

WATER-LEVEL DATA ACQUISITION

For many purposes in ground-water investigations, the accurate determination of water levels in wells or piezometers is paramount. Without accurate measurements, it is not possible to interpret the data to assess ground-water flow directions or, if the data are "apparently" interpretable, a faulty interpretation is made.

Depending upon the ultimate use of the water-level data, the methods and instruments used to collect and record changes in ground-water levels vary substantially. Water-level data acquisition techniques are divided into two major categories for discussion purposes: manual measurements or typically non-recording methods, and continuous measurements using instruments that provide a record. Although not exhaustive, the following discussion describes techniques most frequently used by the practicing hydrogeologist. These methods are summarized in Table 9.1.

Table 9.1. Summary of Methods for Manual Measurement of Well Water Levels in Non-flowing and Flowing Wells.

Measurement Method	Measurement Accuracy in Feet	Major Interference or Disadvantage
Nonflowing Wells		
Wetted-tape	0.01	Cascading water or casing wall water
Air-line inaccuracies	0.25	Air line or fitting leaks; gage
Electrical surface	0.02 to 0.1	Cable wear; hydrocarbons on water
Transducer	0.01 to 0.1	Temperature changes; electronic drift; blocked capillary
Float	0.02 to 0.5	Float or cable drag; float size and lag
Popper depth	0.1	Well noise; well pipes and pumps; well
Acoustic probe	0.02	Cascading water; hydrocarbon on well water surface
Ultrasonics	0.02 to 0.1	Temperature changes; well pipes and pumps, casing joints
Flowing Wells		
Casing extensions	0.1	Limited range; awkward to implement
Manometer/pressure gage	0.1 to 0.5	Gage inaccuracies; calibration required
Transducers	0.02	Temperature changes; electronic drift