HARTT Laura A * WRD

From: SCANDELLA Benjamin P * WRD
Sent: Thursday, June 1, 2023 11:48 AM
To: Jaeger, William K
Cc: HARTT Laura A * WRD; LIEBE Annette I * WRD; IVERSON Justin T * WRD
Subject: RE: Follow up question about groundwater RAC and data

Hi Bill,

Sorry that we missed you at the RAC meeting yesterday. One thing that was announced was a request for feedback on the rule revisions proposed so far, including on "reasonably stable groundwater levels," by Wednesday, June 7th. I look forward to reading your suggestions!

Best,
Ben

From: SCANDELLA Benjamin P * WRD
Sent: Thursday, May 18, 2023 7:27 AM
To: Jaeger, William K <wjaeger@oregonstate.edu>
Subject: RE: Follow up question about groundwater RAC and data

Hi Bill,

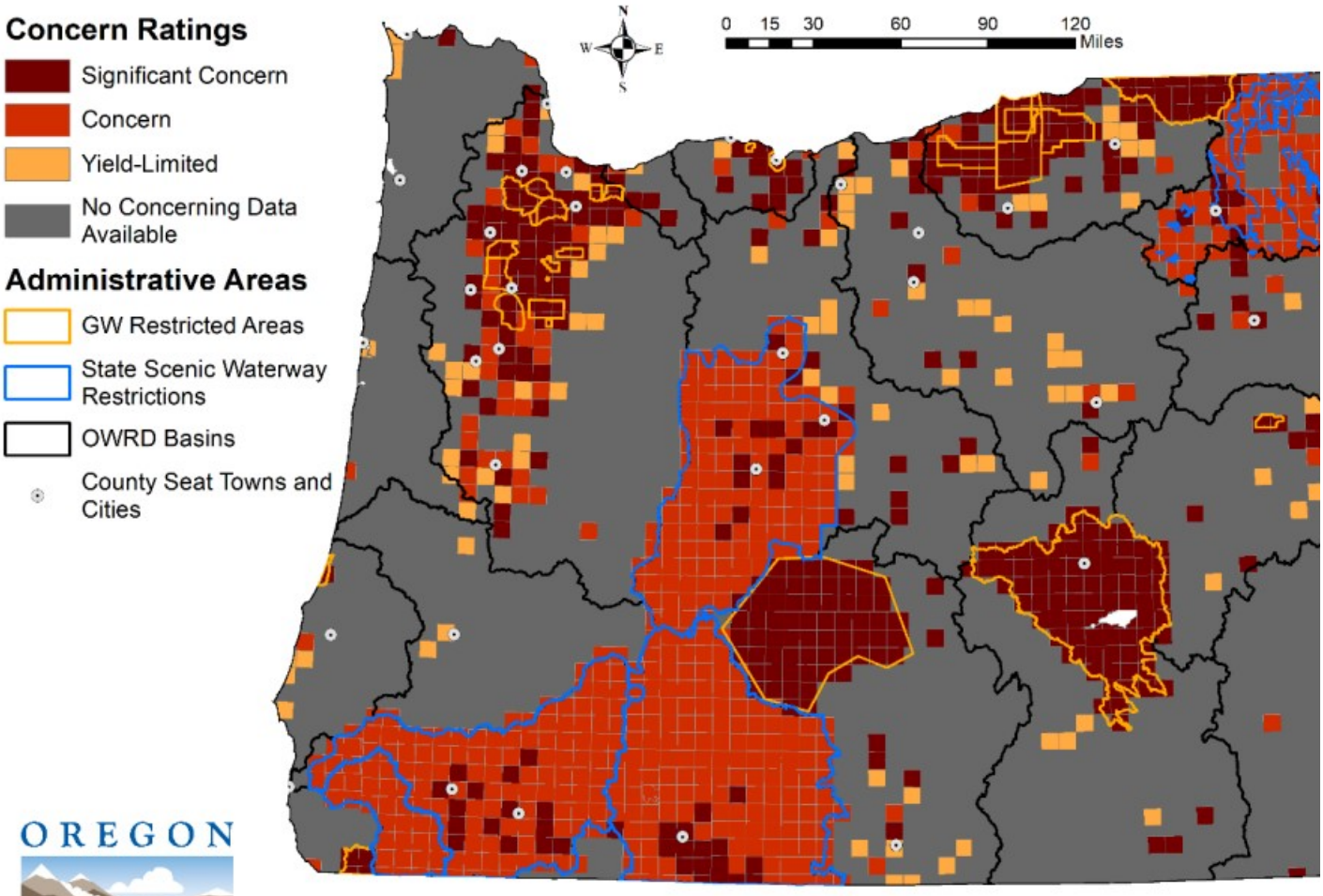
Thanks so much for your follow up and all your comments and questions last Wednesday! Looking forward to discussing more, and apologies for my slow response.

It's a good point that nearby water level data may be useful in augmenting the water level record in a particular well. I'd be interested to discuss and learn what you and your colleagues and students come up with.

Yes, you're correct that the water level data used to evaluate the stability or declines in groundwater levels would be in the Groundwater Information System. We would continue to accept new data into that system for further analysis, and I don't think there would be any restriction on the age of the data considered. We don't have many wells with records longer than 50 years, and yes there are parts of the state with insufficient data to establish any trend. For more on that, I'd refer you to Figure 14 of the 2021 Groundwater Resource Concerns Report (screenshots below), showing that many townships lack sufficient data to evaluate a water level trend (i.e. 0 supporting "data points") . Many of those areas present other obstacles to groundwater development.

Cheers,
Ben

Groundwater Resource Concerns



OREGON
WATER RESOURCES DEPARTMENT

The concern ratings shown on this map reflect the sustainability and restrictions associated with expanded consum of groundwater in a given area. They are not a substitute for a review of a groundwater application to determine availability of water for a specific use. Users of this information should consult the primary report and data to ascert the usability of the information. This map may not be suitable for legal, engineering, or surveying purposes.
OWRD Groundwater Section, 4/20/2021. Projection: Oregon Lambert NAD 83 (EPSG #2992).

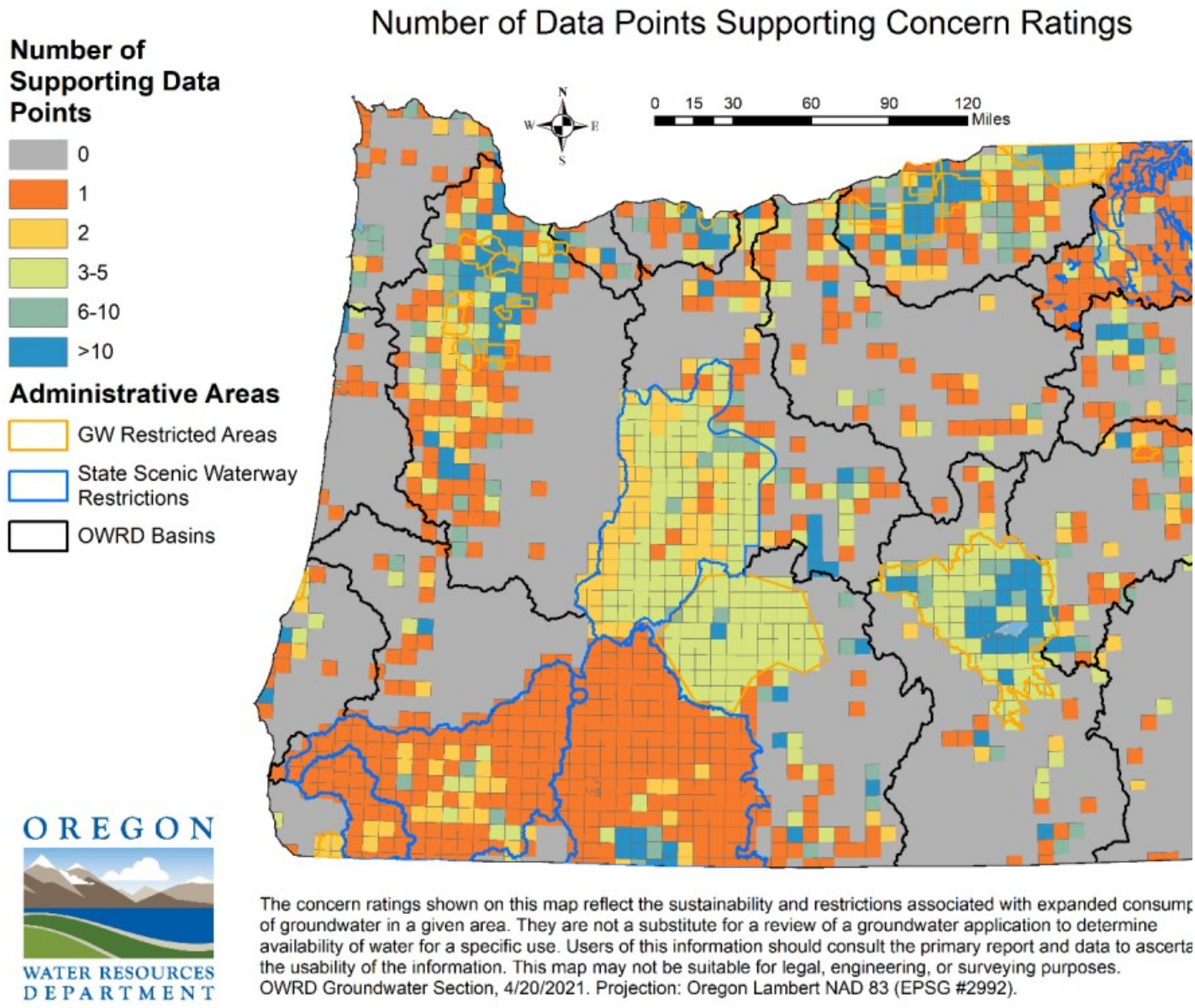


Figure 14: Number of data points supporting the concern rating in each Township.

From: Jaeger, William K <wjaeger@oregonstate.edu>
Sent: Friday, May 12, 2023 2:10 PM
To: SCANDELLA Benjamin P * WRD <Benjamin.P.Scandella@oregon.gov>
Subject: Follow up question about groundwater RAC and data

Hi Ben,

Following our meeting Wednesday, I went back and dug up our prior exchange from a couple of years ago. Not surprisingly it was about well data for a research project we are (still) working on.

In my follow-up notes for the RAC, one point I will make is that there are some techniques developed in econometrics over the past 20 years or so that seem to me to be very well suited for this kind of data and the question being asked, and also that they are very powerful tools for the kind of question being asked. We refer to these approaches as involving "panel data" (where you follow a set of the same units (in this case wells) over time, so you have not just cross-section and time-series data, but you have the same 'individuals' (units) in each period). In this case,

however, you would also have the ability to use 'spatial econometrics' meaning using methods that recognize and take account of spatial relationships/proximity among units in the data. I'm curious enough about this to see if I can get a colleague or grad student to think more about how these tools might be applied to this case. It is interesting.

Am I right that the data that would be used to determine when a decline begins, is the same data that you referenced below, the Groundwater Information System? Following your directions in 2021, we downloaded a set of those data, and came up with 109,000 observations by well/month/year. I'm assuming the data for what you are proposing is the full data set, but probably not the 50-year-old data. So am I right that for many areas you would have good long time series data for water levels, but in other areas quite sparse data?

Bill

From: SCANDELLA Benjamin P * WRD <Benjamin.P.Scandella@oregon.gov>
Sent: Thursday, July 15, 2021 3:28 PM
To: Jaeger, William <jaegerw@oregonstate.edu>
Subject: RE: WARS data request follow-up

[This email originated from outside of OSU. Use caution with links and attachments.]

Fantastic, thanks Bill!
Ben

From: Jaeger, William <jaegerw@oregonstate.edu>
Sent: Thursday, July 15, 2021 3:26 PM
To: SCANDELLA Benjamin P * WRD <Benjamin.P.Scandella@oregon.gov>
Subject: Re: WARS data request follow-up

Ben,

Sure. Here it is. I'll include the other main pub from the WW2100 project as well.

Bill

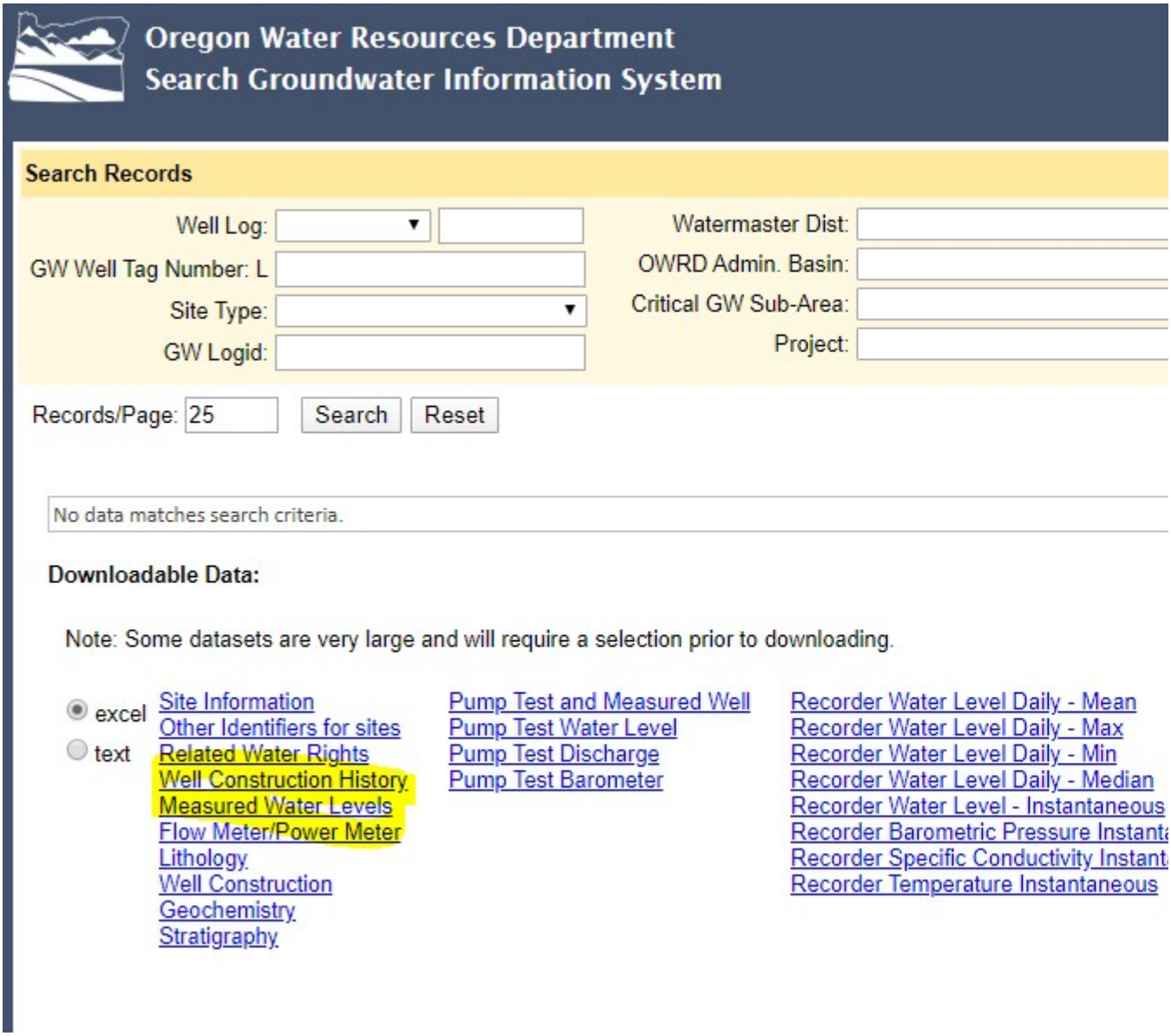
On 7/15/2021 2:55 PM, SCANDELLA Benjamin P * WRD wrote:

> [This email originated from outside of OSU. Use caution with links and attachments.]
>
> P.S. Are you able to send me a PDF of your 2019 Nature Sustainability paper on drought management?
>
> ---
>
> **From:** SCANDELLA Benjamin P * WRD
> **Sent:** Tuesday, July 13, 2021 12:32 PM
> **To:** Jaeger, William K <jaegerw@oregonstate.edu>; BEAMER Jordan P * WRD <Jordan.P.Beamer@oregon.gov>
> **Subject:** RE: WARS data request follow-up
>
> Hi Bill,

Nice chatting with you today!

You can get to our water level data through the Groundwater Information System. Under the "Search for a groundwater site" link, you'll see a bunch of hyperlinks at the bottom of the page. You'll definitely want to grab one of the GIS files, as well as the manually "Measured Water Levels" (as opposed to "Recorder Water Levels", which refer to transducer data). As I mentioned, they can be joined on gw_site_id or gw_logid. If you click the links without searching for any wells, then it downloads the entire dataset for all wells. As we discussed, I'd recommend grabbing for each well:

1. Look for water levels with near_static = 1, which reflects a combination of assumptions and/or human review of water levels for whether they represent static conditions in the aquifer, as opposed to pumping influence. I noticed that we don't actually publish these near-static values at the moment in the downloads, and our IT department is swamped right now, so I'll send you the data when you're ready for them. In the absence of those data, I'd filter out any with measurement_status_desc other than 'STATIC' or 'UNKNOWN'.
2. First, look for spring high measurements among all those measured between January and April each year. These should be available in many wells during the time range of interest.
3. Then, look for summer (June through October?) lows to estimate seasonal swings in wells that have such data. Maybe those swings will be negligible to pumping costs, but it's worth a quick check.
4. Look at both the water level below land surface and water level elevation, because I imagine that elevations will be more reliably aggregated than depths in areas with steep slopes. Mapping up the values may help you see which ones are more homogeneous.
5. Some wells have experienced significant declines over the past 25 years, so you'll need to decide how you want to deal with those changes.
6. In case there are some areas with significant water level variability that can be attribute to different aquifer systems (thinking the middle of the Willamette valley, with sedimentary and basalt aquifers), you could stratify the data by aquifer system. Those data are available in the "Well Construction History" download, again tied by gw_site_id or gw_logid. Not that a well may have multiple well logs representing first drilling, alterations, and abandonments, so there may be many well construction history records for every well. They may even have different aquifer systems. I believe that our best assessment of the most current aquifer system is indicated in the GIS downloads.



The groundwater restricted areas are mapped here and listed here.

It turns out we're both right about the calls database. We do have one, but we only began populating it in 2018, so I don't think it would be useful for your project.

Best,
Ben

From: SCANDELLA Benjamin P * WRD
Sent: Friday, July 09, 2021 12:56 PM
To: Jaeger, William K <jaegerw@oregonstate.edu>; BEAMER Jordan P * WRD <Jordan.P.Beamer@oregon.gov>
Subject: RE: WARS data request follow-up

Yep, that time and zoom both work fine.

Haha, don't get your hopes up; I don't think either of those other risks are easy to estimate. Just that your project reminded me of the recent papers on a nationwide analysis of wells and water levels (attached).

Have a great weekend!
Ben

From: Jaeger, William K <jaegerw@oregonstate.edu>
Sent: Friday, July 09, 2021 12:43 PM
To: SCANDELLA Benjamin P * WRD <Benjamin.P.Scandella@oregon.gov>; BEAMER Jordan P * WRD <Jordan.P.Beamer@oregon.gov>
Subject: Re: WARS data request follow-up

Hi Ben,

Great. Yes, let's talk next Tuesday. How is 11AM?

It would be great to incorporate the risk of groundwater users being shutoff, or well going dry. I'll look forward to your thoughts on what kind of estimate or proxy we might use for that.

If zoom works, I can send you a link.

Bill

On 7/9/2021 11:34 AM, SCANDELLA Benjamin P * WRD wrote:

> [This email originated from outside of OSU. Use caution with links and attachments.]
>
> Hi Bill,
>
> Nice to meet you! I'm interested to read what you and your colleagues find.
>
> Food for thought: are you also considering the risk of groundwater users being shut off or wells going dry?
>
> Depth to groundwater is complicated in many parts of Oregon by the presence of multiple poorly-connected aquifers such that there may be multiple relevant water depths at a given location. In addition, water levels may drop significantly over the course of the irrigation season, so that pumping costs may vary. Still, we do have a reasonable amount of groundwater level data in areas with significant irrigation such that you can probably make some reasonable estimates, and I'd be happy to chat about it. How about next Tuesday after 10am, Thursday after 2:30pm, or Friday before 4pm?
>
> Cheers,
> Ben
>
> *Ben Scandella, PhD, GIT*
> Groundwater Data Chief
> 725 Summer Street NE, Suite A Salem, OR 97301 | 503-437-5231| Pronouns: he, him

From: Jaeger, William K <jaegerw@oregonstate.edu>
Sent: Friday, July 09, 2021 7:13 AM
To: BEAMER Jordan P * WRD <Jordan.P.Beamer@oregon.gov>; SCANDELLA Benjamin P * WRD <Benjamin.P.Scandella@oregon.gov>
Subject: Re: WARS data request follow-up

Jordon: great. Thanks. Talk to you on Tuesday.

Hi Ben: I'm an economist at OSU, working with several colleagues on an empirical analysis of how water rights affect the value of farmland throughout the state of Oregon.

We've compiled a large dataset with about 30,000 sales of farmland, and we have a range of land and climatic characteristics. For the surface water rights, we're looking to see if there is evidence that a senior water right has more value than a junior water right, but of course this should only be the case in basins where there is a risk of being shutoff (or that is our hypothesis). In the case of groundwater rights, aside from land and climate characteristics, the depth to groundwater is going to affect the economics of irrigating. We don't expect to have well depth for thousands of parcels, but I'm wondering if there are any estimates of average depth to groundwater at some spatial resolution across the state? Even something at the county or HUC-6 or HUC-8 would be useful for our purposes. What kind of information is available about depth to groundwater across the state?

If you'd prefer to talk about this, let me know when would be a good time to talk.

Thanks.

Bill

On 7/9/2021 6:53 AM, BEAMER Jordan P * WRD wrote:

> [This email originated from outside of OSU. Use caution with links and attachments.]
>
> Hi Bill,
>
> Next Tuesday at 3 pm works for me to meet. For groundwater data, I'd suggest we loop in Ben Scandella (cc'd), the GW data chief.

Best,
Jordan

From: Jaeger, William K <jaegerw@oregonstate.edu>
Sent: Thursday, July 08, 2021 4:36 PM
To: BEAMER Jordan P * WRD <Jordan.P.Beamer@oregon.gov>
Cc: WRD_DL_wateravailability
<WRD_DL_wateravailability@oregon.gov>
Subject: Re: WARS data request follow-up

Jordon,

This all looks great. Thanks for all the great information. I had looked some at the Cooper paper, but only after sending you my questions.

Yes, a call would be good. Now about next Tuesday afternoon? 3PM?

One question that perhaps you can answer now. We are also wanting to get information about groundwater rights and resources. For example, are there estimates by basin for the average depth to groundwater? Who should I contact about that information?

Bill

On 7/7/2021 3:56 PM, BEAMER Jordan P * WRD wrote:

> [This email originated from outside of OSU. Use caution with links and attachments.]
>
> Good afternoon Bill,
>
> Thank you for sending along the questions, we can definitely get you the WA data we have available and clarify details about WARS. This week is busy, it would be great to set up a call to discuss some of your team's questions. I'm available next Mon-Thurs if a time worked then for you. I'd also suggest reviewing the Cooper 2002 paper discussing the WARS methods and data to help answer some of the questions. I took a quick stab at your questions below, in red.
>
> Best,
> Jordan
>
> Jordan P. Beamer, PhD, RG
> Hydrologist | Surface Water Section
> 725 Summer St NE Suite A | Salem OR 97301
> Mobile: 971-707-1964 | jordan.p.beamer@oregon.gov
> Pronouns: he/him/his

Integrity | Service | Technical Excellence | Teamwork | Forward-Looking

---

From: Jaeger, William K <jaegerw@oregonstate.edu>
Sent: Monday, June 28, 2021 9:58 AM
To: BEAMER Jordan P * WRD <Jordan.P.Beamer@oregon.gov>
Cc: WRD_DL_wateravailability <WRD_DL_wateravailability@oregon.gov>
Subject: Re: WARS data request follow-up

Hi Jordan,

Thanks for following up. I didn't get a chance to put together that email over the weekend, but I'll do so here, and copy it to the WRD_DL_wateravailability email.

(For the record, I sent an email to them before talking to you last week, but did not include much detail. Here is a fuller description of what we are requesting.)

For a research project on the economics of irrigated agriculture in Oregon (and with relevance beyond Oregon), we are compiling a dataset with farm economics data, land characteristics, land sales data, climate, etc. To take account of the relative value of a senior water right versus a junior water right, we need some measure of the amount of water available, how often it may be scarce (shut off), and where a particular water right holder would be ranked based on their seniority versus other water rights in the basin, and the general availability of water in that basin. So here is what we need:

1. We'd like to have the shape files that describe the boundaries of each WAB. We are hopeful that these boundaries will correspond to some degree with boundaries of HUC-8 or other levels of resolution. It would be useful to know that as well, although we have those shape files and will be able to see that correspondence. We can provide the WAB boundaries where water availability analyses are available. I'm not sure we've done a comparison of how many line up with HUC boundaries, but will check with GIS folks.

2. Within each WAB, there is a point at which the water availability is calculated. Perhaps this is always at the most downstream point in the WAB. It would be very helpful to have this information, and if possible to have these identified in the shape files as well. The WA analysis is completed at the WAB outlet, and the latitude/longitude of that location is provided as a watershed characteristic (as well as other watershed characteristics), so should be fairly easy to extract those points.

3. We'd like to have all the monthly data for calculating the water availability (natural stream flow, consumptive use and storage, expected stream flow, reserved stream flow, instream flow requirement, and net water availability). This would include the calculations on 'detailed report on consumptive uses and storage', and instream flow requirements. There are some instream flow 'requirements' in the Willamette Basin that have not been "converted" to certified water rights yet; are those accounted for? This would be for all basins? I'll have to check with my colleague on whether we have all that information readily available, and get back to you. Yes the minimum flows (MFs) in the Willamette have been entered as instream requirements in the affected WABs.

4. These water availability metrics are reported at the 50% and 80% exceedance levels. Are they calculated for other levels in the probability distribution? If there are calculations of other frequencies (30%, for example) that would provide additional information for purposes of estimating the risk of shortage. We have other exceedance flows (5%-95%) calculated only at specific gaged WABs but only 50% and 80% for all ungaged WABs. The 80% exceedance standard is used for evaluating new applications for live flow allocation, and is based on the definition of over-appropriation (11(a)) from https://oregon.public.law/rules/oar_690-400-0010. The 50% exceedance analyses is used for evaluating storage applications.

5. Related to the previous question, presumably the frequency distributions are based on historical measures of stream flow in each basin. Is there documentation that we can have so we can explain the basis for estimation of the probability distributions (presumable data on actual flows over a period of years, that are then used to estimate the natural stream flow probability distribution -- is that correct?). What period of years are used to estimate those distributions of flows? The base period used for the natural streamflow

(gaged and ungaged) is the 30-year period 1958-1987. There is an explanation of how that was selected in the Cooper 2002 report. The gaged flows were combined with watershed characteristics to develop regional regression equations to predict natural streamflow in ungaged basins.

6. The other components of the estimation are presumably updated when there are changes in the water rights situation. For example, when a new water right is certified in year T, does the WAB estimate reflect that starting in year T? Are there adjustments to keep the information current? If so, how often? And if this is the case, would it be possible to get older versions of the WAB data? We are looking at farmland sales prices over a 25 year period, so it would be relevant to have information on water availability on or near the time of the sale. This may be data intensive to pull together archival data. But if estimates every 5 or 10 years were possible, that would be helpful. Do these values change much over a decade in most basins? This is one that may require more explanation. So water rights after 1992 (when water allocation policy adopted) are entered into WARS individually and tracked in the database. So they are entered as they some are submitted. For water rights before 1992 they had to summarize or lump them together to get an estimate of existing uses in the WABs. Unfortunately we don't provide a what-if scenario to look back in time at historical water availability, only the current snapshot to be used in the review of new applications.

7. I know that in some parts of the state there are water rights that are still "on the books" but have been abandoned or simply not used (even though they have not been reclaimed by the State). How are those treated? For example, in the Willamette Basin, some water rights for irrigation are not used, or land owners don't even know there is a water right on a piece of land they own. I'm guessing these are still 'counted' in the demands on water. There are also some large water rights for timber mills, fish hatcheries, and private hydro, but these are not consumptive uses, so they would not really affect water availability, right? For tracking out-of-stream consumptive uses and storage the main categories are: irrigation, municipal, de minumus (industrial, commercial, domestic, livestock, agricultural), and storage rights. The non-consumptive use types are not tracked. If the applicable water right is tracked in the water rights data base then it is included in the evaluation. The model does however account for

the fact that not all water rights are being used to the full acreage and duty.

8. One related factor we will need to pay attention to is the distinction between areas where water rights have been adjudicated and where they have not been adjudicated. Does this distinction affect your calculations of water availability? Do you have detailed information on which WAB or HUCs are adjudicated or not? If not, can you point me in the direction of a person who could provide this information (which would also be necessary to distinguish by year of implementation, e.g., in the Klamath Basin). This is one we need to do a little research on and get back to you. The map below appears to be from 2003 so looking for an updated version. There's no mention of adjudication in Cooper 2002 that we could find. https://www.oregon.gov/owrd/programs/WaterRights/Adjudications/Documents/Adjudicated_Areas.pdf

9. Is there any way that you take account of groundwater/surface water interconnections in terms of availability? I know this has been an important issue in the Deschutes and I believe also in the Klamath? Are there return flows from groundwater extraction that add significantly to surface water availability? New groundwater rights with potential for substantial interference determined by the GW section are entered into WARS and debited from WA. There is also a tracking tool for tracking SW and GW uses within and above state scenic waterways. We don't track additional returns associated with pumped GW but that is certainly a question for future evaluation after we have a more complete picture of the GW budgets across the state.

10. Do you estimate return flows from irrigation and/or other uses, in your calculations? As you know, those can be high in some streams and zero in others (when an irrigation district is not near the river). For out-of-stream uses in a WAB only the consumptive portion of the water right is subtracted, the remaining portion assumed to return or left in stream. For out-of-basin diversions are assumed to be 100% consumptive (full diversion rate subtracted).

11. Are return flows by irrigation technology taken account of (flood versus drip versus sprinkler)? No, only consumptive portion of the water right subtracted.

12. When you consider water that is appropriated for irrigation (for example), due to an irrigation water right, how to you compute the amount of water that is no longer 'available'? Presumably you do not use the rate or duty on the "paper water right." Your table headings refer to 'consumptive uses'. Do you calculate the monthly consumptive use taking account of the crops grown, and the irrigation technology being used? If so, is there documentation on these calculations. There is documentation in Cooper 2002 of how the consumptive uses were estimated and the data used. Most were based on USGS water use reports from the 1990's and AG census surveys, with CU values lumped to HUC8 watersheds.

I know this is a long list of questions and requests. There may be a few more questions that we have. If it would be helpful to discuss again on the phone, please let me know.

Thanks for your help with this.

Sincerely,

Bill Jaeger

Oregon State University

Department of Applied Economics

On 6/28/2021 8:02 AM, BEAMER Jordan P * WRD wrote:

> [This email originated from outside of OSU. Use caution with links and attachments.]
>
> Good morning Dr. Jaeger,
>
> I wanted to follow-up with your call last week regarding OWRD's Water Availability information to let you know that I have not received the email you sent requesting data. You may try re-sending and cc'ing me.
>
> Best,
> Jordan

Jordan P. Beamer, PhD, RG
Hydrologist | Surface Water Section
725 Summer St NE Suite A | Salem OR 97301
Mobile: 971-707-1964 |
jordan.p.beamer@oregon.gov
Pronouns: he/him/his

Integrity | Service | Technical Excellence | Teamwork | Forward-Looking

--
William K Jaeger
Professor
Department of Applied Economics
213 Ballard Extension Hall
Oregon State University
Corvallis, Oregon 97331
541.737.1419 (phone)
541.737.2563 (fax)
wjaeger@oregonstate.edu

--
William K Jaeger
Professor
Department of Applied Economics
213 Ballard Extension Hall
Oregon State University
Corvallis, Oregon 97331
541.737.1419 (phone)
541.737.2563 (fax)
wjaeger@oregonstate.edu

--
William K Jaeger
Professor
Department of Applied Economics
213 Ballard Extension Hall
Oregon State University
Corvallis, Oregon 97331
541.737.1419 (phone)
541.737.2563 (fax)
wjaeger@oregonstate.edu

--
William K Jaeger
Professor
Department of Applied Economics
213 Ballard Extension Hall
Oregon State University
Corvallis, Oregon 97331
541.737.1419 (phone)
541.737.2563 (fax)
wjaeger@oregonstate.edu

--
William K Jaeger
Professor
Department of Applied Economics
213 Ballard Extension Hall
Oregon State University
Corvallis, Oregon 97331
541.737.1419 (phone)
541.737.2563 (fax)
wjaeger@oregonstate.edu

HARTT Laura A * WRD

From: Adam Sussman <asussman@gsiws.com>
Sent: Monday, May 22, 2023 3:13 PM
To: LIEBE Annette I * WRD; IVERSON Justin T * WRD; HARTT Laura A * WRD
Subject: GW RAC - thoughts....
Attachments: Reasonably Stable Groundwater Levels_5_19_2023_COCO.docx

Hi Annette, Justin, and Laura:

Based on the last e-mail from Laura sounds like you are going to spend some time going back to the drawing board on the Division 300, 400 and 8 draft rules. As you do so I wanted to provide you some food for thought, which may clarify what I was saying at the last RAC meeting.

I should note that COCO continues to be concerned about the overall direction of the rules and the reliance on water levels as a proxy to understanding groundwater sustainability. Putting an arbitrary time limit on how long a decline is "reasonable" ignores the many reasons the hydraulic head in a groundwater system may be changing. This aside, I have attached a concept that can be incorporated into a definition of "Reasonably Stable Groundwater Levels." This concept defines the term as a percent of thickness of certain groundwater reservoirs that can removed, regardless of rate. (See attached). Also, still lots of other questions about the Department's current draft definition that I have not marked up or discussed.

I understand from Annette at the last meeting that the definition of "Declining Groundwater Levels" is going to be dropped (which I support) so I have not addressed that and understand that eliminating that definition will require several related changes to the rules.

I would be happy to discuss further.

Sincerely,

Adam

Adam Sussman
Principal Water Resources Consultant
direct: 541.257.9001 | mobile: 541.602.5188
1600 SW Western Boulevard, Suite 240, Corvallis, OR 97333
GSI Water Solutions, Inc. | www.gsiws.com

"Reasonably Stable Groundwater Levels" means that, for a well:

(a) The representative annual high water level for the year under evaluation either meets (A) and (B) OR it meets (C):

(A) indicates an average rate of decline in representative annual high water levels of less than 0.5 feet per year over any immediately preceding averaging period between 5 and 20 years; **and**

(B) is less than 25 feet deeper than the first measured representative annual high water level**; or** ~~. If the Department determines the preceding water level data in nearby well accessing the same aquifer are sufficient to establish the water level elevation as it would have existed earlier in the subject well, then that water level may be used to represent the annual high water level.~~

~~(B)~~(C) for aquifers that can be ascertained or reasonably inferred to have a saturated thickness of 500 feet or greater, the representative high water level is 15 percent or less than the saturated thickness of the subject groundwater reservoir.

(b)~~.~~ If the Department determines the preceding water level data in a nearby well accessing the same aquifer are sufficient to establish the water level elevation as it would have existed earlier in the subject well, then that water level may be used to represent the annual high water level.

(c) In the absence of more recent data, a finding of reasonable stability may be presumed to persist for a maximum if five years.

(d) ~~This definition may be superseded by a basin program rule adopted pursuant to the Commission's authority in ORS 536.300 and 536.310, but such definition may not indicate reasonably stable groundwater levels when they would not be indicated by this statewide rule. A superseding definition must also be consistent with the superseding definition od "Declining Groundwater Levels: in OAR 690-008-0001(5) such that water levels cannot simultaneously be both reasonably stable and declining.~~

HARTT Laura A * WRD

From: Lisa Brown <lisa@waterwatch.org>
Sent: Monday, May 15, 2023 4:46 PM
To: HARTT Laura A * WRD; LIEBE Annette I * WRD; IVERSON Justin T * WRD
Subject: Groundwater Allocation RAC - initial WaterWatch comments re: Div. 8
Attachments: Div 8 Updated (051023)_limited initial WW comments.docx

Hi,
I wanted to get a few comments in regarding the Div. 8 draft rules following up from the 5-10 meeting. I will likely file additional comments after the 5-31 meeting, per the recent email extending the deadline, but thought I'd send these few in now.

Let me know if there are any questions. Thank you.

Best,
Lisa Brown
WaterWatch of Oregon
O: 503.295.4039 x102

Water Resources Department
Chapter 690
Division 8

STATUTORY GROUND WATER TERMS

690-008-0001
Definition and Policy Statements

A number of terms are used in the statutes, ORS 537.505–537.795, prescribing the management of ground water in Oregon. These rules define terms to qualify and clarify the statutes. In all statutes and rules employed in the management of ground water by the Water Resources Department and Commission, the following definitions shall apply, unless the context requires otherwise:

(1) "Aquifer" means a geologic formation, group of formations, or part of a formation that contains saturated and permeable material capable of transmitting water in sufficient quantity to supply wells or springs and that contains water that is similar throughout in characteristics such as potentiometric head, chemistry, and temperature~~a water-bearing body of naturally occurring earth materials that is sufficiently permeable to yield useable quantities of water to wells and/or springs~~.

(2) "Critical Ground Water Area Boundary" means a line established in a critical ground water area order on a map that surrounds an area in which one or more of the statutory criteria for critical area declaration are met and which is located either:

(a) Physically by coincidence with natural features such as ground water reservoir boundaries, hydrologic barriers, or recharge or discharge boundaries; or

(b) Administratively by surrounding an affected area when that area does not coincide with an area bounded by natural features.

(3) "Customary Quantity" means the rate or annual amount of appropriation or diversion of water ordinarily used by an appropriator within the terms of that appropriator's water right.

(4) "Declined Excessively" means any cumulative lowering of the water levels in a ground water reservoir or a part thereof which:

(a) Precludes, or could preclude, the perpetual use of the reservoir; or

(b) Exceeds the economic pumping level; or

(c) Constitutes a decline determined to be interfering with:

(A) A surface water diversion having a priority date senior to the priority dates of the causative ground water appropriations; or

(B) A surface water body that has been administratively withdrawn with an effective date senior to the priority dates of the causative ground water appropriations unless the causative ground water appropriations are for uses that are exceptions to the withdrawals; or

(C) An adopted minimum stream flow or instream water right, or closure having an effective date senior to the priority dates of the causative ground water appropriations; or

(D)) A surface water body which has a classification that is senior to the priority date of the causative ground water appropriation(s) and the use or uses to which the ground water is being put are not included in the classification.

(d) Constitutes a lowering of the annual high water level within a ground water reservoir, or part thereof, greater than 50 feet below the highest known water level; or

(e) Results in ground water pollution; or

(f) Constitutes a lowering of the annual high water level greater than 15% of the greatest known saturated thickness of the ground water reservoir. the saturated thickness shall be calculated using pre-development water levels and the bottom of the ground water reservoir, or the economic pumping level, whichever is shallower.

(5) "Declining Groundwater Levels" means that, for a well:

(a) The representative annual high water level for the year under evaluation:

(A)indicates an average rate of decline in representative annual high water levels of at least 0.5 foot feet per year over all immediately preceding averaging periods between 5 and 20 years that can be evaluated; or

(B)is at least 25 feet deeper than the first measured representative annual high water level. If Department determines that preceding water level data in nearby wells accessing the same aquifer are sufficient to establish the water level elevation as it would have existed earlier in the subject well, then that water level may be used to represent the annual high water level.

(b)In the absence of more recent data, a finding of declining water levels may be presumed to persist for a maximum of 5 years if based on the average rate of decline as in (a)(A) above, or indefinitely if based on decline from the first measurement, as described in (a)(B) above.

(c)This definition may be superseded by a basin program rule adopted pursuant to the Commission's authority in ORS 536.300 and 536.310, but such a definition must also indicate declining groundwater levels whenever they would be indicated by this statewide rule. A superseding definition must also be consistent with the superseding definition of "Reasonably Stable Water levels" in OAR 690-008-0001(10) such that water levels cannot simultaneously be both reasonably stable and declining.

Commented [LB1]: Following up on the 5-10 meeting, I offer two comments about this provision:

1. 25 feet seems high as a way to define reasonably stable or declining groundwater levels. For example, it seems that a decline of 25 feet in a domestic well would strike one as declining long before it hit 25. I would suggest 10.

2. I do not think this should be defined in relation to the depth/thickness of an aquifer, as was suggested at the 5-10 meeting.

First, that doesn't make sense given the term that is being defined. A decline is not less of a decline just because the aquifer is deeper.

Second, often the depth of the aquifer is unknown, so it using the depth as a standard would set up an impossible standard.

Third, using a percentage instead of a depth in feet will fail to protect domestic well owners, springs, surface water users, etc. Dropping an aquifer more than 25' just because it is deeper will not be protective of the public welfare, safety and health, nor would it protect "adequate and safe supplies of ground water for human consumption" (ORS 537.525(5)). It would not fulfill the statutory policy of the Groundwater Act.

(~~5~~6) “Economic Pumping Level” means the level below land surface at which the per-acre cost of pumping equals 70 percent of the net increase in annual per-acre value derived by irrigating. (The value is to be calculated on a five year running average of the per-acre value of the three, if there are that many, prevalent irrigated crops in the region minus the five year running average of the per-acre value of the three, if there are that many, prevalent regional non-irrigated crops.)

(~~6~~7) “Excessively Declining Water Levels” (Note: “Excessively” as used in ORS 537.730(1)(a) is taken to modify both “are declining” and “have declined”) means any ongoing lowering of the water level in a ground water reservoir or part thereof which:

(a) Precludes, or could preclude, the perpetual us of the reservoir; or

(b) Represents an average downward trend of three or more feet per year for at least 10 years; or

(c) Represents, over a five year period, an average annual lowering of the water level by 1% or more of the initial saturated thickness as determined by observation or investigation in the affected area; or

(d) Results in water quality deterioration.

(~~7~~9) “~~Overdraw~~Excessively deplete” , “excessively depleted~~overdrawn~~”, or “excessively depleting~~o verdrawing~~” means to pump or otherwise extract groundwater from an aquifer, groundwater reservoir, or part thereof when~~artificially produce water, in any one year period, from a ground water reservoir, or part thereof, at an annual rate that~~:

(a)One or more representative wells exhibit declining groundwater levels as per OAR 690-008-0001(5)~~Exceeds the average annual recharge to that ground water supply over the period of record~~; or,

(b) The use of groundwater by existing water rights substantially interferes with surface water sources as per OAR 690-008-0001(8)(a)~~Reduces surface water availability resulting in:~~

~~(A)One or more senior appropriators being unable to use either their permitted or customary quantity of surface water, whichever is less; or~~

~~(B)Failure to satisfy an adopted minimum streamflow or instream water right with an effective date senior to the causative ground water appropriation(s).~~

(c)~~Reduces the availability of surface waters that have been:~~

~~(A)Withdrawn with an effective date senior to the priority dates of the causative ground water appropriations; or~~

~~(B)Restrictively classified with an effective date senior to the priority date(s) of the causative ground water appropriations.~~

~~(10)~~ (8) “Impairment”, “impair”, “substantial interference”, “substantially interfere”, “undue interference”, or “unduly interfere” ~~“Substantial or Undue Interference”~~ means the spreading of the

cone of depression of a well to intersect a surface water ~~body~~ source or another well, or the reduction

of the ground water gradient and flow as a result of pumping or otherwise extracting groundwater from an aquifer, which contributes to:

(a) Depletion of a surface water source ~~A reduction in surface water availability to an extent~~ that:

(A) is already over-appropriated during any period of the year; or

(B)is administratively or statutorily withdrawn; or

(C)is restrictively classified; or

(D)is the source for o~~O~~ne or more ~~senior~~ existing surface water ~~appropriators~~ rights ~~are unable to use either their permitted or customary quantity of water, whichever is less~~ that have been regulated off due to insufficient supply to satisfy senior surface water rights or is subject to a rotation agreement to address limited surface water supplies; or

(E~~B~~) ~~An adopted~~ has a minimum perennial streamflow or instream water right ~~with an effective date senior to the causative ground water appropriation(s) cannot be satisfied~~ that is unmet during any period of the year.

(b) The ground water level being drawn down to the eco`nomic level of the senior appropriator(s); or

(c) One or more of the senior ground water appropriators being unable to obtain either the permitted or the customary quantity of ground water, whichever is less, from a reasonably efficient well that fully penetrates the aquifer where the aquifer is relatively uniformly permeable. However, in aquifers where flow is predominantly through fractures, full penetration may not be required as a condition of substantial or undue interference.

(10) "Reasonably Stable Groundwater Levels" means that, for a well:

(a) The representative annual high water level for the year under evaluation:

(A) indicates an average rate of decline in representative annual high water levels of less than 0.5 feet per year over any immediately preceding averaging period between 5 and 20 years; and

(B) is less than 25 feet deeper than the first measured representative annual high water level. If the Department determines that preceding water level data in nearby wells accessing the same aquifer are sufficient to establish the water level elevation as it would have existed earlier in the subject well, then that water level may be used to represent the annual high water level.

(b)In the absence of more recent data, a finding of reasonable stability may be presumed to persist for a maximum of 5 years.

(c)This definition may be superseded by a basin program rule adopted pursuant to the Commission's authority in ORS 536.300 and 536.310, but such a definition may not indicate reasonably stable groundwater levels when they would not be indicated by this statewide rule. A superseding definition

Commented [LB2]: Same comment as on definition of "declining groundwater levels" -

Following up on the 5-10 meeting, I offer two comments about this provision:

1. 25 feet seems high as a way to define reasonably stable or declining groundwater levels. For example, it seems that a decline of 25 feet in a domestic well would strike one as declining long before it hit 25. I would suggest 10.

2. I do not think this should be defined in relation to the depth/thickness of an aquifer, as was suggested at the 5-10 meeting.

First, that doesn't make sense given the term that is being defined. A decline is not less of a decline just because the aquifer is deeper.

Second, often the depth of the aquifer is unknown, so it using the depth as a standard would set up an impossible standard.

Third, using a percentage instead of a depth in feet will fail to protect domestic well owners, springs, surface water users, etc. Dropping an aquifer more than 25' just because it is deeper will not be protective of the public welfare, safety and health, nor would it protect "adequate and safe supplies of ground water for human consumption" (ORS 537.525(5)). It would not fulfill the statutory policy of the Groundwater Act.

must also be consistent with the superseding definition of "Declining Groundwater Levels" in OAR 690-008-0001(5) such that water levels cannot simultaneously be both reasonably stable and declining.

(~~9~~11) "Substantial Thermal Alteration" means any change in water temperature of a groundwater reservoir, or a part thereof, which:

(a) Precludes, or could preclude, the perpetual heating or cooling use of the groundwater reservoir; or

(b) Constitutes a change in the mean annual temperature within a groundwater reservoir, or part thereof, greater than 25 percent of the highest recorded naturally occurring Celsius (C) temperature.

(~~10~~12) "Substantial Thermal Interference" means the spreading of the radius of thermal impact of a low-temperature geothermal production well or low-temperature geothermal injection well to intersect a surface water body or another well, or the reduction of temperature or heat flow as a result of pumping or injection, which contributes to change in groundwater or surface water temperature to an extent that one or more senior appropriators of the low-temperature resource are unable to use water for the purpose(s) designated in the associated water right.

(~~11~~13) "Wasteful Use (of ground water)" means any artificial discharge or withdrawal~~n~~ of ground water from an aquifer that is not put to a beneficial use described in a permit or water right, including leakage from one aquifer to another aquifer within a well bore.

Statutory/Other Authority: ORS 537

History:

WRD 18-1990, f. & cert. ef. 12-14-90

WRD 21-1988, f. & cert. ef. 12-14-88