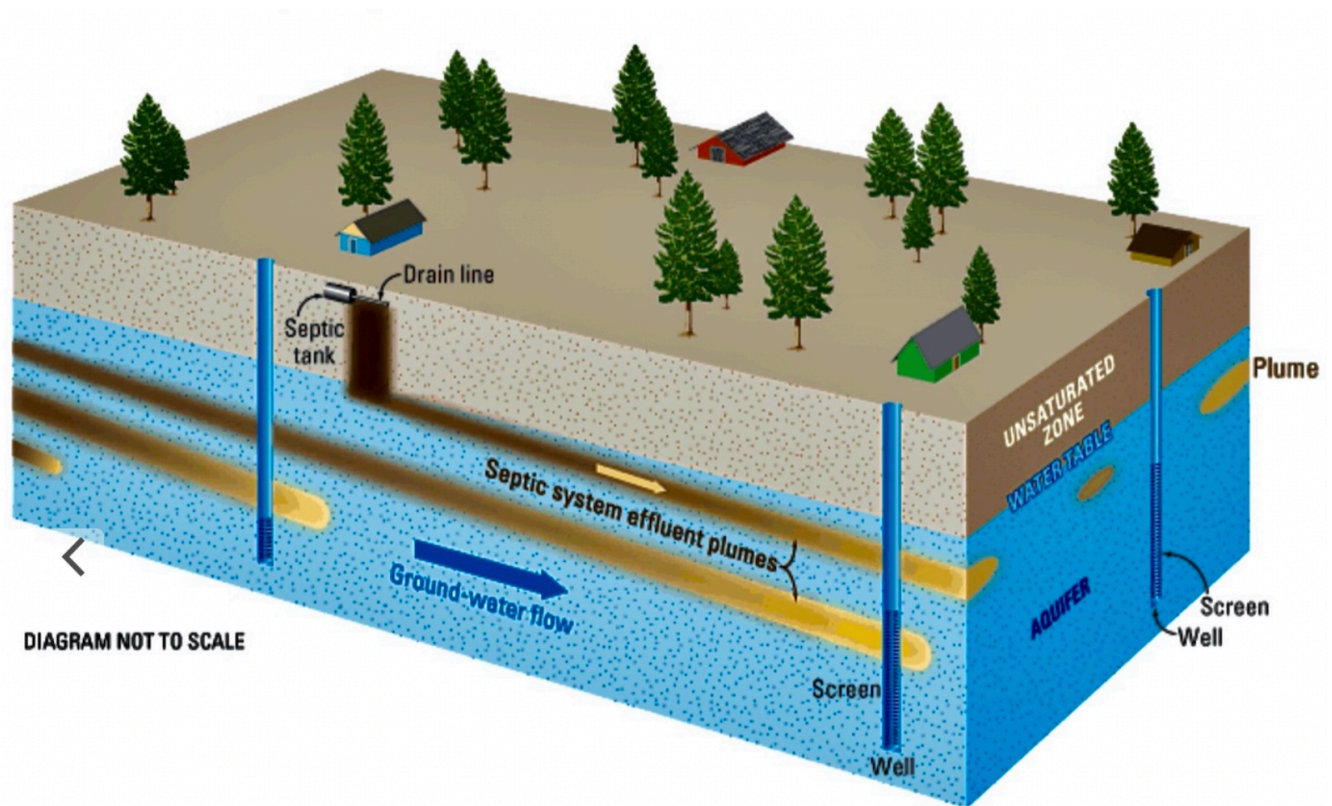


58 percent of home lots are 1 acre and 82 percent are less than 2 acres make residential densities relatively high for an area where homes are dependent on individual septic systems and wells. A cluster of homes with weak water supplies can be highly effected by new close by housing with water wells. When the low flow water tables are pulled on the results can be septic affluent into the aquifer.



Wastewater from septic systems contains nitrogen in the forms of ammonia and organic nitrogen. As wastewater leaves the septic system drainfield and percolates through the unsaturated zone, these forms of nitrogen are converted to nitrate. When the wastewater reaches the water table it forms plumes of elevated nitrate within the aquifer. The plumes move downward with the ground water and slowly spread. Currently, relatively few wells have water with high nitrate concentrations because these plumes have not had time to reach the depths where most domestic supply wells draw water. As more homes are built, and as plumes move deeper and spread, many more supply wells will be affected.

Questions

ENVIRONMENTAL PROTECTION AGENCY

- a. Describe what happens to groundwater when the rate of pumping is less than the rate of infiltration.

The level of the water table drops a little, but overall it is fairly stable, and doesn't change much.

- b. In this situation, how do you think water needs can be met over the long-term?

As long as rainfall and infiltration replenishes the groundwater faster than humans use it, the groundwater supply is reliable and steady. Groundwater is a renewable resource in this situation, and can meet water needs into the future.

- c. Describe what happens to water levels when the rate of pumping is greater than the rate of infiltration.

The water table drops a lot, so much that some of the shallower wells run dry.

- d. In this situation, how do you think water needs can be met over the long-term?

When infiltration is unable to replace groundwater as quickly as pumping removes it, the water table drops. Deeper wells could be dug to chase the table, but then the water table will just drop even further. Over the long-term, groundwater is a non-renewable resource in this situation, and won't be able to supply all the needed water.

The population will either have to reduce its water usage, or find other sources of water.

Overuse of groundwater can cause wells to dry up. This often leads to expensive and ultimately futile attempts to keep up with the dropping water table by drilling deeper and deeper wells. Other serious consequences can also follow groundwater overuse.

- e. What happened to the stream as the water table dropped? What would have happened if that water body wasn't a stream, but an ocean?

Water was pulled out of the stream back into the groundwater as the water table dropped. If that had been an ocean, the water moving into the groundwater and into the nearby wells would be seawater. This would contaminate the water supply - salt water is toxic to land plants and animals, so it couldn't be used for drinking or irrigation, and it would harm machinery, so it couldn't be used industrially either.

When too much water is withdrawn from the ground, the land can collapse, a process called subsidence. When groundwater fills spaces in the soil, it supplies part of the internal strength of the ground. When the water is removed, leaving openings filled only with air, the weight of the overlying earth compacts and crushes the spaces.



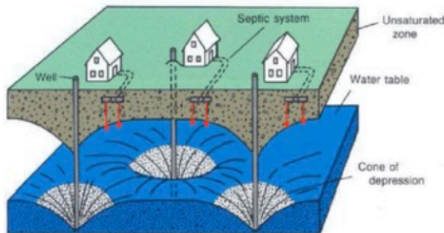
**PLEASE READ THIS
CAREFULLY.
FROM USGS WEBSITE**

by Roger M. Waller

[This report is available in PDF format.](#)

INCREASED PUMPING IN THE IMMEDIATE AREA

Another reason that wells "go dry" is the lowering of the water table by increased pumpage in the immediate area. Housing developments with small lots and individual wells have been built in many rural areas. If the aquifer is low yielding so that pumping causes a large drawdown, a cone of depression will develop around each well. Thus, several domestic wells close together can create a steady lowering of the water table if pumpage exceeds the natural recharge to the system (unless the withdrawn water is returned to the aquifer through septic systems). A third major reason that rural wells "go dry" is the installation of larger capacity wells for municipal, industrial, or agricultural purposes adjacent to residential areas. The increased withdrawals may cause large widespread cones of depression that intersect one another and cause general water-level declines that affect nearby domestic wells.



Effect of concentrated housing on ground-water level.

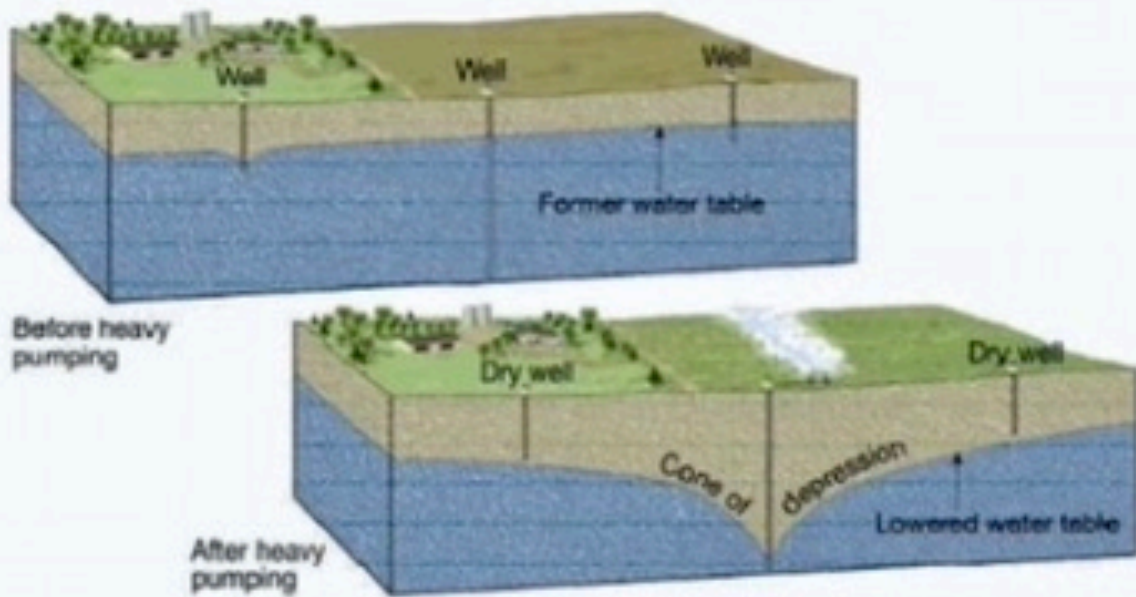
As you can see from this USGS report lowering our water tables from over-use and deeper wells from a neighboring subdivision can not only make our current shortages worse but can cause cones of depression around our wells and cause water to return to our aquifer from our septic systems. Compounding this scenario is the fact that all of our older homes in close proximity to the proposed subdivision have WELLS and SEPTIC DRAIN FIELDS way closer together than current laws allow. This damage is IREVERSABLE.

The fact is 8 deep water wells can very easily lower our water table . If that happens it will pull the water table level down lower than our wells can reach. Our septic drain fields then have the potential to leach totally contaminating the entire aquifer. This is irreversible.



EFFECT OF DEEPER WELLS

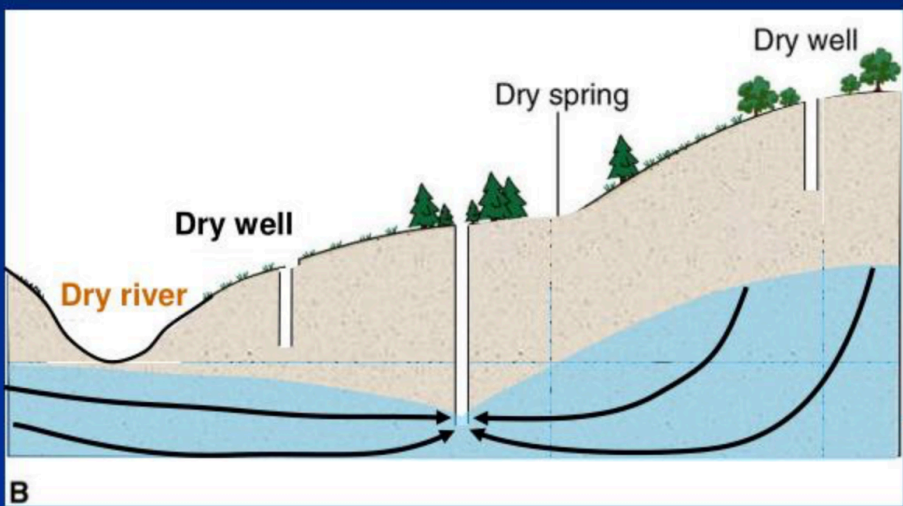
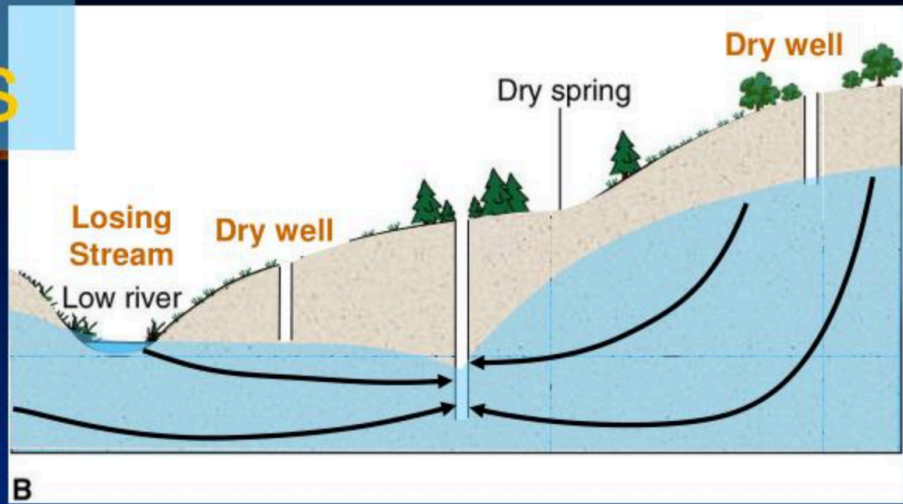
Formation of a cone of depression in the water table



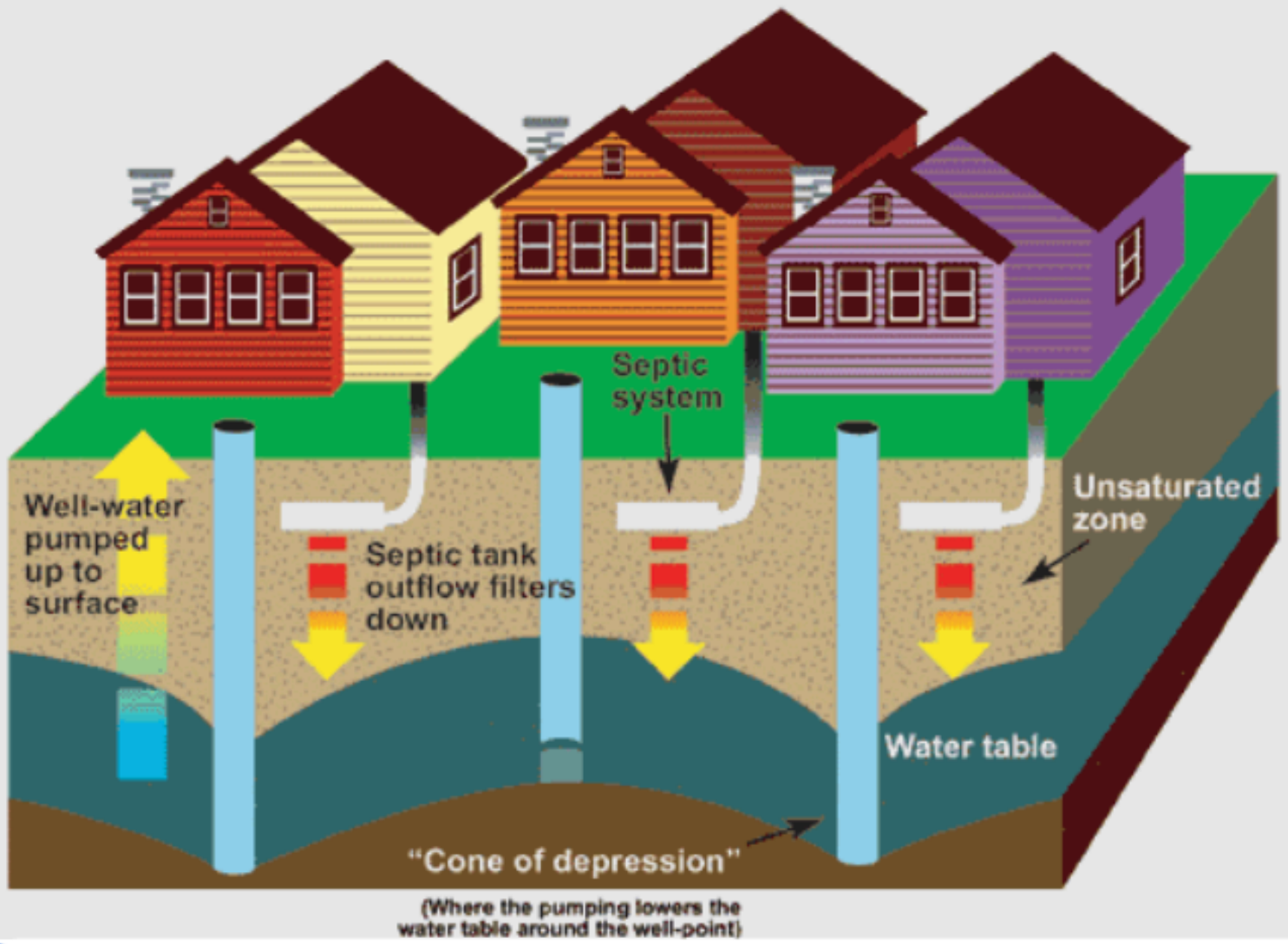
NOTICE HOW A DEEPER WELL CAN RUIN NORMAL WELLS AROUND THEM

Effects of Pumping Wells

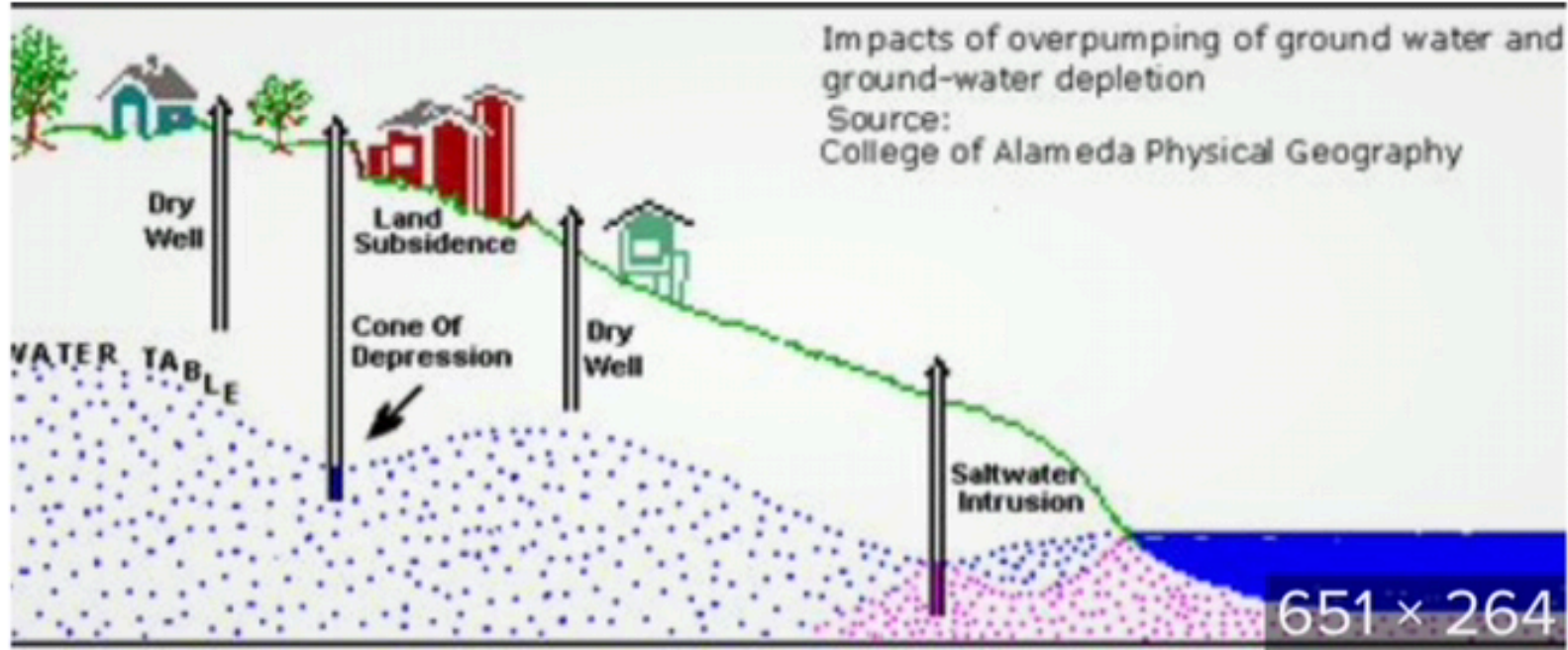
- Continued water-table drawdown
 - May dry up springs and wells
 - May reverse flow of rivers (and may contaminate aquifer)
 - May dry up rivers and wetlands



Effect of concentrated housing on groundwater level



Impacts of overpumping of ground water and ground-water depletion
Source:
College of Alameda Physical Geography

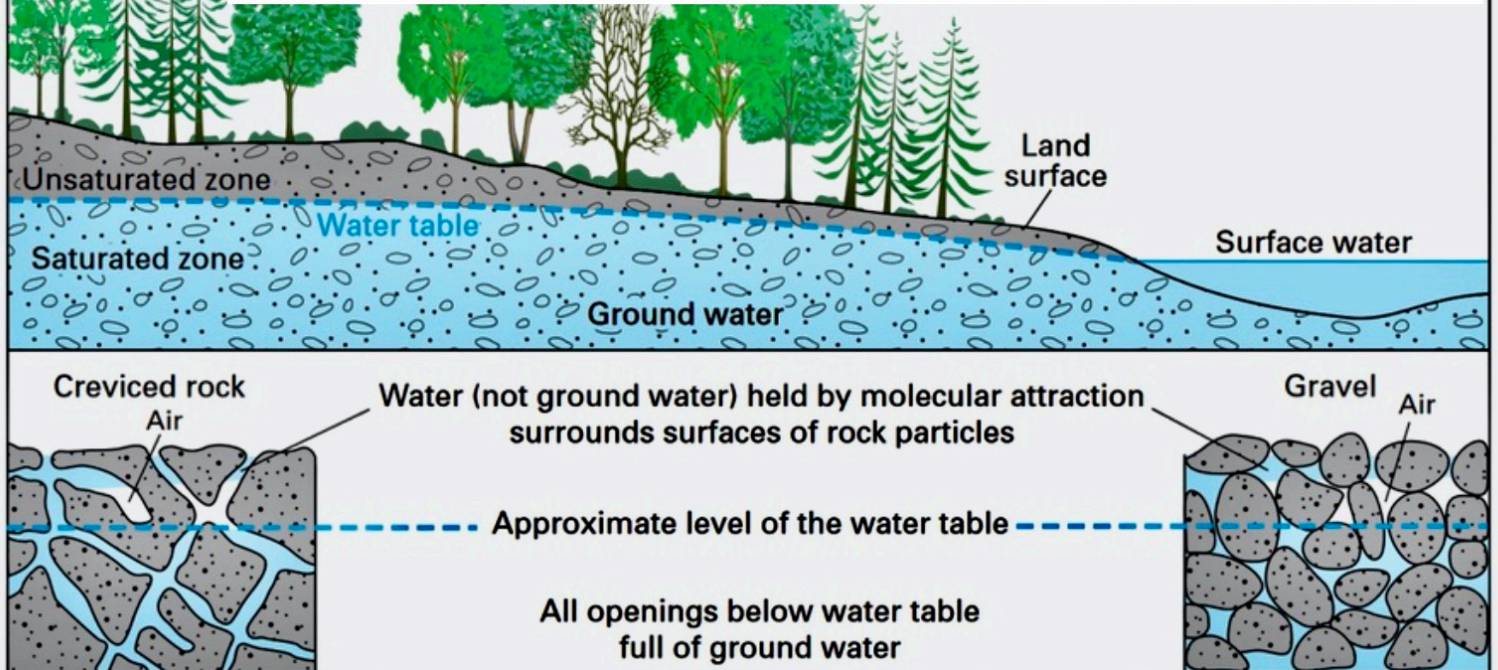


651 x 264

Groundwater is the saturated zone of soil/rock below the land surface

By [Water Science School](#) 1999 (approx.)

This really straightens up the very common misconception of what an aquifer is. It is 'NOT' a river, stream, lake, or any kind of pocket of water.



How ground water occurs in rocks.

[Original Thumbnail Medium](#)

Detailed Description

How Ground Water Occurs

It is difficult to visualize water underground. Some people believe that ground water collects in underground lakes or flows in underground rivers. In fact, ground water is simply the subsurface water that fully saturates pores or cracks in soils and rocks. [Ground water](#) is replenished by precipitation and, depending on the local climate and geology, is unevenly distributed in both quantity and quality. When rain falls or snow melts, some of the water evaporates, some is transpired by plants, some flows overland and collects in streams, and some infiltrates into the pores or cracks of the soil and rocks. The first water that enters the soil replaces water that has been evaporated or used by plants during a preceding dry period. Between the land surface and the aquifer water is a zone that hydrologists call the unsaturated zone. In this [unsaturated zone](#), there usually is at least a little water, mostly in smaller openings of the soil and rock; the larger openings usually contain air instead of water. After a significant rain, the zone may be almost saturated; after a long dry spell, it may be almost dry. Some water is held in the unsaturated zone by [molecular attraction](#), and it will not flow toward or enter a well. Similar forces hold enough water in a wet towel to make it feel damp after it has stopped dripping.

- [Water Science photo gallery](#)

VERY IMPORTANT TO READ THIS

Under Oregon Law, all water belongs to the public. With few exceptions, any person wishing to take and use surface water or ground water must first obtain a permit from the Water Resources Department. The water right, once developed, is a type of property right and is attached to the land where it was established. Land with an attached water right may be several miles from the actual source of water. In Oregon, landowners with water flowing past, through, or below their property do not automatically have a right to use that water.

Oregon's water laws are based on the principal of "prior appropriation." That is, the first person to obtain a water right to a water source is the last to be shut off in times of low water availability. In water-short times, water users with the oldest water rig

Under Oregon Law, all wat..

6:06 PM

From Oregon Water Rights

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Oregon's water laws are based on the principal of "prior appropriation." That is, the first person to obtain a water right to a water source is the last to be shut off in times of low water availability. In water-short times, water users with the oldest water right can demand the amount specified in their right regardless of the needs of junior users. If there is a surplus beyond the specified amount of the senior right holder, the person with the next oldest priority date can take their specified amount as necessary to satisfy their appropriation under their right and so on down the line until there is no surplus.

♦

Oregon Water Rights Basics

BY RICHARD M. GLICK

Securing a safe and reliable water supply is a priority concern for every Oregon community. Most cities in Oregon operate their own water systems, while others are served by various forms of water districts or contracts with other cities. Municipal and industrial water use constitutes just a fraction of the total amount of water withdrawn from streams or pumped from aquifers in comparison to irrigated agriculture, but efforts to acquire or expand municipal water supplies attract a lot of attention and sometimes controversy. The availability of new water rights is shrinking, while regulatory requirements expand.

Oregon water law, as in other Western states, follows the rule of Prior Appropriation, often described as “first in time is first in right.” Prior to enactment of the state’s water code in 1909, the common law was that whoever first diverts water out of a stream for a beneficial use can prevent later comers from interfering with that use. That is, the prior appropriator has a legal right to withdraw the full amount used under the original claim, even if it means junior appropriators are denied water. There is no sharing of shortages under the Wild West rule of prior appropriation.

WATER RIGHTS ADMINISTRATIVE PROCESS

New water rights follow a three-step process. First, an application is filed with the Oregon Water Resources Department (OWRD), and the date of the application establishes the priority date. That’s important because the entire water right process can take considerable time to complete. Second, if the OWRD finds that water is available for appropriation, and withdrawal would not “impair or be detrimental to the public interest,” then it issues a permit. The permit allows development of water works and initial use. Third, when construction is complete, the permittee files a Claim of Beneficial Use with OWRD that documents how the water is being used, which may differ from the rate of diversion or volume of water specified in the permit. The OWRD then issues a certificate, which is conclusive evidence of a fully vested water right.

As long as the certificate holder continues to use the water in accordance with the certificate, the right continues in perpetuity. Generally, certificated water rights may be forfeited for five consecutive years of non-use. However, municipal water rights are the exception and cannot be lost for non-use.

WATER RIGHTS ADMINISTRATIVE PROCESS

1. Application filed with OWRD
2. If water is available, OWRD issues a permit
3. Once construction is complete, a Claim of Beneficial Use is filed with OWRD by the permittee

That’s straightforward enough, what could possibly go wrong? Water rights permitting is a very public process. When the OWRD issues a proposed final order to issue a permit, the public has the right to file a protest, which could set off a trial-like “contested case” hearing process. For example, a protestant may claim that the new appropriation would deprive fish of needed flows or interfere with other water rights. Any dissatisfied party to the contested case is entitled to review by the Oregon Court of Appeals. From there, a party may petition the Oregon Supreme Court, but the court can decline to hear the case.

WATER RIGHT TRANSFERS

As the water system is developed, sometimes the permit holder finds that a change in permit conditions, such as the point of diversion, is necessary. That can be accomplished through a permit amendment. After the certificate is issued, however, the process is a bit more complicated. In that case, a “transfer” application must be filed, and the test is whether other water right holders may be “injured” by the change. An example is a change in point of diversion higher up in the watershed, which could mean withdrawals of water above someone else’s diversion. Like proposed final orders for permits, proposed transfers are also subject to protest and hearings.

(continued on page 34)

Groundwater rights and exempt uses

Under Oregon law, "all water within the state from all sources of water supply belongs to the public." In general you must obtain a water right permit before using water from any well. However, there are exceptions called "exempt uses" (see ORS 537.545). These uses are excused from applying for a water right permit, but must be beneficial and without waste. Pumping groundwater under the exemption carries the same weight as a water right and has a priority date. An exempt use is subject to the same privileges and restrictions as any water right permit or certificate and is subject to state water law. The Oregon Water Resources Department (OWRD) has the authority to regulate, reduce or stop groundwater withdrawals when they interfere with prior or "senior" water rights.

Exempt uses of groundwater include:

- Single or group domestic uses up to 15,000 gallons per day;
- Stock watering;
- Irrigation of any lawn or noncommercial garden of 1/2-acre or less;
- Down-hole heat exchangers;
- Single industrial or commercial development up to 5,000 gallons per day; or
- Irrigation of school property up to 10 acres in critical groundwater areas. Exempted uses are on a per-property or per-development basis. Adding additional wells does not increase an exempt limitation (for example, adding a second well does not increase the irrigation exemption to more than 1/2-acre). The Oregon Water Resources Commission is responsible for managing the groundwater resource. In many areas, high demand of groundwater supplies has required that new uses be restricted or prohibited to protect existing water rights.



OREGON
WATER
RESOURCES
DEPARTMENT

Application to claim your water from competing wells 2 pages

Groundwater Well Interference Complaint Form

This form is intended to be jointly completed by the local Watermaster (WM) and well owner during a scheduled office visit or phone call. The well owner may initially fill out the fields marked with an * before their meeting with the Watermaster and are encouraged to bring any supporting documents with them to the meeting. Find your local WM at www.oregon.gov/owrd/aboutus/contactus/Pages/RegionalOfficesandWatermastersDirectory.aspx

Date: _____ WM District: _____ WM Staff: _____

*Well Owner Contact Information:

Name: _____

Phone Number: _____ Cell Number: _____

Email Address: _____

Mailing Address: _____

Well & Water Right Information:

*Well Tag: L- _____ Well Log ID (e.g., HARN 99999): _____

County: _____ Township _____ N/S Range _____ E/W – Section _____, Tax Lot _____

Well Location Lat: _____ / Long: _____ (decimal degrees)

*Well Address: _____

*Power Meter s/n _____ Reading/Date/Units _____

*Flowmeter s/n _____ Reading/Date/Units _____

***Attach Map:** tax lot map, Google Map, or other map showing well of interest and location of any suspected problem-causing wells

*Include other well information if no well log is available:

Depth: _____

Casing Size: _____

Date Drilled: _____

Original Owner: _____

Well Use: Exempt Use: Type (e.g., domestic, stock, etc.): _____

Permitted Use: Use Code (e.g., IR, IS, etc.): _____

Water Rights Related to Well (Permit, Cert, etc.): _____

***Complaint details** (describe the type and timing of the problem, suspected cause of the problem [as described by the well owner], any previous well problems or complaints, any past maintenance on the well, any changes to pump set depth, well deepening, etc.):

Next Steps / Resolution:


ENVIRONMENT HEALTH

As wells run dry, Oregon residents depend on a state program that trucks in water

The legislative Emergency Board approved \$5 million for the program in early June, and Klamath County residents are the first to need it

BY: ALEX BAUMHARDT - JUNE 30, 2022 6:00 AM



 Klamath County has struggled with persistent drought. A report from the Secretary of State's Office found Oregon agencies in charge of ensuring water quality and quantity are understaffed, underfunded and lack coordination and planning for the future, compromising the state's water security. A new drought package from bipartisan lawmakers hopes to tackle these issues. (Courtesy of the governor's office)

Rhonda Nyseth's well dried up on Sept. 15, 2021, nine months after she bought her house in Klamath Falls.

"When it happened, I won't lie, I started crying immediately," Nyseth said.

She was familiar with the situation. She's a social services emergency liaison for the Oregon Department of Human Services Office of Resilience and Emergency Management.

Last summer, she helped oversee the distribution of more than 100 water tanks, each holding 500-gallons, to residents in Klamath County with empty wells.

Oregon homeowners with failing wells seek help as relief funding threatens to run dry



By **Emily Cureton Cook** (OPB)

July 13, 2023 6 a.m.

Income caps and long wait lists work against some rural homeowners struggling with water access.



For 83-year-old Lona Norman, having the money to dig a deeper well made the difference between staying in her Central Oregon home and being forced to sell the property.

“I’m in my comfort zone,” she said. “I feel safe here.”

Norman lives near La Pine, but is outside the range of city services. [Like nearly 1 in 4 Oregonians](#), she relies on a private well for her primary source of potable water. As drought and pumping worsen the decline of aquifers across Oregon, rural homeowners like Norman are first to pay. She needed to come up with more than \$20,000 for well repairs, but she’s on a fixed income. So, Norman’s daughter helped her navigate how to ask Oregon for help.



Paying the price

Burdick had no running water for weeks as she waited for a drilling company with a monthslong backlog. She was ultimately saddled with more than \$30,000 in costs.

“It was a nightmare,” she said. “And the story just gets worse.”

Burdick is among the Oregonians paying the price of declining groundwater in the state’s fastest-growing region. Over the past 10 years, Deschutes County residents have deepened an average of 29 wells per year. Last year, that shot up to 60, and so far this year the problem is worse.

Meanwhile, development is booming, with more than 1,100 new wells drilled since 2020 alone.

State regulators have long taken a timid approach to safeguarding groundwater for domestic wells, which aren’t regulated like larger commercial or agricultural uses. People who complain about dry home wells are often told that the only recourse in state law is to keep digging deeper.



Aiken Well Drilling operators bore a domestic well at a new rural home site about ten miles east of Bend, Ore., July 5, 2022.

Emily Cureton Cook / OPB

Even in the upper Deschutes, one of the most regulated river basins in the state, lawmakers and officials have focused on appeasing rather than reining in wealthy developers who are allowed to buy groundwater rights in one place and then extract that water from miles away, where aquifer levels are dropping at alarming rates.



Oregon Water Resources Department Well Report Mapping Tool

Search

Identify

Layers

Bookmarks

Well Reports

Water Wells

Type of Well Report

Water Wells

Monitoring Wells

Geotechnical Holes

Type of Work for Water/Monitor Wells

New Wells

Deepening Wells

Conversion Wells

Alteration Wells

Abandonment Wells

Other

Type of Work for Geotechnical Holes

Well Characteristics

Wildfire Extent



Other Boundaries



Hydrography/River Miles



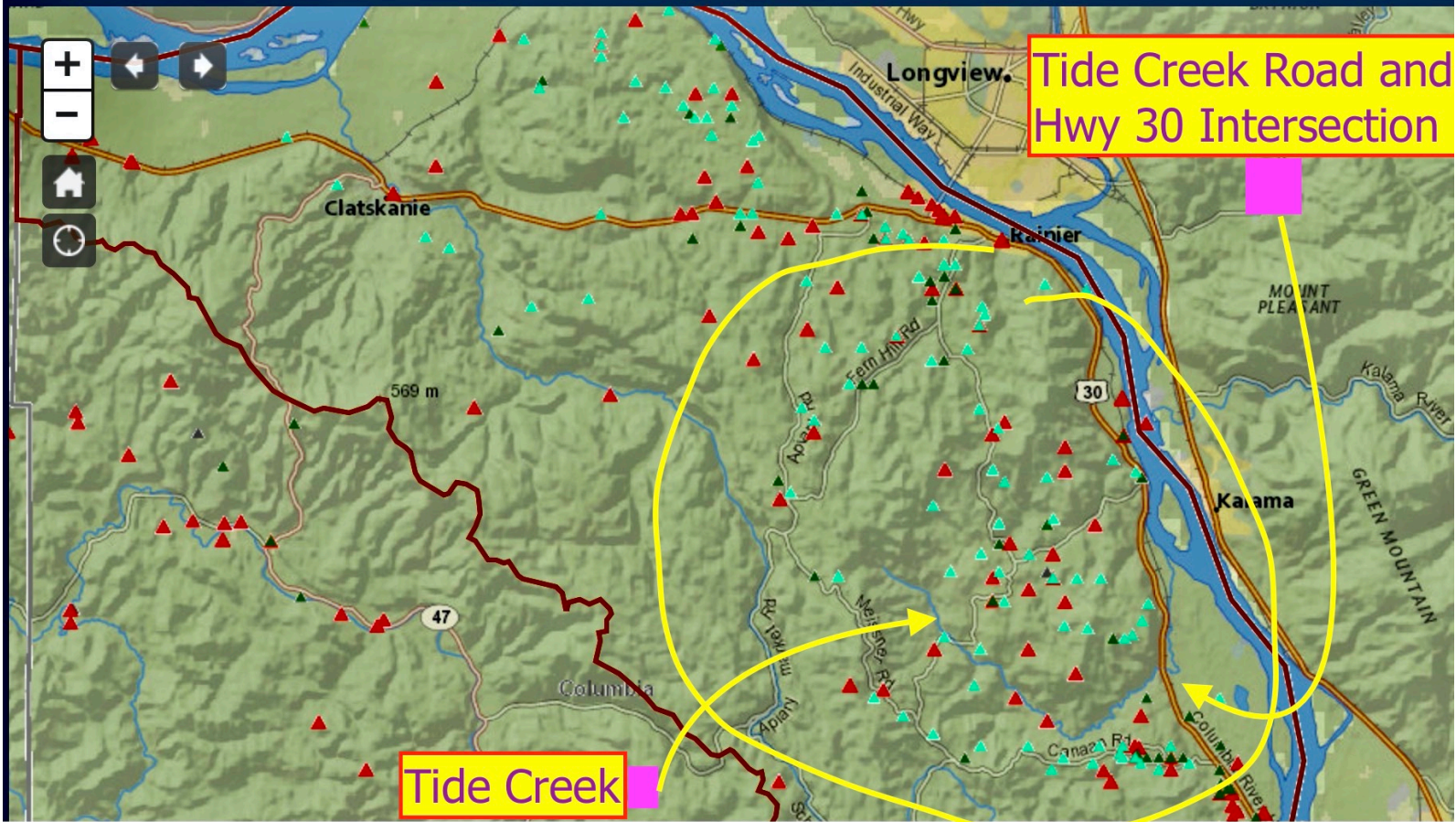
Tax Lots

PLSS

DOGAMI Geology



**# 1 Of 2
map to
follow**



Deepening Wells and Dead Wells in our area
These are only the ones that have been reported



WE ARE IN THIS GREY AREA

1 of 2

EXPLANATION



Unconsolidated-deposit aquifers



Pliocene and younger basaltic-rock aquifers



Volcanic- and sedimentary-rock aquifers

WE ARE IN A WEAK AQUIFER AREA



Aquifers in pre-Miocene rocks—Minor regional aquifers, generally yield little water to wells. Carbonate-rock aquifers (line pattern) are part of the Basin and Range aquifers of Segment 2.

— Limit of regional aquifer system

A—A' Line of hydrogeologic section

