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BARNYARDS & BACKYARDS

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From wallet to production – UW Extension materials still on target

Scott Cotton
UW Extension Area Educator

Scott Cotton

Whether your pocketbook, yard, stable, field or herd, UW Extension still offers powerful materials to enhance profitability, knowledge and quality of life.

Articles in this year's edition of the UW Agriculture and Horticulture Barnyards & Backyards newspaper insert are as diverse as the nature and residents of Wyoming.

These authors continually upgrade their expertise and materials with one goal – providing you the best reviews of research-based information, which can be quickly applied to issues and problems across the state and region.

Close to home, you will enjoy considering using your own hydropower system, growing fruits, healing trees and keeping horses healthy. Imagine using water in your own yard or acreage to generate power or cashing in on a small fruit crop each year.

We hope you enjoy the informative articles on irrigation, pest control, livestock nutrition, cattle market analyses and related issues. Agricultural production to remain profitable requires intense focus and use of the best techniques and information. This challenge includes adjusting and surviving climate events and disasters. Wyoming as a whole relies on a healthy agriculture industry.

Some of the subjects are updates on existing information, such as water and disease, and yet others are shiny and new information. No matter which type of information, UW Extension educators and specialists will be out in your communities reviewing research, generating understanding and providing education that addresses your needs.

UW Extension's agriculture/horticulture educators and specialists team provides programs across the state on these and many other topics every year. These resource people and others from UW are embedded parts of your communities with over a century of dedication to helping Wyoming citizens live better, safer and more profitable lives. Check your local extension office to see what programs are coming up in your community. See www.uwyo.edu/uwe/county for a listing of offices and contact information and www.wyomingextension.org/news for articles about UW Extension and the College of Agriculture and Natural Resources.

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Reducing agricultural risks during blizzards requires old-school attitude, new technology awareness

Scott Cotton

Agriculture producers in Wyoming and adjacent areas face blizzard potential every year. In most cases, the blizzards that generate the worst impacts are those that:

- are heavy snow;
- occur at an unusual time;
- occur when animals have increased vulnerability; or
- several of these factors acting together. When this situation develops, we usually experience loss of livestock.

In all cases, a producer's ability to prepare, find livestock, get access to livestock, feed livestock and provide protection to livestock are key elements of mitigating the impacts of blizzards. A blizzard is less of a disaster and more of a time and finance inconvenience if all are addressed.

Create Where You Want Them to be

Finding livestock before, during or after a blizzard is the first step. Traditional approaches included, "Put them where you want them to be and know how the storm will move them." Exceptional modes of transportation may be needed to seek and find livestock, such as airplanes, snow machines and heavy equipment. If you do not have the equipment, it pays to identify which neighbors or agencies do have access to needed equipment.

New technology has the ability to look at high-resolution satellite images and locate livestock, but most commercially available services such as Google Earth do not have a rapid enough photo refresh rate. Military and government satellites do have such updates but are seldom available for agricultural uses. Finding livestock will depend on knowledge and area resources.

Getting access to livestock during or after a blizzard is all old school with the exception of high technology maps for routing and GPS devices to

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Small fruit varieties sweeten palates, add beauty to landscapes

Scott Hininger

Several cold-hardy small fruit varieties are grown in Wyoming and can sweeten and add nutrition to your table.

All small fruit prefer a sunny location with good drainage, preferably a neutral soil ph and they like plenty of moisture and fertilizer. Ph tests are available and easy to use from most places that sell plants or contact your local extension office.

Incorporating plenty of organic matter in the soil before planting will boost the soil health, and using a fertilizer with sulfur will temporarily lower the ph.

Strawberries

Strawberry varieties are classified as June bearing, everbearing and day neutral.

June-bearing varieties tend to produce the most flavorful, aromatic berries. Some recommended June bearers (one crop) for Wyoming are Guardian, L'Amour, Honeoye, Redchief, Delite, Jewel, Mesabi, A.C. Wendy, Cabot and Cavendish.

Everbearing strawberries typically provide two main crops each year, with small amounts of fruit produced between the main crop in June and a lighter crop in late summer or early fall. Common everbearing varieties include Ogallala, Fort Laramie and Ozark Beauty.

Day neutral varieties are similar to everbearers, but flower and fruit more consistently over the summer. Recommended day-neutral varieties include Tribute, Tristar.

Generally, replace strawberry plants every three to four years for best production.

Raspberries

There are two growth-types of raspberries: summer bearing and fall bearing.

Summer-bearing varieties produce flowers and fruit on canes that are in their second year of growth.

Fall-bearing varieties produce flowers and fruit on canes that are in their first year of growth. Recommended fall-bearing raspberries include Autumn Britten, Anne (yellow-fruited), Polana, Jaclyn, Joan-J (nearly thornless), Himbo-Top, Caroline, Heritage, and September.

By planting both types, you'll have early and late-season bounty of fruit.

Twenty-five feet of row should produce 15 to 20 pounds of raspberries per year. Cut off the spent floricanes of summer-bearing varieties at the ground after they bear fruit. Dispose of these canes – they often harbor insects and disease. In the spring, remove the dead, weak and small canes. Remove winterkilled tips of the remaining canes.

Mow or cut the canes of fall-bearing varieties to ground level after the fall harvest. New canes will be produced in the spring.

A V-shaped trellis is handy to keep this year's growth separate from last year's growth, which produced berries.

Elderberry

Elderberry plants are truly multi-purpose. Growing your own offers many unique benefits. Plant several in a row to create an attractive hedge or screen, or use them as wildlife attractants to bring even more natural beauty to a backyard.

An elderberry plant features magnificently scented white flowers in spring and, in summer, will produce a bounty of dark, purple-black berries not found in many grocery stores. Berries from the elderberry plants can be eaten fresh as long as they are fully ripe, although they are commonly used for making delicious wines, jams, sauces and pies. You can also use the flowers for making fritters, pancakes or tea.

Goji Berry

For something different, try goji berry plants, which are extra-sweet, extra-nutritious and anti-oxidant-jammed. Plants produce a valuable harvest you can freeze, dry or juice, in addition to enjoying the just-picked berries. In spring, these easy-care and pest- and disease-resistant plants develop showy purple flowers against gorgeous green foliage. Plants grow well in almost any well-drained soil and are also drought tolerant. In early summer, fruit will begin to ripen into brilliant red, little oblong fruits that will continue coming until a heavy frost.

Honeyberry

Honeyberry plants are members of the honeysuckle family and produce clusters of unique, elongated blue berries with a high level of antioxidants and a sweet, blueberry-like flavor good for fresh eating or making preserves. These are long-lasting plants with a life span of up to 50 years! They are cold hardy and ripen in early summer. These fruit producing shrubs require a pollinator, and it is always good to have two.

Many of these berries can be found in local nurseries, or check several of the online catalog companies. Be sure to check that the plants are zoned for Wyoming, unless you have a protected spot out of the wind, then a zone 5 plant may work.

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Master Gardeners know how to grow

University of Wyoming Extension Master Gardener volunteers are trained to answer and assist residents in their communities facing horticultural and landscaping questions.

UW Extension educators and experienced professionals train Master Gardeners in botany, soils, flowers, trees, shrubs, lawns, growing fruits and vegetables, season extension, water management, plant nutrition, integrated pest management, pesticide safety and diagnosing plant problems.

They receive approximately 40 hours of education on these topics with information specifically related to Wyoming growing conditions. They also receive *Sustainable Horticulture For Wyoming: A Master Gardener Handbook.* Fees cover all educational materials and approximately 40 hours of training.

After completing training, Master Gardeners give back to their communities through volunteer service. Volunteer activities are coordinated locally to address local needs and opportunities. Some examples of volunteerism include diagnosing plant problems and offering advice to other gardeners, public speaking, hands-on gardening workshops, farmer markets, community gardens, plant clinics and information booths. The goal of the Master Gardener program is to extend gardening knowledge to everyone interested.

Some Master Gardeners far exceed their community service requirement. Two Goshen County Master Gardeners logged 835 and 505 hours respectively in 2013.

Whether a beginning gardener or with years of experience, after completing training, Master Gardeners take away knowledge and skills that make them better gardeners. Many Master Gardeners continue with the program for years and years. The longer a Master Gardener stays with the program, the more they learn.

UW Extension educators and active Master Gardeners offer advanced education to build on your base of knowledge. Master Gardeners typically enjoy the social aspect of learning together, volunteering together and helping others.

If interested in gardening, want to learn more, and want to help your community grow, consider joining the Master Gardener program. To learn more, please contact your local UW Extension office or Chris Hilgert, UW Extension Master Gardener coordinator, at 307-766-6870 or chilgert@uwyo.edu. Master Gardener program information is also available online www.uwyo.edu/mastergarden

Winter hoof care helps provide healthier hooves rest of year

Jenny Ingwerson

Don't overlook winter hoof care for your horse.

The same amount of time should be dedicated to hoof care year-round to maintain a healthy hoof.

Winter often means less riding and is an opportune time to remove shoes if horses are not ridden extensively. Shod horses in winter often increase the chance of hard-packed snow in the foot, and horseshoes are very slick on ice. This creates safety risks for the horse and rider. Most horses have better traction on snow and ice when shoes are removed. Regularly picking out the horses' feet will help prevent snowpack. Removing horseshoes in winter can also enhance the overall health of a horse's feet. Removing the shoe can aid in thickening the hoof wall, increasing the depth of the sole, expanding the heel and many more benefits.

Horse hooves grow slower in winter, but routine hoof care is still important. Hooves should be trimmed regularly at approximately six- to eight-week intervals while being unshod to prevent cracks and breakage. This interval depends on each horse and the amount of hoof they grow.

If shoes are required for winter riding, pads may protect the sole from bruising caused by hard-packed snow or uneven, frozen ground. Packed snowballs under the foot may compromise a horse's balance and can be very dangerous to the horse and the rider. Horses with accumulated, hard-packed snowballs are more likely to develop foot pain, sole bruising, abscesses, strained tendons and ligaments, etc. A farrier can help select the most beneficial type of pad to use. Pads may be plastic, rubber or leather, each with its own advantages and disadvantages.

Traction can be added to horseshoes to increase safety for rider and the shod horse. Borium welds added to the heel and/or toe of the shoe can provide traction. Working with your farrier is important as excessive mounds of borium welded to the shoe can lead to unnecessary, additional strain on the legs of the horse.

Studs can also be added to the shoe for increased traction. Studs can be drive-in, which are permanent, or screw in, which are removable and changeable to smaller or larger studs as needed.

Time and attention to hoof care over the winter can benefit your horse with a stronger, healthier hoof the rest of the year.

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Check calving supplies before first one arrives

Kellie Chichester

With calving time just around the corner (or perhaps it's already arrived for many!), take inventory and ensure necessary supplies are on hand.

Every calf counts with cattle prices higher than ever. Time, money and the best genetics have been invested, and you've worked endlessly to provide water, feed and mineral to keep the cows and bulls healthy. Now, sort cattle according to their nutritional needs as younger and older animals often need a little extra feed.

Your first-calf heifers are working overtime. They are still growing and also growing a calf. She will be at her highest level of nutritional requirements as soon as that calf hits the ground. Don't have her start this task in a deficit nor have her fall out of the herd due to not breeding back. A quick body condition scoring assessment can help determine those that may need a bit more energy prior to calving.

For details on how to body condition score, check out this tutorial http://beef.unl.edu/learning/condition1a.shtml.

Take a look at facilities once the herd's health is assessed. Most producers have a well-stocked vet supply room. A South Dakota State University publication has a list of items that may need replacing or purchased for the calving season. Some of those include, but are not limited to:

- Disinfectant for chains and equipment
- Disinfectant for calf's navel (different than what is used for equipment)
- Antiseptic soap for washing the cow
- OB sleeves
- OB lubricant
- Syringes and needles
- Colostrum replacer
- Milk replacer
- Electrolyte powder for scouring calves
- Tubing bags/esophageal feeders
- Nipples for milk bottles
- Medications/preventatives as outlined by your veterinarian
- Ear tags and markers
- Tagging gun
- ·Halter or rope

Check your supplies and the condition. Are all of the pieces of the calf puller there and operable? Are the chains in good condition? Are any medications past expiration dates? Have they been stored properly to avoid the extreme heat or cold? Are there enough syringes and needles? Remember, you may be doctoring calves; you might want to get smaller-gauge needles for them. Do you have colostrum replacer on hand, either powder or frozen? Is the esophageal feeder in working order? Was it cleaned and stored properly to keep it in working order?

These questions may be best discussed at a family meeting with one person assigned the task of taking inventory and replenishing supplies.

Facilities, if used, may need checked. Is your electrical system in good working condition? Have you cleaned off any barn lights to avoid a fire? Barn fires can be catastrophic during calving, not only if you have a barn full of animals, but also if you rely on the facility to protect newborn calves from the elements of Wyoming weather.

Be sure everyone who may be helping during calving season has the veterinarian's phone number memorized. You may just not be able to assist the heifer at all and need to call in your vet. This is not the time to be trying to find out who to call.

Calving is a high-stress time in the spring, but it can also be very rewarding. You have put in the time to select the best genetics for your operation. Now you can see that work running and playing. Happy calving!

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THE AGRICULTURAL ACT OF 2014:
Important programs for Wyoming livestock producers

The Agricultural Act of 2014 (farm bill) passage spells greater certainty for current agricultural policy and new risk management planning opportunities for Wyoming livestock producers.

Several new programs and options are available, along with changing the way crop production support payments are administered, that should benefit livestock producers – a new dairy support program, reworked Non-Insured Crop Disaster Assistance Program (NAP) coverage, a new whole farm insurance product, and reauthorized livestock disaster programs.

Livestock producers who have program crops in their operations should carefully review their information to determine which new farm program options fit best.

Dairy Margin Protection Program

The Dairy Margin Protection Program (MPP-D) provides dairy producers coverage when the milk price falls below the average calculated feed price. This margin is determined by the Farm Service Agency (FSA) and calculated using the National Agricultural Statistics Service (NASS) and Agricultural Marketing Service (AMS) prices for alfalfa hay, corn and soybean meal.

Dairy producers must establish a production history using their highest annual milk production year from 2011-2013. Once a production history has been established, coverage for 25 to 90 percent of this history can be purchased at a price of $4.50/cwt to $8.00/cwt (available in $0.50 increments).

Producers can purchase catastrophic coverage (CAT) for a $100 sign-up fee, which pays 90 percent of a producer's production history at the $4.00/cwt margin level. Premiums increase as coverage levels go up and range from $0.006/cwt to $1.36/cwt (depending on production level).

Payments are made when the actual production margin is lower than the coverage level for a consecutive two-month period; for example, where a dairy has actual production of 36,000 cwt with coverage level at 50 percent and $6.50/cwt. If the actual margin is calculated to be $4.50/cwt, the difference of $2 is multiplied by 50 percent and actual production (36,000 cwt) divided by 6, resulting in a payment of $6,000.

While the sign-up deadline for the 2015 year is now past, sign-up for 2016 is July 15-September 30. An online tool allowing producers to analyze their own production information and compare coverage is at www.fsa.usda.gov/mpptool. See Figure 1.

The new farm bill makes additional NAP coverage up to 65 percent at 100 percent of the established price (buy-up) available for certain eligible crops.

Grazed forages are not eligible for buy-up coverage; however, producers should keep in mind any payments for losses under NAP (up to $125,000) would be in addition to payments that may be available under the Livestock Forage Program (LFP), up to an additional $125,000. See below for more on LFP.

An online tool is available at www.fsa.usapas.com/NAP that assists producers in determining available coverage under NAP buy-up.

Enrollment for NAP coverage requires payment of $250 per crop enrolled, up to $750 per administrative county, and no more than $1,875 per producer. These fees are waived for beginning farmers, limited resource farmers or socially disadvantaged farmers or ranchers.

Whole Farm/Ranch Insurance

The Risk Management Agency (RMA) began offering Whole Farm Revenue Protection (WFRP) insurance with the 2015 crop year.

This policy provides coverage for all produced commodities on a farm (including those purchased for resale), with up to $8.5 million in insured revenue. The policy was tailored for producers of crops and livestock that may not be insurable under other programs – including specialty crop and livestock operations and direct marketing businesses.

Figure 1. *USDA's Forecast Dairy Margin*

The insurance could also provide coverage for the gap some livestock producers face under previously available insurance policies. WFRP differs from past programs in that it covers all commodities on a farm, including those purchased for resale.

WFRP allows producers to carry other RMA policies on crops produced. WFRP premiums are adjusted to reflect other coverages that may be in place (other coverages cannot be at the CAT level).

WFRP coverage can be from 50 to 85 percent of a farm's approved average revenue (determined by the farm's whole farm income reporting). Five consecutive years of IRS Schedule F reporting is required.

Each commodity produced must represent at least 8.3 percent of a farm's total revenue to qualify, and no more than 50 percent of total revenue can come from commodities purchased for resale.

Losses for a year are determined after the corresponding tax return is filed and will be paid when actual revenue drops below the insured revenue level (after certain adjustments).

Disaster Programs Reauthorized

Several livestock disaster relief programs were permanently reauthorized by the new farm bill.

The Livestock Forage Program (LFP) provides payments due to loss of grazing on native or improved pastures. Payments are triggered by drought designation via the U.S. Drought Monitor (see http://disaster.fsa.usda.gov). To be eligible, a producer must be in the D2 or higher designated drought county or have a fire/natural disaster designation. Payments are based on rates determined by FSA and can be for losses extending up to 180 grazing days.

The Livestock Indemnity Program (LIP) compensates producers for extraordinary livestock losses due to extreme weather events or predator attack. The program pays up to 75 percent of the approved market value for animals lost. Notice of the loss must be given within 30 days of the loss for each occurrence.

The Emergency Assistance for Livestock, Honeybees, and Farm raised fish Program (ELAP) provides payments to producers for losses due to natural disasters not associated with drought or fire that were not covered by either LFP or LIP. Livestock losses, feed shortages and losses associated with hauling water are covered. The livestock losses must be due to an approved event and cover up to 75 percent of the approved market value for animals lost.

Many have learned, with past versions of these programs, that good records are imperative to remain eligible for program payments. Death loss verification, grazing records/receipts, feed purchased, livestock headcounts and contracts/leases are just some of the necessary records.

For more information

Visit the Farm Service Agency's website at www.fsa.usda.gov for more information on the new farm bill programs including Noninsured Crop Disaster Assistance Program coverage, the Dairy Margin Protection Program, and disaster assistance programs or the Risk Management Agency at www.rma.usda.gov for information on insurance products.

Online tools developed by academic professionals are available at the Farm Service Agency's website to assist producers in evaluating many of the programs.

RightRisk has numerous farm bill resources available as well as other tools to guide producers through additional aspects of the new farm bill programs. Visit RightRisk.org/WY/FarmBill for links to recorded presentations, slide sets, handouts and links to other information.

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DATES TO REMEMBER

NAP Sign Up:
Most Spring-planted Crops
April 1

MPP-D (Dairy, 2016 crop year)
July 15-September 30

THE AGRICULTURAL ACT OF 2014:

New risk management opportunities for Wyoming farms

Passage of the Agricultural Act of 2014 by Congress offers many changes to farm bill programs and how they are administered.

The biggest change comes in the form of two new revenue insurance programs that replace the Direct/Counter-cyclical Payments program. Producers of program crops can add one of these options to their existing risk management strategy and have the opportunity to update their base acres – the first time since 2002.

New Revenue Insurance Programs

The previous farm program support payment structure has been replaced by two new programs: Price Loss Coverage (PLC) and Agricultural Risk Coverage (ARC). These programs take an insurance-based approach by making payments to producers when prices fall below target levels calculated on their base acres as determined by the Farm Service Agency (FSA).

PLC makes payments to producers when the effective price of a covered commodity is lower than the reference price as set by the farm bill legislation for the 2014-2018 crop years. The effective price is the higher of the market year average price or the national average loan rate.

Payments are calculated as 85 percent of the producer's base acres of the covered commodity times the difference between the reference price and the effective price times the PLC payment yield. The payment yield is the farm's 2013 counter-cyclical yield or can be updated as part of the sign-up process.

Remember, PLC payments are not affected by actual planted acreage; for instance, a producer with wheat base acres would still receive a payment even if no wheat acres were actually planted for the crop year.

DATES TO REMEMBER

ARC/PLC Election
March 31

NAP Sign Up:
Most Spring-planted Crops
April 1

A choice of PLC for a farm can also include the Supplemental Coverage Option (SCO), which gives producers the option of covering a portion of their crop insurance deductible, depending on availability. SCO indemnity and subsidy rates are based on the county or area yield loss.

ARC can be selected as county (ARC-CO) or individual level (ARC-IC) coverage. Following the county level coverage, payments are issued when the actual county crop revenue of a covered commodity is lower than the ARC-CO guarantee for the covered commodity.

Payments would be equal to 85 percent of a producer's base acres of the crop multiplied by the difference between the county guarantee and the actual county crop revenue for the crop as determined by FSA. The county guarantee is determined by the five-year average price (excluding the highest and lowest prices) times the five-year county average yield (excluding the highest and lowest yields in that period).

ARC-IC is similar except it uses a producer's individual crop data to determine the revenue guarantee. Payments are calculated as 65 percent of the sum of the base acres of all covered commodities on the farm times the difference between the individual revenue guarantee and the actual crop revenue across all covered commodities planted on the farm.

SCO is not available for either ARC-CO or ARC-IC coverage. ARC/PLC, base acre reallocation and yield update decisions are one-time elections, and the choices will remain in effect for the life of the current farm bill, through 2018.

Base Acre Reallocation

Producers also have the option of reallocating their base acres and updating their yields (CC yields). This choice will depend on how current a producer's base acres relate to their actual crop mix.

For example, if a farm's cropping rotation has changed and one or more commodities included in its base acres have not been grown over the past five years, the landowner may elect to reallocate those acres toward the crops currently grown on the farm.

Farm Example

The National Coalition for Producer Education (NCPE) led by the University of Illinois has developed one of two online decision tools producers can use to help make farm program decisions.

This tool (see fsa.usda.gov) allows producers to either view sample farm data or use their own custom farm information to compare how the ARC and PLC programs stack up over the coming five-year period.

Using an example Big Horn County farm with base acres of 360 acres of corn, 120 acres of barley, and 60 acres of oats, we can show how the base acres could be reallocated on a typical Wyoming farm. The farm's current cropping mix has managers moving away from planting oats, and, if they reallocate their base acres, the acreage mix becomes 364.16 for corn, 169.61 for barley, and 6.24 for oats.

The tool allows up to five years of yield history for each crop and to set projected prices (Congressional Budget Office [CBO], USDA, Food and Agricultural Policy Research Institute [FAPRI], or custom projected prices) depending on the manager's price expectation.

For the example farm, we will use November 14 FAPRI prices. The tool allows users to include their current crop insurance program in the analysis. Our example farm uses Revenue Protection (RP) at 85 percent coverage when available.

Results of the analysis can be displayed by crop for each scenario; in this case we compare PLC (scenario one) with ARC-CO (scenario two) and ARC-IC (scenario three), shown in Figure 1 below.

ARC/PLC Decision

The decision between ARC-CO, ARC-IC, and PLC depends on several factors: the farm's acreage mix and cropping plan will play a large role. Certain crops in certain areas are more likely to earn payments under ARC versus PLC. How actual farm yields compare to county yields should be carefully considered when examining programs for the coming five years.

The type and amount of crop insurance used to protect against deeper losses than the farm programs are designed to cover is also important. Finally, expectations about prices over the next four years will have an impact on which program might best fit each commodity in the base acre mix.

Tools and Resources Are Available

Sign-up and enrollment in the new farm programs is taking place with a short time horizon, and it is important for producers to begin assembling their information to make these decisions very soon.

There are several resources available to help producers understand how these new programs can affect their farms. Visit RightRisk.org/WY/FarmBill for links to recorded presentations, slide sets, handouts and links to other information about ARC/PLC and other important farm bill topics.

Informational links to the new farm programs, including the online decision tools available from National Association of Agricultural and Food Policy, led by Texas A&M and the NCPE led by the University of Illinois, are also included on the RightRisk page.

REMEMBER:

The choice of ARC vs. PLC for your farm must be made by the March 31 deadline. Failure to choose by that date results in an automatic PLC election and any payments for the 2014 crop year will be forfeited. On farmland that is rented or leased, everyone with an ownership interest and any operators must be in agreement on the ARC/PLC choice or the same assignment/forfeiture applies.

These tools allow a producer to input their individual farm information and compare projections on resulting payments from the different programs based on their price expectations.

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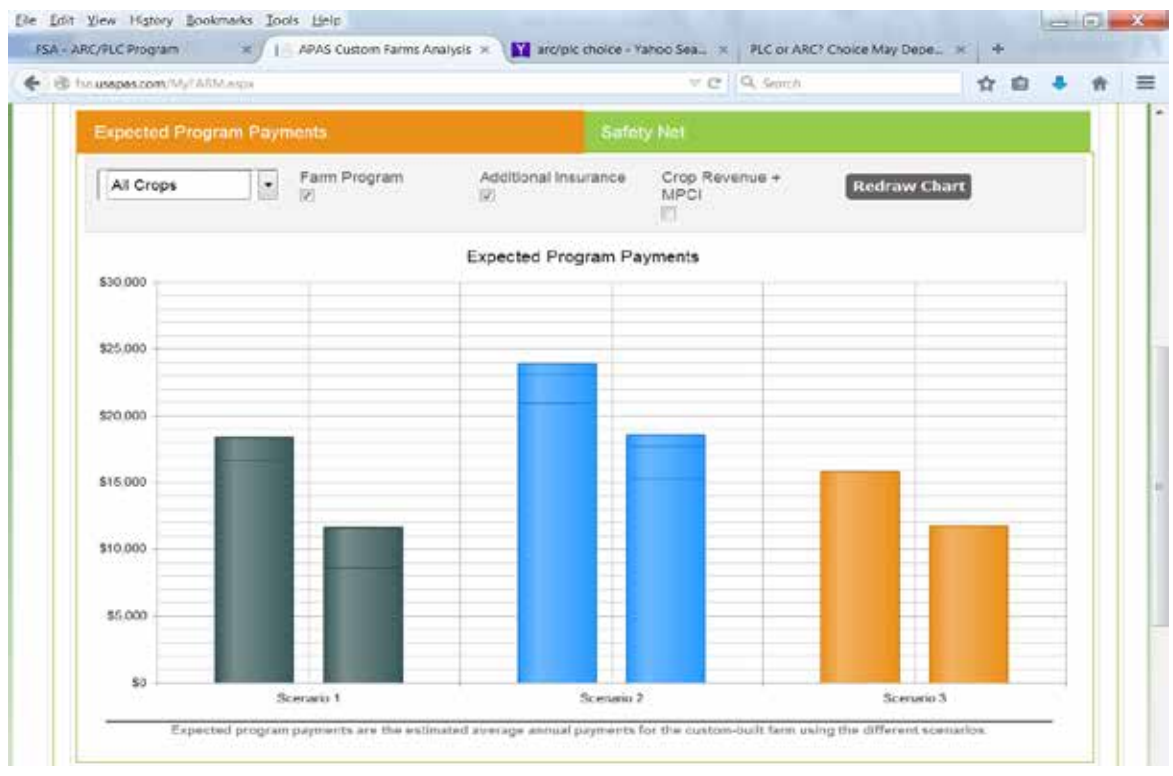

Figure 1. *Expected Payments for ARC/PLC over 5 Years on Example Farm*

Hydraulic fracking creates big demand for little bean but could be Wyoming hay or cover crop

Brian Lee

Guar bean (*Cyamopsis tetragonoloba*), also known as cluster-bean, is a nitrogen-fixing crop that may have value in Wyoming agriculture.

The crop was historically grown in the Middle East and India but has recently increased in acres in the United States, namely Texas and Oklahoma. The crop has been produced as an additive in food products as a thickener. Since 2011, hydraulic fracturing companies have mixed the bean extract, post processing, with water to extract additional oil and gas. Demand has increased exponentially.

The current guar bean market in the United States is very unstable, causing hydraulic fracturing and food companies to search for alternatives. This instability isn't being caused by unstable demand but by uncertain outlets for processing the guar bean.

Could be Hay or Cover Crop

There is little research and evidence to suggest guar bean will be a suitable production crop for Wyoming, but it may have some value as a hay crop and cover crop in certain settings. Guar bean does well in dry conditions. The plant requires little input and can help build and hold soils. Guar bean may be an excellent crop to work in as a rotation crop for green manure, or harvested, chopped and fed to livestock. One company, Green Cover Seed in south-central Nebraska, sells guar bean as a cover crop to improve no-till farming practices.

Only a few varieties are available in the United States, but the

most common variety is probably Kinman guar bean. The variety's 120-day maturity sits right at Wyoming's growing days threshold. Guar is often touted as a "plant it and leave it" crop. Extremely drought tolerant, the plant will require 20-30 lb/acre of phosphorus and 40-50 lb/acre of potassium. The planting rate is about 5 lb/acre in 30-inch rows, which can be done with a row crop planter or a grain drill in narrower rows. Pre-plant herbicides such as Treflan may be used for weed control. There are no post-plant herbicide options, although manual cultivation may be an option. Inoculant introduction to the seed before planting is suggested. A guar bean inoculant is available, and there is also research that suggests a cowpea inoculant may work.

Yields at Lingle

Guar bean yields range from 350 to 1,725 lbs/acre in Texas. Yields at Lingle in 2014 were around 200 lbs/acre. Short plant height in Wyoming may be a problem during harvest. In the southern U.S., guar bean is harvested with an ordinary grain combine at reduced ground speed and slower cylinder speed to ensure proper threshing. Due to the relatively long growing season of guar, plants may not dry until after frost in Wyoming.

I think guar bean can have many uses in Wyoming as a value-added crop in certain situations. The added value may be from supplemented grazing, improving soils for a next crop, or as a high protein additive (33-45 percent crude protein content) to a feed mixture. For more information, please contact me.

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Youths, adults can participate in International Year of Soils

Lesson plans, activity guides available and producers can access valuable soil information sites

Caitlin Price Youngquist

A healthy and fully functioning soil system is at the heart of solving some of the biggest issues facing humanity: food security, changing climates, biodiversity and the availability of adequate and safe water for drinking and irrigation.

Every day we eat food grown in soil, drink water filtered through soil and even take medicines originating from bacteria living in the soil. Soils directly and indirectly support all life on our planet (even aquatic), and as our soils disappear, so do plants and animals.

Soils are a non-renewable resource on a human time scale, and one we absolutely cannot live without. This means protecting soil systems is imperative – we won't get a second chance.

The Soil Science Society of America (SSSA) is coordinating with other organizations around the world to celebrate the 2015 International Year of Soils, as declared by the 68th UN General Assembly. This ambitious global collaboration educates decision makers and the public, supports effective policy and action for the protection and management of precious soil resources, promotes investment in sustainable soil management activities and increases our capacity to study and monitor soils worldwide.

Activities for Students, Adults

Would you like to join the celebration? There are many ways for children and adults to participate. The SSSA has designated 12 themes throughout the year, one for each month. The theme for March is "Soils Support Agriculture." A lesson plan and activity guide are provided for each month, as well as short videos and many other resources.

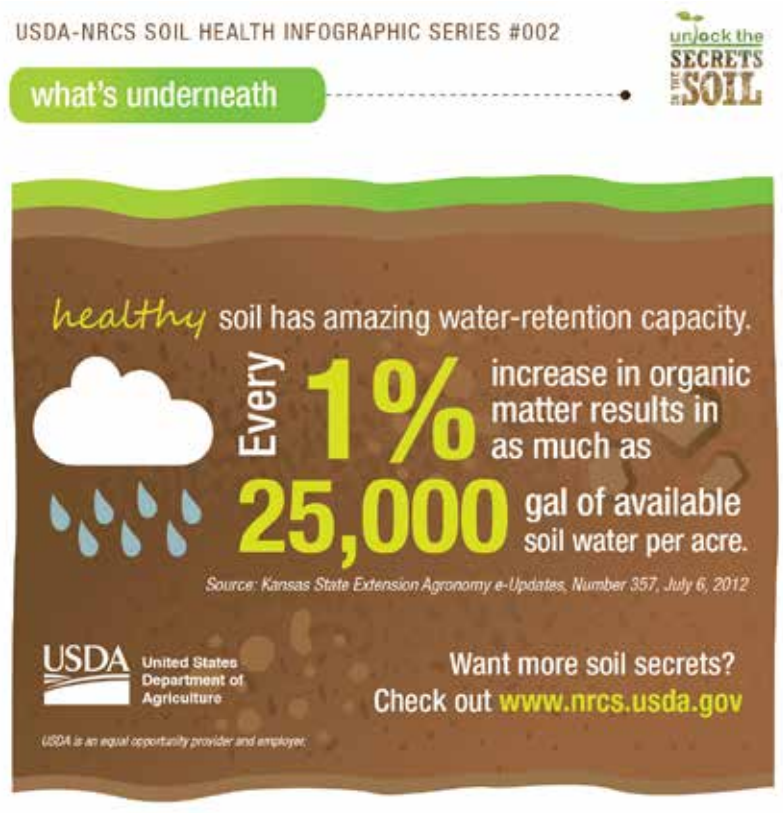
Want to make a soil-themed dessert, play Soil Jeopardy or learn about your state soil? All this and more is on the SSSA International Year of Soils website https://www.soils.org/iys.

The SSSA also has an "Ask a Soil Scientist" program for K-12 teachers and students on its Soils 4 Teachers website http://www.soils4teachers.org/ask. You can also request a visit from a soil scientist to your classroom or community group.

Sites for Farmers, Ranchers

The engaging resources and activities provided by the SSSA are primarily focused on K-12 students, teachers, consumers and the general public; however, there are many other good places farmers and ranches can get information about soil. For example, the USDA Natural Resources Conservation Service (NRCS) has created a series of good fact sheets, informational videos and soil health profiles. The NRCS Soil Health website is certainly worth a visit http://bit.Ly/nrcssoilhealth

Associate professor Jay Norton, UW Extension soil specialist,



is tasked with providing Wyoming-relevant soil information to land managers. If you are a Wyoming farmer or rancher, this website is the place to go for information on fertilizer management, soil reclamation, irrigated and dryland soil management and soil testing http://www.uwyo.edu/soilfert/

We all eat, and we all need clean air and clean water. So go out and celebrate the International Year of Soils and be grateful for all the wonderful things our soils do for us!

Caitlin Price Youngquist *is a University of Wyoming Extension educator serving the Big Horn Basin. Her specialties, in addition to soil quality, include livestock mortality composting and manure management. She can be reached at 307-347-3431 or at cyoungq@uwyo.edu.*

2015 International Year of Soils

Advantages, disadvantages switching to subsurface drip irrigation system

Caleb Carter

Water in a subsurface drip irrigation (SDI) system is applied directly to the crop root zone using buried polyethylene tubing, often referred to as drip tape or dripline.

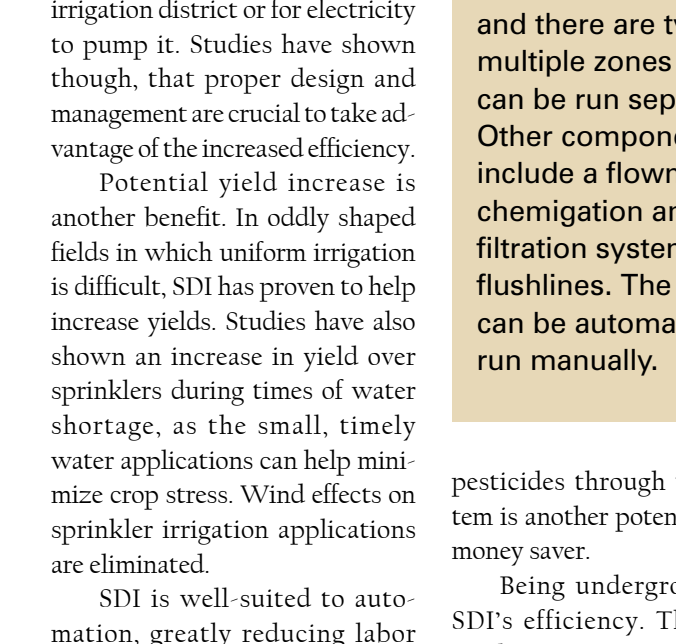
SDI has gained popularity in Wyoming recently even though SDI has been around for more than 20 years.

Two main draws include reduced water use and labor. A properly designed, managed and maintained SDI system can average 95 percent or better efficiency. Meaning for every inch of water applied to the field through the system, 0.95 inches makes it to the root zone. Flood irrigation is considered 50 percent to 75 percent efficient, although if the water is captured for reuse, this could be much higher.

Regardless, the potential for water savings with SDI means less expense, whether you pay the irrigation district or for electricity to pump it. Studies have shown though, that proper design and management are crucial to take advantage of the increased efficiency.

Potential yield increase is another benefit. In oddly shaped fields in which uniform irrigation is difficult, SDI has proven to help increase yields. Studies have also shown an increase in yield over sprinklers during times of water shortage, as the small, timely water applications can help minimize crop stress. Wind effects on sprinkler irrigation applications are eliminated.

SDI is well-suited to automation, greatly reducing labor requirements. Even without automation, the labor required to run an SDI system is similar to a pivot, and much less than what is needed for flood irrigation. Remember, though, time invested in management and learning will be higher. The ability to apply fertilizers and pesticides through the SDI system is another potential time and money saver.



THE SDI SYSTEM

A subsurface drip irrigation system is installed similarly to a lawn sprinkler system. A large mainline is typically buried similar in size to what would be used to supply a pivot, although the actual diameter depends on the overall system capacity, etc. Driplines then come off submains, and there are typically multiple zones that can be run separately. Other components include a flowmeter, chemigation and filtration systems and flushlines. The system can be automated or run manually.

Being underground boosts SDI's efficiency. This reduces, or eliminates, evaporation loss. Small, frequent irrigations can also minimize deep percolation losses below the root zone. Depending on soil type and dripline depth, traffic may be able to enter the field, even during an irrigation event, without disturbing the soil. That equates to less time lost on irrigation during field operations such as fertilizing, spraying or hay harvest. Weed germination on the soil surface is minimized due to lack of moisture, although it can also make crop germination difficult. In arid locations, alternative irrigation might be needed to germinate a crop without sufficient soil moisture.

SDI requires initial monetary investment. Proximity to and quality of the water source, the field size and shape and the level of automation can affect initial costs. Cost per acre can average anywhere from $1,200 to $4,000; however, depending on the field shape, an SDI system might help utilize more of the field as compared to a pivot, possibly helping gain back some of the extra expense.

Dripline spacing, typically dependent on spacing of the crop rows, dripline depth, emitter spacing and zone size also affect the system cost. Emitter spacing and dripline depth are determined as a consideration of the soils, crop water needs and germination needs. Cultural practices such as tillage, cultivation also must be considered. Selecting the proper dripline and emitter spacing can potentially affect what crops can be grown and should be considered carefully.

Water quality can be a big factor in the expense and amount of upkeep. Regular maintenance is required to prevent clogging, including chemical treatments and flushing. If ditch water is the source, much more expense will go to the filtration system compared to using well water. Water with high levels of calcium and other minerals can clog driplines and emitters. Bacteria and algae buildup can also cause problems. Highly saline water can lead to the buildup of salts in the soil, which may require occasional deep irrigations to leach below the root zone.

Rodent damage is another potential issue, especially in Wyoming. Evaluate the potential prior to installation. Digging up a dripline to locate a leak can be difficult and time-consuming.

High costs have limited SDI use for high-value crops, but many Wyoming producers find the reduced water requirement, increased control and more uniform water application are incentive enough to make the switch. But each producer weighing the advantages and disadvantages for themselves is important to make an informed and appropriate decision.

Caleb Carter *is the University of Wyoming Extension educator serving southeast Wyoming. He specializes in crop systems and can be contacted at 307-532-2436 or ccarte13@uwyo.edu.*

Last fall's dramatic changes being seen

Donna Hoffman

Spring is almost here, and thoughts of the various greens of spring are always greatly anticipated with our long, monotone Wyoming winters.

One issue we'll see in our landscapes is damage from the extreme temperature change in late October and early November.

Central Wyoming had a high of 55 on Nov. 10 and dropped 49 degrees that night to a low of 6. The low was -27 degrees just two days later – temperature change of 82 degrees over two days.

This type of temperature fluctuation has a dramatic effect on evergreen trees and shrubs. Damage showed up just a few days later when many of the evergreen trees across the state turned brown. We don't usually have such warm autumn seasons, and the trees normally have plenty of time to develop sugars that serve as antifreezes and provide adequate dormancy for cold-hardy species. Last fall, the temperatures dropped too dramatically too quickly to allow time for this natural preparation for winter.

Many homeowners had deep-watered in October knowing the season was unusually warm and were concerned they had not gotten enough water on the trees. The browning was confusing to most.

Our regional recommendations have been to water adequately this winter to help the trees and shrubs survive any further winter damage and arrive at spring as healthy as possible.

Could anything have been done to prevent or minimize the damage? In discussing the damage here at the local extension office with Master Gardeners who had similar situations at their homes, I had mentioned wishing I had experimented with spraying the foliage of trees with water and allowing it to freeze on the trees to provide a layer of insulation. Fruit orchards spray the foliage in various places around the country when impending freezes occur.

The layer of ice seems to hold enough heat energy and prevent the extreme cold temperatures from penetrating into the leaf tissues to cause damage. Trees sprayed as the temperatures dropped came through the extreme fluctuation in temperature without needles browning.

With spring on its way, continue to care for these evergreen trees to minimize stresses and to allow as much new growth as possible in the coming growing season without encouraging excess new growth that would cause additional, undue stress to these trees.

Some of the trees may have ample energy reserves and living buds to put on new foliage in the coming growing season. Others may have had previous stresses, and the buds may not be viable – meaning the tree will not put on new leaves this year and may unfortunately succumb to the damage and need to be removed.

I want to minimize the number of lost trees in the future and, since spraying the foliage has worked for local Master Gardeners, the technique will be in my recommendations for any future cold snaps after a long, warm autumn season.

Donna Hoffman *is the county horticulturist in the Natrona County office of the University of Wyoming Extension. She can be reached at 307-235-9400 or at dhoffman@natronacounty-wy.gov.*

MICRO-HYDROPOWER – Where and how is it viable for small landowners?

Milton Geiger
UW Extension and the School of Energy Resources

Many Wyoming landowners have stared at water rushing down a canal or being piped from a spring and wondered, "Can I generate electricity with that?"

Developing micro-hydropower can offer a cost-effective and reliable way to offset home, farm or ranch electricity use, but all hydropower is a very site-specific resource. Before investing time and money into development, small-acreage owners benefit from understanding the typical characteristics of a viable project, from production potential to location to permitting/licensing issues.

25 kW-and-under Systems Most Practical

Micro-hydropower systems are generally considered systems less than 100 kilowatts (kW) designed to offset personal energy consumption, not generate electricity for sale to a utility. Wyoming net metering law caps grid-connected renewable energy systems at 25 kW. As net metering provides both a financial incentive, offering the opportunity to bank electrons at the retail rate, and an expedited utility interconnection agreement, systems under this size are generally the most practical micro-hydropower system.

For example, a 25 kW system operating at 50 percent efficiency would generate 18,000 kilowatt-hours (kWh) per month. This is enough to power 20 typical Wyoming homes, so the net metering cap rarely interferes with the development of micro-hydropower. Even a 1 kW system would produce a useful amount of electricity.

Although the micro-hydropower evaluation and development process can appear daunting, the two general steps profiled below can help guide your decision.

Step 1 – Do I have a developable resource?

Do you have adequate flow and head to generate useful energy?

The amount of energy available for a micro-hydropower system is a product of head (vertical drop) and flow (quantity) of water. When very low flow or head exist, systems often will not produce enough electricity to justify initial investment and ongoing maintenance. This includes many hydrokinetic systems that simply "drop into" a canal. Although the full power equation is more involved, a basic understanding of the relationship between head and flow in an 80 percent efficient system is shown in the abbreviated power formula:

Power (kilowatts) = Head (feet) x Flow (cubic feet per second) x 0.068

For those who detest math, a handy online calculator is available at the UW Extension Efficient and Renewable Energy website, linked directly at http://bit.ly/1saqi3W

Seasonality of water flows is also important. Although some springs may have consistent flows year-round, most micro-hydropower installations will have significant variations in flow. A raging torrent during spring rains or early summer snowmelt does not typically dictate the designed size of a hydroelectric system.

Do you have legal access to existing, unpowered water infrastructure, such as canals, pipelines, small dams, or developed springs?

Developing a natural waterway (e.g., stream or river) is technically feasible, but the regulatory burden is much greater and often makes development difficult.

Do you have the legal right to access the falling water?

In short, just because you have water flowing across your property does not mean you have a right to access it, even if your use is non-consumptive. Existing water rights for irrigation or other use make the process easier. Local irrigation districts or ditch companies may also need consulting.

Do you have an electric load or transmission infrastructure nearby? The farther the distance the greater the costs.

Delivering electricity over long distances reduces efficiency and increases costs. Ideally, a load will be within ½ mile of the site being developed. The closer the better!

Does your site have unique political or environmental aspects, such as known cultural resources or endangered species?

Existing water infrastructure is typically free of such concerns, but property owners know if there is something "special" about their resource.

If you made it through the first step and are still thinking "I might have something here...," then you move into the development phase.

Step 2 – I might have a developable resource, so now what do I do?

- What are the types of small hydropower systems?
- What technologies and designs can be utilized?
- What are expected costs?
- How are permits and licenses obtained?
- Where will electricity be used?
- What is the value of the renewable electricity?
- What financing and incentives are available?

Handbooks Available

As only select landowners are able to make it through step 1, the details to step 2 are provided in the recently released *Wyoming Small Hydropower Handbook Summary: Making Informed Decisions*. You can also access the full *Wyoming Small Hydropower Handbook* for even more details.

Through these resources, you can fully vet and hopefully develop your own clean energy resource. If you have a site worth exploring further, UW Extension can assist. All materials mentioned in this article are available at www.wyomingrenewables.org You are always welcome to contact your local UW Extension educator for additional information.

Milton Geiger *is the University of Wyoming Extension energy coordinator and can be reached at 307-766-3002 or at mgeiger1@uwyo.edu.*

Animal Health Network provides rapid disease risk information to livestock producers

Ron Cunningham and Scott Cotton

One of the most crucial pieces of information for livestock producers, veterinarians, sale yards and feed yards is knowing if a livestock disease or health risk has entered their area or state.

Ensuring timely animal health information gets directly to producers is the primary goal of the Animal Health Network. This effort was initiated in 2007 as a joint effort between the Extension Disaster Education Network (EDEN) and the USDA National Institute of Food and Agriculture using Food and Agriculture Defense Initiative funds and working with extension and state veterinarians in six states to set up an "early warning" system for animal health issues.

This pilot project evolved from six states to 15 states including Wyoming and Colorado. Administrated by Texas A&M AgriLife, the system works directly with the EDEN point of contact in each state. Wyoming's contact is Fremont County extension educator Ron Cunningham, and the state veterinarians and extension educators.

The EDEN point of contact works with educators to establish agreement and contacts with feed stores, livestock yards, equipment dealers and veterinarians across the state willing to get information directly to producers.

Here is how it works:

- The state veterinarian defines a notice that needs to go out.
- The state EDEN extension point of contact sends it to all of the contacts on the list via fax and email within minutes and to all UW Extension offices.
- Those entities make the material and update immediately available to producers and veterinarians.

This health alert system could provide veterinarians, animal owners, and officials the latitude to prevent health risks from entering the state and any specific area as well as providing a leading edge to contain any issues that occur in Wyoming. This "trusted" message approach has the potential to greatly reduce and mitigate any animal health disease risk in the state.

The system has participating information outlets in Fremont, Natrona, Converse, Niobrara and Carbon counties. Extension educators participating are involved in contacting local feed dealers and veterinarians, explaining the system, submitting contact information to the UW EDEN point of contact and maintaining updated contact information.

More information on the Animal Health Network and other UW EDEN efforts are on the Wyoming Extension Disaster Education website http://bit.ly/wyomingeden.

Efforts are being made to encourage states surrounding Wyoming to undertake this or a similar system of verified information distribution.

In trials, this system received crucial information from a federal and state level directly to the animal owners in three to 44 hours.

To know if your area is covered by the system, or would like to establish it, please contact your local extension office or Cunningham at (307) 332-2363.

More information on the Animal Health Network is at www.animalhealthnetwork.org.

Importance of beef herd nutrition during winter

Chance Marshall

Late 2014 and early 2015 temperatures in Wyoming were a bit chilly to say the least.

Record cold temperatures were reported across the state with some of the eastern plains bearing the bitterest wind chills. According to the National Weather Service, temperatures dipped to 48 degrees below zero in Daniel and the wind child was 67 degrees below zero in Rock River the early hours of December 31.

Feed Intake

An obvious effect of cold and/or windy winter conditions is on the maintenance requirements of cattle, directly affecting feed intake requirements. Generally, voluntary feed intake increases with decreasing temperatures (Table 1). According to the National Research Council (NRC), cattle are expected to consume 105-110 percent of predicted feed intake when temperatures drop below 22 degrees and up to 125 percent of predicted intake for temperatures below 5 degrees. Extreme temperatures below 5 degrees may have varied effects on feed intake due to cattle's reluctance to leave sheltered areas.

Making feed readily available close to protected areas during cold days may be beneficial. Also, offering higher quality forages during harsh periods and/or feeding extra to make up for elevated nutrient requirements is likely necessary to keep pregnant cows' body weights from slipping. As a rule of thumb, experts suggest an increase of 1 pound of total digestible nutrients (TDN) per head for every 5 degrees below zero.

Supplementation

Managing cattle on low- to moderate-quality hay (6-10 percent crude protein) during the winter months is common in Wyoming; however, unless your hay tests ≥ 10 percent crude protein and ≥ 60 percent TDN, hay alone is not likely to contain enough protein and energy to meet nutritional needs during winter and early spring. This period is also the third trimester of gestation (i.e., January-March in spring calving herds) and on through lactation (Figure 1). Additional protein and energy must be included in the diet to at least maintain body weight and body condition.

There are many options for protein and/or energy supplementation methods that sufficiently provide necessary nutrients to a cowherd (e.g., cake pellets, lick tubs, etc.). A producer must determine which option best suits his/her operation and make it available. It's crucial to know the quality of the hay fed and to remember the critical periods during winter months that will only add to the difficulties of meeting nutritional requirements of a cow herd.

Table 1. Voluntary feed intake of cattle in varying thermal environments. (Adapted from NRC, 1981)

Temperature Range	Feed intake related to published values (NRC 1974)
78 to 60˚F	Predicted feed intake values published in Nutrient Requirements of Beef Cattle handbook
60 to 40˚F	Increased intake of 2 to 5%
40 to 22˚F	Increased intake of 3 to 8%
22 to 5˚F	Increased intake of 5 to 10%
<5˚F	Increased 8 to 25% likely. Intake may vary during blizzards and extreme cold

Cow Performance

Pregnant females' fat stores will be depleted if they are unable to meet nutrient demands from winter weather through late gestation. Decreased body condition scores are a good indicator of the number of days she will need between calving and resumption of her estrous cycle. The odds of nutrient-restricted females falling out of the annual calving cycle will be much greater.

Requirements of the Growing Calf

Meeting increased cow requirements due to cold windy weather and late gestation is not only important for the current generation of the cow herd, but also for future generations. Approximately 75 percent of overall fetal growth occurs during the final 60 days of pregnancy. Numerous studies show heifer calves with larger birth weights have greater probability for survival, higher conception rates, and increased growth. This response to maternal plane of nutrition is known as fetal programming.

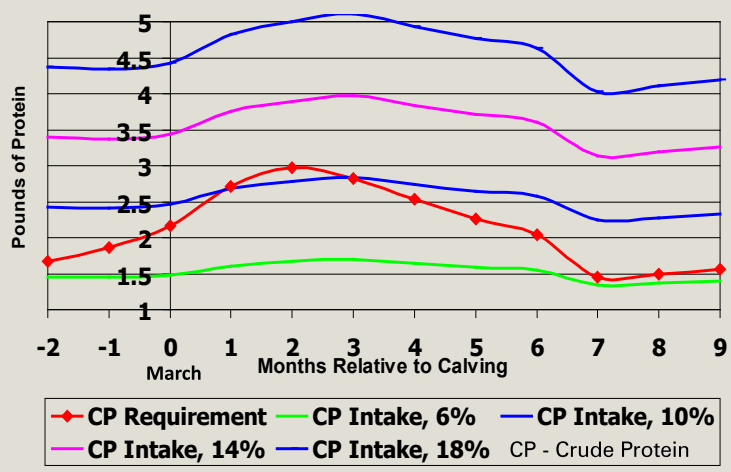
Increased birth weight could translate into greater calving difficulty; however, early research showed that supplementing cows during late gestation to meet requirements had no effect on the number of assisted births; however, these studies did show cows nutrient restricted during the winter months lost 10 percent more calves at birth and 19 percent more calves from birth until weaning. This may be explained by a lower colostrum yield, inability of the calf to absorb immunoglobulins, or decreased passive immunity due to maternal protein and energy deprivation during the final trimester.

Conclusion

Providing adequate nutrition is without a doubt a priority during this time of the year. Not only are Wyoming cattle challenged with the cold and wind, but also with the elevated demands of late gestation, and eventually lactation and rebreeding. Paying close attention to herd nutrition during the chilled winter months is sure to be a very important piece of the success puzzle in the near and far future.

Chance Marshall *is the University of Wyoming Extension educator serving northeast Wyoming. His specialties include profitable livestock systems and ruminant nutrition/education. He can be reached at 307-682-7281 or cmasha1@uwyo.edu.*

Figure 1.



Paisley, 2013

Beef cow herd shows signs of growth, outlook still positive for 2015

Bridger Feuz

Three major factors affect beef industry market dynamics – supply of beef, demand for beef and status of the beef trade.

Looking at each factor provides a better understanding of long-term market trends; input costs are an additional factor that also must be addressed.

Starting in 2006, the Jan. 1 cow inventory has declined year over year through 2013. The 2015 Jan. 1 beef cow inventory shows a modest increase of 2.1 percent from 2014 to 29.7 million head. The number of heifers held as beef cow replacements declined from 2006 to 2011 but is starting a rebound. The Jan. 1, 2015, number shows the biggest increase in several years of 4.1 percent. The last few years have shown slight increases in the Jan. 1 heifer retention numbers, but by July 1 those increase have disappeared. With a 4.1 percent increase, we are likely to see even an increase in the July 1 numbers.

Calf Crop at 75-year Lows

Although signs of growth are seen, the U.S. calf crop will still be at levels not seen since the 1940s. Several factors have led to this decline in cow numbers with severe drought conditions in the south and west being a large contributor.

The beef demand index, an index that adjusts for inflation and uses 1990 as the base year for comparison with a value of 100, bottomed out in 1997 at 77 – a 33-percent decline from 1980 levels but showed consistent growth through 2004 managing a 14-percentage point increase.

Much of this growth can be attributed to a positive image of beef quality and to consumer diets that encourage protein and discourage carbohydrates; however, in 2005 the demand index again started to decline and dropped to a low of 75 in 2010.

This recent decline emphasizes a constant need to focus on meeting the changing needs and requirements of consumers, especially as consumers see a tightening in disposable income.

The beef demand index has rebounded again over the last three years and now sits at 81. That the index has continued to rebound over the last couple years even with consumers facing record high retail beef prices is impressive.

The export markets, although down slightly from 2013, were a strong asset for U.S. beef producers in 2014. The annual net value of our exports (sales of exports – cost of imports) was over $2 billion for 2014. Favorable exchange rates and a strong demand for U.S. beef were reasons for the positives in U.S. beef trade in 2014.

Looking ahead at 2015, the U.S. dollar continues to strengthen against most foreign currencies. The dollar is 14 percent more valuable now than in July of last year. This continued strengthening of the dollar may temper exports for 2015.

Input Costs Offset in 2014

Cattle producers saw favorable input costs in 2014, including lower corn prices. Corn is projected to moderate at $3.50-$4 per bushel in 2015. Record calf and cull cow prices also helped offset input costs in 2014. Cow-calf returns over cash cost were estimated at just over $500 per cow in 2014 for the U.S. One of the challenges for cattle producers in 2014 and likely this year is managing profit to create equity and add value in their ranching operations.

2014 was characterized by a tight supply, strong export market and steady demand. This led to record price levels for beef producers. As the retail price of beef continues upward, there is risk consumers will begin to substitute away from beef.

Consumer demand and weather impacts are likely the two largest risks producers will face. This year looks to be much like 2014 with cattle supply still relatively tight. If export markets can maintain and consumer demand holds, prices could again reach record levels, but the gains over 2014 will not be as significant as seen from 2013-2014.

Bridger Feuz *is the University of Wyoming Extension livestock marketing specialist and can be reached at 307-783-0570 or bmfeuz@uwyo.edu.*

Alfalfa weevil can cripple field production

Scott Schell

The alfalfa weevil is consistently the most damaging pest to Wyoming's alfalfa – a crop important because of the impact on the state's economy.

Alfalfa is grown mostly under irrigation with approximately 1.44 million tons produced in 2013, according to the National Agricultural Statistics Service's 2014 Wyoming report.

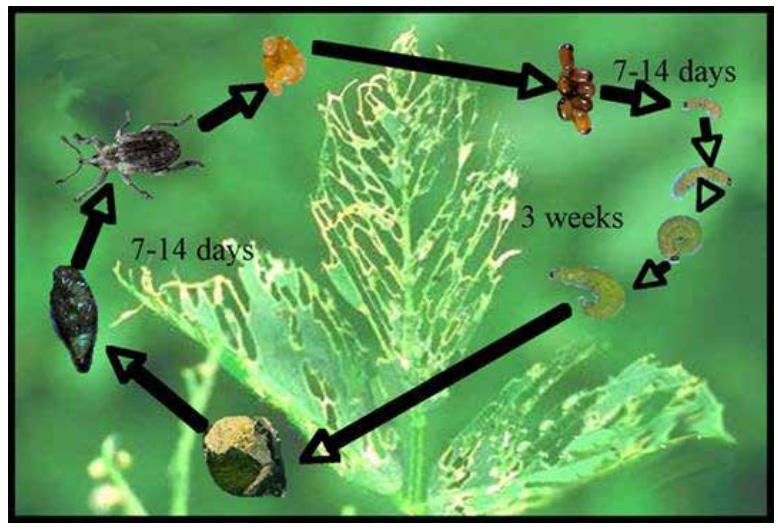
The crop's value has increased drastically the last five years. In 2010, quality alfalfa hay prices were about half of now. Most alfalfa hay was utilized close to where grown. Now, large square bales are easily trucked between states, and "double compressed" bales are exported overseas to expanding markets in Asia and the Middle East.

Demand for alfalfa and its price per ton is unlikely to decrease. This makes managing alfalfa production pests even more important as reduced tonnage and feed quality can cause significant financial losses.

Alfalfa Weevils in Cross Hairs

The University of Wyoming advocates Integrated Pest Management (IPM) when dealing with crop pests. Always make a positive identification of the pest. The alfalfa weevil (*Hyperia postica*) is a small (3/16 inch) brown beetle with chewing mouthparts on the end of a projecting snout. The immature or grub stage is worm-like, cream to bright green in color with a dark head capsule with chewing mouth parts. Thankfully, only one generation per year is successfully produced in Wyoming.

Adult alfalfa weevils that survive winter become active as daytime temperatures warm. They reenter alfalfa fields after alfalfa ends winter dormancy and resumes growth. The female chews a hole in an alfalfa stem and deposits five-20 eggs. Females can produce 400 to 1,000 eggs in their lifetimes. The eggs hatch after seven to 14 days, depending on temperatures. If temperatures are too cool for the weevil eggs but are still warm enough for alfalfa growth, the combined egg mortality and increased plant growth usually leads to a year when weevil damage is minimal before the first cutting.



Lifecycle and developmental stages of the alfalfa weevil with the typical leaf skeletonizing damage caused by alfalfa weevil grubs feeding.

Spring weather and temperatures sometimes account for major differences in pest pressure year-to-year. Predictive models, using degree days needed by alfalfa weevil eggs and grubs to grow, forecast populations in relation to the date of the first cutting http://ippc2.orst.edu/wea/

Finding Economic Threshold

In Wyoming, alfalfa weevils are the main culprit in inflicting yield and quality damage; however, they can also affect regrowth and yield of the second cutting.

To determine the economic threshold – the point at which losses exceed cost of control – weevil populations have to be estimated accurately and numbers related to yield and forage quality loss.

A heavy-duty insect sweep net is used to estimate populations. An instructional video by Utah State University posted on its website http://bit.ly/sweepnet details the method better than I can explain with the written word.

Not everyone owns a sweep net, although as an entomologist, I think they should. Every farm owner owns a bucket, and a bucket can be used to estimate alfalfa weevil populations when alfalfa growth reaches 10 inches. Sampling then usually coincides with the peak second stage alfalfa weevil grubs and, if warranted, control efforts can be carried out before they reach the fourth stage, which is the most damaging.

The bucket population sampling method is simple and explained in great detail at the High Plains IPM website http://bit.ly/weevilipm

Estimate Potential Loss

The goal of either sampling method is to estimate the potential loss of alfalfa in tons per acre. Figure 2 estimates alfalfa yield loss. With this information and costs of insecticides and application, a producer can determine if treatment makes economic sense.

An early first cutting is a popular cultural control method for alfalfa weevil that can be very effective – if hot and sunny. Alfalfa windrows dry quickly and can be removed from the field rapidly. Rapid removal prevents surviving alfalfa weevil grubs crawling under windrows and eating the alfalfa regrowth under a protective cover. If cool, cloudy weather prevents a lot of grub mortality in the stubble of the first cutting, insecticide treatments are sometimes required to protect the alfalfa's regrowth.

The cost of insecticides and applications varies year to year. Contact local agricultural chemical suppliers for lists of available labeled insecticides and prices, and talking to commercial insecticide applicators about treatment costs can prepare you to rapidly react to an economically damaging alfalfa weevil infestation in the spring.

Investigating the purchase of application equipment and obtaining training to apply insecticides yourself needs to be done well in advance of spring.

Based on the low efficacy of registered insecticides compatible with organic farming methods, early harvest is the best method to control alfalfa weevil without using synthetic insecticides. Visit High Plains Integrated Pest Management at http://wiki.bugwood.org/HPIPM:Crops for detailed information on sampling methods, economic threshold calculations, and biological, cultural and chemical control options for most crops grown in Wyoming.

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http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=11947

Figure 1. *Compressed bales of alfalfa hay are easily transported in cargo containers. According to 2013 data, 1.26 million metric tons of alfalfa hay were exported from the U.S., with the United Arab Emirates, Japan, China and Korea being the four biggest importers.**

Joseph Berger, Bugwood.org

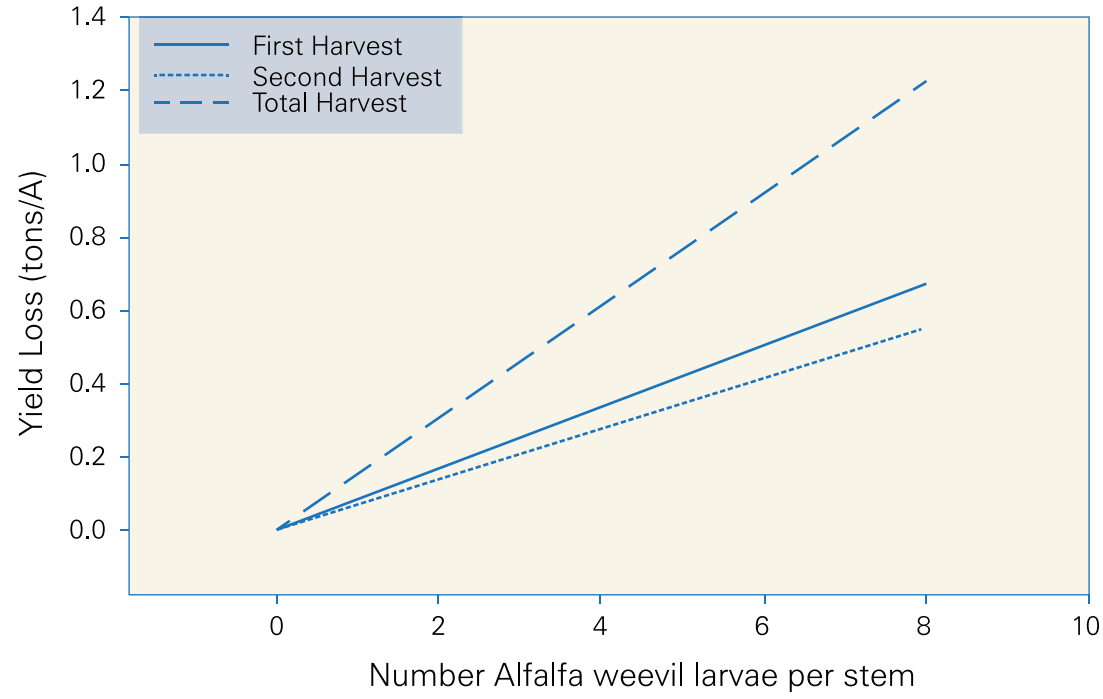

Figure 2. *Alfalfa weevil expected yield loss, in tons per acre, for first and second hay cutting on alfalfa up to 15 inches tall, based on densities of alfalfa weevil larvae sample numbers by both the bucket and sweep net sampling methods. Source: High Plains IPM website http://wiki.bugwood.org/HPIPM:Alfalfa_Weevil*

Composting dead livestock on the farm or ranch

Caitlin Price Youngquist

The burden of loss is always hard when animals die, whether they are pets, working partners or investments.

Planning ahead for carcass disposal can help ease the burden and avoid problems of improper disposal. In Wyoming, burial and composting are the on-farm options for carcass disposal. Removal options are disposal at a licensed landfill, rendering or cremation and abandonment (scavengers).

Cause of death, proximity of neighbors, available resources and weather conditions are all factors to consider when developing a mortality disposal plan.

Wyoming law states that "It shall be the duty of the owner, or person having charge of an animal which may die in this state, to remove the carcass to a distance of not less than half a mile from the nearest human habitation, or to bury it with not less than two (2) feet of soil over it" (WY Stat 35-10-104).

Access to rendering and incineration services for large animals is very limited in Wyoming but may be available in neighboring states. Ask your veterinarian for local small animal cremation services.

Carcasses of animals euthanized by sodium pentobarbital injection (a common and humane method recommended by American Veterinary Medicine Association) must be immediately buried, cremated or properly composted to prevent secondary poisoning of wildlife or dogs that may scavenge the carcass.

Composting Dead Livestock

With proper management and materials, on-farm composting is an economical, safe and effective method of carcass disposal. Composting allows for immediate, year-round carcass disposal with minimal costs and equipment. When compared to abandonment or burial, composting can protect surface and groundwater, reduce the spread of disease and recycle valuable nutrients on the farm.

Composting is a biological process in which aerobic bacteria and fungi (microbes) convert raw organic waste into stable, nutrient-rich organic matter. While eating the raw materials, these microorganisms produce enough heat to raise temperatures inside the compost pile to well over 130 F. This heat kills any disease-causing organisms. The compost microbes require food (raw organic wastes), oxygen and water to thrive. Too much of one thing or not enough of another can slow the compost process, or worse, can lead to messy piles that attract pests, spread disease or contaminate water sources.

The basic requirements of a successful carcass compost system are raw organic materials (carcass, manure, straw, sawdust, etc.), a dedicated area and careful management. When managed well, composting is a great way to turn a waste product into a valuable soil amendment. Use compost to improve soil and plant health and increase the productivity of a garden or pasture.

Carcass composting is a relatively simple process that can be easy to manage – but when things go wrong, it gets ugly!

University of Wyoming Extension collaborated with several other universities to publish a thorough resource on the topic for large- and small-livestock producers. A 24-page booklet with color illustrations and an instructional video in Spanish and English are available at no cost. To receive a copy of the booklet in the mail, contact Caitlin Youngquist, UW Extension educator in Washakie County, at 307-347-3431 or cyoungqu@uwyo.edu. The booklet and video is also available at http://www.ext.colostate.edu/pubs/ag/animal-compost.html.

Key Steps for Composting Dead Livestock

1. Choose a well-drained site at least 300 feet from any stream, lake, pond or well. Consider the location of neighbors, other animals and access roads. Be prepared to leave this compost pile alone for a year if necessary.
2. Build a base of absorbent high-carbon material at least 2 feet deep. Sawdust, straw or hay works well. Place the carcass on the base at least 2 feet away from any edge.
3. Completely cover the carcass with 2 to 3 feet of absorbent compost material. Used bedding, old hay, silage, straw and sawdust work well. Don't be stingy here, as an exposed carcass will attract pests and vex the neighbors!
4. Watch carefully for signs of disturbance and settling, add more compost material as needed. This is especially important during the first few weeks.
5. The compost is ready to use in about four months to a year, depending on the size of carcass and compost materials used. After about six to 10 weeks of composting, the pile can be turned and mixed using a bucket loader, and multiple compost piles can be combined.

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Evaluating alternative feeds use during droughts, other agricultural disasters

Scott Cotton

Feed availability and quality often is reduced at the very times livestock producers need it the most.

Feed resources often diminish when producers are affected by floods or wildfires. At these times, producers commonly consider using less desirable feeds or alternative feeds. Many producers already affected by short- and long-term disaster effects make every effort to keep their herds intact to offset landscape productivity losses.

This process includes acquiring low-quality roughages and possibly trying to maintain livestock performance by adding supplements at increased levels. Several approaches used historically include grazing areas of marginal value, using by-products, using residue from field crops and purchasing and feeding roughage such as straw. This is done not just because it is often lower in cost, but because it may be all that's available in a region.

Software can Provide Diet Analysis

A good general rule is to nutrient test the material and analyze it as part of a complete ration that includes your supplement of choice and your remaining natural forage. Results can be plugged into a number of commercial and university software packages for an overall picture of what the diet provides. Spending money on a diet that will generate losses or condition drop in a herd is counter-productive.

A number of good programs are out there, and those developed by land-grant universities have no product to sell (tend to be objective).

Recently, I have used the program BRANDS – Beef Ration and Nutrition Decision System (Iowa/Nebraska) (http://bit.Ly/beefrations) because it allows a producer to plug in their breed, cattle frame, age, and goals besides computing diets differently for stocker feeders, breeding cattle, bulls, and dry cows.

I have also used Nutrition Balancer (http://bit.Ly/nutbal), which was developed originally at Texas A&M University. This program also requires some manure sampling. Both programs are based on the Nutritional Requirements of Cattle database from the National Academy of Sciences.

Evaluate Feeds Side-by-Side

It's crucial during rough times livestock managers carefully evaluate a diet before committing financially to a plan. There are tools that allow producers to evaluate feeds side-by-side such as the Feed Cost Calculator by Matt Stockton of UNL (http://westcentral.unl.edu/agecon3), which allows you to judge feeds on a "cost per pound of protein to the mouth of the cow." Such a program can help producers make sound decisions on which feed to buy, how far they can afford to feed and which benefits their stock the most.

Meeting protein, dry matter and mineral needs has many options. But many alternative feed mixes are extremely short on energy, leaving inhibited performance, weak calves and reduced breed back on cows as well as a shrinking body condition score.

If facing any situation in which you may need to vary from normal feeds and consider an alternative feed ration – test the feeds, supplement, and grass first (a $70 investment) and contact your local extension office to help interpret the numbers. Many of the software programs are user-friendly and inexpensive or free.

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Wyoming's complex hydrology shapes extreme water variability

Ginger Paige

Snow water equivalent for the major basins in Wyoming the end of January ranged from 71 to 123 percent of average with most very close to average snowpack for the month.

Wyoming experienced several multiday periods of sub-zero temperatures last winter; however, a mid-winter thaw resulted in the warmest January temperatures in Cheyenne (70 degrees on January 27) since 1873. These are the types of hydrologic and climate information hydrologists and water managers watch closely every winter.

Snowpack levels and temperatures are two of the factors that impact the amount and timing of spring runoff each year.

Susceptible to Drought, Climate Extremes

Wyoming, a semi-arid state, has a complex and dynamic hydrology, and its water supply is very susceptible to the potential impacts of long-term drought and extreme climate. Wyoming has an average annual precipitation of 16.4 inches, ranking it the fifth most arid state. Although a headwater state, over 70 percent of the state receives less than 12 inches of annual precipitation.

Most of Wyoming's water is from snowpack and runoff in the high elevation areas (over 10,000 feet). These areas receive over 36 inches of precipitation – predominately snow.

Wyoming is repeatedly subjected to periods of drought. During the past 100 years of instrumented record, Wyoming has experienced a minimum of four significant periods of drought, the most recent from 2000 to 2008.

The recent drought, though regionally persistent, was not consistent in location across the state. (Weekly updated information on the drought conditions in Wyoming can be found in the U.S. drought monitor site http://www.drought.unl.edu/).

In addition, Wyoming can also experience periods of flooding from spring runoff. In 2008, many basins in the state experienced flood levels not seen since 1997. [Monthly updated information on the flooding potential across the state can be can be found at the Wyoming Graphical Water Supply Outlook: http://bit.ly/wyowatersupply *(updated by the 15th of every month January-June)]*

Boosting the hydrology data network across Wyoming is one response to the state's periodic drought and potential changes in water availability. See "Water Demands Increase."

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WATER DEMANDS INCREASE

Many western states face increased water demands coupled with changing climate and water supply.

Wyoming and the rest of the semi-arid Intermountain West is looking for ways to adapt to periodic drought conditions while planning for more potential changes to the water budget and water supply given the changing demands.

Decreased amounts of available water will be one significant, potential long-term effect of a warmer climate or more extreme climatic variability in Wyoming, necessitating changes in grazing and other agricultural practices.

Wyoming water resource professionals are expanding the hydrologic data network across the state. These efforts will most likely expand with the new Wyoming Water Strategy recently released by the governor's office (http://water.wyo.gov).

The objectives are to 1) improve our knowledge of our current water supply and 2) improve our ability to forecast droughts and water supply deficiencies across the state. Neither is simple but can be more manageable with timely and detailed data.

Available water and climate information

The Community Collaborative Rain, Hail and Snow Network (CoCoRaHS, http://www.cocorahs.org/) is a grassroots volunteer network of backyard weather observers of all ages and backgrounds working together to measure and map precipitation (rain, hail and snow) in their local communities.

- Wyoming NRCS has a Monday Morning Snow Report that can be accessed through WRDS: http://bit.ly/mondaysnow and at NRCS for the media values http://bit.ly/snowmediavalues
- Monthly Wyoming hydrologic summary and graphics: (updated monthly around the 15th of every month) http://bit.ly/monthlyhydro
- Wyoming drought information page: (updated at least once a month) http://www.crh.noaa.gov/riw/?n=drought
- Wyoming graphical water supply outlook: (updated by the 15th of every month—January-June) http://bit.ly/wyowatersupply
- Wyoming average precipitation by basin: (updated monthly) http://bit.ly/basinprecip
- Wyoming spring snowmelt runoff flood potential graphic: (updated around the 25th of the month – January-May) http://bit.ly/runoffpotential
- Current and forecast Wyoming streamflows and/or river stages: http://bit.ly/streamflows http://waterdata.usgs.gov/wy/nwis/rt

Additional information on these and other climate, drought and water-related issues can be found on the Wyoming Water Resources Data System website run by the State Climatologist Office (http://www.wrds.uwyo.edu/.) Timely and accurate water information is critical for short and long term planning in Wyoming. Updating and expanding our water information network is an important step in on going efforts to meet Wyoming's water resource needs.

BLIZZARDS — *Continued from page 1*

document locations. Equipment types similar to finding livestock efforts are needed, but often neighbors and local resources can be encouraged to help open corridors of access, especially if numerous producers design a pathway that reaches multiple herds. Visit with your county emergency manager and/or county commissioners about the specifics within their agriculture disaster plan.

Feed Needs may Increase 30 Percent

Feeding livestock during or after blizzards provides not only regular sustenance but calories crucial to maintaining their thermal body temperature. Feed levels for blizzard-affected livestock need to be as much as 30 percent more than normal feeding rates with an emphasis on roughage and energy.

A time-tested, old school technique is to place feed supplies in locations where there is a chance livestock will get caught by blizzards and at the best shelter in that area without putting animals at risk for getting "blown over" by snow (avoid draws and canyons). If feed is not left at diverse locations, a producer must have suitable equipment to get the feed through the storm to the cattle. New technologies such as helicopters are not very feasible (a Blackhawk helicopter can only haul 30-40 bales per load). Simple, old-school techniques like pulling a hay semi into fields with a crawler or using horse-drawn hay wagons usually prove more practical than some new technology.

Providing protection for livestock from blizzards usually means having them at or moving them to a wind-protected site that has some access by the producer. In blizzard-prone areas, many producers have erected strategic windbreaks, some with feed stockpiled behind them and protected by panels.

The old-school approach to effective blizzard response via neighbor networking is still practiced in Wyoming. If you can't get to your cows or have a piece of equipment – your neighbor may. Working with area neighbors also provides support in case there are injuries or unexpected incidents.

Put Technology to Use

The largest technological advances for surviving blizzards, other than good experience with storms, is the early warning technologies available to producers to evaluate the risk of approaching weather. A number of smartphone applications and website resources will email, text and notify a producer if there are freeze warnings, blizzards or drastic changes pending for their specific zip code. This, combined with local experience, can reduce losses during calving, early fall storms and wet spring storms.

Some of these applications (UW Extension does not promote any specific service) include:

- ·National Weather Service – www.crh.noaa.gov/dmx/?n=preparesvrwarning
- ·Accuweather – www.Accuweather.com
- ·My Warning – www.MyWarn.com
- ·Severe Weather Alert – severeweatheralertapp.com

There is no substitute for being ready and paying attention to reduce risks on farms and ranches. Recognizing when something unusual is pending will assist in reducing impacts as long as you have some basic home, power, food, and equipment preparations in place.

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