

## **What Can I Do if My Well Begins to Perform Poorly or Occasionally Runs Dry?**

For those of us who rely on a well as our sole water source, discovering that no water comes out when we turn on the tap can be very concerning, if not a cause for panic. This paper briefly examines some of the things you can do to try to determine why your well is not producing the **quantity** of water that it used to, and what you can do about it. Problems you may encounter with the **quality** of the water produced by your well, and how to address them, will be the subject of a later paper.

First, a shortcut to determining why your well is not producing adequate water may be to consult with the professional technician (if there is one) whom you rely on to service and repair your water system or who otherwise is the most familiar with your well's construction and operation. However, be aware that paying a technician's hourly rate to diagnose and repair a water quantity problem can quickly get expensive.

The rest of this paper assumes that you would like to try to identify the cause of your water shortage problem yourself, and only seek professional help as a last resort. Accordingly, it is important to recognize at the outset that the reason you are not getting water at the tap may have little or nothing to do with the well itself.

### **1. Potential Water Quantity Problems**

#### **A. Got Power and Timers?**

First, try to confirm that electricity is still reaching your pump and water conveyance system. If you have any doubts about your ability to do this without electrocuting or otherwise injuring yourself, call an electrician. However, you may be able to tell whether your pump and water system are "live" by simply flipping the switches on those devices on and off (and listening for a hum from the pump(s)), or by using a simple volt meter available from your hardware store to test their electrical connections.

As part of your investigation, take the time to check whether any timers (for backyard irrigation, filling a swimming pool, backwashing a water filter, etc.),

which should be set to operate for limited times on specified days, are working correctly. Sometimes, it is easy to overlook when a timer has either malfunctioned or been poorly programmed, but when that occurs large quantities of water can be lost/wasted as a result.

### **B. Open Connection?**

Assuming your system has power, check all of your water-using appliances and make sure that a running toilet, a sink tap left open in your guest room, a failing dishwasher or hot water heater, or some other open water connection in your house, irrigation system or an outbuilding didn't drain your water storage tank.

### **C. Leaks?**

Next, check for leaks in your water conveyance system. First, look for leaks in the pipe that conveys water from your well to your tank. Is there any location where you can see water bubbling to the surface? Are there any unusually green and healthy grasses and other plants growing adjacent to the pipe or your tank? Is there any sign that pipes or valves associated with the tank are broken or leaking? Is there any indication that the tank itself is leaking?

If you find nothing amiss, do a similar inspection of the pipes leading from the tank to your house, your irrigation system, and any outbuilding that has a water spigot. It is remarkable how, for example, a deteriorated garden irrigation system over time can account for a substantial water loss.

If you find any leak or other system failure as a result of your inspection, you may have identified the reason why the quantity of water produced by your well became inadequate or unreliable – your well simply couldn't produce sufficient water to keep up with the rate at which water was leaking or otherwise being lost from your system. At this point, properly repair the part of your system that leaked, or hire a professional well service company or plumber to do so.

## D. The Neighbors?

It is worthwhile at some point in your inquiry to ask yourself when you noticed that your system had begun producing inadequate or no water. Do you associate your water quantity problem with a new next door neighbor who perhaps is unaware of the importance of using water wisely, and is possibly using much more water than his/her predecessor? Has a neighbor constructed and begun taking water from a new well located within 500 feet of your well?

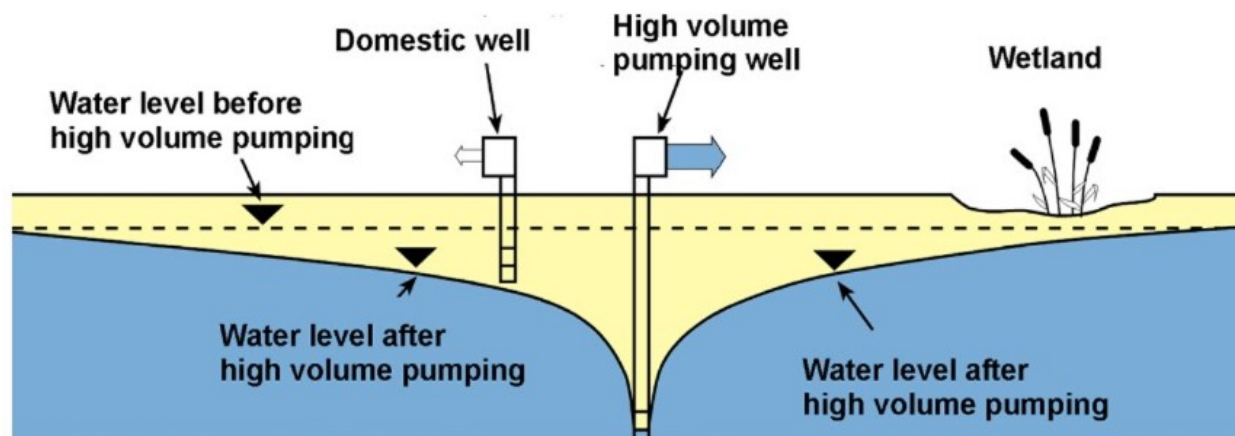


Figure – A high volume well may cause the water level to drop. Shallow domestic wells may have problems pumping water if water levels drop below their pump intake.

If one or more of your neighbors' nearby wells draw water from the same water-bearing materials as yours does, new or excessive pumping may account for your well's poor or uneven performance. To evaluate if your neighbor's well(s) might be causing your problem, it could be helpful to learn (if the neighbor will tell you) about any changes in pumping from your neighbor's well(s). The value of neighbors sharing this type of information with each other is yet another reason (if you needed any) to be on good terms with your neighbors.

## E. An Earthquake?

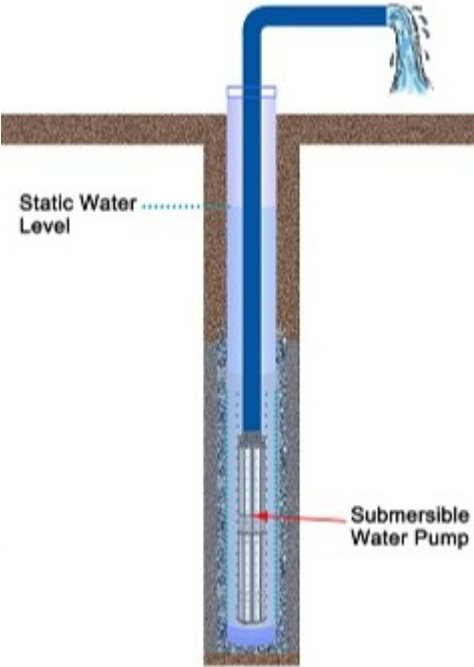
Has an earthquake recently struck your area? Many of us have observed a sharp reduction in the depth to groundwater and/or the amounts of water produced by our wells immediately following an earthquake, even one many miles away. It seems plausible that an earthquake could alter and adversely affect the network of fractures through which groundwater has historically traveled to your well. If you think an earthquake might have affected your well, there is

nothing you can do about it except see if others in your neighborhood have experienced a similar change in their well’s performance, and then wait and see if your water supply improves. Fortunately, our limited experience in Nicasio with this circumstance has been that earthquake interference with well performance (to the extent it occurs) is likely to be transitory.

## 2. Has Your Well Gone Dry?

Assuming you determine that running toilets, leaks, or other water system losses are not the cause of your water quantity problem, consider checking the depth to groundwater in your well. This can be easy and inexpensive, particularly if you have a groundwater depth detection device of the type referenced at pages 2-3 of our previous paper on measuring well performance (May 2023, Issue 6).

In addition to having and knowing how to use the proper device to determine the depth to groundwater in your well, you need to know: (1) the depth of your well, and (2) the depth in your well at which your pump intake is set. Due to drought conditions or perhaps a failure of the well casing, when you determine the current static (non-pumping) water level in your well you may conclude that the water in the casing has simply dropped below the level of your pump.



For example, if you know that the bottom of your casing is 185 feet below ground surface (bgs), you know that your pump intake is set at 165 feet bgs, and you determine that the static water level in your well is 170 feet bgs, a well service technician should be able to lower your pump intake deeper in the well casing (e.g., at 180 feet bgs). In this scenario, the pump setting would be below the static water level and it could again pump water. [Note that if you are someone whose well is only 40 – 45 feet deep, you have much less flexibility when it comes to changing the depth of your pump to access deeper groundwater.]

If lowering your pump in the well will not allow you to access a reasonable amount of good quality water, you can consider: (a) abandoning the well and drilling a new, deeper well (expensive); (b) deepening your existing well (normally less expensive than drilling a new well, but not commonly done); and (c) trucking in water, turning off your pump and water system, and hoping that an upcoming rainy season will recharge the water-bearing materials and breathe new life into your well (probably least expensive).

### **3. What if my well, pump or other well equipment are inadequate?**

So, assume that you have not found any electrical problems, leaks, or other malfunctions in your water system. Further, neither the depth to groundwater in your well, the depth at which your pump is set, nor anything else you have looked into explains why your system does not produce an adequate amount of water. Whatever the reason, your well and pump are not doing the job you need them to do. At this point, you probably need to consult a well service professional for assistance in determining how to improve your water system.

It is important to understand that although getting professional help to address problems with your water system may be very worthwhile, and even essential to identifying and correcting your water supply problems, it can also quickly get quite expensive. For example, it will likely cost you more than \$1,000 to have your pump pulled and re-installed in your well. In the course of doing that work, do not be surprised if the technician recommends that the pump be inspected and repaired, rebuilt or replaced. If the pump is four or five years old, or worn out from pumping well water that has contained detrimental quantities of sand or other fine-grained particles, it will likely be worthwhile, and cost-effective, to either have the pump rebuilt or a new one installed. Replacing a pump and control box can cost \$4,000.

A good technician should also advise you if he/she observes corrosion or heavy scaling or other damage to the well casing itself. The technician may recommend that he/she “camera” the well after the pump is removed and the casing is empty; that process involves using a special borehole camera to take a 360 degree color video of the interior of a well casing and where it is screened. The “camera” process may indicate a variety of conditions including, for example, a broken casing, severe corrosion in places, plugged screens that do not admit

water into the casing, and heavy mineral scaling on the interior of the casing. If you follow the technician’s advice and have your well “cameraed,” the technician should review the video with you and provide a copy for your records.

The technician can address some of the corrosion, scaling and plugging problems observed in the course of the video process by using chemical treatments and/or special tools to scrub and clean the inside of the casing. Sometimes, the interior of the casing can be lined with a new casing. Again, this is all work that the technician may recommend, and that you can decide whether to have him/her do it.

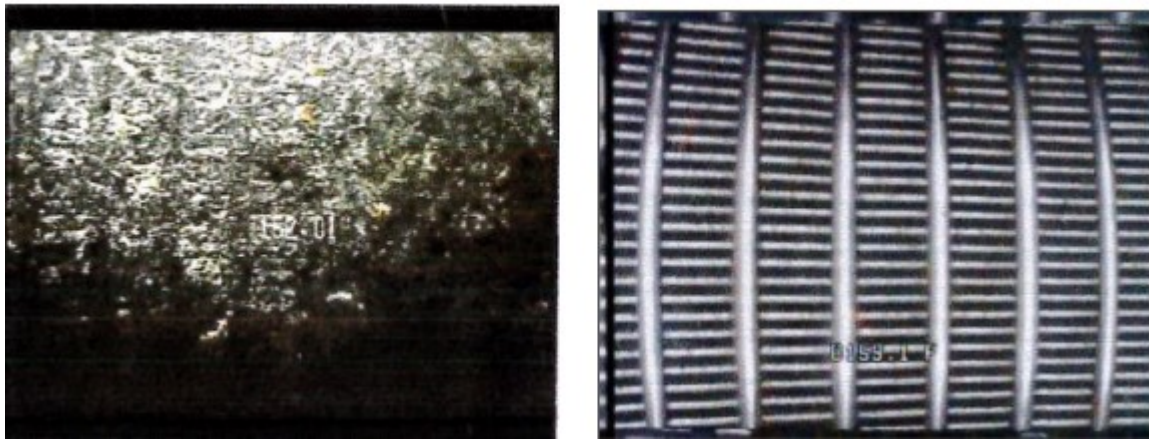


Figure – Borehole camera images of mineral scaling on well screen (left) and of cleaned well screen (right).

In the interests of avoiding having to repeatedly engage a technician to service or repair different parts of your well, it will likely reduce your overall well maintenance expense if you have the technician identify and address all pump and casing problems whenever he/she has to pull the pump for servicing or repair.

Knowing something about how our wells work (and why sometimes they don’t) is important. Looking into and promptly repairing any water system performance problems, along with capturing rainwater and reusing graywater, are just some of the things we can do to efficiently obtain the water we need while extending our area’s limited groundwater supply.

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