

Geologic Site of the Month
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Maine's Dug Wells



Text by
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Introduction

A dug well is an excavation into unconsolidated sediments, and sometimes bedrock, dug by hand, backhoe, or auger. It must be deep enough to go a few feet below the water table. Brief descriptions of types of wells may be found in the [Ground Water Handbook](#) for the State of Maine and in the U.S. Geological Survey's WaterScience for Schools website entitled [Groundwater: Wells](#). The first hand-dug wells in the world are thought to date to the [Neolithic Age](#). The "[deepest hand-dug well in the world](#)" was constructed between 1858 and 1862 in Woodingdean, England, and extends to a depth of 1,285 feet. The overall "[largest hand-dug well in the world](#)" was built in 1887 in Greensburg, Kansas, and extends to a depth of 109 feet with an inside diameter of 32 feet. Drilled wells are common in developed countries, but many third world countries still rely on [digging wells by hand](#) for water.

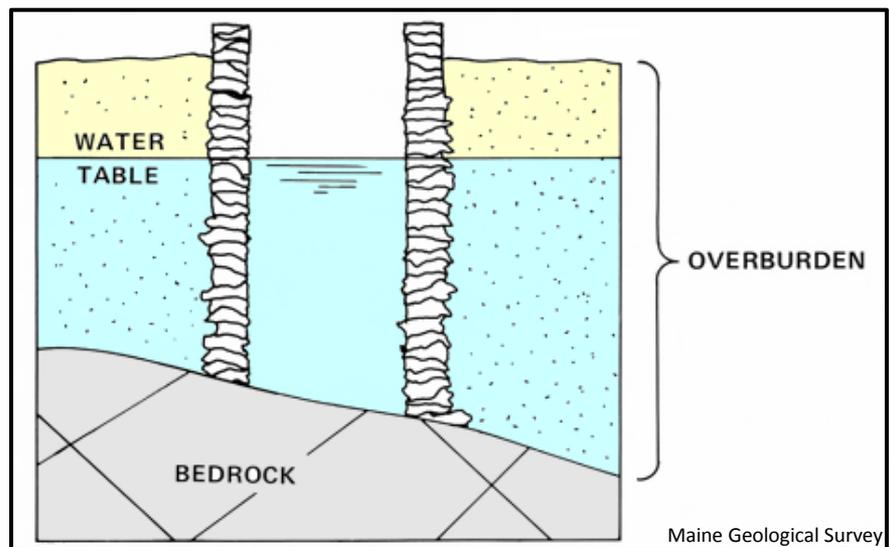


Figure 1. Diagram of a typical dug well.



Hand-dug Wells

In Maine, dug wells have been used since the time of the earliest settlers. While many early residents would have used available surface water or springs for watering livestock and much of their domestic needs, shallow wells were dug by hand. This work was arduous, time consuming, and dangerous. Even though the walls of the well were reinforced by stacking rocks in a sort of inverted cone with the narrowest diameter near the bottom to provide greater stability, cave-ins likely occurred. Most dug wells in Maine typically have depths of approximately 15 feet, with some extending to as much as 60 feet. Working in these dark, damp, and often cramped spaces must have been extremely difficult and required pulling the excavated material upward in buckets. When the water table was encountered, the well digger was faced with the task of removing inflowing water in addition to sediment. The water withdrawal process involved hand bailing with buckets, hand pumping, and possibly engine-driven pumps. Since Maine ground water levels are lowest in the late summer, it is probable that many wells were dug during this time or may have been works in progress depending upon water availability.

In many cases dug wells were installed along slopes or hillsides where a spring or seep was observed. In these areas a trench was excavated using drag-line buckets drawn by horses or oxen. This approach allowed for relatively quick digging to the desired depth and greater ease in construction of the rock lining. Examples of some of these horse-drawn buckets may be found in the [National Museum of American History Collection](#) and at [Fresno scraper](#).

Sometimes, difficulty was encountered in finding adequate yield, and property owners often employed dowsers to assist in determining exactly where to dig. Dowsers claim to possess the ability to find water, sometimes with the use of a forked branch or with metal rods. While many people strongly believe in dowsing as a means of siting wells, the scientific community typically regards the practice as unreliable.



Hand-dug Wells

While some homeowners dug their own wells, others hired individuals to do the backbreaking work for them. Over time, these early water well contractors honed their skills in excavating deeper wells and reinforcing the well walls using the art of stone masonry (Figure 2).



Photo by Daniel Locke

Figure 2. A hand-dug well lined with rocks in Richmond, Maine. This well has a total depth of 20 feet and is terminated on the bedrock surface. In the late summer, the water level is typically around 14 feet below land surface with a water column of 6 feet.

Modern Dug Wells

Most modern dug wells are excavated using either wheeled or track-mounted backhoes capable of digging to depths of 15-18 feet. Instead of hand-fitted rocks or bricks, wells are now lined with concrete well tiles varying in size from 3 to 5 feet in diameter with sealed joints (Figure 3).



Figure 3. A backhoe-dug well with concrete tiles in Farmingdale, Maine. This well has a total depth of 12 feet. There are numerous springs in the area which contribute to recharge of the well. It does not go dry in the late summer.

Dug Wells in Maine

The dug well is still a relatively common source of water in Maine. Since the State of Maine does not regulate such wells, it is not known with certainty how many dug wells exist in Maine or what population is served by dug wells. On the other hand, a ground-water study in southwestern Maine examined 4262 wells and revealed that dug and driven point wells together comprised about 15 percent of the total wells (Marvinney and others, 1994). It should be noted that since dug wells and driven well points were combined in one category, dug wells would make up something less than 15 percent of all wells for this study. Similarly, the Maine Department of Transportation estimates that overall, their well inventory and sampling data along State roads in Maine indicate that dug wells generally comprise about 15 percent of all private wells (Joshua Katz, MDOT, personal communication, March 7, 2011). Given that dug well usage in Maine is likely quite variable, it appears reasonable to assume that dug wells comprise 10-15 percent of all private water supply wells in Maine.

In 1990, public water supplied 54 percent of the population, drilled and dug wells served 41 percent of the population, and 5 percent of the population reported "other" for domestic water supply (U.S. Census Bureau, 1990). Using the estimate that 10 to 15 percent of private wells are dug wells, then 4 to 6 percent of the population of Maine is served by dug wells. It should be recognized that this estimate of the use of dug wells is very crude and that more work is necessary to make a more refined determination.



Should I have a dug well installed?

As noted above, the State of Maine does not regulate dug wells. Generally speaking, because of their shallow depth, dug wells may have increased likelihood of contamination and a greater chance that the water level will become too low during the summer months. It is possible that a dug well as a water supply could have an impact on the ability to sell or finance a home.

Ultimately, the decision to install a dug well rests with the homeowner. If someone wants a dug well installed, they should find a reputable contractor who has expertise in installing such wells and have the well pump-tested at the time of installation and during the late summer. The well water should be thoroughly [tested for all appropriate contaminants](#), especially coliform bacteria, before using the well as a drinking water source. Contact the [Health and Environmental Testing Laboratory](#) for more information (1-866-522-4385).



References and Additional Information

Katz, J., personal communication, March 7, 2011, Environmental Services Specialist IV, Well Claims Unit Supervisor, Ground Water and Hazardous Waste Division, Environmental Office, Maine Department of Transportation.

Marvinney, R.G., Loiselle, M.C., Hopeck, J.T., Braley, D., and Krueger, J.A., 1994, Arsenic in Maine groundwater: an example from Buxton, Maine: Proceedings of the 1994 Focus conference on Eastern regional ground water issues, National Ground Water Association, Burlington, Vermont, p. 701-715.

U.S. Census Bureau, 1990, 1990 Summary tape File 3 (STF-3) sample data, Table DP-5, Housing Characteristics: 1990.

[Ground Water Handbook for the State of Maine](#)

[Department of Health and Human Services - Chapter 232 - Well Drillers and Pump Installers Rules](#)

[New Hampshire Drinking Water/Ground Water Fact Sheets](#)

