

# DIY Groundwater Monitoring

Groundwater Series: Skills & Knowledge | Fact Sheet 5 | Produced by Cotton Catchment Communities CRC and UNSW Water Research Laboratory

## What to monitor ?

Groundwater level should be measured from a standard reference point such as ground level or the top of casing.

Water salinity can be monitored simply by an EC meter (electrical conductivity). Water salinity should also be periodically analysed by a laboratory to measure concentration of sodium, calcium, magnesium, chloride, sulphate and bicarbonate salts. Full laboratory analysis can be used to check more frequent EC measurements.

Other basic water quality tests are nitrate and E.Coli, an indicator of bacterial contamination. Note there are hundreds of water quality parameters that can be tested depending on the intended use of water.

## What equipment is needed ?

1. Access point for monitoring on the bore casing and preferably a dip tube installed next to the pump main (Figure 1). A monitoring dip tube can be made from a 25 mm PVC tube, with slotted sections near the base and should be installed with the pump, and also in the gravel pack outside the bore casing.
2. Measuring tape and "dipper" device. Alternatively, a commercial dip meter provides more accurate data.
3. Basic EC meter & clean measuring cup.

## How often to monitor ?

Groundwater level – weekly during pumping season, monthly at other times. A consistent record over many years is most important.

Water salinity (EC) – monthly during pumping season.

Water salinity (major salt ions) – once per year, preferably during the non pumping season.

If there is a change in groundwater levels or salinity then professional hydrogeological advice should be obtained. Further assessment is required if the change is larger than previous variations, or there is a consistent pattern of falling groundwater levels or increasing salinity.

## What to do with the data ?

Data can be recorded on the attached form.

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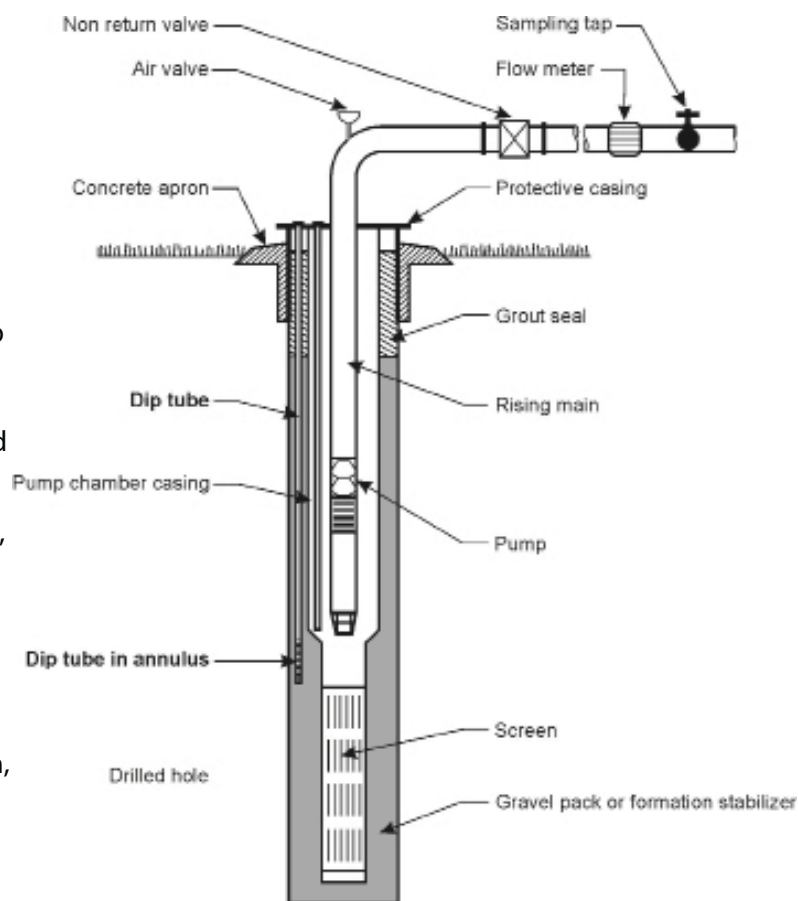
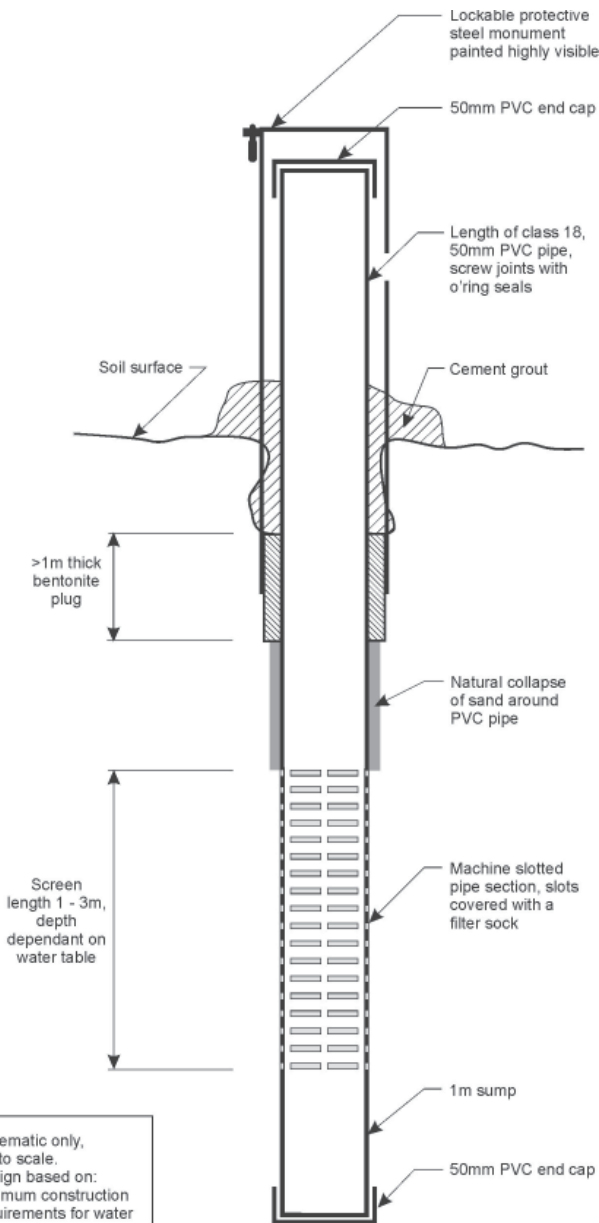


Figure 1 – Monitoring dip tubes in an irrigation bore

Fact sheet modified after Timms, W., 1997. The Liverpool Plains Water Quality Project: 1996/97 Report on Groundwater Quality. Department of Land and Water Conservation, Centre for Natural Resources, CNR 97.108.



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Figure 2– Groundwater monitoring piezometer

### What is a piezometer ?

A piezometer is a specially designed bore with a short intake screen to monitoring groundwater levels at a specific point in an aquifer. Ideally, monitoring should be undertaken in both irrigation bores and piezometers.

Figures 2 and 3 show how to construct a shallow monitoring piezometer and the materials that are required.

Shallow piezometers can be installed in an auger hole to about 5 m depth. Deep piezometers require a drilling rig and specialised materials to prevent leakage between different aquifer systems.



Figure 3 – Materials to install a shallow monitoring piezometer

### How much does monitoring cost ?

Your time is the most significant cost. Keep in mind the costs of not monitoring the water that you use could be incalculable. Basic monitoring equipment can be purchased from companies such as [www.enviroequip.com](http://www.enviroequip.com) For example, a fox whistle (~\$120) can be attached to a tape measure for water level measurement, or a electronic dip meter can be purchased (~\$600). A basic pocket EC meter costs about \$150 (Figure 4).



Figure 4 – Example of water level dipper and pocket sized salinity EC meter.

A NATA certified laboratory should be contacted for current prices. A rough guide for EC and major salt ions is about \$50 per sample, and about \$20 per sample for nutrients. Labs can advise about suitable methods and bottles to use to ensure that the data is reliable.

