

Hello this is Gene Hester and Frank Hall Representing the small community on Tide Creek Road that is in opposition of the Peterson partition application. Our first comments submission to the Columbia County wed site S23-01 was a failure. The Planning Department was having trouble with their machine and the best they could do at the time was improvise with a different machine. The comments submitted are titled "Comments Received 9/8/23". Please disregard these comments. These comments that you are in right now are the correct and complete ones . We apologize for the inconvenience. Thank You

To the Columbia County Planning Commission

8/23/2023

From Gene and Lynn Hester

33340 Tide Creek Road

Deer Island Oregon, 97054

And the people that have ask us to speak for them

We are writing this letter strongly opposing the Lupine Meadow Subdivision. Our property is tax lot #1001 and is directly across the street from the proposed development. I have entered in this package 12 total Tax Lot numbers surrounding the proposed lupine meadows that are having the very same issues.

To start with I purchased and moved into my home in 1982. I purchased this home 41 years ago. The well logs date back to 1975 when our home was built. Things have changed significantly since that time. This area has grown and a lot of new wells have been established. As time goes on we have less water and lower flow rates. In addition several years running there has been annual shortages of ground water that feeds aquifers. We as well as most people around us are experiencing serious water issues. I have had my well cone out three times and every time they shorten my well. We are on our 4th pump. The majority of my neighbors have had to have water storage tanks installed to deal with the water shortages.. Water is pumped into the tank a little at a time accumulating in low and slow use time. This supplies you with a minimum amount of water for daily use. You can still run out particularly in the summer. We recently had \$4200 work done on our well. Justin from McMullen Wells in St. Helens told us it was just a bandaid and we will probably have bouts of no water. Justin told us that putting in storage tanks was a good option but a new well would be better. Justin Says that issues with our current well are not ideal to dig it deeper. The problem with a new well is the only location we can put a new well is too close to our septic drain field.

What is helping us is that there are only 2 of us living here. My wife did not even have her hanging baskets this year. We have run out of water 3 times.. I am planing a new building to house water storage tanks. We are 100% dependent on the low-flow rate well we have. Justin told me we have only 28 feet of water and around 2.5 gpm.

The laws for developing land partitions are written very poorly. It lets developers use well logs from nearby properties that they submit to the county proving that there are good flow rates. Those well logs are usually very old and obsolete. (You will see how I proved that Petersons well log reports for the proposed project are not current or correct). My well flow rate was established in 1975. Some Houses

around me are even older . In addition the Oregon State Water Master has no information on our area aquifer. However the Oregon State Water Master did say one thing about our area. He stated that our Aquifer is very poor. Our poor aquifer area will be well outlined with illustrations and facts from the USGS in this report.

8 new 4 bedroom homes will likely have a detrimental impact on surrounding wells. I ask Justin McMullen what will happen to our wells with that much usage. He simply said the guy with the deepest well wins. Severe coning will develop. Also water depletion establishes a very high risk of septic systems leaking into the Aquifer . This will be shown in illustrations that follow. When all of our homes were built there were different stands pertaining to how close our septic systems and wells could be to each other in a neighborhood.

Most of the current long time residences of this surrounding area cannot endure the financial hardship of drilling a new \$25,000 plus well. Even then we will be competing with a huge amount of very nearby water usage.

Everything we are going through is nothing new to the other families up here on Tide Creek Road. Please read through all of the illustrated documentation I have included in this package from the USGS and the EPA concerning wells, well water, aquifers and the reality of what really happens when new subdivisions move in around already weak systems. I have been told don't worry you have rights and you can sue and have wells shut down. That is something none of us ever want to experience. Then it is probably too late. And what about the unsuspecting families that purchase those 8 homes ?? Will they be forced not to use their wells because of our water rights?? We hope and pray that we can save our water here on a local level but in the event that does not work we are prepared to take this to Oregon State with our measure 49 Attorney. We have absolutely no choice. We have to save our water. Aggie Peterson once said that it is no problem for us because we are all land owners so we can all borrow money to drill wells. We are asking the Peterson's as neighbors to please back off and take this to one of your other many properties and help your neighbors save our depleting aquifer. Again quoting Justin McMullen..... "The person with the deepest well wins". We will not be able to compete with the Petersons new 8 deep water wells.

Again please study the illustrations that I have included in this package that clearly outlines what we will be in for. The info I have included just barely scratches the surface of what is out there to study. Please take time to google well water problems and you will see what we are facing is very very real and it is happening all over the country. If need be please bring this to a halt to at least do an impact anylasis study on the plight we are facing. And let the burden of this study be on the Peterson's . They have the money obviously and we should not have to spend money to defend our long time homes that our greedy neighbor could care less

about.

Thank you so very much for reading this and giving us all the opportunity to be heard. This subdivision that the Petersons have the wherewithal to put anywhere they want on their many many properties is a very, very real threat to our long time homes . We beg you to give this serious situation your upmost attention. It is a huge threat to all of us up on the hill near this proposed project . I just cannot express enough how scary the potential of this coming to fruition is for all of us.

Thank You so much from all the people on Tide Creek Road that this impacts.

Sincerely, Gene Hester



The well logs from the Petersons that are being used to justify the proposed subdivision water is stated by Oregon State water resources as archaic and not reliable.

Water volumes, levels and well conditions from neighbors properties are current and as reported by the property owner. The property owners Tax Lot # (TL) is included

Page 1 of 2

WELL INFORMATION

- 1 Christie, 32829 Tide Creek Rd., 4 gal. per min., has storage tanks. TL00200
- 2 Andrew Ahensbrak, 33562 Tide Creek Rd., 4 gal. per min., relies on storage tanks. TL01100
- 3 Parsons, 33220 Tide Creek Rd., 3 gal. per min. Has gone empty often. and has sulfur odor. TL00700
- 4 Hall, 33268 Tide Creek Rd., .4 gal. per min. and relies on storage tanks and can't re-drill. TL00800
- 5 Mary, 33378 Tide Creek Rd. they are on their second well and getting 2 gal. per min. TL01007
- 6 McFarland, 33300 Tide Creek Rd., well level has dropped 150' and has had rework done. TL00900
- 7 Gene Hester, 33340 Tide Creek Rd., 28' of water in well, goes empty in 45 min., has had recent rework cost 4K, McMullen said was only a bandage. Has sulfur odor. Pump replaced 4 times do to aquifer coning. Can't re-drill, need storage tanks. TL01001
- 8 Tim Rose, 33396 Tide Creek Rd., has a large storage tank due to low water. TL00201

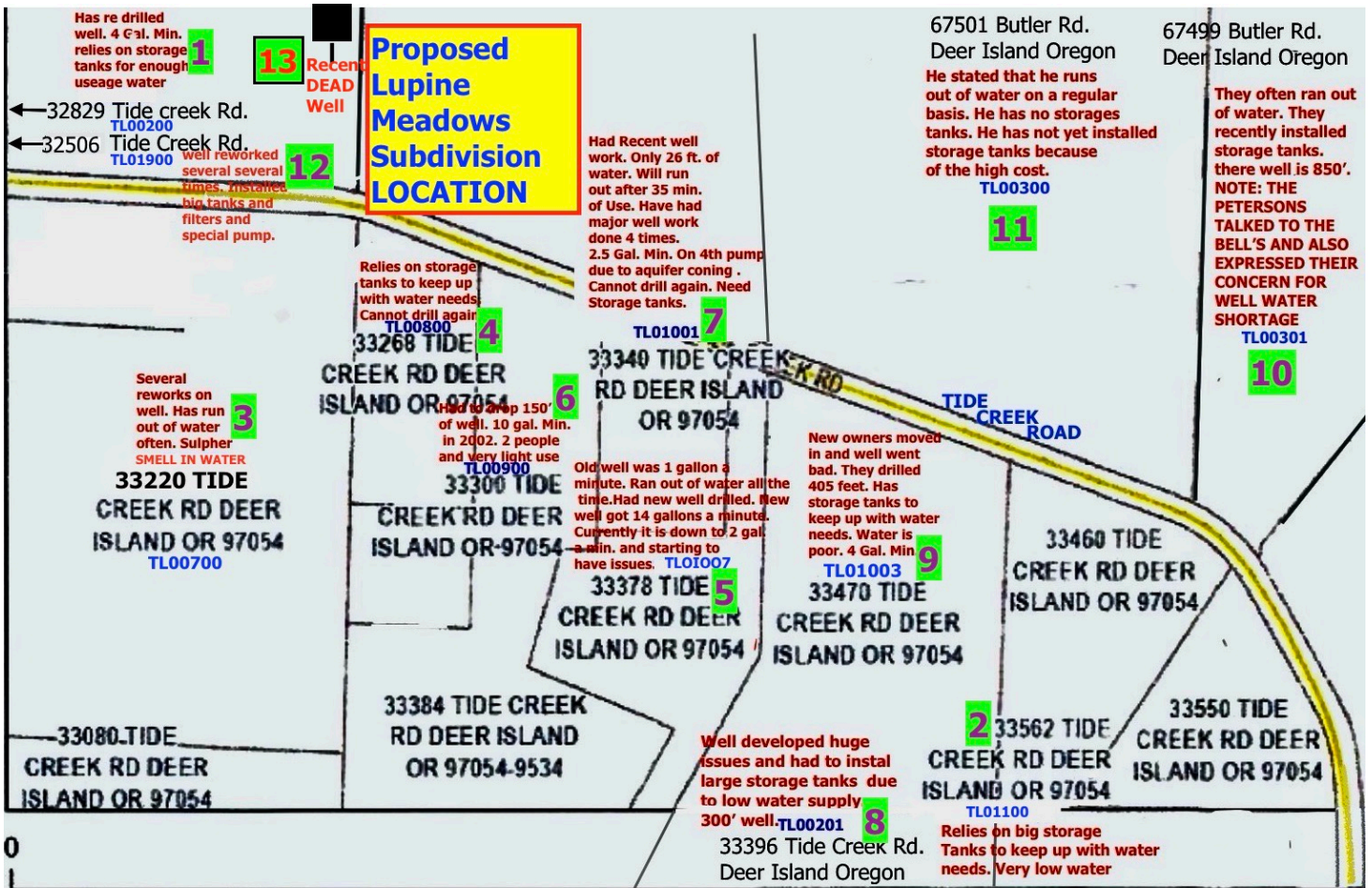
9 Meador, 33470 Tide Creek Road. New property owner. They had to dig a new well. 405 ft. 4gpm. Poor water. They are on storage tanks to get enough water. TL01003

10 Sheila Bell, 67499 Butler Rd., They rely on newly installed water storage tank, before that they often ran out of water. Also the (Petersen's talked to the Bell's and also expressed their concerns about well water shortages). Well at 850' TL00301

11 Parlot, 67499 Butler Rd., He stated he runs out of water on a regular basis, he also has no storage tanks due to the 4100 cost of installation. TL00300

12 Hughes, 32506 Tide Creek Road. Ken has ran out of water often. He has had extensive well work done. He is now on big expensive tanks and a filtration system to handle bad water . About 3 gallons a minute but without tanks he runs out of water. TL01900

13 Frank Hall . 67501 Tide creek Rd. Frank owns the property on the direct West border of the proposed Lupine Meadows Subdivision. Franks well on that property is about inline with the middle of the proposed project. His well is not far from the property line. After spending thousands of dollars on his well it has gone dry. Its gpm is not measurable because it will only pump about 5 minutes. TL00200



Disclaimer: This map was produced using Columbia County GIS data. The GIS data is maintained by the County to support its governmental activities and is subject to change without notice. This map should not be used for survey or engineering purposes. Columbia County assumes no responsibility with regard to the selection, performance or use of information on this

The numbers on the locations above correspond with the numbers on the well information sheet that has owners name and address and TL # . Yes I know it looks convoluted but it brings to light all the water problems in one small confined area. It showcases that there is a big problem in a small area that can only get worse with 8 new wells. When we get into the water aquifer part of this plee for help you will understand how this can happen

The following page is a well data Log sheet that Petersons are using in their partition application showcasing that there is 10- 60 gallons average per minute in the surrounding wells . You will see how we corrected their data.

1 --- This is Petersons new well. We were actually surprised that they did not include their other 2 new wells ???

2--- We crossed this out because it is a duplicate of # 6. # 2 says 37gpm and # 6 says 10 gpm. They are both the same property belonging to Jim McFarland . It was 37gpm way way way back when. In 2002 Jim McFarland had to have extensive well work done. They had to shorten his well 150 ft and it had 10 gpm. That was in 2002. Jim does not know what his gpm now. He said it is hard to tell with just 2 of them and lite usage. So we are using the 2002 10 gpm in our reports.

You can read the rest of them on our summary at the end of Petersons following well log reports

Peterson's submitted this well log data in an attempt to show that the Residents in the proposed lupine meadow area on Tide Creek Road have plenty of water. Because the well log data came from McMullens I am sure it is very legit. However since the data was collected as far out as 52 years ago it is mostly not current and obsolete.

Peterson also claimed on this well log sheet that OWRD states that half a gallon a minute can establish a well. He does not tell you the whole story . That is only if you instal a very expensive big storage tank system that the water can trickle into to build up over time when you are not using it. And a huge water supply. Just normal common sense clearly dictates that you cannot run a household on one half gallon a minute. You can have 5 gpm water but run out of water with 30-40 minutes of steady running. Most all of us have had extensive well work done and a large percentage are on storage tanks. Storage tanks are a last ditch effort and you are limited with them when it comes to garden watering and pressure washing etc.

WELL LOG DATA

Startcard # (if listed)	Well Log #	Date	Tax Lot No.		Yield (gal/min)
1028595	COLU 55121	10/26/2015	6225-00-00400	1	10.0 Petersons new well
	COLU 1704	7/13/1976	6225-00-00900	2	37.0 duplicate
	COLU 1706	8/7/1971	6225-00-00700	3	10.0 3 gpm
83956	COLU 50307	10/30/1995	6225-00-01009	4	25.0 out of area
83964	COLU 50308	10/26/1995	6225-00-01006	5	12.0 3 gpm
126399	COLU 52001	2/6/2002	6225-00-00900	6	10.0 2002
148019	COLU 52165	12/31/2002	6225-00-01007	7	20.0 2 gpm
1043597	COLU 55494	7/15/2019	6236-00-00300	8	60.0 out of area

Submitted with this application as Attachment 8 are copies of the above well logs. This data establishes a yield for wells in the area ranging from 10 to 60 gallons per minute.

1 c

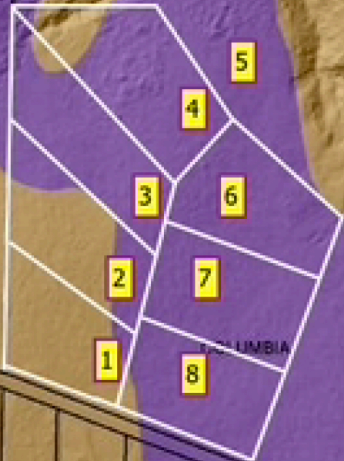
The OWRD well logs clearly establish adequate potential for water for the proposed lots.

- 1** This is Petersons new deep water well
- 2** This is a duplicate on Jim McFarland property. (#2 and # 6 above) He lost 150' of well and dropped to 10 gpm 2002. He is not sure what it does now . 2 people in house. Lite use.
- 3** John Parsons. Several reworks on well. Sulpher smell.Runs out of water often.Cannot drill again
- 4** Out of area well
- 5** Tim Rose installed large storage tanks due to low water. 3gpm
- 6** Jim Mcfarland. Had 37 gpm. Major well rework .Dropped 150' off of well. 2002 10 gpm
- 7** Mary Wells. Had to put in new well at the same time as Jim Mcfarland. Was 14 gpm now down to 2 gpm
- 8** Out of area well

OREGON STATE LIDAR MAP

**HYDRIC SOIL
WETLAND MAPPING**

**LUPINE MEADOWS
PROPOSED SUBDIVISION
8 LARGE HOMES
8 SEPTIC SYSTEMS
8 NEW WELLS**



Gene Hester

Before continuing I would like to address a very valid and important question a committee member ask at the Sept. 11th, 2023 meeting. It was concerning the proposed Lupine Meadows 8 large new deep water wells being able to put very serious or devastating, nonreversible impacts on the Tide Creek Road Communities water supply .

I apologize for not being able to identify the Committee members by name. I am just not familiar with the committee. The question the gentleman on the committee ask was, I quote, " WHAT HAPPENS THEN "? He continued "WHAT ARE THE REPERCUSSIONS OF THEM LOOSING THEIR WATER"?

The only reply was from another Committee member that said BUYER BEWARE" ! Great Question and following remark.

I am sure lawsuits of different sorts would naturally ensue . I am sure there is a chain of command ladder of responsibility that attorneys would be climbing concerning who's fault this is that this was allowed to happen after the opposition to the partition, supplied creditable information that would warrant closer investigation at the burden of the applicant. Thats why we are so clearly trying to illustrate that we have an extremely threatening situation with a high probability of loosing our water. We are real people with real homes that have been here a very long time that have very provable existing issues. The many water storage tanks just can't lie. McMullen Water services most all of our wells and can point a finger at all of us low water table slow flow wells.

No one here is an attorney. It is our job as the opposition to the applicant to supply enough adequate information to educate all that are involved that there is a highly probable chance that we could and would be impacted in a very negative way having already serious well issues.This is compounded by 8 large houses moving in across the street on our weak aquifer . There are illustrations and statements from OWRD, USGS, DEQ, State Of Oregon and other sources clearly outlining our plight enclosed in this PDF. You could seemingly read forever in the USGS web site. They have more things to click on than Google.

May I refer back to the committee member that stated " BUYER BEWARE". Well said ! Besides us, the opposition to the applicant, facing huge loss, life altering consequences, and undue financial strains, there are also the "8 unaware new home buyers". The ,good ,hard working Unsuspecting buyers of those 8 houses. We have figured out how to help them. More on that.

Unfortunately those 8 new home buyers would have to be our first target to protect "our" water if our wells were effected by ground water aquifer depletion.

Yes, "Our" water .The State of Oregon clearly states that we have water rights over newly developed wells in our area. They could be miles away.If you let 8 new homes be built that effect our water supply now their water supply will also be effected . Their water can be shut off. It is not fair to anyone.

Among the enclosed documentation and illustrations is a Groundwater Well Interference Complaint Form sent to us by Justin Iverson, OWRD Groundwater Section Manager Salem Oregon.It is the first step in having junior water users slow down or turn off their water to save the senior user. Information on this to follow.

Enclosed you will find a lot of information. Please educate yourself on this huge problem that is going on all over the country. We have put a lot of information in here.There could easily be 20 or 30 or 40 more times the info. We are putting in well enough to feed you to dozens of other resources on the subject if you are interested. We have to give you enough to show that beyond a shadow of a doubt, for the record, we have presented our serious issue plain and clear.

Us home owners on Tide creek Road with water problems have organized and hired Attorney Thomas Cutler. Thomas was highly referred to us by an industry icon to be the best. Thomas has certainly proven himself. Thank You Thomas. He has been a land use attorney for 30 years and an expert on Measure 37/49.Thomas is ready to take this as far as we have to go.

In those meetings we have only a short time talk. We want it well known that we are not threatening anyone or trying to prove a point or trying to deny anyone their rights of land use. I have personally known the Petersons since they purchased their land next to my dads property in 1965 when I was 9 years old.I am now 74. I was raised up here on Tide Creek Road. I bought this house from a friend of mine that had previously purchased land from my dad in 1975 . I purchased this house from him 1983. So I am still on the hill. I think I have previously wrote somewhere that it was 1982. My wife corrected me. Petersons purchased their property here on Tide Creek Rd. to raise cattle and hay. It has never been zoned residential-ever. They definitely did not buy it with that in mind in 1965. Having 37/49 come along was just a big feather in their cap which is awesome. Most people up here are huge supporters of freedom of rights and freedom to do what you want with your land. I tout myself as the biggest supporter of freedoms on this hill but there are plenty of guys up here that would arm wrestle me for that title . I have been neighbor and friends with John and Aggie for 55 years. They were neighbors. Always friendly. Aggie stood up at the Sept. 21st meeting and went on about her property up here. Thats fine. We are not trying to take it .When you know local people for 58 years you learn a lot. I could throw a lot of rocks. But thats not me.I will say that I know that this is only business to them. Think nothing else. They are huge land holders. This is a business. John has told me a lot about how much land they own. That is wonderful.I do not begrudge successful people , I support them. Aggie Peterson is allowed to put her 20 measure 49 houses anywhere they want on their properties. She has other places she can place these homes. However there is a real question about the legality on her being able to place these 8 homes on contiguous properties but we will not go there till it is deemed necessary.

The Petersons have a lot of land and we only our small acreages with our homes. All of ours together are nothing next to their holdings. It is a business. So guess what folks ! What would you do in our case. Roll over and loose all the equity in your home and do an expensive tank set up and pay to have water hauled in and watch your home equity dwindle Or Fight for your water... You know exactly what you would do.

Getting back to the 8 new home owners and "BUYER BEWARE" . They would not know that they would be moving into a water problem area. They would not see this coming. We would protect them and us. We have 4 of our properties that are right across the street from the proposed subdivision. There will be big signs put up by the road with the a new web site posted on it that anyone can go up on the web and read this and all the other public information about this case and the local water issues. This may save our ground water table and them from having their wells shut down by the state when their wells pulled the water table down hill away from the bottom of our pumps. As you will see, this is real folks.

What would you do ? Well I must tell you I have not really enjoyed canceling a big trip and working on all of this for the past couple of weeks. All there is left to say is Aggie please leave your neighbors alone . We have enough problems maintaining our current water table without it being sucked downhill from us. And as you will see in the following information that can and does happen . Thank you, Gene Hester



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:

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)

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.

♦

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.

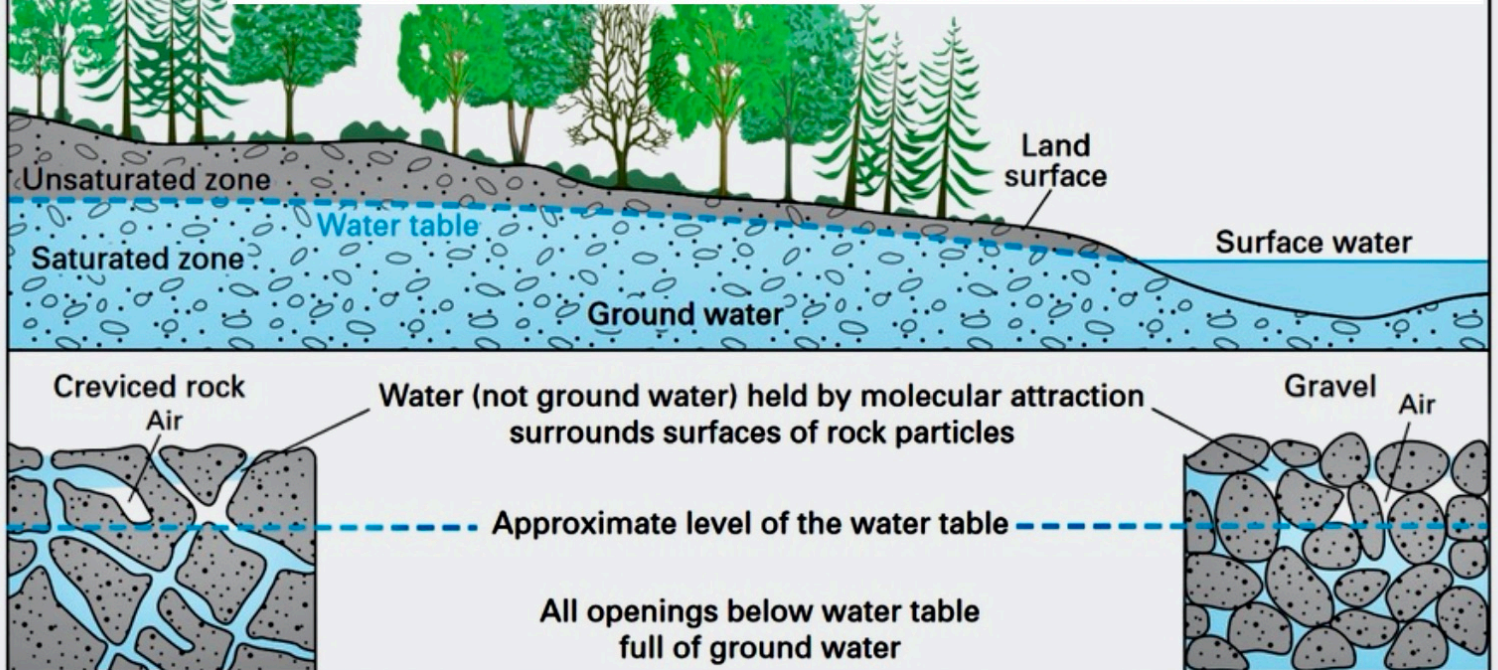
Exempt uses of groundwater include:

- 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.

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

