

Installing a well (a.k.a. piezometer)



Installation of piezometers into the water table in the active channel of the stream or into the floodplain can establish whether it is influent (feeding the groundwater) or effluent (being fed by groundwater). Water levels in the wells can be measured and related to the water level in the stream to determine the direction of water movement.

Materials

1" diameter PVC (schedule 40) pipe w/caps (this is the diameter to fit the Center's driving rods)

measuring tape

waterproof marker

hacksaw

metal driving rod w/head

sledgehammer

pipe wrench

pin/galvanized steel bolts

Methods

Cut the PVC pipe to the desired sampling length below water table level ensuring that it is long enough to also remain above the surface water level. Pipe can be cut with a handsaw suitable for plastic.

Starting at one end of the well, measure the amount of PVC pipe that will be inserted into the streambed making sure it is long enough to extend below the expected water table. Create a thick line at this length with a permanent, waterproof marker.

Place pre-cut PVC pipe over a pointed metal driving rod. The pointed tip must extend ~1-2 below the bottom of the tube to prevent sediment from going up the tube during installation.

Place tip of driving rod (with pipe attached) into the streambed at the point where the well is to be installed.

Attach driving rod head to driving rod and secure with metal pin.

Using a sledgehammer, pound the driving rod and PVC pipe into the streambed until pen mark is even with the surface of the streambed. (**Please note: the Center has a new sledgehammer -- the broken one pictured to the right has been retired. If the sledgehammer breaks, DO NOT use duct tape and continue using.**)



Pull out the driving rod and head while holding onto the well (to prevent it from rising up)

Cover the top of the well with a cap to keep leaves, insects and dust out.

Notes

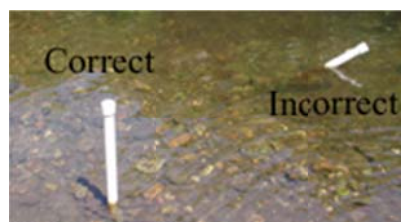
It is less labor-intensive and less time-consuming to install wells at times of low discharge.

There are 2 kinds of lids - slip on and screw on. With the slip on lid it is best to drill a small hole in the lid to release pressure that builds up in the well over time while capped; this makes it easier to get the lids on and off.

The screw on type comes in two pieces - the threaded base and the lid. The threaded base of the screw on lid can be permanently attached using PVC cement to prevent it from changing position.

When installing wells think about the weather! If you want to sample all summer, remember the water table may drop so you should put them in a little deeper than you think (or put in multiple wells at different depths). If you are sampling through winter, you must account for rising surface water levels or your wells will be under water.

When installing a deep well (>50cm) pause during the hammering and twist the driving rod around within the well casing. This will help you remove the driving rod when you reach the desired depth.

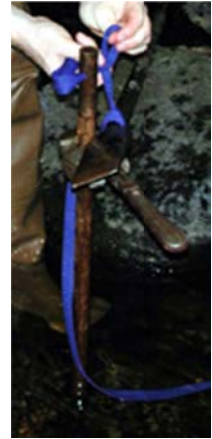


Always put the well in straight! It may be necessary to move the well position because of buried rocks/cobble that impede well installation.

Using the pipe wrench as a lever is often the best way to remove a stuck driving rod or well.

Currently (2002) the Center only has 1.5 m driving rods. If you want to put in deeper wells, you must dig a hole to within this length and install the well. You can then use a coupler to attach another piece of PVC to the well to extend it to the ground (or water) surface and back fill the hole.

When digging holes in the riparian zone it is best to keep soil layers separate and return them to the hole in the order you found them.



References

Hauer, F. Richard, Gary A. Lamberti. *Methods in Stream Ecology*. Academic Press, San Diego, CA. 1996.