Stock Water Demand

Introduction

Livestock water use is associated with livestock watering, feedlots, dairy operations, and other on-farm needs. Water for poultry operations and fish farms is accounted for under industrial use. It also includes water use associated with cooling of facilities for the animals and animal products such as milk, dairy sanitation and wash down of facilities, animal waste-disposal systems, and incidental water losses.

The KDA-DWR, requires stock water right permits and annual water use reports for facilities with a capacity of 1,000 or more head of cattle. According to K.S.A. 82a-701 and K.A.R. 5-1-1, the watering of livestock and other uses of water directly related to the operation of a feedlot with the capacity to confine 1,000 or more head of cattle; or any other confined livestock operation or dairy that would divert 15 or more acre feet of water per calendar year is regulated and water use for this purpose must be reported annually to the Chief Engineer as stock water use.

Quantification of all stock water demand is challenging therefore only the amount of stock water use in larger (>1,000 head) dairy or feedlot facilities is reported. The U.S. Geological Survey (USGS) estimates water use in small animal production operations using a coefficient based on sales statistics; the most recent USGS stock water use estimate is for 2010.

Stock Water Supply

Sources and Use of Stock Water for Permitted Facilities

Most permitted livestock water demand is supplied from groundwater reflecting the higher concentration of livestock production in the western part of the state where groundwater is the prevalent source. As of October 2012, 111,046 acre feet of water is authorized to be diverted for stock water use. Only one percent is from surface water, the remaining 99% is from groundwater.

Most permitted livestock facilities are in the western part of the state, therefore the High Plains aquifer is the source of most of the groundwater.

Source of Water for Livestock Production Facilities Not Requiring a Water Use Permit

Smaller scale livestock production or dairy facilities (<1,000 head and/or less than 15 acre feet) do not require a water right, are not required to report use and are not included in state reported stock water use totals. Water for livestock are typically grazed on rangeland or confined in smaller confined animal feeding operations (CAFOs), is obtained from farm ponds, watershed ponds, springs, streams or domestic groundwater wells.

Table WD-04

Sources of Authorized Stock Water – 2012

Source of Water for Stock Water	Authorized Quantity in Acre Feet
Surface	1,454
Groundwater	109,592
Total Authorized	111,046

Rangeland is generally not irrigated and rangeland grazing in Kansas varies due to rainfall amount and the quality and quantity of grass supported. Stocking density ranges from 22 acres per pair (cow/calf) per year in western Kansas to six acres per pair per year in the south east, reflecting the higher quality and quantity of grassland in the eastern part of the state due to climatic conditions.

Total Livestock Inventory and Estimated Water Demand

Most feedlots or CAFOs with capacity exceeding 1,000 head are located in western Kansas. As the ability to access groundwater for irrigation developed in the middle 20th century, livestock production became increasingly concentrated in CAFOs where ready access to irrigated crops for livestock feed is available.

Since 2000, stock water use in permitted facilities has remained fairly stable. Higher amounts used reflect drier years. From 2001 through 2011, an average of 39,051 acre feet has been diverted for stock water use, only 35% of the total authorized quantity available (111,046 acre feet).

Water requirements for cattle vary depending on factors including temperature and condition of the animal. Cows nursing a calf require up to 18 gal/day; feeder weight cattle required up to 21 gal/day; and dairy cows require up to 40 gal/day.

Based on 2012 NASS estimates, cattle demand could be 111 million gallons per day (341 acre feet) or 40.5 billion gallons per year (124,437 acre feet) assuming an average temperature of 80°F (Table WD-05).

The estimated total stock water demand for cattle alone exceeds the 111,046 acre feet authorized (Table WD-04) indicating a sizeable amount of stock water use is not reported and quantified. The difference is the estimated stock water use for small operations and cattle in pasture/ range production.

Using national data sources, the USGS estimates that 25,819 acre feet of surface water is used annually for stock water. The USGS data are not broken out by source, but compared to the 1,454 acre feet of surface water authorized, this could account for some of the unreported demand from rangeland grazed livestock and smaller CAFOs.

Table WD-05

Estimated Daily and Annual Stock Water Demand for 2012

	Per day (80 F) [1]	**Inventory 2012** [2]	**Daily need mgpd/ acre feet**	**Annual need mgpy/ acre feet**
Beef Cows	18	1,430,000	25.7/79	9,395/28,833
Dairy	40	123,000	4.9/15	1,796/5,511
Cattle on Feed	21	2,370,000	49.8/153	18,166/55,750
Other Heifers	15	1,500,000	22.5/69	8,213/25,203
Bulls	19	90,000	1.7/5	624/1,915
Calves (<500 lb)	10	645,000	6.5/20	2,354/7,225
Sheep/Goats	4	70,000	.3/1	102/314
Horses (1999)	25	105,000	2.6/8	958/2940
Swine	12	1,810,000	21.7/67	7,928/24,330
TOTAL		**8,143,000**	**135.7/416**	**49,536/152,021**
[1]KSU Research & Extension				
[2]NASS Various Reports				
		Cattle Total	**111 mgd (341 acre feet/day)**	**40.5 billion gal/yr (124,437 acre feet/yr)**