

Comments on Water Resource Plan for Parowan Valley from meeting of December 11, 2018

Mr. Kent L. Jones, P.E.,

Utah State Engineer

Dear Mr. Jones;

These are the comments of Leon Robinson Farms, Inc., a water rights holder in the Parowan Valley. Our address is P.O. Box 733, Parowan UT 84761. We commend you for initiating this Water Resource planning process for Parowan valley. It is important that the public be informed and that you gather any information you need to exercise your statutorily defined duty (Section 73-5-15 Utah Code) to preserve the resource and protect the legal rights of all water rights holders, specifically groundwater rights in this case.

If you choose to adopt a groundwater management plan for Parowan Valley as you have proposed, your actions must be guided by three objectives:

- 1) Limit groundwater withdrawals to safe yield;
- 2) Protect the physical integrity of the aquifer; and
- 3) Protect water quality.

There will be some very dramatic changes to the water budget and important policy implications if you choose to adopt the scientific conclusions put forth in the USGS publications "Water Resources of Parowan Valley, Iron County, Utah" and "Groundwater Model of the Great Basin Carbonate and Alluvial Aquifer System Version 3.0: Incorporating Revisions in Southwestern Utah and East Central Nevada published in 2017" ("2017 USGS Groundwater Reports") as you appear to be inclined to do. The scientific conclusions contained in these reports seem reasonable to us and should be adopted by the State Engineer.

The scientific conclusions positive to the groundwater budget include:

Table 4 of the Parowan Valley 2017 USGS report shows no value for subsurface outflows to other groundwater basins. Studies from the 1940's estimated this value at 5,000 acre-feet. More recent studies have reduced this value as water table levels in Parowan Valley have declined. One study concluded the subsurface outflows were negligible. The Table 4 conclusion is reasonable.

Table 4 contains a conclusion that discharge from groundwater through evapotranspiration has averaged 200 acre-feet per year since 1994. Studies from the 1940's contained values as high as 8,700 acre- feet. The discussion of evapotranspiration in the current study concludes that the decline of groundwater levels has largely eliminated evapotransportation sourced from groundwater. Long term residents remember when springs and artesian wells saturated many acres of the valley floor for several months each year. Clearly deeply rooted vegetation had access to groundwater through most or all of the year in some areas. The current report states that most phreatophytic vegetation types that are present in the Parowan Valley can be sustained by the current average annual precipitation. Based on

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this conclusion, adopting a discharge from groundwater through evapotranspiration value for Parowan Valley in the range of 0 to 200 acre- feet is reasonable.

The scientific conclusions negative to the groundwater budget include:

The groundwater irrigation recharge conclusion contained in 2017 USGS Groundwater Reports if adopted by you will have major policy implications. Surface water rights define the quantity of water that may be diverted. Groundwater rights do the same. As was explained in the meeting, the surface water rights holder with the highest priority is allowed to divert the full amount of his/her diversion water right, then any remaining water goes to the water right holder with the next highest priority and so on until the water resource is fully utilized. Those with lower priority water rights retain those rights but get water less frequently. The legal principal is the same for groundwater rights.

The priority listing of Parowan Valley groundwater rights provided on the Division of Water rights website assumed 40 percent recharge of the water diverted for irrigation. However, for non-irrigation uses such as, for example, Parowan City water right 75-109 the priority listing assumes 100 percent depletion of the water diverted, perhaps assuming the water evaporates in a sanitary sewer lagoon. Similarly, industrial water rights also conclude diversion equals depletion. The 2017 USGS Groundwater Reports conclude that of the groundwater withdrawn from the aquifer for irrigation only 5 percent returns to the aquifer to recharge it. Given the use of center pivot irrigation systems that allow for precise water application control it is unlikely that much water penetrates beyond the root zone. Additionally, it is unlikely that much of that water returns to the much-deeper than-in-the-past aquifer. The 5 percent irrigation recharge conclusion is reasonable.

If this conclusion is adopted by the State Engineer the priority listing provided by the Division of Water Rights requires recalculation to reflect this new conclusion of 5 percent recharge from irrigation instead of the 40 percent recharge assumption of the past. This will not change the diversion water rights but will increase the depletion amount calculated for each irrigation diversion and lead to the conclusion that the priority date when water rights in Parowan Valley will equal groundwater available to be withdrawn from the aquifer under the water budget based on the safe yield objective is earlier in time than postulated in the public meeting.

Iron County was estimated to be the fastest growing Utah county in a recently released Utah population estimate. As has occurred in other areas that have urbanized, water rights transfers from agricultural irrigation to municipal and industrial use will occur in Iron County in the future. Adoption of the reduced recharge percentage conclusion will increase to percentage of an irrigation diversion water right that may be transferred for municipal or industrial purposes, thus facilitating this transition.

Regulation of north valley water vs central and south valley water:

The USGS 2017 Groundwater Reports indicate that while historically groundwater levels were falling faster in the south of the valley compared to the north, that trend has reversed and water is now being mined at a faster rate compared to recharge in the north than the south. The water chemistry in the north part of the valley is different from that of the south part of the valley especially near the mountains on the east and south. The surface inflows into the north part of the valley are very limited compared to inflows into the south part of the valley. The underground water rights in the north part of the valley are generally of later priority date than underground water rights in the central and south

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parts of the valley. These differences have led some to postulate that perhaps there should be different regulation of underground water rights in the north than in the south part of the valley. The USGS 2017 Groundwater Reports conclude that:

“The chemical evolution of water originating in the northern part of the valley is similar to the chemistry of water observed around Little Salt Lake, indicating that the northern part of the valley is hydrologically connected to the southern part.”

The surface water runoff from the north of the valley periodically flows down the Fremont wash onto the playa of the Little Salt Lake. It is reasonable to conclude that subsurface flows follow a similar path explaining why the chemistry of south valley water near the Little Salt Lake is the same as the water chemistry found in the northern part of the valley.

Based on this science it is reasonable to continue to prioritize and regulate all Parowan valley groundwater as a single unit as has been done in the past.

Aquifer protection:

Protection of the physical integrity of the aquifer is one of the key statutory duties of the State Engineer. While there was extensive discussion of ground subsidence issues in the Cedar City valley near Enoch area during the December 11th meeting, there was no mention of such issues in the Parowan valley. We call you attention to a Utah Geological Survey Report of Investigation 253 published in October 2004. The authors of this investigation express concern about ground cracks along the western margin of Parowan valley analogous to the Cedar City valley cracks and ground subsidence discussed in the meeting.

The authors state the following:

“We conclude that the ground cracks along the western margin of the Little Salt Lake playa and within Parowan Gap are localized features related to the desiccation and compaction (i.e., irreversible consolidation) of clay-rich playa deposits, due to a lowered water table.”

The report of investigation contains photographs, maps, and tables of data as well as analytical discussions and conclusions. Please evaluate this and any other evidence of aquifer damage in the Parowan valley related to water table decline. Such issues may be less likely to be discovered in the Parowan valley than Cedar valley because it is less urbanized. Among the recommendations of this investigation is “Application of satellite interferometry (InSAR) to quantify possible subsidence across the entire Parowan Valley.” Please also evaluate this recommendation as part of your aquifer protection investigation.

The need to better quantify actual volumes of water being withdrawn from the aquifer:

The current water commissioner system monitors acres irrigated relying mostly on satellite imagery. This may be an effective method to enforce equity between irrigation water rights holders but is not an effective way to derive the actual quantity of water being withdrawn from the aquifer. The electric power utilization methods of the past used to attempt to derive water production have become unreliable for at least three reasons:

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- 1) The use of sprinkler irrigation introduces uncertainty as some energy is used to lift water to the surface and some energy is used to move water to the place of consumption and pressurize it.
- 2) The efficiency of irrigation wells is highly variable due to many factors such as depth, well design, pump efficiency, and well quality.
- 3) The increasing use of electricity from solar panels to pump water.

While we have no specific recommendation on how better groundwater diversion data should be obtained for individual water right holders, if, as appears likely, groundwater diversion is restricted over time to match safe yield based on priority date, effective individual water right enforcement data will become, if it is not already, critical.

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