Upland Water and Deferred Rotation Effects on Cattle Use in Riparian and Upland Areas

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On the Ground

- Our experience shows that land management agencies rely on upland water and deferred rotation grazing systems to reduce riparian use and improve conditions, rather than addressing stocking rate and requiring herding of cattle.
- Range scientists have published studies showing that cattle prefer to linger in riparian areas and that stocking rate is more important than grazing system.
- We collected 4 years of data on upland and riparian residual vegetation, riparian stubble height, and bank alteration prior to implementation of the upland water developments and deferred rotation scheme and compared that with 4 years of data collected after implementation.
- As a result of this change in management, post-grazing riparian stubble heights decreased; bank alteration was unchanged; upland residual grasses were reduced; there was no change in residual herbaceous vegetation in the riparian zone; and utilization remained excessive in both upland and riparian areas.
- Range science shows that to reverse this outcome and improve conditions, changes must be made. These include
  - setting stocking rates based on currently available preferred forage species and todays consumption rates of livestock,
  - enforcing utilization rates of less than 30% in upland and riparian areas,
  - enforcing riparian stubble heights of >15.2 cm across the aquatic influence zone and floodplain,
  - enforcing bank alteration levels of <20%,
  - using riders to limit riparian use and distribute livestock, and
  - providing rest, not deferment, so that sensitive native grasses recover vigor and productivity prior to being grazed again.

Keywords: utilization, bank alteration, stubble height, riparian, upland water, deferred rotation.

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In 2007, a U.S. Bureau of Land Management (BLM) National Environmental Policy Act process for the Duck Creek allotment resulted in the installation of six large-capacity upland water troughs that would "draw" livestock away from riparian areas. New fences were built to divide the allotment into four pastures so grazing could be managed under a deferred rotation system. This would reduce livestock access to individual riparian areas from 4 months to 1 month, provide alternating periods of growing season rest, and correct a distribution problem. Similarly, uplands would experience fewer defoliations due to shorter grazing periods and alternating periods of growing season rest. The expected results were reduced use of the riparian areas, no measurable increase in use of the uplands, and improved conditions for both.[1]

We collected data for parameters used by BLM to assess compliance with objectives for upland and riparian utilization and greenline stubble height. Bank alteration, although not an annual indicator or objective used by BLM, was also measured. This data was collected for 4 years prior and 4 years after implementation of the upland water and deferred rotation grazing system. Our intent was to measure changes in use; we expected that if the changes in the grazing system and upland water resulted in less use of the riparian area, then riparian utilization, greenline stubble height, and bank alteration would decline. Similarly, for the uplands, we were interested in whether measurable changes in utilization would occur. We did not measure changes in plant species, ground cover, stream channel width, or other long-term condition parameters.

Reviews of season-long grazing versus grazing systems found no discernible difference between the two, regardless of the dependent variables compared. Grazing systems showed limited or no benefit in arid systems, while rest and deferment

were not sufficient to overcome the effects of periodic heavy use on primary forage plants.[2] In both the semi-arid and desert range types, rotational grazing systems generally showed no advantage over continuous or season-long grazing.[3] A recent comprehensive review analyzed outcomes of over 30 separate studies comparing rotational grazing to continuous grazing. Eighty-nine percent of the experiments reported no difference in plant production or standing crop between rotational and continuous grazing with similar stocking rates. Stocking rate emerged as the most consistent variable influencing vegetation response.[4]

Water and slope limited cattle use and distribution in a Wyoming study, with the majority of use within 366 m of water and 79% of use on slopes less than 7%.[5] In a study of continuous and deferred-rotation grazing systems in northeast Oregon's Blue Mountains, small riparian meadows were the preferred sites. The deferred grazing system increased cattle use of riparian areas.[6] In a companion study of vegetation production and cattle presence in small riparian meadows, standing crop of herbaceous vegetation "at the end of the grazing season was similar under continuous grazing and the early and late grazing periods of a two pasture deferred rotation grazing system."[7] In the Starkey Experimental Forest and Range in Oregon with water and salt available in upper elevation areas, the majority of summer use was in areas of less than 35% slope and in the riparian zone. Salt and upland water did not reduce use of the riparian areas.[8] A controlled experiment at the Hall Ranch Unit of the Eastern Oregon Agricultural Research Center using off-stream water and supplements found no significant difference between supplemented and nonsupplemented pastures in erosion index or mean cattle hoof prints along the stream margin.[9]

Study Area Description

The Duck Creek allotment is located in Rich County in northeastern Utah (Fig. 1). This area is part of the Middle Rocky Mountain Physiographic Province. The allotment is located in the Bear River Plateau, which contains nearly level to steep uplands dissected by numerous small drainages.[10] It is a semi-arid cold desert sagebrush-grassland, or sage-steppe type, in which the majority of the precipitation falls as snow during late fall to early spring, while summers are dry.[11]

Annual precipitation varies from approximately 30.5 cm at lower elevations to 40.6 cm at higher elevations.[10] Precipitation averages 34.5 cm, and temperatures range from a minimum monthly average of −16.7°C in January to a maximum monthly average of 27.8°C in July. During the 32-year period of 1983 to 2014, the Randolph climate station (14 km south) recorded 12 years with below average precipitation out of 24 with a complete record.[12] Annual precipitation during the period 2005 to 2013 is shown in Figure 2.

Elevations on the Duck Creek allotment range from 1,920 to 2,220 m. The allotment contains 9,053 ha, including BLM-managed land, private land, and state-managed lands. Perennial streams within the allotment include Duck Creek, Six Mile Creek, and North Fork Sage Creek.[1]

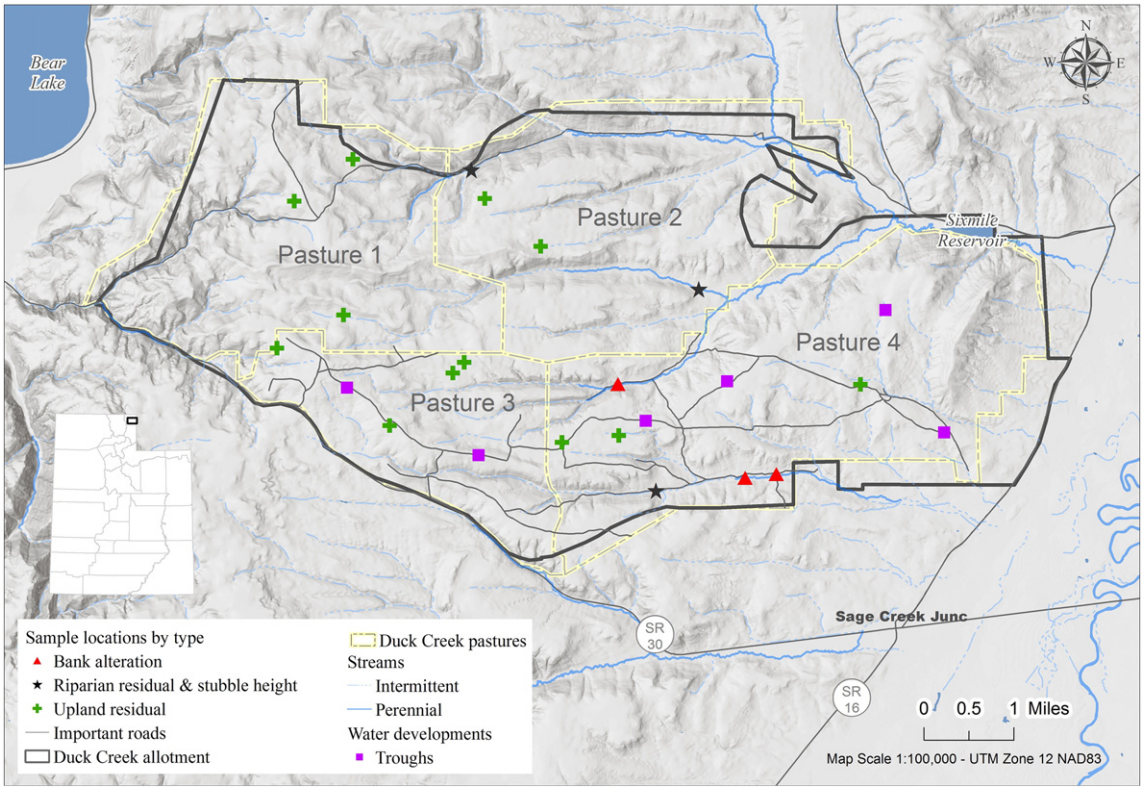

Figure 1. Map of the Duck Creek Allotment.