page 8 – Definitions

“Appendix A contains definitions for most of the technical terms used in this report.”

“In this report the ground water basins are defined on the basis of geological and hydrological conditions and consideration of political boundary lines whenever practical. Since Bulletin 118 (1975) identifies all of the State’s basins solely on geological and hydrological bases, the additional purpose of this report is to identify those basin boundaries that reflect political boundaries and, thus could not be used for groundwater basin management purpose.”

Ground Water Basins in California – A report to the legislature in response to Water Code Section 12924 (1980)

Other Reports Reviewed Here (not in refereed journals or books)

Richter (1974)

“A ground water basin may be defined as an area underlain by one or more permeable formations capable of furnishing a substantial water supply.”

Concepts of groundwater management University Extension, UC Davis p. 2-27

Law Environmental (1991)

“Ground Water Basin: An extensive depressed area into which the adjacent land drains, and having no surface outlet.”

Water Supply Evaluation – Antelope Valley, California, p.47

US Geological Survey Reports for the Region

- No formal definition found. Use depends on problem being studied.
- Bloyd (1967) conducted a water resources reconnaissance. He refers to two ground-water basins: Antelope Valley and Fremont Valley basins (p.9). His ground-water basins were divided into “ground-water subdivisions” consisting of “ground-water subunits” and “ground-water areas.” A ground-water basin consists of both subunits and areas (see plate 10, p.6, 20, 22).
Water Resources of the Antelope Valley-East Kern Water Agency Area, California (1967)
- Duell (1984) discusses water quality monitoring network design and used the subunit and areas designations of Bloyd (1967) but stayed clear of the term ground-water basin.
Geohydrology of the Antelope Valley Area, California, and Design for a Ground-Water-Quality Monitoring Network (1984)

USGS continued

Quantitative simulation analysis by Durbin (1978), and map reports (e.g., Carlson and Phillips (1998)), documenting water levels and water level changes used the “groundwater subunits” of Bloyd (1967) BUT called them collectively a “ground-water basin.”

Durbin (1978), Calibration of a Mathematical Model of the Antelope Valley Groundwater Basin, California; Carlson and Phillips (1998), Water-level Changes (1975-98) in the Antelope Valley, California

Rewis (1992) “describes the ground-water level and monitoring program and presents interpretations of the ground-water-basin boundaries...” (p. 3) for a much smaller region surrounding Edwards Air Force Base (p. 5).

Ground-water-level monitoring, basin boundaries, and potentiometric surfaces of the aquifer system at Edwards Air Force Base, California, 1992.

“Basin” Boundaries and Safe Yield

- **Safe Yield** has a common definition: “The amount of naturally occurring ground water that can be economically and legally withdrawn from an aquifer on a sustained basis without impairing the native ground-water quality or creating an undesirable effect such as environmental damage.”

Applied Hydrogeology, Fetter (2001, p. 588)

“In the past the term safe yield, implying a fixed quantity of extractable water basically limited to the average annual basin recharge, has been widely used. The term has now fallen into disfavor because a never-changing quantity of available water depending solely on natural water sources and a specified configuration of wells is essentially meaningless from a hydrologic standpoint.”

Groundwater Hydrology, Todd (1980, p. 363)

- “Use of the term is discouraged because the feasible rate of withdrawal depends on the location of wells in relation to aquifer boundaries and rarely can be estimated in advance of development.”

Glossary of Geology, Bates and Jackson (1987, p. 581)

Summary

“Groundwater Basin” is a term of convenience, not a term of art.

Definitions differ in that they do not make clear the nature of the boundaries, or what the boundaries are intended to contain. Boundaries can be hydrologic, geologic, physiographic, or political. The groundwater basin can contain hard rock areas or only unconsolidated sediments

A key scientific issue is whether or not areas of aquifer recharge must be within the groundwater basin or not.

Sept 16, 1991

Adopt 13+14
10:00 a.m. legal
arrangements

forensic accountant

w# 714 834-4643

cell 714 932-8600

Irvine-Land

Fund 113

more problems

Vicki Stewart
Margaret Maada

on
paid
admin
leave

forensic acct

Menden morning
beginning (fund) analysis

3:00 p.m.

August 26 Bd Meeting
(1) to request a loan
(2) suspend 33% fees