IN THE OFFICE OF THE STATE ENGINEER
OF THE STATE OF NEVADA

#1267

ORDER

CURTAILING THE USE OF GROUNDWATER RIGHTS THAT ARE SUPPLEMENTAL TO SURFACE WATER RIGHTS WITHIN THE SMITH VALLEY HYDROGRAPHIC BASIN (107) NEVADA

WHEREAS, the State Engineer makes the following findings of fact, conclusions of law and order as follows:

FINDINGS OF FACT

The Walker River[1]

1. The Walker River Basin covers an area that consists of approximately 4,050 square miles. The entire river basin stretches in a northeasterly direction from its origins in the southwestern elevations of the Sierra Nevada Mountains to the basin's terminus, Walker Lake.
2. Between the headwaters of the Walker River in Mono County, California, and its terminus at Walker Lake in Mineral County, Nevada, the Walker River Basin includes portions of Nevada's Douglas, Lyon, and Churchill Counties. Approximately twenty-five percent of the Walker River Basin lies within California, and this portion of the basin accounts for the majority of the precipitation. This section of the basin is also the primary source of the basin's surface-water flows. On the other hand, the vast majority of consumptive water use within the basin, including evapotranspiration and evaporation from surface waters, takes place in Nevada. The basin's principal agricultural water use for irrigation occurs in Bridgeport and Antelope Valleys in Mono County, California, and Smith and Mason Valleys in Lyon County, Nevada.
3. The Walker River system consists of two forks, the West Walker River and the East Walker River. The West Walker River has its origins below the divide that separates the Walker River Basin from Yosemite National Park and flows north through Leavitt

[1] Much of the introductory section describing the Walker River system is borrowed from *Mineral County v. State of Nevada, Dept. of Cons. and Natural Resources*, 117 Nev. 235, 20 P.3d 800 (2001).

Meadow and into Antelope Valley. Before reaching Nevada, water from the West Walker River is partially diverted into Topaz Reservoir for water storage. The West Fork of the Walker River flows through Smith Valley

4. The second fork, the East Walker River, is fed by waters in the high Sierra north of Mono Lake. Water draining from Virginia Lakes flows north and joins with water from tributaries. These flows contribute to water stored in Bridgeport Reservoir.
5. The confluence of these two forks is located approximately seven miles upstream from the city of Yerington, Nevada, at the south end of Mason Valley. The merged forks of the West and East Walker Rivers flow northerly and then turn east as they enter the Walker River Paiute Indian Reservation where water is stored in Weber Reservoir from where the river continues south for approximately twenty-one miles before entering Walker Lake.
6. Historically, most of the irrigation in Smith Valley used the surface waters of the Walker River. However, beginning in the late 1940s, water right applications began to be filed to use groundwater to augment/supplement Walker River surface-water rights. The filing of applications for supplemental groundwater rights accelerated in the 1960s and 1970s. The supplemental groundwater rights were only to be used when necessary to make up, but not wholly replace, the surface-water source when surface water was deficient.
7. The Smith Valley Hydrographic Basin was designated pursuant to NRS § 534.120 by State Engineer Order No. 245 on June 27, 1960. The designation of a basin is the first tool the State Engineer enacts in the process of more closely managing or regulating the use of water or water rights in a basin. Since that time, additional orders have been issued in Smith Valley including curtailing the new appropriation of groundwater with limited exceptions,[2] ordering meters be installed and maintained on all wells utilizing groundwater,[3] and amending the boundary of the designated area.[4] These orders

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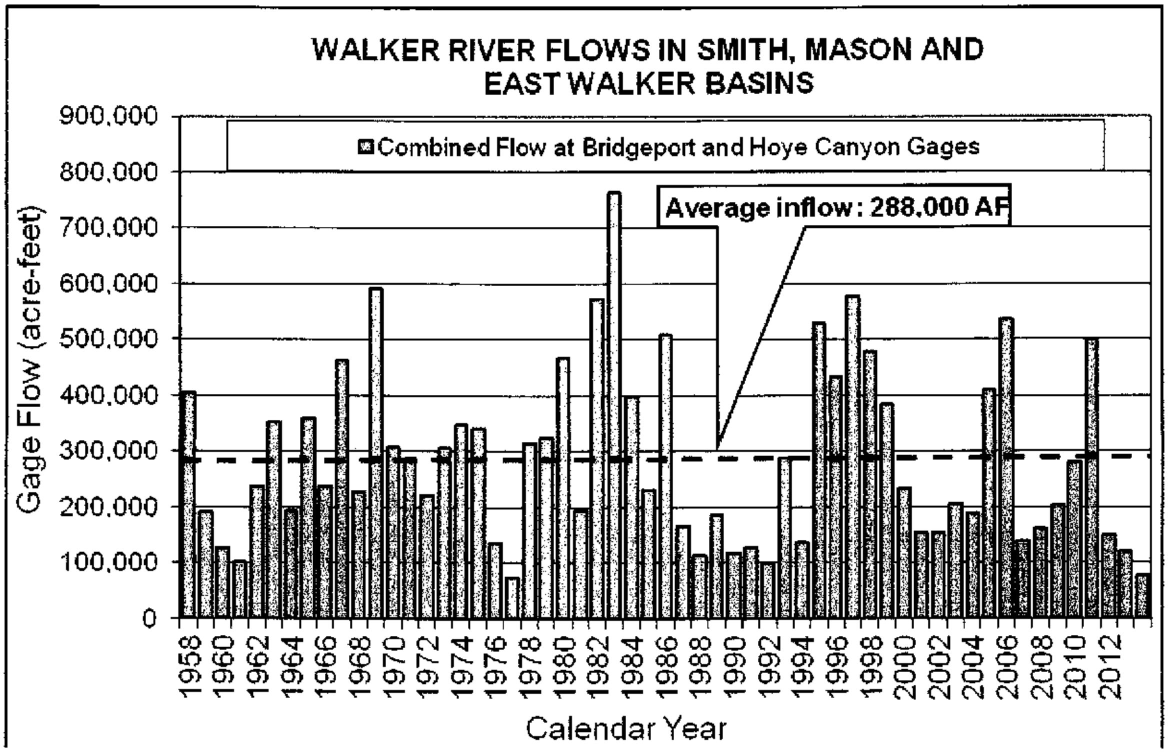
[2] State Engineer's Order No. 1126, dated February 4, 1997, official records in the Office of the State Engineer.

[3] State Engineer's Order No. 1159, dated February 1, 2000, official records in the Office of the State Engineer.

[4] State Engineer's Order No. 1177, dated July 8, 2005, official records in the Office of the State Engineer.

demonstrate the concern of several State Engineers over time with the use of groundwater in Smith Valley.

8. As shown in the chart below, the historical records of Walker River flows from the late 1950s through the mid-1980s demonstrate that years of very low flow in the river were seen in the early 1960s and mid-1970s, but these years of low flow only encompassed an average two-year period of time. Since the mid-1980s, more years of significant low river flows have been recorded and the years of low flows are covering longer multi-year periods of time.



Water Rights and Basin Yields

9. In granting applications to appropriate water in Nevada, the State Engineer is guided by Nevada Water Law. At the time these supplemental water rights were granted, Nevada Water Law provided that:

> Except as provided in subsection 2, the state engineer shall approve all applications made in the proper form where all fees, as provided in this chapter, have been paid which contemplate the application of water to beneficial use, and where the proposed use or change does not tend to impair the value of existing rights or to be otherwise detrimental to the public welfare.
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> * * *

> Where there is no unappropriated water in the proposed source of supply, or where its proposed use or change conflicts with existing rights, or threatens to prove detrimental to the public interest, the state engineer shall reject the application and refuse to issue the permit asked for.

10. The water law directed the State Engineer to approve applications that contemplated the beneficial use of water if the use of the water did not tend to impair the value of existing rights or otherwise be detrimental to the public welfare. As the State Engineer considered the applications filed to appropriate groundwater for supplemental water rights in Smith Valley, he had to consider this provision of the law and whether water was available for appropriation. In Smith Valley, State Engineers recognized that substantial additional recharge to the groundwater basin occurred through the infiltration of surface irrigation water along ditches, canals, drains and through direct infiltration below irrigated fields. Based on this additional recharge, State Engineers administered groundwater using a system yield approach, rather than by perennial yield. The "perennial yield" of a groundwater basin is the maximum amount of usable groundwater perennially available that can be continually withdrawn and consumed each year for an indefinite period of time without depleting the groundwater reservoir. The perennial yield cannot exceed the natural recharge to the aquifer and is limited to the maximum amount of discharge that can be utilized for beneficial use. The system yield has been defined as the maximum amount of surface and groundwater that can be used each year for an indefinite period of time.[5]
11. The Division of Water Resources estimates that the perennial yield of the Smith Valley Hydrographic Basin is 17,000 acre-feet.[6]
12. The system yield of the Smith Valley Hydrographic Basin is estimated to be 62,000 acre-feet.[7]

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[5] *See* Huxel, C.J., and Harris, E.E., 1969, Water Resources and Development in Mason Valley, Lyon and Mineral Counties, Nevada, 1948-65. Nevada Department of Conservation and Natural Resources, Division of Water Resources, Water Resources Bulletin No. 38, pp. 2, 27.
[6] Rush, F.E. and Schroue, C.V., 1976, Geohydrology of Smith Valley, Nevada, with Special Reference to the Water-Use Period 1953-72. Nevada Department of Conservation and Natural Resources, Division of Water Resources, Water Resources Bulletin No. 43, p. 50.
[7] Rush, F.E. and Schroue, C.V., 1976, Geohydrology of Smith Valley, Nevada, with Special Reference to the Water-Use Period 1953-72. Nevada Department of Conservation and Natural Resources, Division of Water Resources, Water Resources Bulletin No. 43, p. 73.

Supplemental Water Rights

13. In Smith Valley, where supplemental groundwater rights have been granted based on the system yield, the State Engineer considers supplemental groundwater rights to be a class of water rights that are subordinate to primary, stand-alone water rights. The State Engineer distinguishes supplemental groundwater rights from primary, stand-alone water rights, and imposes restrictions on their use that are not applicable to primary stand-alone rights, including: not allowing their use when surface water is available; not permitting supplemental irrigation water rights to be transferred to other manners of use; restricting transfers of supplemental rights to locations that also have a surface water right of the same or senior priority as the surface water right at the place of use for which the groundwater right was originally granted; and, not allowing supplemental rights to be converted to primary, stand-alone groundwater rights.
14. Using a system yield approach in issuing supplemental groundwater rights is appropriate in a river-dominated basin like Smith Valley where the primary use is irrigation. The amount of water used under any particular supplemental water right is constantly in flux relative to the available surface-water resources. If the groundwater was used heavily in one or more years, it was recognized that the system would recover in wetter years when supplemental water rights would have minimal use. Additionally, in wetter years, the increased supply of surface water generates more aquifer recharge. However, as can be seen since the 1980s, consecutive years of drought are more frequent and the years of significant river flow to support recovery of the groundwater aquifer are far fewer than when the supplemental water rights were granted.
15. Because Smith Valley is managed with the system yield method, supplemental groundwater rights were issued in amounts far in excess of the estimated perennial yield of the groundwater basin. Existing groundwater rights in Smith Valley total 55,000 acre-feet, of which approximately 53,000 acre-feet are irrigation rights.[8] Of the approximate

[8] Division of Water Resources Hydrographic Area Summary of Basin 107, official records in the Office of the State Engineer.

53,000 acre-feet of irrigation water rights, 34,000 acre-feet are supplemental groundwater rights.[9]

16. Where the State Engineer is authorized and directed to declare preferred uses pursuant to NRS § 534.120(2), the consideration of supplemental groundwater rights as subordinate to primary, stand-alone rights supports the State Engineer's conclusion that supplemental rights are *not* a preferred use, and do not have priority over stand-alone rights, which may be junior to the supplemental rights.
17. Smith Valley is in the midst of an unusually severe four-year drought, currently categorized by the U.S. Drought Monitor as *D4 – Exceptional Drought.*[10]
18. The prolonged drought has lead to an over-reliance on groundwater as the principal source for irrigation water. For the calendar years of 2012, 2013 and 2014, groundwater pumping in Smith Valley was estimated to be 37,000 acre-feet, 38,000 acre-feet and 41,000 acre-feet, respectively.[11]
19. Groundwater pumpage for each of the last three years has increased over the previous year, and each subsequent year represented the highest pumpage ever recorded in the basin.
20. At the same time, the drought has reduced surface-water supplies to the extent that aquifer recharge is severely diminished. This recent over-reliance on groundwater coupled with the lack of recharge has resulted in a significant and unsustainable depletion of the groundwater aquifer in Smith Valley.
21. Groundwater levels in Smith Valley have been measured by the State Engineer's Office and by the U.S. Geological Survey since the 1940's.
22. The State Engineer's Office currently measures 32 wells on a semi-annual basis.

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[9] Water right permit files, official records in the Office of the State Engineer, more specifically identified as those listed within the supplemental priority water right list, available at http://water.nv.gov/WalkerRiver/Smith_Supp_Priority_Table.pdf.

[10] *See* http://droughtmonitor.unl.edu/Home.aspx (last accessed August 28, 2015). Possible impacts from drought severity D4 (Exceptional) include exceptional and widespread crop/pasture losses, and shortages of water in reservoirs, streams, and wells creating water emergencies. *Id.*

[11] Smith Valley, Hydrographic Basin 9-107 Groundwater Pumpage Inventory (2012); and, preliminary pumpage data for calendar years 2013, 2014, official records in the Office of the State Engineer.

23. Over the last few years, water levels have declined at an unprecedented rate at most locations across the basin.

24. Water-level declines of more than eight feet per year over the last three years have occurred in several areas in Smith and Mason Valleys.[12] With the exception of areas of mine dewatering, this rate of water-level decline does not occur elsewhere in Nevada.

25. Water-level decline of more than four feet per year has occurred beneath most of the lands irrigated with groundwater.

26. The continued rapid decline of groundwater levels and the depletion of the aquifer is not a sustainable or acceptable condition. Depletion of the aquifer can result in increased pumping costs, damage to the aquifer in the form of loss of water storage potential, land subsidence, and water quality deterioration.

27. In Smith Valley, there are approximately 340 wells that are less than 150 feet deep. Many of these shallow wells are in areas where the water table is already near the bottom of the well, and where the water level is declining at four to eight feet per year or more. These wells are in danger of failure if these conditions persist.

28. The number of wells requiring deepening or replacement has increased substantially over the last three years.[13]

29. Should the drought continue into 2016, the Smith Valley groundwater aquifer will continue to be depleted unless there is a significant reduction in the amount of water pumped from the aquifer.

Desert Research Institute Model and Curtailment in 2016

30. On February 3, 2015, the State Engineer issued State Engineer's Order No. 1250, which curtailed the use of all supplemental groundwater rights in the Smith and Mason Valley Hydrographic Basins by 50% for 2015. A legal challenge to Order No. 1250 was mounted in the case of *Farmers Against Curtailment Order (FACO) v. State Engineer*, Third Judicial District Court Case No. 15-CV-00227.

31. In the *FACO* case, the District Court, in granting a preliminary injunction against the implementation of the Order No. 1250 stated, among other reasons, that it could "not

[12] Water level records of the State Engineer, official records in the Office of the State Engineer, available at www.water.nv.gov (last accessed July, 2015).

[13] Official records in the Office of the State Engineer, available at http://water.nv.gov/mapping/Well Log Data File.

understand how the State Engineer could identify what level of curtailment was needed in order to justify what water rights could not be served."

32. The State Engineer, guided by the Court's statement in *FACO* case, set upon a method to identify what level of curtailment was needed in order to achieve a slowing of additional water-level declines.

33. In light of the unprecedented water-level declines observed to date in Smith Valley, the State Engineer determined that limiting further declines to four feet or less was an appropriate target. The State Engineer's Office measures water levels at approximately 2,000 wells across the state. Even in the heaviest irrigated areas statewide, water-level decline is less than four feet per year. In this instance, four feet of additional water-level decline per year is an unreasonable lowering of the static water level.

34. In order to determine how to specifically manage groundwater pumping under a wide range of drought conditions, the State Engineer determined that using a groundwater flow model was appropriate to determine what percentage of curtailment, if any, could achieve the target of limiting further water level declines to four feet or less.

35. To that end, in May, 2015, the State Engineer contracted the Desert Research Institute (DRI) to conduct model simulations utilizing DRI's existing groundwater flow models of Smith and Mason Valleys. The model simulations requested by the State Engineer were used to predict what percentage of junior supplemental groundwater rights would need to be curtailed based on predicted inflows of the Walker River.

36. For the modeling approach to be accurate, it is important that the initial base line conditions used in the model be similar to, and representative of, the current hydrologic conditions. Under similar conditions, changes simulated by the model can be expected to be representative of changes that would occur if drought continues into 2016.

37. Current conditions are that Walker River flows are exceedingly low and this area is in the middle of a four-year drought. Model simulations will be for drought in a fifth consecutive year.

38. The year 2004 was the last year of a five-year drought, which is one year longer than the present drought, but not as severe. Water levels at the end of the 2000 to 2004 drought, as measured in March of 2005, were at or near the lowest levels that had occurred until

then. This hydrologic condition closely resembles the current drought. Water levels in Smith Valley are now almost, without exception, at all-time lows.

39. The baseline for river flows upon which all the model scenarios are based is the year 2010. River flows in 2010 are very near the long-term average.[14]
40. The model scenarios run by DRI varied river flow by 20% to 100% of average. As well, model scenarios varied groundwater pumping by simulating curtailment ranging from no curtailment up to 100% curtailment of supplemental irrigation water rights.
41. Based on the doctrine of prior appropriation, the most junior supplemental water rights were simulated as being curtailed first. For each simulated river flow scenario, the minimum curtailment necessary to achieve four feet or less of groundwater-level decline was determined.
42. The curtailment percentages and coinciding priority dates are demonstrated in the table in the concluding section of this Order, which shows what percentage of junior supplemental water rights are required to be curtailed in order to achieve the intended target. The State Engineer has made available a list of supplemental water rights, by priority, available on the State Engineer's website which establishes where in the percentage scale each supplemental irrigation water right by priority date is located.
43. On or about April 1, 2016, the Natural Resource Conservation Service (NRCS) will release the Nevada Water Supply Outlook Report, which report forecasts the water supply for the West Walker River (NRCS April Report).[15]
44. Within the NRCS April Report, the gaging station for the West Walker gage near Coleville (USGS Station No. 10296500) and the 50% probability of exceedance for April to July will be used as the estimated water supply for Smith Valley. The 50% probability of exceedance is synonymous with the estimated flow.

[14] Carroll, R.W.H., and Pohll, G.M., 2015, Mason and Smith Valley Groundwater Pumping Curtailment. Technical memorandum submitted to the State Engineer's Office, 30 pp.
[15] NRCS reports are available at http://www.nrcs.usda.gov/wps/portal/nrcs/main/nv/snow/waterproducts/

45. The example below is taken from the NRCS April Report from *2015*, and pictorially identifies the information the State Engineer will use when the NRCS April Report is issued in 2016.

Walker River
Streamflow Forecasts - April 1, 2015

Walker River	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment — Chance that actual volume will exceed forecast: 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
E Walker R nr Bridgeport								
	APR-AUG	0.67	2	8	12%	24	46	67
	MAY-AUG	0.59	1.77	6	10%	18.4	37	59
W Walker R bl L Walker nr Coalville								
	APR-JUL	0	7.5	24	15%	40	65	162
	MAY-JUL	0	5.1	21	15%	38	62	142
W Walker R nr Coalville								
	APR-JUL	15.7	21	24	15%	27	32	163
	MAY-JUL	0	2.9	21	15%	59	114	143
Walker Lake Elevation Change[1]								
	LOW-HIGH	-5.9	-3.5	-2.4	-170%	-1.26	1.17	1.41

46. To illustrate an example of using the NRCS April Report from *2015*, above, the estimated stream flow would have been calculated at **15%.**

47. The estimated flow as determined by the NRCS April Report in 2016 will be used in conjunction with the curtailment table to determine the amount of curtailment for 2016.

48. If the forecast in the NRCS April Report is for less than 20% of average river flow, the curtailment for 20% estimated flow will be used.

49. If the water supply is more than predicted by the NRCS April Report as a result of unusually high April and/or May precipitation, the amount of curtailment will be reduced using the NRCS June 1, 2016, streamflow forecast (NRCS June Report) in the same fashion as the NRCS April Report.

50. In the event that the water supply forecast in the NRCS June Report is less than the NRCS April Report, there will be no change in the amount of ordered curtailment.

51. Because the actual percentage of junior rights that must be curtailed, if any, is contingent upon the NRCS April Report, this Order serves to inform holders of supplemental groundwater rights how any curtailment will be applied; however, which rights will be curtailed cannot be determined until the release of the NRCS April Report.

52. The State Engineer will issue a supplemental Order after the release of the NRCS April Report identifying which supplemental groundwater rights are curtailed.

53. On October 7, 2015, a public administrative hearing was held concerning a draft version of this Order, with oral and written public comment having been received on the draft. The State Engineer has given careful consideration to all comments received, and this final Order is issued.
54. While this Order applies to holders of supplemental groundwater rights, the State Engineer strongly encourages all water right owners that are not subject to this curtailment, including owners of domestic wells, to conserve water during this prolonged drought.

CONCLUSIONS OF LAW

1. Groundwater is being depleted in the Smith Valley Hydrographic Basin, and this Order is made pursuant to NRS § 534.120(1) as being essential for the welfare of the area involved.
2. Supplemental groundwater rights in Smith Valley were issued pursuant to the system yield of the basin and are considered to be a class of water rights that are subordinate to primary, stand-alone water rights.
3. Pursuant to NRS § 534.120(2), the State Engineer is authorized to designate preferred uses of water within designated basins from which water is being depleted.
4. The State Engineer declares in Smith Valley that supplemental groundwater rights are a non-preferred use.
5. The State Engineer concludes that continued pumping of supplemental groundwater rights during the continuing drought will result in an unreasonable lowering of the static water level, will endanger the long-term health of the aquifer, will threaten to conflict with existing rights and will threaten to prove detrimental to the public interest.
6. Nevada water law requires that curtailment of water rights be by priority of right.
7. The State Engineer concludes that the curtailment of non-preferred supplemental irrigation water rights by priority is required to protect the integrity and continued water supply of the basin.

NOW THEREFORE, IT IS HEREBY ORDERED that the use of water under supplemental groundwater rights be curtailed for calendar year 2016 by the following percent, as determined by the April 1, 2016, NRCS streamflow forecast:

Percent of Median River Flow	Percent Curtailment	Water Rights Curtailed (Rights Equal to and Junior to Date Below)
100%	No curtailment	NA
80%	No Curtailment	NA
60%	No Curtailment	NA
50%	No Curtailment	NA
40%	75% Curtailment	5/4/60
20%	80% Curtailment	3/21/60

IT IS FURTHER ORDERED that where the percent of forecast river flow is between the figures specified in the table above, the percent curtailment shall be interpolated. For example, a forecast river flow of 30% of average would require a curtailment of 77.5%.

IT IS FURTHER ORDERED that if the June 1 NRCS forecast exceeds the April 1 forecast, the curtailment will be revised downward (less curtailment) using the above table pursuant to the June 1 forecast.

P.E.

JASON KING, P.E.
State Engineer

Dated at Carson City, Nevada

this 28th day of October, 2015