



Basic Data Unit Field Services Section Hydrology Division

Basic Data Unit

Personnel:

Teri Davis-

Field Services Section Manager

Rick Herther-

Basin Studies Group Supervisor

James Jacobson-

Transducer Group Supervisor

Aaron Cuthbertson -

GWSI Database Support

Stephen Flora -

Reporting/Webpage Support

Basic Data Staff-

Q&M/Field Support

Who to Contact at ADWR

For Data Needs:

ADWR Information Services
3550 N Central Ave
Phoenix, AZ 85012
(602) 771-8627

For Monitoring Information:

Hydrology Division
(602) 771-8500

For Basic Data Information

Field Services Section
1520 W. Adams
Phoenix, AZ 85007
(602) 771-1500
(602) 771-1520 (fax)

General ADWR Information:

www.azwater.gov

GROUNDWATER DATA COLLECTION

May 2009



Manual Water Level Measurement

Data Collection Basics

Staff from BD unit, which include hydrologists and water resource specialists, measure water levels in wells, collect water quality samples, measure discharge from pumping wells, and conduct well inventories throughout the State of Arizona. BD unit collects groundwater and surface water data statewide, provides field staff for other parts of ADWR, produces Hydrologic Map Series (HMS) that show groundwater conditions statewide, and maintains a groundwater database containing information on groundwater levels statewide.

BD unit visits about 5,000 wells statewide each year and makes an intensive effort to measure groundwater levels in at least one groundwater basin or Active Management Area (AMA) each year. BD unit also collects several hundred water quality samples annually. Water level and water quality data may be found in the ADWR's Groundwater Site Inventory (GWSI) database which BD unit maintains. GWSI is a field verified database consisting of thousands of wells; including cadastral and GPS locations, current and historical water level measurements and numerous associated data relating to those wells. To view the GWSI database please visit:

<http://arcims.azwater.gov/gwsi/waterresourcedata.aspx>

Unit History

The Arizona Department of Water Resources (ADWR) has been in existence since 1980. Before becoming an agency, ADWR was known as the Arizona Water Commission (a much smaller group), which was a part of the Arizona State Land Department. The Basic Data (BD) Unit has been the data collection arm of ADWR since the beginning. The unit was patterned after similar data collection units in the United States Geological Survey (USGS). ADWR adopted all data collection protocols from the USGS, including field inventories, water level measurement, water quality sampling and discharge measurement. This enabled the data that ADWR collected to have instant compatibility with all USGS historical data.



Automated remote monitoring

OVERVIEW OF GROUNDWATER LEVEL COLLECTION METHODS

One of the Primary types of hydrologic data collected by ADWR is groundwater level data. Methods that ADWR uses for groundwater level data collection include the following:

Automated Sites

These sites utilize groundwater monitoring devices that record water levels on a predefined frequency and a continuous basis. The department uses



Automated Well

both real-time (satellite-linked) and non-real-time automated recording systems (transducers and shaft encoders). See State-wide Automated Monitoring Fact Sheet for more details

Manual (Conventional) Methods

These data are collected by using electric sounders or steel tapes that take discrete measurements at selected intervals (usually only one measurement per year).

Index Lines

Index lines are groups of wells that are visited once each year by ADWR field staff and measured manually with a device called a sounder. Data are recorded using a tablet PC and uploaded into the ADWR's GWSI database upon

return to the office. Data for these wells are used to monitor groundwater levels throughout the state. About 1,700 wells are measured annually through the index line program.

Basin Sweeps

A basin sweep is an intensive effort within a groundwater basin to measure as many wells as necessary in order to provide a comprehensive picture of the groundwater system. In the Phoenix AMA for example there are about 2,200 wells measured every five years. The resulting water level data support a number of water management and hydrology programs, as well as cities, consultants, and private individuals.

Recent Activities

In the winter of 2007-2008, the Pinal AMA, Gila Bend, Big Sandy, Tonto Creek, and Agua Fria basins were measured. In the winter of 2008-2009 the Phoenix AMA, Prescott AMA, and the Verde River basins are scheduled to be measured. Annual index well measurements have also been performed.



Index Well location

Additional Types of Data Collection

Statewide Hydrologic Monitoring Program

ADWR is tasked with providing stewardship of the State's precious and limited groundwater resources through active management and enforcement of the Arizona Groundwater Code. ADWR's BD unit engages in a wide variety of data collection activities in support of public needs, such as the Assured and Adequate Water Supply and Recharge Programs, Drought Monitoring Program, well drilling and well impact assessments, and in support of hydrologic studies such as groundwater modeling and water budget development.

In addition to groundwater levels, the BD unit also collects data for:

- Stream Flow
- Crop Surveys
- Well Discharge
- Water Quality

This data is used to provide better hydrologic data in many parts of the State and to devote more attention to ensuring that activities are coordinated so that the information gathered and products produced are made widely available. There is

also a need to collect additional data in areas of the state subject to rapid change, such as developing areas or areas sensitive to change.



Crop Surveys and Water Use

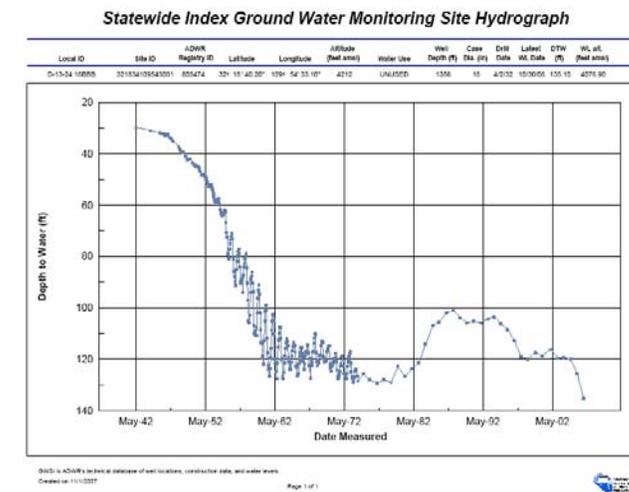


Stream Flow Measurements

What are the data used for and who uses it?

ADWR uses the information gathered from well measurements to develop water level maps and to support scientific, planning, and management studies of each basin's aquifer system. The BD unit produces the Hydrologic Map Series (HMS) reports, which show groundwater conditions statewide. Each of the HMS reports are dedicated to an individual groundwater basin and are prepared using data collected by the BD unit. Water Level Change Map Series (WLCMS) reports show water level changes between the two most recent basin sweeps.

The BD unit staff will conduct three basin sweep investigations, service and maintain all analog recorders & transducers, install new transducer sites, and measure all 1700 index wells (statewide). From Oct. '03 to Apr. '04, the BD unit staff measured approx. 4000 new water levels statewide, in addition to the thousands of water levels



Who uses our data?

1. ADWR
2. State and Federal Agencies
3. Municipalities and Cities
4. Power Providers
5. Consultants
6. Developers and Real Estate
7. Universities and Students
8. Farmers and Ranchers
9. Well Drillers
10. General Public

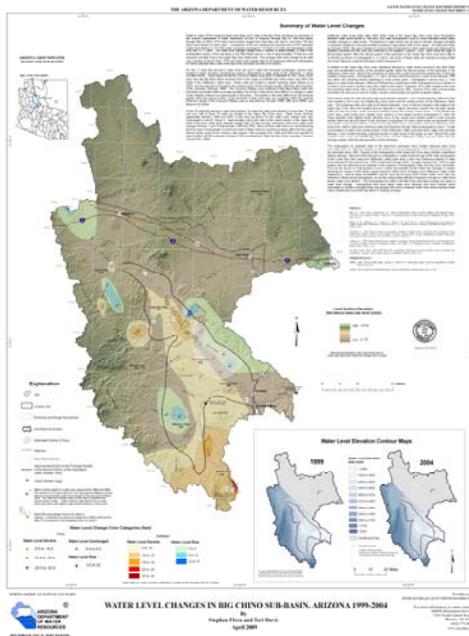
Shown left: Hydrograph of one of the 1,700 Index wells statewide.

recorded by our continuous monitoring sites.

This data is added to the GWSI data base in a timely fashion, and thereby made available throughout ADWR and to the public. The data is then used to produce one to two HMS reports and three to four WLCMS reports per year. HMS and WLCMS reports are listed below.

What are the data used for?

1. Resource management (especially critical in drought)
2. Preparation of groundwater models (Input and calibration)
3. Map construction (depth to water, flow direction, water levels)
4. Reporting hydrologic conditions throughout the state
5. Development of annual water budgets
6. Determining assured water supply
7. Growth and development planning (urban and rural)
8. Locating areas of concern and monitor groundwater mining
9. Develop hydrographs and water level trends



WLCMS No 2—Big Chino Sub-Basin, 2009

Hydrologic Map Series (HMS) Reports

1. Harquahala Plains Area, 1980
2. TDS in Arizona, 1981
3. Gila Bend Area 1979
4. Haulapai Basin, Area 1981
5. Big Sandy Area 1981
6. McMullen Valley Area 1981
7. Avra/Altar Valley Atra, 1982
8. Waterman Wash Area, 1982
9. Prescott AMA, 1983
10. Hassayamba Sub-Basin, 1983
11. Upper Santa Cruz Basin, 1982
12. Phoenix AMA, 1986
13. Butler Valley Basin, 1987
14. Detrital Wash Basin, 1987
15. Peach Springs Basin, 1987
16. Duncan-Virden Valley Basin, 1987
17. Harquahala/Tiger Wash, 1990
18. Renegras Plain Basin, 1990
19. San Simon sub-basin, 1991
20. Gila Valley sub-basin, 1991
21. Sacramento Valley Basin, 1991
22. Virgin River Basin, 1991
23. Maricopa-Stanfield, 1989
24. San Bernardino Valley, 1992
25. Willcox Basin, 1989
26. Douglas Basin, 1989
27. Phoenix AMA, 1995
28. Big Chino sub-basin, 1995
29. Gila Bend Basin, 1996
30. Yuma Basin, 1992
31. Upper San Pedro Basin, 1990
32. Donnelly Wash Basin, 1997
33. Aravaipa Canyon Basin, 1996
34. Upper San Pedro Basin, 2002
35. Phoenix AMA
36. Pinal AMA
37. Southern Navajo County

Water Level Change Map Series (WLCMS) Reports

1. Willcox Basin, 2008
2. Big Chino Sub-Basin, 2009

ADWR

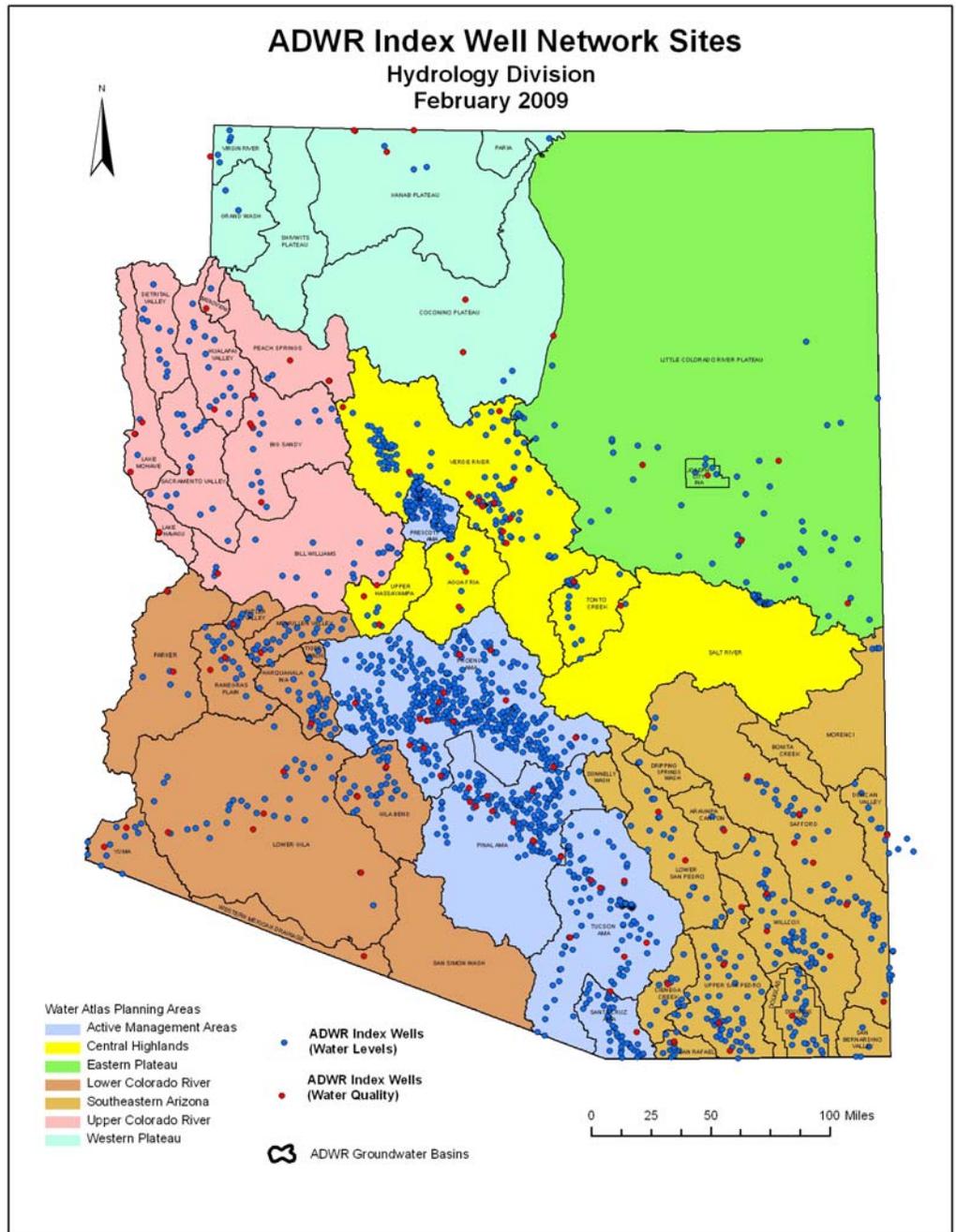


Conventional Water Level Measurements from a pumping well

“ADWR uses the information gathered from well measurements to develop water level maps and to support scientific, planning, and management studies of each basin’s aquifer system.”



Index Well located throughout the state



North American Datum 1983 HARN
13.118.077

Current Statewide Status

The current ADWR statewide Index well monitoring network is shown above and includes over 1,800 wells. Approximately 1,700 of the Index wells are manually measured for groundwater levels and 100 Index wells are measured for groundwater quality on an annual basis.

To view a current map showing all of ADWR's Index well monitoring sites please visit:

<http://arcims.azwater.gov/gwsi/Default.aspx>