OREGON
WATER RESOURCES DEPARTMENT

Memorandum

TO: Jason Spriet
FROM: Ben Scandella
DATE: July 30, 2025
SUBJECT: Corrected: Evaluation of Division 512 RAC Alternate PTW Scenario

A previous version of this memo, published on May 30, 2025, had an error in the caption of Table 3 that incorrectly identified the basis year as 1980. This version changes that number to the correct year, 2018.

Following the proposal of a set of Permissible Total Withdrawal (PTW) numbers by OWRD in the Division 512 RAC #14 meeting, some members of the RAC expressed concern about the quantity of reductions proposed in the Lower Blitzen-Voltage subarea when compared to the severity of groundwater level declines in that subarea. These RAC members asked the Department to investigate if there was an alternative set of PTW numbers that could achieve the goal with less curtailment in that specific subarea. A RAC member also proposed an alternate set of PTW values that the Department could test with the model. The Department analyzed the WRD Proposal and confirmed that it achieved the goal in the timeline set with the least quantity of basin-wide reductions (~35% of 2018 pumpage). The Department also ran the RAC member proposed alternate scenario and evaluated the results. The alternate scenario achieves the goal by decreasing pumpage reductions in Lower Blitzen-Voltage to 18% of 2018 modeled pumpage, increasing Northeast-Crane reductions to 45%, and increasing basin-wide reductions to ~37%. This document describes the two PTW proposals and presents the major differences between their results.

Inputs

The model was run using PTWs from the WRD Proposal and the RAC Alternate scenario, shown in Table 1. The schedule for pumpage reductions in both scenarios followed the same timing as the WRD Proposal.

Table 1: Summary of pumpage input values used for simulating the PTWs proposed by WRD and an alternate from a member of the RAC following meeting #14.

Subarea	Historic Model	WRD Proposal	RAC Alternate	WRD Proposal	RAC Alternate
Units	kaf/yr			% Reduction from 2018	
Dog Mountain	4.6	4.2	4.2	9%	9%
Lower Blitzen-Voltage	13.7	8.3	11.2	39%	18%
Northeast-Crane	53.1	35.0	29.1	34%	45%
Silver Creek	21.0	15.2	15.2	28%	28%
Silvies	24.8	21.2	21.2	15%	15%
Upper Blitzen	0.1	0.1	0.1	0%	0%
Weaver Springs	19.2	4.8	4.8	75%	75%
All	136.5	88.8	86.0	35%	37%

Results

Water Levels

Increased pumpage in Lower Blitzen-Voltage caused water levels there to decrease in the RAC Alternate scenario compared with the WRD Proposal, with the median among well-cells reaching about 2 feet lower by the end of the century (Figure 1). By the same token, reduced pumpage in the Northeast-Crane subarea caused water levels there to decline less than the WRD Proposal (Figure 2). The increasing water levels following 2040 in the RAC Alternate scenario brought median water levels about 11 feet higher than the WRD Proposal by the end of the century in Northeast-Crane. The changes in pumpage had a minor impact on water levels in the Silvies subarea, raising the median water level by about 0.3 feet by the end of the century (Figure 3).

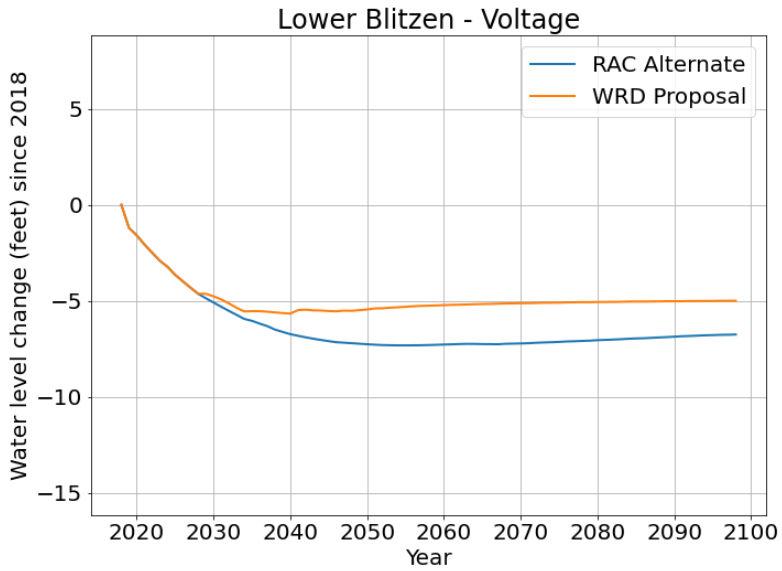

Figure 1: Median water level trajectories in the Lower Blitzen-Voltage Subarea beginning in 2018. The RAC Alternate scenario (blue) causes water levels to decline more than the WRD Proposal (orange), by about 2 feet at the end of the century.

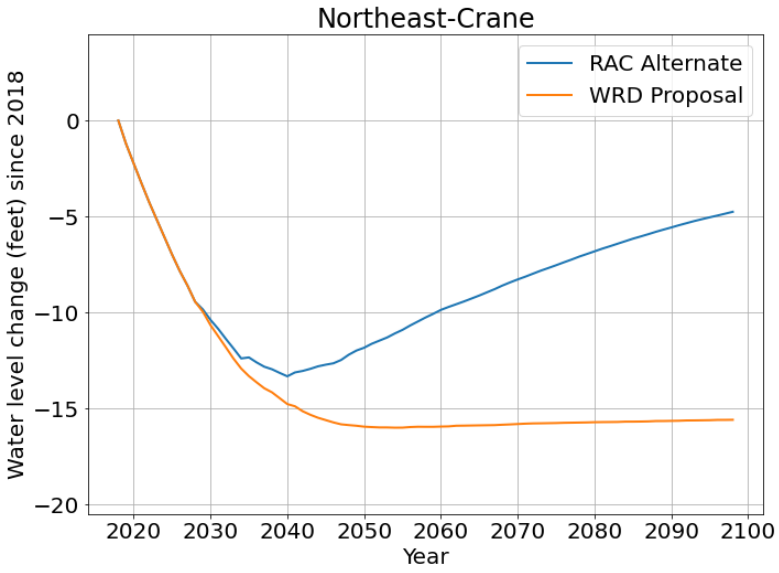

Figure 2: Median water level trajectories in the Northeast-Crane Subarea beginning in 2018. The RAC Alternate scenario (blue) causes water levels to decline less than the WRD Proposal (orange). The increasing water levels following 2040 in the RAC Alternate scenario bring water levels about 11 feet higher than the WRD Proposal by the end of the century.

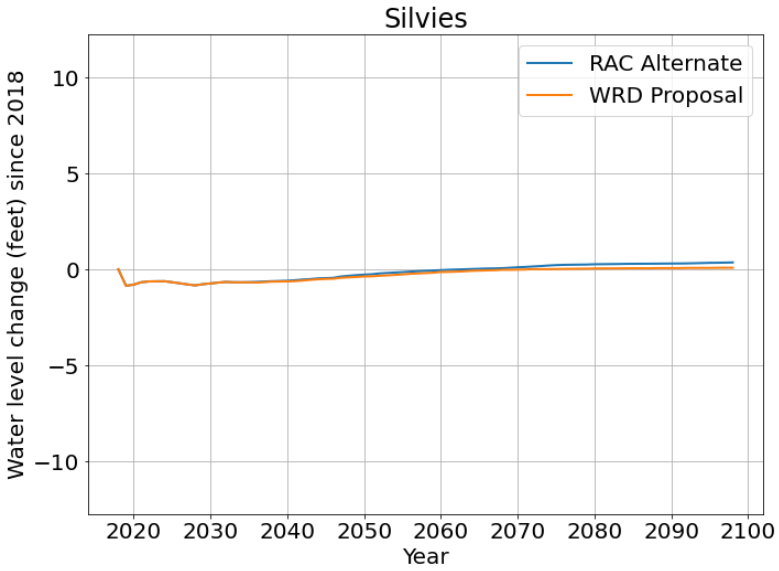

Figure 3: Median water level trajectories in the Silvies Subarea beginning in 2018. The RAC Alternate scenario (blue) causes water levels to recover compared with the WRD Proposal (orange), by about 0.3 feet at the end of the century.

Groundwater Discharge to Springs & Streams

Annual groundwater discharge to springs and streams was summarized in the lowland portions of each subarea, as shown in Table 2. The modeled discharge estimates in the year 2058 (30 years after the start of reductions) are shown alongside values in the same subareas in 1980 and 2022. Discharge numbers from 1980 presented in Table 2 are slightly larger than those presented in slide 181 of the presentation for RAC meeting #14 due to an accounting error used in development of that presentation.

Table 2: Annual groundwater discharge to springs and streams in lowland portions of each subarea, in units of kaf/yr (thousand acre-feet per year). Results are presented from 1980 under the historical pumpage scenario and 2022 under the full-pumpage (constant beginning in 2018) scenarios developed by Gingerich and others *(2024), as well as in year 2058 from the WRD Proposal and RAC Alternate scenarios.*

Subarea	Historic Model	Full Pumpage	WRD Proposal	RAC Alternate
Year	1980	2022	2058	2058
Dog Mountain	0.0	0.0	0.0	0.0
Lower Blitzen-Voltage	9.2	2.8	2.9	2.7
Northeast-Crane	4.0	2.0	2.0	2.1
Silver Creek	17.8	11.7	9.6	9.6
Silvies	8.9	3.2	3.4	3.5
Upper Blitzen	11.6	10.4	11.2	11.2
Weaver Springs	0.2	0.0	0.0	0.0
All	51.8	30.1	29.0	29.1

Comparing the discharge between the WRD Proposal and the RAC Alternate scenario, the increased pumpage in Lower Blitzen-Voltage reduced discharge to springs and streams (Table 2), as well as lowering water levels (Figure 1). On the other hand, reduced pumpage in Northeast – Crane caused discharge in springs and streams to increase. The balance of these two effects increased discharge to springs & streams in the Silvies subarea.

Natural Evapotranspiration

Annual lowland natural evapotranspiration (ET) estimates showed reduced ET in Lower-Blitzen Voltage under the RAC Alternate scenario, consistent with more pumpage and lower groundwater levels compared with the WRD Proposal (Table 3). Conversely, further-reduced pumpage in Northeast-Crane caused water levels there to rise and increase natural ET as compared with the WRD Proposal, though the overall magnitude of ET in that subarea remained smaller in 2058 as compared to 2018 values. Despite the slightly higher median water levels at the end of the century in Silvies (Figure 3), Natural ET was lower under the RAC alternate scenario than under the WRD proposal. Basin-wide, lowland natural ET was slightly lower under the RAC Alternate scenario than under the WRD Proposal.

Table 3: Annual natural evapotranspiration in lowland portions of each subarea, in units of kaf/yr. Results are presented from 2018 under the historical pumpage scenario, as well as in year 2058 from the WRD Proposal and RAC Alternate scenarios.

Subarea	Historic Model	WRD Proposal	RAC Alternate
Year	2018	2058	2058
Dog Mountain	0.3	0.2	0.2
Lower Blitzen-Voltage	4.8	4.1	3.6
Northeast-Crane	2.0	0.4	0.8
Silver Creek	17.9	14.7	14.6
Silvies	21.8	17.5	17.1
Upper Blitzen	1.5	1.5	1.6
Weaver Springs	0.7	0.6	0.6
All	49.0	38.9	38.5

Dry Wells

Domestic wells that lost access to water due to modeled water levels falling below the bottom of the well are counted in Table 4. Consistent with the lower groundwater levels in Lower Blitzen-Voltage, 3 additional wells were modeled as going dry there. Conversely, higher water levels in Northeast-Crane reduced the number of wells that went dry there by 10. All other subareas had the same number of dry wells in the year 2058 under both scenarios.

Table 4: Counts of number of domestic wells that lose access to water due to modeled water levels dropping below the bottom of the well.

Subarea	Historic Model	WRD Proposal	RAC Alternate
Year	2018	2058	2058
Dog Mountain	4	7	7
Lower Blitzen-Voltage	7	9	12
Northeast-Crane	27	46	36
Silver Creek	4	4	4
Silvies	23	25	25
Upper Blitzen	1	1	1
Weaver Springs	11	9	9
All	77	101	94

References

Gingerich, S.B., D.E. Boschmann, G.H. Grondin, and H.J. Schibel, 2024. Groundwater Model of the Harney Basin, Southeastern Oregon. U.S. Geological Survey. doi:10.3133/sir20245017.