



United States Department of the Interior
FISH AND WILDLIFE SERVICE
Mountain-Prairie Region



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JUN 27 2016

David Barfield, P.E., Chief Engineer
Kansas Department of Agriculture
Division of Water Resources
1320 Research Park Drive
Manhattan, Kansas 66502

Dear Mr. Barfield:

The U.S. Fish and Wildlife Service (Service) appreciates all the work performed by the Kansas Division of Water Resources (DWR) regarding the impairment investigation. The Service entered into the Rattlesnake Creek Partnership Agreement (Partnership) in 2000 in good faith that impacts to the water rights at the Quivira National Wildlife Refuge (Refuge) would be addressed and a remedy would be legally enforced. After 12 years of the Partnership and more than 15 years of collaboration, very minor reductions in groundwater withdrawals were achieved, and the Service was informed that the stipulations from the Partnership would not be enforced. The Service consulted with the DWR and found we had no other choice but to file an impairment investigation to seek relief.

In reviewing the report, we recommend a correction on page 26. The following sentence cites information from a Certification Memo that was superseded.

"The surface area of the Little Salt Marsh is approximately 950 acres; 2,850 acre-feet of evaporation from the Marsh was assumed in the year of record for the certificate."

The full memo on pages 18 and 19 of the impairment report indicates that the Little Salt Marsh has a capacity of 950 acres and 2,850 acre-feet. However, the Service submitted area-capacity information in a November 12, 1993 letter that listed the Little Salt Marsh having a surface area of 864 acres and a capacity of 1,865 ac-ft. The correct capacity and resulting evaporation were listed in the impairment report on page 20. It should be made clear that the capacity and evaporation information that was used in the perfection of Water Right Certificate No. 7,571 are the amounts listed on page 20, and not the assumed amounts listed in the Certification Memo that were later superseded.

Going forward, we understand that the impairment report is the technical analysis determining if impairment occurred and that the next step is the remedy phase if impairment is found. However, many of the comments to the impairment report supported augmentation as the

only feasible solution. The Service believes there may be legal and technical challenges in using augmentation. The Kansas Legislature in 2015 passed Senate Bill 52 that allowed for augmentation of senior water rights in Rattlesnake Creek Basin if the water was given voluntarily and if it is available. We believe that water cannot be considered "available" in an over appropriated basin that is closed to new appropriations. Surface water and groundwater may be in excess of legal demands during portions of the year, but a water shortage will likely be in place when augmentation is needed.

Additionally, augmentation poses several technical challenges. The DWR conducted a series of model runs using the Big Bend Groundwater Manager District No. 5 funded Balleau Groundwater Inc. groundwater model looking at different augmentation scenarios. The results were presented in a webinar on November 4, 2014 and the presentation is posted on the DWR website. These hypothetical wells and augmentation of streamflow occurred about 13 miles upstream of the Refuge. The modeled results found that only about 50% of the water augmented to the stream actually reached the Zenith gauge due to infiltration back into the aquifer.

One of the options mentioned at the collaborative meetings was to locate augmentation wells closer to the Refuge to reduce the percentage of flow that infiltrates from the stream into the aquifer. The Service is concerned that the aquifer near the Refuge is not able to support large demands from pumping wells. The enclosed publications by Rubin and Buddemeier (2003) and Ma et al. (1997) indicate that there is abundant saline water located at the base of the Great Bend Prairie Alluvial Aquifer near the Refuge, and that high pumping demands lead to upconing of this saline water. Ma et al. (1997) recommended a maximum pumping rate of 525 gpm under normal climatic conditions to reduce saltwater upconing. Augmentation water would likely be needed most in times of drought, further reducing the safe pumping rate. Higher pumping rates during drier conditions could lead to salinization of the aquifer. This could permanently degrade water quality such that the aquifer is unsuitable not only for augmentation needs, but also for irrigation of crops in the vicinity of the augmentation wells.

Finally, the scale and capacity of augmentation is a general concern due to long term development, large up-front expenses, and perpetual operation and maintenance costs. The lack of availability of sufficient groundwater near the refuge, water quality concerns, the legal availability of water, and the potential adverse impacts to natural resources within the watershed should all be considered before choosing augmentation as a remedy. The Service does not desire an augmentation plan that ultimately leads to a temporary partial solution and further degradation of the watershed. The depletion of surface water flows in Rattlesnake Creek was caused by over-appropriation of groundwater. The Service has maintained that solving an issue of over-pumping with further pumping is not a sustainable solution.

Please contact Jaron Andrews of my staff at jaron_andrews@fws.gov or call at 303-236-4490 if you have any questions.

Sincerely,



Kathleen R. Dennis
Assistant Regional Director
Budget and Administration

Enclosures/References:

Ma, T. S., Sophocleous, M., Buddemeier, R.W. 1997. Modeling saltwater upconing in a freshwater aquifer in south-central Kansas. *Journal of Hydrology* 201, 120 – 137

Rubin, H., Buddemeier, R.W. 2003. Analysis of aquifer mineralization by paleodrainage channels. *Journal of Hydrology* 277, 280 - 304