



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



IN REPLY REFER TO:
NWRS WTR
KS WR
Mail Stop 69016

MAILING ADDRESS:
P.O. Box 25486, DFC
Denver, Colorado 80225-0486

STREET LOCATION:
134 Union Boulevard
Lakewood, Colorado 80228-1807

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

December 13, 2018
submitted via email to:
David.Barfield@ks.gov

Dear Mr. Barfield:

Enclosed is the U.S. Fish and Wildlife Service (Service) 2019 request to secure water regarding water right No. 7571 from injury due to junior groundwater wells. The Service appreciates being informed of any developments regarding the Local Enhanced Management Area (LEMA) that is being drafted to remedy impairment.

Please contact me at 303-236-4491 if you any questions or would like to discuss further. Thank you for your assistance in this matter.

Sincerely,

Brian S. Caruso, Ph.D., P.E.
Chief, Division of Water Resources

REQUEST TO SECURE WATER

To: Chief Engineer
Division of Water Resources
Kansas Department of Agriculture
(or his or her authorized agent)

January 01, 2019
(Date)

1. I am presenting the following information as the basis for action on my request to secure water:

That pursuant to K.S.A. 82a-701 et. seq., a water right, identified as follows, has been established:

a. Vested Right
File No. County Source
Quantity Rate
b. Appropriation Right
File No. 7571 Priority Date August 15, 1957
Status Certified
Rattlesnake Creek Source 14,632 Quantity 300 cfs Rate

2. That the authorized place of use for the water right is: Quivira National Wildlife Refuge

3. A. That the appurtenant to the water right described in paragraphs 1 and 2 is owned by:

U.S. Dept. of the Interior - U.S. Fish and Wildlife Service Name
P.O. Box 25486, Denver Federal Center, Mailstop 60189, Denver, CO 80225 Address

B. That the land described in paragraph 2 is owned by:
(If different than owner of water right)

same as above Name Address

4. That the undersigned, (if not the owner) has an interest in the above-described land and water right as follows:

Agent (tenant, lessee, buyer, contract or other)

5. That during this calendar year 0 acre-feet of water has been used under this right. see attached

6. That the undersigned has need for 14,632 acre-feet of water at a rate of ^ g.p.m. for Recreational purposes at locations described as follows:

Fish and Wildlife Habitat, Forage

No. of Acres: 22,135 Kind of Crop: N/A

7. That I am prepared to, and will, in the exercise of my water right described above, apply to beneficial use all water available to me at a rate of see attached g.p.m. or less, commencing at 12 o'clock A.M. on January 1, 2019.

8. That I have been informed that water is available from the source of supply in the amount of:

<u>Date</u>	<u>Estimated Flow</u>	<u>Location</u>
<u>1974 - 2013</u>	<u>Variable</u>	<u>Rattlesnake Creek, Zenith Gage</u>

9. That I have been informed that water is, or was, being diverted from the source of supply as follows:

<u>Date</u>	<u>Water Right</u>	<u>Name</u>	<u>Estimated Rate of Diversion</u> <u>30,000 - 60,000 AF per</u> <u>year depletions to</u> <u>Rattlesnake Creek</u>
<u>1995 - 2007</u>	<u>Multiple</u>	<u>Junior Appropriators</u>	

10. That I have advised the persons listed below of my need for water and my intention to exercise my water right:

<u>Name of Person</u>	<u>Date</u>	<u>Agreeable - Yes Or No</u>
<u>Big Bend GMD No. 5</u>	<u>12/01/2016</u>	<u>No</u>

I request in accordance with the provisions of K.S.A. 82a-706b, that the Chief Engineer or his or her authorized agent open, close, adjust or regulate the headgates, valves, or other controlling works of any ditch, canal, conduit, pipe, well, or structure as may be necessary to secure water to which I am entitled:

Brian S. Caruso
Signature

State of Colorado
~~Kansas~~
County of Jefferson) SS

Brian S. Caruso by me being duly sworn, declare that the information is true and correct to the best of his or her knowledge and belief.

Brian S. Caruso
Affiant's Signature

Subscribed and sworn to before me this 13th day of December, 2018

CAROLINE M. CORDOVA
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20044034704
MY COMMISSION EXPIRES 09/28/2020

Caroline M. Cordova
Notary Public

My Commission Expires Sept. 28, 2020

135 Quitman Street
Denver CO 80219

Seasonal Rattlesnake Creek Water Need Estimates for Quivira National Wildlife Refuge, Prepared May 2015

Background

At the request of Kansas Department of Agriculture, Division of Water Resources (DWR), the U.S. Fish and Wildlife Service (Service) has provided information to increase understanding of *seasonal* water needs to accomplish management objectives of the Quivira National Wildlife Refuge (Refuge). The Refuge's current annual Water Right 7571 on Rattlesnake Creek is 14,632 ac-ft. There is no single estimate that accurately predicts seasonal surface water needs of the Refuge because various factors influence water needs within and among years, such as short- and long-term weather patterns, the timing of wildlife events (e.g., migration), and changing habitat conditions.

Approach

Scenario 1 – There was interest by DWR to evaluate the potential of using past water use records to quantify estimates of seasonal water needs to accomplish refuge management objectives. To accomplish this task, Refuge staff compiled 48 years of monthly water-use records and grouped months into seasons based on the life cycle events of waterbirds (timing of migration, relative abundances) and the lag time required to transfer water to wetlands through the ditch infrastructure (Table 1). For example, flooding a wetland to the appropriate depth can require days to weeks depending on location from the diversion, volume of water available, and existing soil moisture conditions (e.g., dry, saturated).

Table 1. Significant annual events largely considered in determining seasonal water needs to accomplish management objectives of Quivira National Wildlife Refuge.

Jan-Feb	Mar-Apr	May-Jun	Jul-Sep	Oct-Nov	Dec
MANAGEMENT TO SUPPORT WILDLIFE FOOD & COVER REQUIREMENTS					
Use water where needed to provide/maintain semipermanent wetland habitat.					
Shallowly flood select units to saturate dry soils that will be used to produce wildlife foods.					
Dewater select wetlands for suitable germination and growth of desired plants used for wildlife food and cover. Drawdown dates are based on scientific information.					
Irrigate select wetland units to support survival, growth, and seed production of germinated wildlife food plants.			After seeds mature, gradually increase water levels in wetlands to coincide with the food and cover needs of target species.		
CHRONOLOGY OF SPECIES ANNUAL EVENTS OR WHEN LIFE REQUIREMENTS NEED TO BE AVAILABLE FOR SPECIES USE					
Waterfowl and bald eagle wintering habitat is provided when open water is available (generally where flooded deep and/or where flow prevents ice formation).	Peak spring waterfowl migration (habitat flooded <15 inches).	Main spring shorebird migration (habitat flooded <6 inches and mudflat).		Main fall shorebird migration (habitat flooded <6 inches and mudflat).	Peak fall waterfowl migration (habitat flooded <15 inches).
	Endangered whooping crane spring migration (shoreline & habitat flooded <1 ft).	Breeding-related activities occur for several waterbirds that require flooded habitat for food and/or cover resources, such as for the state-threatened snowy plover, the endangered interior least tern, and for state species in need of conservation (e.g., black rail, black tern).			Endangered whooping crane fall migration (shoreline and habitat flooded <1 ft).

After reviewing the water use records, Refuge staff made the determination to exclude years (n=28) when total annual water use did not exceed 7,000 ac-ft to prevent extreme bias in estimating seasonal water use due to

limited water availability and/or inappropriate timing of available water. For example, during low water years Refuge staff often receive and use water at less than optimal times (e.g., winter) to help increase the odds that at least some wetland habitat is flooded at critical times (e.g., spring waterbird migration). In this case, the average amount of water used during the winter season would be biased high. Conversely, it is common during low water years to not have sufficient water to maintain wetland vegetation, which results in low food production and sparse cover required by wildlife. In this case, the use of water during summer would be biased extremely low. The use of 7,000 ac-ft as a cutoff point was based on approximating 50% of the Refuge water right and, as such, is somewhat arbitrary.

For the 20 years of when total annual water use exceeded 7,000 ac-ft, water use for each year was partitioned into the appropriate seasons and the median, minimum, and maximum seasonal values across all years were calculated (Table 2).

Table 2. Seasonal median, minimum, and maximum water use (ac-ft) values, calculated using 20 years of data where annual use exceeded 7,000 ac-ft. Totals of the median and maximum seasonal water use values are respectively lower and higher than the current annual water right (14,632 ac-ft).

	Jan -Feb	Mar-Apr	May-Jun	Jul-Sep	Oct-Nov	Dec	Total
Median	986	1,115	1,062	2,117	1,781	684	7,746
Minimum	0	89	126	463	151	101	
Maximum	3,557	3,111	2,601	4,374	6,205	2,003	21,851

This Scenario 1 estimate is biased due to the following:

- Historic *use* does not accurately reflect water *needs* during any given year or season.
- Historic water use in a given season may not accurately reflect the volume of water that would have been used if water had been available during that season or, perhaps, previous to that season.
- The use of records that exceeded 7,000 ac-ft was arbitrary and only represents nearly half of the Refuge water right. As such, these estimates likely are biased low.

Scenario 2 –

Scenario 2 is based on achieving minimum requirements of CCP objectives following a drought year and water use was not constrained by the current water right (Table 3, Scenario 2). Unlike Scenario 1, seasons in Scenario 2 were defined by CCP habitat-based objectives, as approved in 2013. Data used to develop this scenario included area estimates and area-capacity curves developed by the Service for individual wetlands, published long-term precipitation and pan evaporation data (including the use of a coefficient to account for shallow wetlands), soil infiltration rates calculated based on information in NRCS soil survey data (SSURGO), LiDAR data to estimate volume of ditches, and aerial imagery to estimate surface area of water in the Big and Little Salt Marshes at the beginning of the scenario.

Table 3. Comparison of Rattlesnake Creek surface water use Scenarios 1 and 2 for Quivira NWR.

Scenario	Seasonal Water Use Estimates (Acre-Feet)												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	986		1,115		1,062		2,117			1,781		684	7,746
2	3,144	7,427			2,895		4,053				5,881		23,400

This Scenario 2 estimate is biased due to the following:

- Water loss due to plant transpiration was not included in water use estimates (which would increase water needs to meet objectives).
- Water loss due to soil infiltration in some wetlands was underestimated because values for the available water capacity of 2,300 acres of wetland soils were not available (which would increase water needs to meet objectives).

- Water loss due to horizontal seepage in ditches during initial flooding was not estimated (which would increase water needs to meet objectives).
- Estimate based on a “normal precipitation” year following a drought year (all units dry); thus, a large volume of water (3,144 acre-feet) is needed to initially flood the Little Salt Marsh before water can be diverted elsewhere on the Refuge. This volume would be lower in years not preceded by drought.
- Estimate based on initially flooding only units and infrastructure on the south end of the Refuge. If north portion of Refuge were flooded early in the year, water use estimates would increase.
- Seasons are based on habitat objectives and do not always reflect the water management activities/schedules (e.g., time required for water to travel from diversion to wetland of interest).

Results

The seasonal estimates in Table 4 were developed after considering Scenarios 1 and 2 described in the approach above.

Table 4. Seasonal Rattlesnake Creek surface water need estimates for Quivira NWR, given the current water right.

Seasonal Water Use (Acre-Feet)						Total
Jan-Feb	Mar-Apr	May-Jun	Jul-Sep	Oct-Nov	Dec	
1,500	3,500	2,000	3,500	3,632	500	14,632

Although Scenarios 1 and 2 were developed based on quantitative information; these estimates were constrained by limitations that precluded either scenario from being used to directly estimate seasonal water needs. In general, the estimate based on past water use is known to be flawed because the Refuge either did not receive its full annual right of 14,632 ac-ft and/or the seasonal availability of water was not available or lacking, which resulted in the use of water during suboptimal times that often limited or impeded the accomplishment of management objectives. In contrast, the Scenario 2 estimate, based on water needs following drought, exceeded the Refuge water right even though important factors (e.g., water infiltration in ditches, plant transpiration) that would have increased water needs were not included in the estimate. Therefore, the Service used information from both Scenario 1 and Scenario 2 to adjust water use so total annual use matches the current water right of 14,632 ac-ft (Table 4).