
ENVIRONMENTAL Fact Sheet



29 Hazen Drive, Concord, New Hampshire 03301 • (603) 271-3503 • www.des.nh.gov

WD-DWGB-1-16

2009

Water Supply Options During Droughts

The purpose of this document is to provide a reference relative to drought effects on wells. Detailed discussion on drilled and dug wells can be found at www.des.nh.gov/organization/commissioner/pip/-factsheets/dwgb/index.htm and scroll down to WD-DWGB-1-2 for more information concerning bedrock well construction and WD-DWGB-1-4 for dug well construction. Dug wells are more likely to be impacted by droughts than bedrock wells.

Conservation

Water conservation efforts by homeowners can be helpful during droughts, however, the greatest demands on groundwater resources are uptake by vegetation, and the movement of groundwater downhill caused by gravity.

POSSIBLE ACTIONS

If the water level in your well water is low, DES suggests evaluating the following relief actions.

Sharing Water Between Homes

Water can be shared between homes. This is a short term response. Sharing can be accomplished by connecting a garden hose from a home with adequate water supply to a home without. This will require modifying the delivery end of the garden hose with a female adaptor and feeding water into the exterior sill faucet of the receiving home. During cooler weather the hose will need to be insulated (possibly with leaves), and a small flow of water maintained within the receiving home to prevent freezing of the hose. This method likely can not be used during extremely cold weather.

If one is lucky to have a neighbor that would be willing to share water during a drought, a potentially wise action would be the placement of a water meter on the water line to the borrower to clearly illustrate how little water is being used.

There may be concerns on the part of the other well owners relative to possible negative impacts of sharing water. The home providing the water can be given assurances of the following.

- a. This is only a temporary situation.
- b. Pumping for two homes does not damage the well.
- c. There should be no damage to the pump so long as air is not seen in the pumpage. Full water depth around the electric motor of a submersible is needed for cooling.
- d. A water meter can be installed to measure usage of the second home, and thus allow a fair method for payment of electricity and water treatment costs (if any) and can assure the provider that only minimum water is being used by the neighbor.

Filling Wells with Water Delivered by Truck

Water delivery by a tank truck to fill a well is usually ineffective in providing a sustained water supply. Truck delivery, at best, provides a very short term solution. If the well is empty, the vast majority of the water that would be put into the well from a truck will infiltrate into the groundwater and drain away when the well is filled.

If using this approach, it is very important that the tank truck be **scrupulously** cleaned from the previous use and all water that will be placed in a well should be from a water supply source proven to be safe.

A useful alternative to placing water in a well from a tank truck is to fill storage tanks, such as 30-gallon, clean trash cans placed in a cellar or garage. Add a tablespoon of chlorine to each tub every few days to control taste and odors. Cover the tanks to protect against dirt and vermin (see section 1506.4.3 state plumbing code). Service from these tanks will typically be by hand dipping to fill small containers. This water should **not** be considered safe for drinking, but can be used for other household purposes.

Well Deepening

Bedrock wells can be deepened or hydrofractured. These actions more directly address the core problem of inadequate well yield. Hydrofracturing opens existing fractures in the rock as explained below. The typical problem facing a homeowner is whether it is better to deepen the existing well or to hydrofracture the well. Conventional wisdom says that if a well is 100-300 feet deep, more drilling is appropriate. If the well is 700-1,000 feet deep, then hydrofracturing is generally chosen.

Drilling requires mobilizing heavy equipment, which may cause damage to the landscaping near the well and requires that the submersible pump and a portion of the pitless adaptor be removed.

Hydrofracturing opens up the fractures in the rock with very high pressure water (3,000 psi) to achieve greater flow. Hydrofracturing also requires equipment mobilization, which requires repair of landscaping and disassembly of the pitless adaptor of a bedrock well. This is a specialized service costing \$1,000-\$1,500 and typically takes a day to complete. See [fact sheet WD-DWGB-1-3](#) for more information on hydrofracturing.

DUG WELL RESPONSES

Three actions are explained below for improving the yield of dug wells. Lowering the pump intake is the easiest, and deepening the well the more difficult.

Lowering the Pump Intake

This is feasible if the present pump intake point and foot valve is somewhat high off the bottom of the well. An extension can be added to the suction line. Make sure the seal between the permanent pipe and the extension piece is air tight.

If a submersible pump is used in the well, fabricate a cradle so that the pump can be installed sideways, a few inches off the bottom of the well. Remember to raise the intake again when the drought abates.

Deflector Plate

Fabricate a deflector plate for dug wells. The plate would hang below the intake pipe with 4 inch minimum clearance. The purpose of the plate is to prevent silt from being riled up below the lowered intake point. The suction assembly and plate would then be lowered until the plate just rests on the bottom of the well.

Deepening a Dug Well

First, probe the bottom of the well to see if the well can be deepened. This is often done by driving a thin rigid steel rod into the bottom of the well. If soils are found to exist, deepening the well is possible. If rock is encountered, the well cannot be conveniently deepened.

The method illustrated below consists of making a smaller well in the bottom of an existing dug well. When deepening a dug well, two precautions are critical. First, examine the general strength and integrity of the main well casing. Next, develop a plan for rescue if cave-in or other unexpected conditions were to occur. Ensure that there is no weakening of the soil support under the outside well tile. This could result in the lowest tile sinking, and dirt entering the well higher up between other joints in the casing. No deepening work should ever be attempted on a well made from fieldstone.

To develop the smaller well sump, drive a smooth, thin, 18 inch diameter pipe into the bottom of the dug well. This pipe is a temporary shield. Use a 2 inch by 4 inch sacrificial wooden timber and heavy hammer to drive the shield into the soil. Now place a permanent 12 inch diameter heavier plastic pipe inside the temporary shield pipe. Drill many small holes through this permanent 12 inch diameter pipe. Place small pea stones between the two pipes and compact. Finally, carefully remove the larger temporary diameter shield, and further compact the pea stones. The pea stones should be larger than the drill holes in the 12 inch permanent casing.

Often a dug well has been installed as deep as possible and no further deepening is feasible. In that case, a bedrock well can be installed in the middle of the dug well, and the dug well filled in with clean fine fill material to the finished grade. This bedrock well position allows the same water discharge line and electrical conduit to be used.

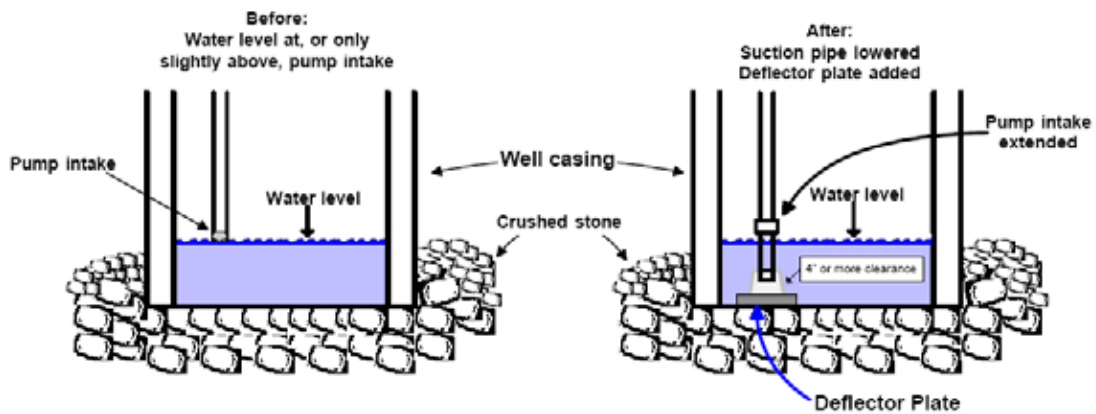
FOR MORE INFORMATION

For additional information, please contact the Drinking Water and Groundwater Bureau at (603) 271-2513 or dwgbinfo@des.nh.gov or visit www.des.nh.gov, click on A-Z List and choose Drinking Water and Groundwater Bureau. All of the bureau's fact sheets are on-line at <http://des.nh.gov/organization/-commissioner/pip/factsheets/dwgb/index.htm>.

Note: This fact sheet is accurate as of September 2009. Statutory or regulatory changes or the availability of additional information after this date may render this information inaccurate or incomplete.

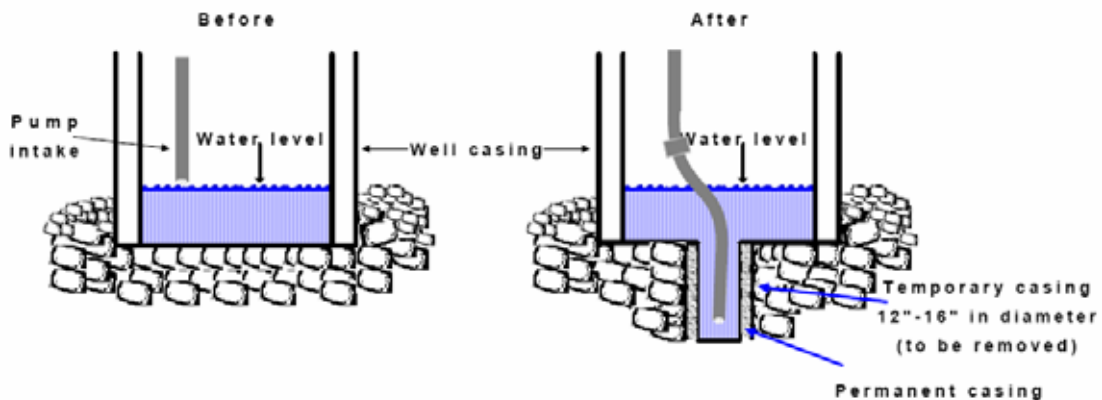
LOWERING THE PUMP INTAKE

Assumes well pump is in the basement.



DEEPENING A DUG WELL

Assumes well pump is in the basement.



- Drive a thin temporary plastic shield into the bottom of the well.
- Center in the middle of the well.
- Excavate interior of the shield by hand.
- Secure a permanent plastic casing that will fit within temporary case with a clearance of 2"-4".
- Drill many small holes in the permanent plastic casing.
- Place the plastic permanent casing in middle of the shield.
- Backfill the annular space between the two casings with pea stone.
- Tamp and compact the pea stone.
- Remove temporary shield carefully so as to not disturb the native soils under the full size concrete well casing.
- Reposition suction line to a new lower location in the deeper well.

Caution: Practical pump suction lift is approximately 20-25'.