Year-round forage systems extend the grazing season

How do I plan a year-round forage system? Dr. Bruce Anderson of the University of Nebraska and Keith Harmoney, KSU Agriculture Research Center, Hays each presented strategies for extending the grazing season at the Feed, Forage and Pasture Conference held November 30, 2004 in Wakeeney, Kansas.

The keystone of most grazing systems is warm- and cool-season perennial grass. Supplemental forages can be added to a grazing system to provide high-quality grazing during periods when grasses are of low quality. Annual cereals such as wheat (winter or spring), oats, rye and triticale can be used during the fall and winter. Summer annuals such as sudangrass, forage sorghum, sorghum-sudangrass crosses, millet, cane and Italian ryegrass provide high quality forage late in the summer when native range quality is declining. Corn can also provide high quality forage throughout mid- to late-summer and can even be left standing for grazing during the winter.

Broadleaf crops such as turnips, rape, chicory, canola and kale can provide very high quality forage during late spring and early summer, and again in the fall after native warm-season grasses quit growing. These highly digestible winter crops are equivalent, nutrient-wise, to a concentrate ration and should be offered along with a higher fiber forage such as prairie hay, straw, stalks, or dormant grass to prevent stomach disorders. Soybeans make an excellent forage crop when harvested up to the 90% pod fill stage. Late maturing varieties generally have greater yield, so varieties with longer growing seasons than are typical for grain production could be used. Amaranths grow quickly during hot, dry summers and have digestibility in the vegetative state similar to alfalfa.

Annual supplemental forages typically proliferate by seed, have small root systems and low carbohydrate reserves. They are generally more responsive to incremental rainfall and partition resources largely towards producing vegetative growth which can be grazed. Vegetation can be grazed to the ground at the end of its life cycle since there is no expectation of regrowth the next season. This allows nearly 100% utilization, compared with the 40-50% utilization recommended for native range which must have reserves left for regrowth. Crops can be interseeded so that a second forage is growing well by the time the first forage is depleted, or two crops

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Current Rangeland Issues-
Winter Feeding Grounds

It is January and winter has arrived in Kansas. With ice and snow across much of the state, many producers are probably feeding hay to livestock. Where should these winter feeding grounds be located and what impact can they have on water quality?

Many times winter feeding grounds are located in areas with protection for the livestock, such as behind windbreaks, or where it is convenient, just inside the gate or on top of the hill. Sometimes hay is fed on a lower slope near the creek where trees provide cover and protection from the weather. Protection for animals during cold and/or wet weather is fine but it can have some negative impacts if the winter feeding grounds are always tied to these sites. Concentration of animals on a regularly used winter feeding location in rangeland and pasture will result in a reduction of vegetative cover and accumulation of manure. If the winter feeding ground is near water, the lack of vegetative cover will increase runoff resulting in the potential for pollution with phosphorus, nitrogen, sediment, and fecal coliform. Moving the feeding area away from the water source and maintaining a vegetative buffer or filter strip can help reduce or eliminate potential pollutants from contaminating the water. Rather than feeding in the same location all winter long, consider moving where the livestock hay is fed. Try to unroll big round bales or feed hay in areas of the pasture that were under utilized the previous grazing season.

Another potential problem associated with feeding hay is the concentration of wasted hay and manure. This combination, along with the right temperatures and moisture is the perfect breeding ground for stable flies. These biting insects are not only a nuisance but can significantly reduce animal performance. Feed only the amount of hay needed by the animals to reduce wastage. Consider spreading the wasted hay and manure to decrease the subsequent fly population.

New Project at KSU looking for farmer-participants

A KDHE funded project; “Citizen Science,” is ready to distribute water testing kits and conduct consultations with farm operators in 2005. Requirements for participation include having already completed the “River Friendly Farms” notebook, available through KSU or the Kansas Rural Center programs, and a willingness to perform a series of water tests on land that you farm or manage. These tests can include farm ponds, streams, other livestock or human water sources, and run-off from fields. The goals of water sampling are to determine where water quality problems may be coming from, and then design cropping systems, structural, or livestock management solutions to solve them. Data are confidential, and collected by farm family members or their employees. Possible water tests include one or more of the following: pH, nitrate, ammonia, phosphorus, turbidity, E. coli, and triazines. For more information about the program or about the tests see the website www.oznet.ksu.edu/kswater. For a copy of the River Friendly Farms notebook see www.oznet.ksu.edu/rff, or contact a KSU Watershed Specialist. If you would like to participate in this program, contact Rhonda Janke at 785-532-0409, rjanke@oznet.ksu.edu, or Morgan Powell at 785-532-2932, mpowell@ksu.edu.

Overgrazing

“When a plant has been grazed a second time before it has recovered from the first grazing.”

cont. from previous page can be used together. Annual legumes such as winter peas, cowpeas, and hairy vetch added to cereal crops reduce or replace nitrogen fertilizer and increase forage quality. Oats and turnips are a good mix but will likely need irrigation in the western part of Kansas for consistent production.

Utilizing alternate forages requires more planning than simply turning cattle out on grass in the spring and feeding them all winter. However, supplemental forages can offer substantial cost savings over hay and will also protect water quality by reducing or eliminating winter feeding sites.
KDHE’s Livestock Waste Management Program

KDHE has regulated confined animal feeding facilities since the late 1960’s. In 1994, Senate Bill 800 established the requirement that confined animal feeding facilities stay certain distances away from habitable structures. In 1998, House Bill 2950 established stricter requirements for swine producers. To read the current statutes and regulations that apply to confined animal feeding facilities go to: www.kdhe.state.ks.us/feedlots.

A confined animal feeding facility is defined as any lot, pen, pool or pond which is used for the confined feeding of animals or fowl for food, fur or pleasure purposes; which is not normally used for raising crops; and in which no vegetation intended for animal food is growing.

Today, KDHE regulates approximately 3,200 confined animal feeding facilities across the state. KDHE issues two types of permits, a state permit (for facilities with less than 1,000 animal units) or a combined state and federal permit (for facilities with 1,000 animal units or more). Permits are issued for five years. The permits are unique to each facility and will contain certain operating conditions, and monitoring and record keeping requirements. KDHE also issues certificates of compliance. A certificate of compliance means that KDHE has determined that the facility, based on the way they operate, does not require a waste control permit. To be issued a certificate of compliance, a facility cannot have any waste control structures like a lagoon.

The process leading up to a permit or a certificate of compliance includes the following steps. First, a facility with 300 animal units or more, must register with KDHE and pay a $25 fee. Once a facility registers, KDHE district staff will assess the site and determine if they need a permit. If they need a permit, KDHE will request that the facility complete a permit application and provide supporting documentation, including names and addresses of property owners and owners of habitable structures within one mile. A permit fee is also required with a permit application. The fee is based on the size of the facility. The fee structure is as follows: $25 for 999 animal units or less, $100 for 1,000-4,999 animal units, $200 for 5,000-9,999 animal units, and $400 for 10,000 animal units or more.

During a site assessment, KDHE looks for the following items: distance to creeks and streams, distance to habitable structures, soil type, location of nearby wells, static water level in nearby wells, groundwater information, slope of the land, direction of rainfall runoff, buffer size, how waste will be collected and stored, location and topography of the land use for waste disposal, whether or not there is enough land for waste disposal, etc.

If a facility has a significant potential to pollute Kansas waters, regardless of size (even those with less than 300 animal units), KDHE will intervene and require the facility to make some changes to reduce the potential to pollute. This can apply to winter-feeding operations. It all depends on the location of the facility and the way it is operated. If KDHE investigates a complaint at a winter-feeding operation and determines it has a significant potential to pollute, KDHE will work with the facility to make changes to reduce the potential to pollute. These changes may include establishing a buffer area between the lots and the creek, building control structures such as sedimentation basins and lagoons or the changes may include relocating the facility to a better-suited site.

Many resources are available to livestock producers to help them with improvements at their facilities. KDHE regularly encourages facilities to contact K-State Research and Extension Watershed Specialists, the Kansas Rural Center, county NRCS offices, county Conservation Districts and county Extension Agents for help with best management practices and cost-share assistance.

In conclusion, remember that each facility is unique and may require different best management practices to prevent water pollution. Also, if you have any questions about the program, it is best to call KDHE directly and get them involved from the beginning. For further information, please call 785-296-6432 or go to our website at www.kdhe.state.ks.us/feedlots.

Claudia Elkins
KDHE Environmental Scientist
Livestock Waste Management Section-BOW
Too many users and too little water. Here are some solutions.

Seven of the 13 water projects are focused on the High Plains aquifer region. The aquifer is the source of water critical to the economic and social well-being of western Kansas. The state’s past policies that fostered development, right for the time, are in transition because ground water is generally being used at a rate greater than the system’s natural ability to recharge.

The High Plains aquifer varies in the amount of water in storage, the rate water moves through the system and the concentration of use. Some areas, based on past water decline trends, are projected to have adequate ground water for more than 250 years. In other areas, it’s less than 25 years.

To deal with the differences, Groundwater Management Districts (GMD) Nos. 1, 3 and 4 are identifying aquifer subunits and tandem water use management plans. These plans will set water use goals and priorities and design strategies to achieve them. Voluntary and incentive-based steps to conserve water will be encouraged to avoid regulatory action whenever possible.

Voluntary water use reduction plans and enhanced regulatory controls are expected to restore greater balance in the Middle Arkansas River, Rattlesnake Creek and Pawnee River/Buckner Creek subbasins. The state and GMD 5’s proposed purchase of the Circle K Ranch in Edwards County and retirement of the water rights would play a significant role in balancing the water budget of the Middle Arkansas River subbasin. The irrigated land taken out of production would be managed by the Kansas Department of Wildlife and Parks as a wildlife area open to public hunting and other recreational uses.

“The proposed solution for restoring stream balance in the Middle Ark stands to be a workable partnership between water users, the state and our district,” says Sharon Falk, Manager of Groundwater Management District No. 5.

An incentive-based pilot program, the Irrigation Transition Assistance Program, would provide grants to irrigators who voluntarily convert to non-irrigated land use in high priority, water-short areas. The program will be targeted to areas that address public benefits including aquifer stabilization and public ground water supplies. Availability of funding from state, federal or other will dictate the extent of the program.

Ground water supplies also are being challenged by the invasion of water thirsty salt cedars and Russian olives in and along western Kansas rivers. Mechanical, chemical and biological control methods are being studied to determine the most effective combination of controls.

Salt-impaired water quality also is an issue in the Arkansas River east of the Colorado/Kansas line. Negotiations are underway with Colorado to devise improved irrigation practices for Colorado irrigators to prevent elevated salt levels. These steps will make a difference to Kansas irrigators and communities.

In northwestern Kansas, irrigators of the Almena Irrigation District have entered into a two-year rental agreement with the state to limit its water withdrawal from Keith Sebelius Reservoir to enhance recreational opportunities. Discussions continue to find a more permanent solution.

DWR is seeking a blended approach to water management, which will include both voluntary and regulatory strategies. The voluntary management strategies can be met in a number of ways. The working group established a list of management options ... the acquisition of Circle K Ranch and the proposed Irrigation Transition Assistance Program (ITAP) would assist in meeting the overall voluntary management strategies.

The acquisition of Circle K Ranch by the state of Kansas would provide approximately 6,600 acre-feet of the 2015 water conservation goal. In addition, discussions have taken place between state agencies and Groundwater Management District No. 5 for a possible partnership to purchase the ranch.
Agricultural producers face the ongoing and increasing challenge of having a profitable business while also satisfying public expectations for natural resource management. This can be particularly challenging in rapidly developing areas such as the land around public water supply reservoirs. To help producers avoid conflict related to issues like water quality, K-State Watershed Specialists and water quality program staff provide a variety of educational support and services including quick-and-easy self-assessments, agricultural extension bulletins, workshops, pasture maps and one-on-one assistance.

Agencies responsible for water quality use both regulation and voluntary programs to help ensure that water is suitable for designated uses like drinking and recreation. Although they are obligated to respond to complaints, they generally prefer voluntary programs because regulating water quality associated with land use like agriculture is expensive and divisive.

The agricultural community can address challenges associated with public expectations on two fronts. First, improvements can be made in public perception of agricultural land stewardship and second, measurable improvements in water quality can be made.

Improvements with the voluntary approach require the availability of management options which are practical and economical. Fortunately, a lot of things already being done in agriculture can provide substantial water quality benefits. For example...

- Fall and winter grazing (wheat, rye, crop residue, fescue, native, other)
- Calving on clean well-grassed pastures
- Cleaning feed sites and applying manure as fertilizer
- Reducing wasted feed
- Developing new watering sites

These are just a few examples. You could probably help us learn more about these practices, as well as identify other practical water quality protection practices. By applying such management practices and explaining their benefits and limitations to other producers, you can potentially improve your bottom-line, improve the public perception of agriculture and enhance the natural resources important to you and others in your area.

To learn more about our educational resources or to share your management experiences contact Will Boyer at 785-587-7828 or Walt Fick at 785-532-5223.

Potential solutions considered in this grassroots effort are tied closely with the need for education and awareness, and minor changes in management practices. Common practices that could result in pollution often occur due to a lack of awareness rather than purposeful neglect. Events such as driving tours and town hall conversations, as well as educational programs and media announcements, can help raise awareness.

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**Water quality trading provides incentives to meet goals**

Dr. John Leatherman, Associate Professor in Agricultural Economics at Kansas State University, presented the topic, “Is Water Quality Trading a Policy Option for Kansas?,” at the Watershed Management Seminar held in Lawrence, KS November 4. Dr. Leatherman explained that water quality trading utilizes economic incentives to encourage point and nonpoint pollution sources to improve water quality and meet water quality goals.

Suppose all pollution sources were responsible for achieving a certain amount of pollution reduction for a given pollutant within the watershed. It might cost an industry much more per unit of pollution reduction to implement elaborate cleaning technology than it would for a rancher to modify some structures or operations. If a source reduces pollution beyond the level required for that source, credits are generated, which can be sold. The industry facing high costs for pollution reduction onsite may welcome the opportunity to buy potentially lower cost credits from the rancher. Economic benefits often accompany improving water quality. The rancher may be able to achieve better water quality, economic benefits, and have her or his monetary costs more than compensated by an industry as well.

A variety of water quality trading (pollution credit) programs exist in several states, based on the needs of the watershed. Stakeholder involvement is critical in the design of such programs since, without their support, the program may not succeed.

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Review of articles from the Grassland database

Life on the Edge: The Ecology of Great Plains Prairie Streams


Grassland streams, characteristically intermittent, undergo flooding and drying. Organisms, such as microbes, macroinvertebrates and fishes, have adapted to these extremes – to “life on the edge” – on the border of land and water. Disruption of prairie stream hydrology from human activities throughout a watershed affects both physical attributes of prairie streams and life in and along those streams. This subsequently influences water quality downstream.

Refugia are critical elements in the ecology of streams. The presence of permanent pools upstream and subsurface water provides habitat important to the survival of some macroinvertebrates. Following a dry period, these refugia may make the difference between life and death for organisms that do or do not find them. Following a dry period, the survivors become the first to colonize the stream and perform their roles in the food chain and other ecosystem functions. However, water extraction, diversion, and other human practices have contributed to lowering water tables, furthering stream drying and the loss of refugia.

Fish also need refugia, such as eddies and complex habitats that provide protection from high current velocities during floods. The smaller the fish, the less swimming strength it has. Thus, small species or juveniles of larger species may be carried downstream during floods when refugia are lacking. Subsequently, impoundments may limit fish movement and recolonization as well as fragment populations.

A conservative estimate puts the loss of Tallgrass Prairie at 95% of its original area (Samson & Knopf, 1994). The remaining prairie fragments often do not cover a functional watershed. Pesticides, channelization, urbanization, etc. impact these fragments, further endangering prairie streams and clean surface water in North America. Although protection and conservation of prairie remnants may be possible, protection of entire watersheds for healthy prairie streams is more difficult.


Reviewer’s note: Both upland and riparian management affects prairie stream ecology. Good vegetative cover is important for good infiltration and reduced runoff. Poor infiltration, increased runoff, and lack of or unhealthy riparian vegetation can lead to exacerbated flooding, longer dry periods in soils (including uplands) and streams, lower water tables, and incised channels – resulting in refugia loss as well as preventing peak prairie functioning. In addition, well functioning channels and healthy riparian vegetation provide the “complex habitat,” as termed by Dr. Dodds, that fish require.

Healthy watersheds are important to everyone and that includes nonhumans. Your part of the watershed counts! Community involvement is the idea behind and the key to success of the Watershed Protection and Restoration Strategies (WRAPS) being developed and carried out in watershed basins across the state.

Notice: There is now a more direct link to our project (GLWQ) digital library collection. To use this link to the GLWQ collection on the KSU Hale Library (CATnet) portal, from our home page, select the “Search Digital Library” link.

The primary difference between the “Digital Literature Library Instructions” link and the “Search Digital Library” link is that the former allows the user to search only our project’s digital collections (or not) and the latter allows searching just the GLWQ digital collection.

Garry Harter

Larry Huber
Drying – “For research in eastern KS, defined as complete loss of water in all but spring-fed reaches of intermittent first- to third-order stream channels. (Stream order is a method of categorizing stream size; first-order channels are the smallest, two first-order channels merge to form a second-order channel, two second-order channels form a third, and so on.)” (Dodds et al 2004)


Riparian – “Relating to or living or located on the bank of a natural watercourse (as a river) or sometimes of a lake or a tidewater.” (Merriam_Webster Online. Retrieved January 5, 2005, from http://www.m-w.com/cgi-bin/dictionary?book=Dictionary&va=riparian)

Riparian Area Management: Using Aerial Photographs to Assess Proper Functioning Condition of Riparian-Wetland Areas


Key Number 2557 in the Grazingland Water Quality Literature Database.

One in a series of Bureau of Land Management (BLM) publications, this easy-to-read technical reference provides an overview for using aerial photos to assess proper functioning condition of riparian and wetland areas over large areas efficiently. Once identified, problem areas can be addressed and management changes implemented as needed.

1. Gather Existing Source Material. This includes past inventory data (if it exists), U.S. Geological Survey topographic maps (7.5 minute, 1:24,000 scale recommended), and the best photos available. Color infrared (CIR) film is particularly valuable for scrutinizing water and subtle vegetative properties. Photos taken in mid- to late-summer provide the best vegetation, width/depth ratios, and erosion deposition signatures.

2. Analyze Equipment Needs. Mirror stereoscopes with 4X-10X generally provide needed magnification while still maintaining a large field of view. Light tables, essential for film transparencies, also sharpen images for paper photos. Drafting pens for comments and mylar paper to protect the photos are also helpful.

3. Define Reach/Area. The defined reach should be a long enough to treat as a manageable unit. Using a topographic map and photo together illuminates channel confinement within the valley, sinuosity, and gradient for further definition.

4. Interpret Aerial Photos. Clearly mark beginning and endpoints of the reach on an overlay. Use photo interpretation keys and a PFC (see below) checklist for each reach. A quote of one interpretation key based on the use of CIR film follows:

Floodplain inundated in “relatively frequent” events (1-3 years),
- Evidence of matted vegetation & debris on the active floodplain.
- Active floodplain (first terrace) is close to the same level as the stream.
- Absence of steep vertical banks adjacent to the active channel.

- Bright red spectral response of vegetation next to the water.

Reviewer’s note: Although a trained interdisciplinary team carried out this particular project in several western states, landowners may be able to see trends and understand much from viewing current and historical photos based on their familiarity with their land.

Proper Functioning Condition – Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality; filter sediment, capture bedload, and aid floodplain development; improve flood-water retention and ground-water recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics to provide habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity. (Prichard et al, 1996).

Wildfire Wanderning

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Know Your Plants to Protect Your Watershed


“Know Your Plants to Protect Your Watershed” (GLWQ Key #3106) is a ‘fact sheet’ type publication put out by the Texas Agricultural Extension Service – but it is also relevant to water resource managers here in Kansas. In this publication, Barron Rector, Associate Professor and Extension Range Specialist at Texas A & M University states: “Each landowner or manager should be able to identify most of the plants growing on his or her land, understand their value to the ecosystem, and know how to use them to monitor the health of the land and the watershed.”

He stresses that using common names for plants has two major drawbacks – common names used incorrectly – such as referring to ‘grama grasses’ lumping sideoats grama, tall grama, red grama, etc. together as if they were one species, or, more importantly, behaved the same under similar management. The second drawback is that there may be more than one common name for the same plant. When one can accurately identify plants, a wealth of knowledge becomes available – in the form of Extension publications, journal articles, internet references, etc. for use in management.

Rector says plants grow where they can adapt to conditions. Specifically he offers: “Because different plants have different requirements, the plants that are presently growing on your land can indicate the kind of environment that exists there.” Further he states that plant communities change over time (succession) and such changes need to be monitored. Knowing what plants are in a watershed and how they are changing is an important component for assessing the health of the watershed – primarily because plant species composition is used to determine range condition. Weeds and/or annual forbs are seasonal, and unlike perennial communities, cannot be counted on to provide adequate cover which reduces soil erosion and transport of organic and anthropogenic (human-produced) chemicals into water resources.

There are a variety of KSU Research & Extension publications useful for plant identification/management such as: Rangeland Grasses of Kansas” (C-567) http://www.oznet.ksu.edu/foreaging/pubs/C567.pdf or “Rangeland Weed Management” (MF1020) http://www.oznet.ksu.edu/library/crpsl2/mf1020.pdf and Establishing Native Grasses (MF2291) http://www.oznet.ksu.edu/library/crpsl2/mf2291.pdf

Further, there is a wealth of information available on-line, such as the USDA’s “Plants” database at: http://plants.usda.gov/ or the “Plant Image Gallery” at: http://www.noble.org/imagegallery/ that agricultural resource managers can use to help assess, protect, and better manage water resources.