

# BARNYARDS & BACKYARDS



UW Extension Profitable & Sustainable Agricultural Systems Risk Management Agency

## UW Extension and Wyoming agriculture

By Steve Paisley  
University of Wyoming Extension beef cattle specialist, Profitable and Sustainable Agricultural Systems team chair



Steve Paisley

We hope the information in this insert is timely, pertinent, and worth a quick read.

These periodic inserts are coordinated, written, and partially sponsored by UW Extension's Profitable and Sustainable Agricultural Systems Initiative Team.

The team is comprised of:

- extension educators,
  - state extension specialists,
  - and university personnel,
- whose focus includes livestock production and management, crop production, and horticulture interests.

We continue as extension personnel to develop innovative educational programs and provide current information while staying successfully rooted in our traditional academic framework.

The Cooperative Extension Service was created by the Smith Lever Act in 1914. Many aspects of both agriculture and communities have changed since then. One of the challenges of agriculture and

extension is to remain competitive and provide a quality product while continuing to improve efficiency.

Extension continues to adapt to the changing preferences and needs of clientele and communities across the nation. UW Extension works to continue to provide timely, relevant information for its clientele. We hope we continue to be a trustworthy, accessible source of information for today's agricultural producers. While there are many sources of information available, extension strives to provide accurate information based on sound, scientific research.

Thanks to great support from the state, UW Extension continues to be an important part of the College of Agriculture and Natural Resources at the University of Wyoming. For additional information or updates on local programming efforts, contact the state extension office at (307) 766-5124 or contact your local extension office.

### Serving the state's agricultural community

Here are additional on-the-ground projects coordinated by Profitable and Sustainable Agricultural Systems team members:

- Master Gardener program,
- "From the Ground Up" television spots,
- Barnyards and Backyards inserts, and
- Local extension programming such as Fremont County Farm and Ranch Days in Riverton, WESTI and

## Design landscapes while snow flies so you'll be ready come spring green

By Scott Hininger

Planning landscapes now can switch one's focus from snowflakes flying by to the warm sunshine and green of spring.

Landscape planning is:

- creating a plan to make the best use of the space available in the most attractive way,
- making the most of the site's natural advantages,
- considering building structures as fences, walls, and patios, and,
- selecting and planting the plants that best fit the design.

The first job is to put on paper what the landscape will be like when completed.

Base planning on how much time you can give to the landscape/garden and how much money can be spent. No need to complete the total design all at once. The first job is to put on

ish different sections as money is available. Completing the entire plan could take several years.

### Landscape Considerations

Landscape architecture not only creates and preserves beauty but also makes the surroundings more functional. Conserving water and including drought-tolerant plants should be considered.

Successful landscape planning involves three considerations:

- First, consider the area as a cube of space – very much like a room.
- Next, when looking out each window of the house, what do you want to see?



Scott Hininger

- Finally, consider the design from outside the house as viewed by you and others. Include goals, such as screening the alley or having a garden, flowerbeds, protection



from winter winds, or to provide summer shade. Then, study the sidewalks and driveway for convenience. Think about maintenance. For example, designing curves and circles into walkways and grass areas eases mowing.

Evaluate established activity areas for appropriateness. Do not allow existing developments



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## Landscape design (continued)

to prejudice decisions. A good approach is to visualize the property as if it were bare. List what you want to have and what problems must be solved. Which plantings should be saved? Keep what helps achieve your goals. If what you have does not work, get rid of it unless the cost is out of your budget!

Incorporating small trees, shrubs, and perennials costs much less than purchasing large plants – you can afford to fill a larger area. You will be surprised at how fast they grow.

Sunshine, rain, snow, wind, and cold influence landscape designs. Plantings can give protection from summer sun and allow warmth from the winter sun, such as deciduous trees. Design the landscape so rain and melted snow move away from the house and into the landscape.

## How Does Your Family Use the Yard?

An inventory of family activities will help plan the overall layout and use of space. Allow space for outdoor living needs, the children's play area, and the service area. If family members don't want to spend much time working in the yard, keep the design simple and plantings that do not need much care.

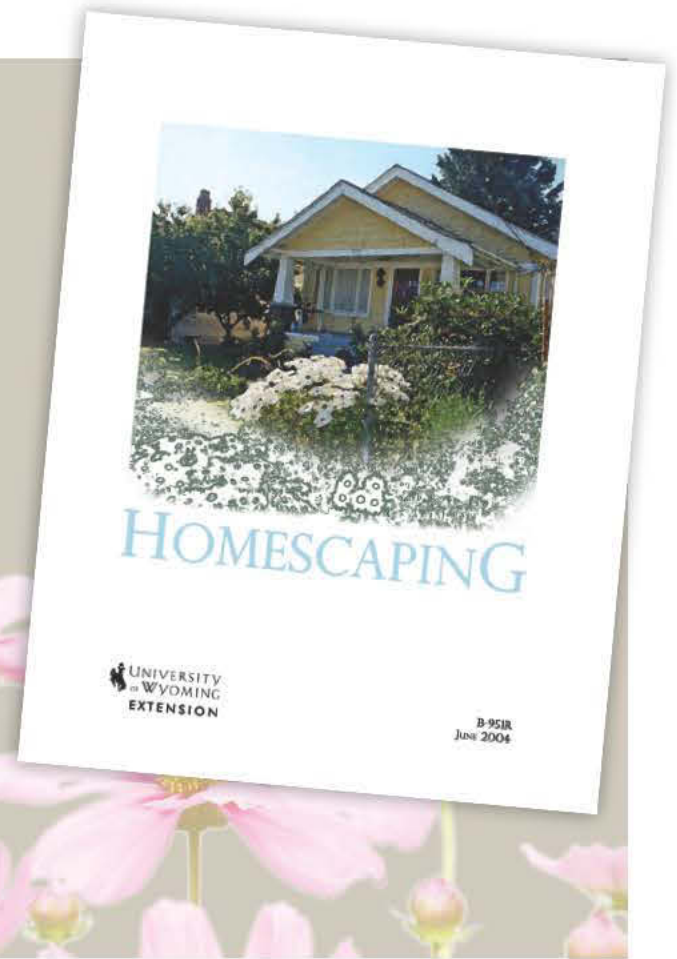
Remember, once planning has begun, the landscape design becomes easier to imagine when broken down into separate areas and periods for completion. This makes the process less overwhelming!

Scott Hininger is the University of Wyoming Extension educator based in Sheridan County and also serves Campbell, Crook, and Johnson counties. He can be reached at (307) 674-2980 or at [extoff1@sheridancounty.com](mailto:extoff1@sheridancounty.com).

## Landscaping design kit among extension's flower, tree, shrub, gardening publications

A home landscaping kit is available for \$3 from University of Wyoming Extension. Go to [www.uwo.edu/ces/](http://www.uwo.edu/ces/) and click on the Publications link on the left-hand side. Click Search Bulletins, then type Landscape into the Publication Keyword field. This kit contains the basic tools, supplies, and step-by-step directions for drawing a home landscape plan.

The kit will be listed among several landscape publications, which include best trees, shrubs, annual and perennial flowers, turf, water-wise gardens, and many more. Most of these publications are free.



# The right questions can save your garden

## Ensure compost doesn't contain carryover herbicides

By Sandra Frost

When you get manure, straw, or grass clippings, ask:

- Were herbicides used on the grass hay/grain fields?
- Have the horses/cattle grazed pastures or was hay sprayed with herbicides?

Gardeners in Wyoming and Montana should ask the right questions about straw and manure before use in vegetable gardens and landscapes.

There have been reports of damage to vegetable and flower crops after applying horse or cattle manure, straw, and compost. Symptoms include poor seed germination, death of young plants, cupped and elongated leaves, and reduced yields.

### Growth Regulators

A class of herbicides – growth regulators – is registered for use in a variety of sites: pastures, rangeland, small grain crops, non-

residential and residential lawns, certain vegetables and fruits, and roadsides. The active ingredient in the formulation may be, for example, aminopyralid, clopyralid, picloram, 2,4-D, aminocyclopyrachlor, fluroxypyr, triclopyr, or dicamba. These herbicides control a wide variety of broadleaf weeds.

According to the EPA, these herbicides can be safely consumed by grazing stock, even livestock raised for human consumption. The herbicides pass through an animal's digestive tract unchanged and are excreted as active herbicides in urine and manure. These active ingredients can persist for years in grass clippings, compost, or manure.

The active ingredients of greatest concern are picloram, clopyralid, aminopyralid and aminocyclopyrachlor because they can remain active in hay, grass clippings, piles of manure and compost

for an unusually long time. The herbicide label will state the crop rotation restriction before any vegetable or forage legume can be planted or grown on treated land. Typically, for these herbicides, the restriction is 12 months or more. These herbicides eventually break down with sunlight, soil microbes, heat, and moisture.

### Know What has been Applied

Problems arise when straw, hay, or manure treated with these herbicides is sold or given to others without knowledge of the crop history. Growers and livestock producers can and should provide the herbicide history of their products. Custom applicators should inform landowners of what herbicides were applied.

If this class of herbicides was used on a hay field or pasture, return livestock manure and any other materials to the field of origin where they will contribute to future weed control.

These broadleaf herbicides are not present if the hay is a grass-legume blend since the legume would have been killed – the operator would not have used the herbicide.

Grass clippings can be equally damaging to a garden. Perfect grass lawns are an indicator herbicides are probably being used. Golf courses may also use some of these herbicides. Ask about treatments the lawn has received before adding clippings to your garden. The safest choice for your garden is not to use grass clippings from lawns treated with these herbicides.



Sandra Frost

### Do This Test

An inexpensive way to test for broadleaf herbicides is a bioassay you can perform. Beans or peas are very sensitive to herbicides and are indicator plants. Take a random number of samples from the manure or compost and mix thoroughly. Mix the suspect material with uncontaminated soil in a 2:1 ratio. Fill three to six small pots with the mix. Fill another pot with uncontaminated soil as a con-

Put saucers under each pot or position the pots far enough apart so water running out of the bottom of the pots will not reach another pot.

Plant three pea or bean seeds in each pot, water, and let them grow for two to three weeks until there are three sets of true leaves. If they all grow well, there may be no problem (if your sampling was adequate). Growth will not be normal if there is a problem with those plants in the contaminated soil (See Resources below). You can do this test on a larger scale in a garden field by randomly planting peas or beans throughout the site.

The bottom line is that both agricultural producers and consumers can avoid problems with increased communication.

Ask the right questions.

Sandra Frost is the University of Wyoming Extension educator in Park County specializing in crops. She also serves Big Horn, Fremont, Hot Springs, and Washakie counties and the Wind



## RESOURCES

**Herbicide Carryover Compost, Soil and G**  
<http://smallfarms.org/f09Herbicide>

**Bioassay Test for Her in Compost**  
<http://www.puyallup.wa.gov/Pubs/CloBioassay>



# Better management through basic financial statements

## A new online course from RightRisk.org

By James Sedman and John Hewlett

Producing quality, up-to-date financial statements is a key to success in any agricultural business. These statements allow analyses of alternatives and sound management decisions.

Producing accurate, well-organized financial statements benefit operations of all sizes and scales. The academic professionals at RightRisk have developed an online course entitled *Getting on Track: Better Management through Basic Financial Statements*. The interactive course relies on an example couple looking at several alternative enterprises for their operation and how they learn to use financial statements to make decisions.

This couple is an example of how operators with little to no knowledge of financial statements and their applications can use the course; this article explores an established operation looking to add a new enterprise and how the course materials can help.

### Example Producers

Platte County producers John and Marcia Smith own and operate a commercial cowherd of 100 head and an irrigated farm of 250 acres. They primarily use the farmland to produce alfalfa and corn silage for their cattle and for sale to others. The Smiths are considering switching 50 acres of their irrigated production to teff hay (an annual forage grass) for sale to horse owners. They hear good things about the grass from neighbors and are curious if diversifying into this crop would be feasible. As they start the financial statements course, they learn there are four main areas they need to examine.

### Cash Flow Statements/Projections

The cash flow statement shows cash inflows and outflows, usually on a monthly or yearly basis. Times of surplus or deficit and the need for borrowing external capital are outlined. The Smiths prepare a basic cash flow projection every year for their bank but believe they need more depth to examine this potential enterprise.

They start by listing all new cash outflows that will be required by the teff acreage. Teff seed is more expensive than other annual forages at \$8 per pound (\$80 per acre) but requires less fertilizer (\$25 per acre). It also requires extensive seedbed preparation that requires renting a specialized drill



John Hewlett

for planting (\$10 per acre to rent).

The Smiths estimate that, if they put up two cuttings of high-quality horse hay as their seed salesman said is possible, a 4-ton per acre yield valued at \$150 per ton and fall grazing worth \$1,500 is possible. These inflows and outflows are summarized on a monthly basis to help determine their cash borrowing needs. A shortened example of their cash flow is below.

### Balance Sheet, Statement of Owner Equity

The Smiths now look at the summary of assets and liabilities on their balance as they move into the next part of the course. They develop a balance sheet every year for their bank, including personal and business assets and liabilities; these are presented separately for clarity.

The question with the potential teff enterprise becomes whether or not the Smiths will need to purchase any new or specialized equipment. While their current round baler would work, they believe they eventually would need a \$50,000 medium-square baler to take advantage of the market.

They can rent a drill to plant but, at some point, would like to spend \$5,000 to modify their existing drill. The bank will loan the money to buy the baler on a 3- or 5-year note at 3.9 percent and 5 percent interest for annual payments of \$17,983 and \$11,549 respectively. The Smiths can deduct the depreciation expense for the baler cost on their tax return. On their statement of owner equity, the large loan will lower their equity in the short term, as the value of the baler will probably decrease quicker than the loan.

### Income Statement

The Smiths now move to the income statement section of the

course. Income statements list all sources of farm revenue and expenses calculating net farm income. The Smiths use cash-basis accounting, meaning their actual cash transactions are recorded for their IRS tax return.

In terms of their new enterprise, the Smiths see from their past year's income statement there is little extra cash available for a potential \$17,983 or \$11,549 baler payment – unless production increases and/or the price received for their alfalfa and teff hay increases above last year's price.

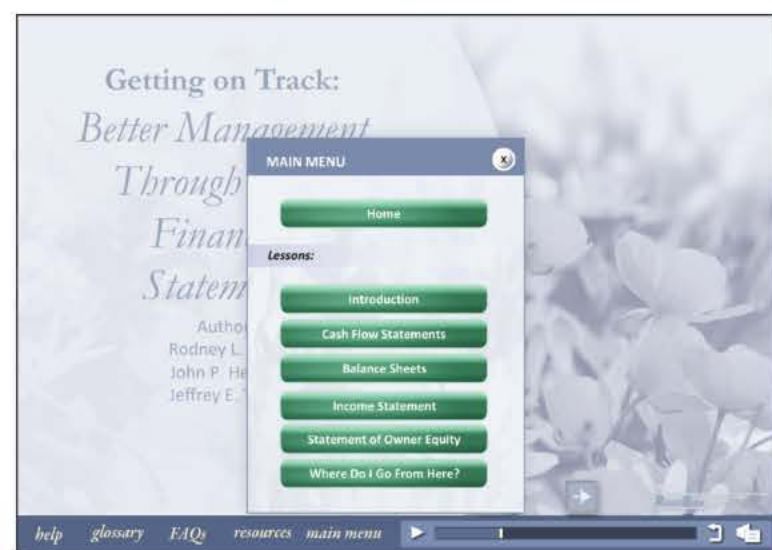
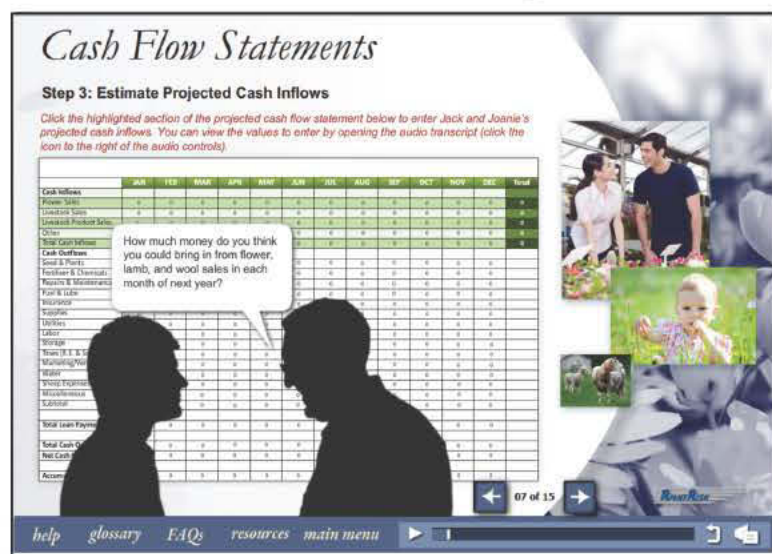
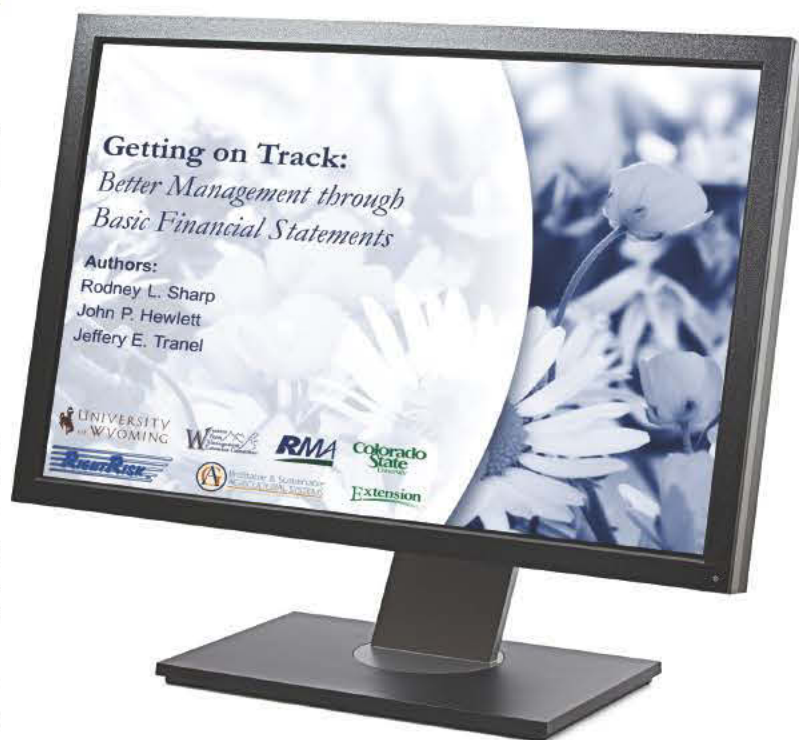
While the teff hay shows a potential operating profit of \$135 per acre (\$6,750 divided by 50 acres), that profit is not enough to cover the cost of the upgraded baler.

### Decision Strategy

Through participation in the financial statements course and their own analyses, the Smiths decide that, to plant the teff hay, they will need to change strategies. Buying the larger baler is not financially feasible. If they really want to put the hay up in that package, they need to look at having a custom operator bale the hay. This will add to the operating cost of the hay, but their owner equity and net income will not be negatively affected.

The added operating cost of the baler plus the loan to purchase it adds too much financial risk to their operation – something they are trying to avoid. They may look to purchase the baler in the future if demand for the teff hay increases and the market improves.

James Sedman is a consultant to the Department of Agricultural and Applied Economics in the University of Wyoming College of Agriculture and Natural Resources, and John Hewlett is a farm and ranch management specialist in the department. Hewlett may be reached at (307) 766-2166 or hewlett@uwyo.edu.



### For more information

Visit RightRisk.org to access the Financial Statements Course or one of the 15 different interactive courses on a variety of risk management topics from taxes to strategic risk management. For more information on financial statements and other risk management topics on the Web, visit the Western Risk Management library online at riskmgt.uwagec.org.

### Example Projected Cash Flow for Teff Enterprise

Cash Inflows	April	May	June	July	August	September	Total
Hay sales				\$18,750		\$11,250	\$30,000
Fall pasture						\$1,500	\$1,500
Subtotal	\$-	\$-	\$-	\$18,750	\$-	\$12,750	\$31,500
Cash Outflows							
Seed	\$4,000						\$4,000
Fertilizer		\$1,250					\$1,250
Fuel		\$1,000					\$1,000
Drill rent			\$500				\$500
Subtotal	\$4,000	\$2,250	\$500	\$-	\$-	\$-	\$24,750
<b>Net cash flows</b>	<b>\$(4,000)</b>	<b>\$(2,250)</b>	<b>\$(500)</b>	<b>\$18,750</b>	<b>\$-</b>	<b>\$12,750</b>	<b>\$6,750</b>

# Creative pruning creates exceptional shapes, exceptional fruit

By Donna Cuin

I have always thought of espaliers and similarly pruned plants as very formal and stuffy. I enjoy seeing formal landscape designs and have taken many photographs of formal gardens I've toured; however, I didn't really see the connection to MY garden.

I didn't need an addition to MY garden that was that controlled.

I "saw the light" after attending the Western Regional Master Gardener training in Rexburg, Idaho, last summer. Yard space available for fruit production in most yards is minimal, especially if children play in the space and there are gardens for food production.

## More Fruit per Square Foot

The lecturer told us an immense amount of fruit can be grown per square foot in highly pruned trees as opposed to traditional orchard tree pruning methods. A traditional orchard will produce .80 pounds or a little more than three quarters of a pound of fruit per square foot of orchard space. Intensely pruned trees in the form of a Belgian fence can produce 4 to 5 pounds of fruit in the same space. Cordon-pruned trees will produce 7 pounds per square foot. For this reason alone, I might just become a formal fruit grower.

Supplies are not difficult to obtain, even in Wyoming. Plants can be grown against an existing wall or fence or trained on an easily built structure of 4 x 4-inch posts and wire.

A 10-foot post set 2 feet in the ground will leave 8 feet above ground to support the wire framework necessary for the training process (an 8-foot post will leave 6 feet above ground level). Spacers made of lathe keep the trunks 4



to 6 inches away from the wall to prevent rubbing.

For training along a wall or on the new wooden structure, use a wire framework for the intended design. Taut wire that is just barely pliable is spaced 12, 18, or 24 inches apart, horizontally. Long bamboo poles provide the diagonal lines of the design from bottom to top (see top photo). Stretchy garden ties hold the branches to the wire and bamboo and allow for growth and some flexibility in wind.

The most important tool for any pruning project is a good set of secateurs, or hand pruners. A set of lopper pruners may be needed to get started, but, after that, pruning should be on small branches.

## Use Dwarf Varieties

Once an espalier is decided upon, time delivery of the trees to coincide with when your structure



Donna Cuin

is ready. Order dwarf varieties of fruit-bearing trees unless you want blooming or green plant material without fruit production.

For Wyoming conditions, avoid the early blooming varieties and stick with midseason or late-season varieties for a greater chance for fruit set on the trees.

Purchase bare root "whips." These are tall plants without branches and without soil on their roots. Keep the roots moist and protected from warm, dry weather until planting.

Most fruit trees and all dwarf fruit trees are varieties grafted onto rootstock. Planting the trees and protecting the rootstock is important. You don't want to lose the fruit-bearing portion of the tree in the first pruning of this long-term project. Do not prune off the variety grafted to the rootstock.

For traditional and other varieties of espaliers, plant trees upright and maintain the branches in horizontal positions. For Cordon style, the branches are maintained at 45-degree angles to the ground, all in one direction. Ten trees in 12 feet of space are feasible. Plant trees at 12-, 18- or 24-inch spacing depending upon how dense you want the final design. Follow basic tree planting practices to ensure healthy growth. Keep 6 feet of space between rows if rows are intended.

## First Cuts can be Dramatic

The first cuts are the most difficult because they seem so drastic. On a traditional espalier, the first cut is made before the tree leafs out, just above the first wire – usually 18 inches above the soil. This will encourage two side branches to grow from the trunk. The directional growth will be a little easier to control if you select buds that are growing on the two

## WHAT IS ESPALIER?

The practice of controlling plant growth so growth is relatively flat against a structure such as a wall, fence, or trellis.

sides as opposed to the front and back of the trunk. The two new branches will develop new growth over the first summer, and a new leader will grow straight up from the trunk.

This will provide the next buds for development in the second summer when you again cut the top out of the tree to encourage side branching. Once each season during dormancy, the top is removed until there is a number of side branches chosen for your design, for the amount of maintenance you would like to do, and for how much fruit you want the tree to produce.

Once started, expect to see fruit on the new tree in about three years.

## Thin Fruit Spurs

Fruit is produced on horizontal branches on fruiting spurs. These are short clusters of branch tissue where flowers bloom and fruit develops. Larger fruit spurs should be thinned to 6-inch spacing between spurs. Some fruit should be removed after fruit set so the tree does not over-produce one year and become stressed followed by very little fruit the next year.

For more detailed information on fruit tree pruning, check with your local UW Extension office or invest in a good pruning or fruit production book.

Donna Cuin is the horticulture program associate for the Natrona County University of Wyoming Extension office. She can be reached at (307) 235-9400 or dcuin@natronacounty-wy.gov.

## A FAN SHAPE

An espalier or fan shape is the use of one trunk to create the design rather than several trees, although if there is room many can be planted. Once creative juices get going, the possibilities are endless, including a living fence around the rest of a garden or a gazebo made entirely of living plants.





## Do real ranchers sell direct? YOU BET THEY DO

By Cole Ehmke

There has been impressive growth in farm-direct marketing over the last decade (especially farmers markets) – but we often get the sense that selling direct is a quaint practice more for backyard gardeners.

Wyoming producers have tested the waters, and they've found them pretty agreeable. Options range from complex operations focusing on interstate sales to smaller ranchers serving local markets. For the uninitiated, the marketing options can be confusing.

Here is a primer.

- First, realize that selling frozen beef (and other meat) can be a main venture or a complementary activity. For ranches like Hecht Creek Ranch in Centennial or Rocky Mountain Organic Meats in Powell, selling beef is more central to their operations. In contrast, operations like Meadow Maid Foods near Torrington sell beef, along with its vegetables and eggs, to the public.
- Second, realize that how a product can be sold depends on how it is processed.

If a consumer (the end user) buys a quarter or half beef and every package they get is stamped “not for sale,” then the processing was at the most limiting level in terms of sale: custom slaughter. Meat processed at a Wyoming Department of Agriculture (WDA)-licensed custom meat slaughter facility, also known as “custom



Cole Ehmke

exempt,” is “uninspected” because it is not processed in a state- or USDA-inspected facility, meaning it cannot be resold. Consumption should be by the owner. It cannot be sold at farmers markets, to restaurants or institutions, or to grocery stores. It cannot be donated to food banks.

### To Sell In or Out of State

Meat processed at a state-inspected slaughter facility can be sold to any stores or individuals within the state of Wyoming but cannot be sold out of state. It may be sold locally at farmers markets or restaurants.

For producers considering selling both locally and across state lines, their meat will need to be processed at a USDA-inspected facility. For Rocky Mountain Organic Meats, this means shipping the live animal to a processing plant (since there are no USDA-

inspected facilities in Wyoming, they go to Billings, Montana) and picking up the frozen product later. They can then sell their product anywhere in the country.

Thinking of preparing food or providing samples at a farmers market? Minimize the chance of a food safety incident by following good food safety practices. Also be aware there will be permits and licenses required – the market manager will be a good first contact.

### Helpful Source of Information

The WDA's Consumer Health Services is an excellent source. Contact them for details on the agricultural producer exemption from licensing, but not inspection, for processing, distributing, storing, or sale of any raw agriculture commodity he or she produces. Also, nutritional labeling is an issue as of March 1 because point-of-sale nutritional labeling is now required (there are some exemptions for ground product, but all the major muscle cuts will have to show information either on a label, brochure, or sign). See story page 10 for more information.

### For additional information

- Meadow Maid Foods [www.meadowmaidfoods.com](http://www.meadowmaidfoods.com)
- Hecht Creek Ranch [www.hechtcreekranch.com](http://www.hechtcreekranch.com)
- Rocky Mountain Organic Meats [www.rockymtncuts.com](http://www.rockymtncuts.com)
- Wyoming Farmers Marketing Association [www.wyomingfarmersmarkets.org/](http://www.wyomingfarmersmarkets.org/)
- Wyoming Department of Agriculture Consumer Health Services [wyagric.state.wy.us/divisions/chs](http://wyagric.state.wy.us/divisions/chs)
- USDA Food Safety and Inspection Service (FSIS) [www.fsis.usda.gov/](http://www.fsis.usda.gov/)

Cole Ehmke is the University of Wyoming Extension agriculture entrepreneurship specialist. He can be reached at (307) 766-3782 or at [cehmke@uwyo.edu](mailto:cehmke@uwyo.edu).

## Tight beef supply contributes to strong price outlook

By Bridger Feuz

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

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

Starting in 2006, the January 1 cow inventory has declined year over year and declined again in 2011. The 2012 January 1 beef cow inventory declined -3.1 percent from 2011 to 29.9 million head.

The number of heifers held as beef cow replacements has also been in decline since 2006 but actually saw a rebound of 1.4 percent in the January 1 numbers. The U.S. calf crop will be at its lowest level this year since the 1950s.

### Cow Numbers Decline

Several factors have led to this decline in cow numbers with severe drought conditions in the south being a large contributor this year.

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-percent 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 rebounded one point in 2011 to a value of 76.

### Export Numbers Strong

The export markets were a strong asset for U.S. beef producers in 2011. On a monthly basis, the U.S. exported on average nearly 70 million pounds



Bridger Feuz

Last year was characterized by a tight supply, strong export market, and steady demand. This led to record price levels for beef producers.

of beef per month more than we imported. The annual net value of our exports (sales of exports minus cost of imports) was more than \$3 billion for 2011.

Favorable exchange rates and a strong demand for U.S. beef were the main reasons for the positives in U.S. beef trade and look to continue in 2012.

Cattle producers continue to face significant input costs but did see lower corn prices in 2011. Record calf and cull cow prices also helped offset input costs in 2011. Cow-calf returns were estimated at \$200 per cow in 2011 for U.S. cattle producers, with some experts suggesting the returns may have been higher for cattle producers in the Inter-mountain area.

Last year was characterized by a tight supply, strong export market, and steady demand. This led to record price levels for beef producers. This year looks to be much like 2011 with cattle supplies even tighter than 2011. If the export markets can maintain and consumer demand holds, prices could again reach record levels.

Bridger Feuz is the University of Wyoming Extension livestock marketing specialist and can be reached at (307) 783-0570 or [bmfuz@uwyo.edu](mailto:bmfuz@uwyo.edu).

### SELLING AT MARKETS

The number of farmers markets in Wyoming has grown quickly over the last five years – they draw a diverse population often interested in local products.

To sell at a market, a producer needs to contact the market manager to arrange vending space (and pay any fees). Health departments will typically allow frozen products in coolers that maintain solid frozen product. Meat has to be processed at a state or federally inspected source (and have a stamp saying so) to be sold.

# Cull cow marketing: A new decision tool available at farmmanagement.org

By James Sedman and John Hewlett

These are interesting times for a cow-calf producer.

Prices have never been higher, and droughts in a large portion of the country have kept cattle numbers down, and they are steadily declining. This good news is tempered by feed and other input prices at or near all-time highs.

There has never been a better time to address the overall risk management strategy of a farm or ranch – managing risk to maximize profit and continuity.

Cull cow management is an often-overlooked facet of a cow-calf enterprise. Depending on prices and cull rates in a given year, cull cows can add a sizeable portion of income. Cow-calf producers have a new tool at [wiki.farmmanagement.com](http://wiki.farmmanagement.com) to assist their cull cow marketing decisions. This calculator can help determine cow values, feed costs, and break-even prices.

Also included is a short fact-sheet and presentation by Dillon Feuz of Utah State University and John Hewlett of the University of Wyoming on how to best utilize the tools and determine pricing trends for individual operations.

## Starting Point

A cow's body condition score is the first consideration of cow culling. Cows that can bring an acceptable price without supplemental feeding should probably be sold.

Next, if cattle need supple-



mental feeding to reach their market potential, consider the availability of feed. For instance, a ranch that primarily puts up grass or native hay will probably need to purchase at least some supplemental feed to make feeding cull cows worthwhile. The cost of feed, both raised and purchased, should be carefully considered.

As discussed above, cattle prices (including killer-cow prices) are high, so one might think feeding for the maximum price is an easy choice. Expensive feed can limit the profit potential of feeding.

Lastly, there should be a price incentive for choosing to feed cull cows. If the difference between a cow with a body condition score of 5 (boner class) and a 7 (commercial class) is less than \$0.05 per pound, there is little incentive to feed. Research has shown slaughter cow prices are seasonal with prices bottoming out in late October or early November and peaking in May to June.

## Examples Using the Cull Cow Marketing Tool

To use the online tool, log on to [wiki.farmmanagement.org](http://wiki.farmmanagement.org), then type in "cull cow marketing" in the search bar. Once at the correct page, click the tool link at the bottom of the page.

To show how this tool works, we consider the situation on two different example ranches. The Number One Ranch is a southeast Wyoming operation that runs 400 cow-calf pairs. Its cattle went to pasture in average condition and came out leaner than average

due to a dry grazing season. The Number One Ranch has 45 open cows on December 1 and, for our purposes, we assume they average a body condition score (BCS) of 5 and weigh an average of 1,100 pounds. Also assume that on December 1 they are worth \$58 per cwt, or \$638 total per head. The ranch has alfalfa hay, corn, and corn silage available; by utilizing the second page of the marketing tool, operators determine their ration cost is \$2.32 per day.

If they feed the cows for 60 days and put on 2.5 pounds per day, they estimate the cows will have a 7 BCS (commercial slaughter grade) and will bring \$71.07/cwt (\$888.32 per head). Assuming total feed costs of \$139.08 per head and other costs (yardage, interest, transportation) of \$30.09, Number One Ranch expects a total return per head of \$81.15 after feed costs.

Their break-even price to cover the costs of feeding would be \$64.57/cwt.

Number 2 Ranch, a central Wyoming ranch, had a dry summer grazing season. Out of their 450 cows, they had 50 opens with an average BCS of 3.5 weighing 1,000 pounds per head. The culls are worth \$53 per cwt, or \$530 per head total. Number 2 Ranch is more limited in its feeding options having access to only alfalfa and grass hay and protein supplement.

Using the ration cost calculator, the ranch's feed costs are \$2.27 per day to get the cows to gain 1.5 pounds per day for 75 days. At the end of the period, the expected value of the cows would be \$63.92/cwt (\$711.10 per head total). The

total return after feed and other costs (assume the same as for the Number One Ranch) is -\$19.24 per head. The results of both scenarios are shown in the table below.

## Results and Conclusion

While the two cull cow examples above are different types of operations, they demonstrate how each situation requires specific planning to make the most profitable decision. Number One Ranch has access to better feed and can put pounds on cows faster. This, coupled with their cows being in better condition than Number 2 Ranch, made the feeding decision

profitable. Number 2 Ranch would be further ahead to sell the culls without feeding because they simply cannot put on enough weight to be profitable. Keep in mind the tool calculates a final value of finished cows based on an average of prices and trends. The actual price could vary due to a number of factors.

James Sedman is a consultant to the Department of Agricultural and Applied Economics in the University of Wyoming College of Agriculture and Natural Resources, and John Hewlett is a farm and ranch management specialist in the department. Hewlett may be reached at (307) 766-2166 or [hewlett@uwyo.edu](mailto:hewlett@uwyo.edu).

## Cull Cow Strategy Comparison

	Ranch One	Ranch Two
Number of head	40	50
Average body condition score	5	3.5
Average cow weight	1,100	1,000
Current market price (\$/cwt)	\$58.00	53
Total value	\$638.00	\$530.00
Days on feed	60	75
Expected daily gain (lbs./day)	2.5	1.5
Expected final weight	1,250	1,112.5
Final BCS score	7	5.7
Expected final price	\$71.07	\$63.92
Expected final value	\$888.32	\$711.10
Feeding Margin	\$250.32	\$181.10
(-) Feed costs	\$139.08	\$170.25
(-) Other costs (yardage, transport, interest)	\$30.09	\$30.09
Total expected return per head	\$81.15	\$(19.24)
Expected Breakeven (\$/cwt)	\$64.57	\$65.68

## FOR MORE INFORMATION

The Cull Cow Management Module is available from the Farm Management Wiki at [wiki.farmmanagement.org](http://wiki.farmmanagement.org) by typing "cull cow marketing" in the search bar and following the link. It includes an article and presentation by Dillon Feuz of Utah State University and John Hewlett of the University of Wyoming and the feeding/marketing tool in spreadsheet form. For more information on this and other risk management topics, visit the Farm Management Wiki at [wiki.farmmanagement.org](http://wiki.farmmanagement.org) or the Western Risk Management Library online at [agecon.uwyo.edu/riskmgt](http://agecon.uwyo.edu/riskmgt).



Whitebark pine

# ONE OF WYOMING'S WONDERS

## This tree benefits many with ability to survive high, dry, windy

By Justina Russell

Nested high in Wyoming's western mountains lives one of the oldest and most ecologically diverse trees in all of the western United States.

Its presence in Wyoming's high elevation mountains promotes increased biodiversity and contributes to a number of critical ecosystem functions, including increasing soil moisture, slope stability maintenance, and the slowing of water runoff to lower elevations. Most importantly, this natural resource treasure produces a highly nutritious food source for a number of wildlife species.

These are just a few of the characteristics that describe one of Wyoming's great wonders – the inconspicuous whitebark pine (*Pinus albicaulis*) tree.

### Survives, Thrives in Inhospitable Locales

The whitebark pine is one of only a few trees adapted to occupy inhospitable environments on exposed ridges and atop high elevation peaks. For centuries, the species has survived and even thrived in extreme mountain environments. On less harsh sites, this remarkable tree is often the first to grow after a disturbance, creating a habitable microclimate for less-resilient tree species to develop and mature.

The whitebark pine is among the few five-needle pines in North America. In dense forest stands, it has a stately stature of more than 60 feet and typically possesses a rounded or irregular spreading crown shape. On open, exposed sites above 8,000 feet, the tree regularly has a shrub-like appearance and can be recognized by its multiple stunted stems.

This conifer species is commonly referred to as a "stone pine" since it has large, thick cones with wingless seeds. Because the hard-shelled cones do not open on their own, the whitebark pine relies on

birds and squirrels to crack them open and spread seeds across the landscape.

### These Birds Have a Job to Do

In fact, the Clark's nutcracker (*Nucifraga columbiana*), a member of the crow family, is almost exclusively responsible for the successful reproduction of the whitebark pine tree. These loveable birds, commonly known as camp robbers and often confused with the gray jay, are experts at harvesting whitebark pine nuts and caching them in small underground nests

for use as winter rations.

A single nutcracker can store an estimated 30,000 to 90,000 seeds a year. Since the birds can consume only a small portion of these stored seeds during the winter, large surpluses of seeds are freely distributed and become the next cohort of whitebark pine trees. The mutualistic relationship these two species share is a prime example of the ecosystem diversity provided by the whitebark pine in western forests.

### Threaten Survival

Yet, the existence of this ecologically important tree is under grave threat due to a number of compounding natural and human-caused pressures that include, but are not limited to, the mountain pine beetle, climate change, past fire suppression efforts, and large white pine blister rust infestations.

Whitebark pine populations have experienced a steady decline over the past century, even in areas previously thought to be protected from the above-mentioned threats.

Researchers predict a continued downward trend in whitebark pine forests. In as little as two or three generations, these unique forests could vanish from western landscapes. While individual trees will most likely remain, the valuable ecosystem functions performed by whitebark pine forests



Justina Russell

on a landscape scale will disappear. Species that have closely linked habitats with the whitebark pine, such as the Clark's nutcracker and the grizzly bear, will also inevitably be affected to some degree.

Efforts are under way to combat some of the threats to whitebark pine, particularly the spread of white pine blister rust, although none of the current approaches are completely effective in slowing the tree's decline.

With continued research and vigilance, this great wonder of Wyoming will be around for future generations to admire and treasure for years to come.

Justina Russell is a University of Wyoming Extension educator serving the Wind River Indian Reservation. She can be reached at (307) 332-2135 or at [jtoth1@uwyo.edu](mailto:jtoth1@uwyo.edu).



Clark's nutcracker

# Manage risk with livestock risk protection, livestock gross margin insurance options

By James Sedman and John Hewlett

An outsider looking at current cattle prices might guess there has never been a better time to be in the cattle business.

Cattle producers know, however, these markets are extremely volatile; that, coupled with high feed prices, makes having an effective risk management plan imperative.

Cattle operators have several options available under the Federal Crop Insurance Corporation program to manage price risk. Livestock Risk Protection (LRP) insurance protects against falling prices in both feeder and fed cattle.

Livestock Gross Margin (LGM) insurance protects against falling fed cattle prices and increasing input prices.

The Lightning-J Ranch is considering how one or both of these programs might fit their specific risk management needs.

## Ranch Background

The Lightning-J is centered in north-central Wyoming. It runs 400 cow-calf pairs and has typically retained ownership on calves, minus replacement heifers. This year, operators are looking at options for feeding 210 steer calves past weaning. They are trying to decide on one of several options: feed calves to just over 700 pounds and sell them, feed them to 900 pounds and sell them, or feed them to slaughter weight of 1,250 pounds.

## LRP Insurance

LRP policies protect a wide range of cattle producers, from cow-calf to feedlot operations. These contracts are for fed and feeder cattle, with contract lengths varying in four-week increments from 13 to 52 weeks. A producer applies for coverage and then selects a contract length for the production period along with the



cattle type, number of head, and expected weight at sale time (up to 900 pounds in the case of feeder cattle, 1,000 to 1,400 pounds for fed cattle). The price used for the insured value is determined by a Chicago Mercantile Exchange (CME) price index.

Indemnities occur if the index determined by CME prices at sale time is below the insured value. The coverage price is multiplied by the coverage level and then multiplied by the cattle weight in hundredweight (cwt) and number of head.

In our example, we will assume 92-percent coverage for feeder cattle and 91-percent coverage for fed cattle. As shown in the table, the ranch can insure steers for a total ranging from \$199,185 for the 700-pound option to \$268,058

for the 900-pound option. If the operators choose to go to finish with the steers, the fed cattle option (the last item in the table below) will also be used following the 900-pound option. If the actual price, determined by the Risk Management Agency (RMA), drops below the insured price, then indemnity payments are made.

## LGM Insurance

LGM insurance addresses the two main areas of fed cattle risk – feeder and slaughter cattle prices and feed costs. LGM insures against losses in margins associated with feed costs in addition to fed cattle prices. These contracts are essentially a bundled option of feeder cattle and corn input costs with the fed cattle price.

Contracts are available for calf

finishing and yearling finishing. Calf contracts assume calves enter the feedlot at 550 pounds and exit at 1,150 pounds, consume 52 bushels of corn, and can be purchased for up to 11 months.

Yearling contracts assume yearlings enter at 750 pounds, exit at 1,250 pounds, and consume 50 bushels of corn. Prices to calculate a producer's LGM gross margin guarantee are determined by the end-of-the-month live cattle, feeder cattle, and corn contract prices from the CME. Indemnities occur when the actual gross margin is less than the gross margin guarantee. In this case, the Lightning-J Ranch would use the calf finishing contract, in the December-to-October insurance period, with June as its target marketing month. The ranch selects a \$90/head deduct-

ible level, essentially the same as selecting a coverage level in LRP insurance.

Losses are determined if the actual gross margin drops below the gross margin guarantee – in this case \$45,958. Remember that, as with LRP contracts, what the ranch actually receives for the cattle on the cash market is not considered when calculating any indemnity payments. Indemnities are determined by the average of CME price indexes for the respective marketing month.

## Ranch Decision

The Lightning-J Ranch decision is based on several factors. Its cash flow position and credit availability are not able to support feeding the cattle to slaughter weight. The ranch should probably choose to feed calves to 700 or 900 pounds and sell them. This would depend upon immediate cash flow needs and if operators believe the premium cost of LRP is effective coverage against a decrease in prices.

Their risk preference also plays a factor. Where they may believe acceptable revenue is available at 700 to 900 pounds without the risk, there are increased expenses and risks involved in feeding calves to slaughter weight.

Remember that other factors not discussed here, such as feed costs, the costs of gain, and availability of feed, play a part in the decision to retain ownership.

*James Sedman is a consultant to the Department of Agricultural and Applied Economics in the University of Wyoming College of Agriculture and Natural Resources, and John Hewlett is a farm and ranch management specialist in the department. Hewlett may be reached at (307) 766-2166 or hewlett@uwyo.edu.*

## Lightning-J Ranch LGM Insurance (Calf Finishing Contract with \$90/head Deductible)

June marketings (# head)	Expected gross margin	Expected total gross margin	Deductible (210 head)	Gross margin guarantee	Liability level (\$104.04/cwt)	Premium cost
210	\$308.85	\$64,858.50	\$18,900.00	\$45,958.50	\$251,256.60	\$3,854.00

## Lightning-J Ranch LRP Policies (210 Head Steers)

Ending cattle weights	Policy length	Coverage price (\$/cwt)	Coverage level (%)	Total insurance coverage	Premium rate	Premium cost (w/13% subsidy)
700 pounds	13 weeks	\$147.28	0.92	\$199,185.00	0.008	\$1,377.66
900 pounds	21 weeks	\$154.16	0.92	\$268,058.70	0.009	\$2,088.17
1,250 pounds	13 weeks	\$125.88	0.91	\$300,693.75	0.005	\$1,388.59

## TO LEARN MORE

For more information on these cattle insurance programs, visit your local participating crop insurance agent or the Risk Management Agency's website at [www.rma.usda.gov](http://www.rma.usda.gov). To view information on this and other risk management topics on the Web, visit the Western Risk Management library online at [agecon.uwyo.edu/riskmgt](http://agecon.uwyo.edu/riskmgt).



# Study yields seed production potential for different tall fescue lines in Big Horn Basin

By Anowar Islam and Randall Violet

Grass pastures are essential to western U.S. agriculture, especially on cattle ranches of the Intermountain Region.

Unfortunately, the yield and quality of these grasslands are low and have declined over time. The process has been further accelerated by soil degradation. Introduction of a highly productive, palatable, nutritious, nontoxic, drought tolerant, and winter hardy tall fescue system may increase productivity, quality, sustainability, and profitability.

Tall fescue is one of the most productive cool-season grass species in the United States. It can grow on a wide range of soils, has high drought and winter hardiness, and can be used for pasture, hay, stockpiling, silage, soil conservation, and turf grass. Tall fescue, a prolific seed producer, could be a seed crop in northwest Wyoming.

University of Wyoming College of Agriculture and Natural Resources scientists in the Department of Plant Sciences, with financial assistance from the Wyoming Crop Improvement Association, seek to identify novel tall fescue varieties/lines suitable for growing in the western mountain regions, specifically in the Big Horn Basin.

The study will generate information on growth, forage yield, and seed yield to benefit not only local growers but also those throughout the state and beyond.

The study started in early May 2009 at two locations: the UW Powell Research and Extension Center (PREC) and the Stroh farm near Powell. There were two separate experiments: seed production and forage production. Standard seeding rates were used for both studies (8 pounds PLS [pure live seed]/acre for seed production and 20 pounds PLS/acre for forage production).

## Plant Seven Varieties

In the seed production study, seven varieties/lines of tall fescue were planted as primary treatment in 22-inch rows with four replications. In addition, two treatments – namely three nitrogen levels (0, 100, and 150 pounds nitrogen/acre) and three clipping times (none, early, and late) – were imposed on top of these varieties/lines.

In the forage production study, similar treatments followed on seven varieties/lines except there was no clipping treatment and the nitrogen levels were 0, 50, and 100 pounds nitrogen/acre.

In 2010, nitrogen was applied in two splits: one during early-growth and the second in the late-growth stage after the first cutting for both studies. For forage yield, plots were mechanically harvested twice: June 28 and October 1 at PREC and June 30 and October 7 at the Stroh farm using a forage harvester. Plots for seed production at both locations were swathed and thrashed July 21 and August 4 at PREC and July 27 and August 5 at the Stroh farm.

## Dry Matter Yields

For all varieties/lines, the lowest forage dry matter (DM) yield was associated with the control treatment (no nitrogen) while significant DM yield increase (two to three times) was obtained from the 50- and 100-pound nitrogen/acre treatment [range 2,650-11,000 pounds DM/acre (PREC) vs. 1,250-5,000 pounds DM/acre (Stroh farm)].

The highest forage yield (11,000 pounds DM/acre) was



Anowar Islam

from variety KY 31 of 100-pound nitrogen treatment while the lowest forage yield (1,250 pounds DM/acre) was from control treatment of the same variety (KY 31).

## Seed Production Results

A similar trend was also observed for the seed production study at both locations; however, clipping time had significant ef-

The highest seed yield was 603 pounds/acre from Cowgirl (150 pound nitrogen/acre treatment) followed by 459 pounds/acre from PDF 584 (150 pounds nitrogen/acre treatment) at the UW Powell Research and Extension Center.

fects on seed yield for all varieties/lines. The late clipping treatment consistently produced the lowest seed yield compared to no or early clipping, while early clipping seemed to produce the greatest seed yield. The highest seed yield was 603 pounds/acre from Cowgirl (150-pound nitrogen/acre treatment) followed by 459 pounds/acre from PDF 584 (150-pounds nitrogen/acre treatment) at PREC.

The lesser forage and seed yields at Stroh farm may be associated with delayed and less frequent irrigation practices compared to PREC. As a consequence, an early shattering of seeds occurred at Stroh farm.

One year of results is not enough to conclude this study. Data was also collected in 2011 and is in the process of compilation. We expect to obtain similar outcomes to 2010. Information, especially on management strategies, from this study will be useful for not only local producers but also for those in neighboring states.

More information or answers to specific questions on the topic can be obtained by contacting the author.

Anowar Islam is an assistant professor and the University of Wyoming Extension forage agroecologist in the Department of Plant Sciences in the College of Agriculture and Natural Resources. He can be reached at (307) 766-4151 or [mislam@uwyo.edu](mailto:mislam@uwyo.edu).

## ON-FARM TRIAL ACTIVITIES



The foreground is forage production and background is the seed production trial at the Powell Research and Extension Center.



Forage production and seed production trials at Stroh farm.



Fertilizer application at the Powell Research and Extension Center.



Using a forage harvester at the Powell Research and Extension Center.



## WANT A MILK COW?

There are several considerations when thinking about drinking that fresh milk

By Hudson Hill

The last frontier for many backyard enthusiasts raising their own food may be the backyard milk cow.

As people look at ways to become connected with their food, more are considering owning a milk cow. Sitting on a front porch with a tall, cold glass of milk from your cow after the day's chores are done certainly holds nostalgia.

Nostalgia aside, there is a lot of work, time, and money behind that glass of milk. Let's consider a few things prior to jumping into home milk production.

### Reasons to Produce your Own Milk

Milk is a healthy and important part of the American diet. Satisfaction in producing one's own food and knowing where it comes from is why many people have their own milk cows. Milk producers do more than drink the product they produce. They also make butter, cheese, and ice cream. Home milk production may save money, especially if you have feed and a place to keep a cow.

Producers who make milk production pay are those with the ability to utilize the milk produced.

### Things to consider

- **Facilities** – Having a place for a cow to live, eat, and be milked is essential.
- **Nutrition** – During lactation, a cow will produce thousands of gallons of milk. A cow needs consistent and constant high-quality feed. If the cow is not

properly fed, there will be health and reproduction problems.

- **Time** – Cows have to be fed and milked twice a day every day during lactation. Cows will also need to be properly cared for during their dry period (when not producing milk).
- **Too much milk** – This may seem like a good problem; however, at peak lactation with good nutrition, many cows will give up to 10 gallons a day. For backyard production to be successful, planning what to do with excess milk is essential.
- **Animal management** – Whether one cow or a thousand, producers must plan for feed, labor, nutrition, dry cow management, reproduction, vaccinations, sickness, hoof trimming, calf management, and dry periods. Understand the many inputs associated with milk production before starting the endeavor.
- **Cleanliness** – USDA regulations to sell or ship milk or dairy products are stringent. There are good reasons for these regulations. Milk and dairy products, when handled improperly or those from an



Hudson Hill

unhealthy animal, can be associated with foodborne illness or disease. Pasteurization is a good technique to understand. Usable milk comes from cleanliness and healthy cows.

- **Picking the right cow** – Different breeds have different production and personalities. Researching what breed would be right is a great place to start for the backyard producer.

Remember – dairy is a great product. Landowners with the ability to manage a milk cow may find once again that the things that take a lot of work often are the most rewarding.

Hudson Hill is a University of Wyoming Extension educator based in Lincoln County and also serves Sublette, Sweetwater, Sublette, Teton, and Uinta counties. He can be reached at (307) 885-3132 or at [hhill@uwyo.edu](mailto:hhill@uwyo.edu).

### For more information

Consumer Health Services,  
Wyoming Department of  
Agriculture

<http://wyagric.state.wy.us/divisions/chs>

## Nutrition labeling for raw meat and poultry products began March 1

By Kellie Chichester

The Nutrition Labeling and Education Act (NLEA) of 1990 required nutrition labeling of most foods regulated by the Food and Drug Administration.

Now, the Food Safety and Inspection Service (FSIS) has amended the federal meat and poultry products inspection regulations to require labeling of major meat cuts and ground meat products (with and without seasoning). Regulations require nutrition labels on the packages of all multi-ingredient and heat-processed meat and poultry products.



Kellie Chichester

### Healthy Diet Choices

USDA officials believe that, as part of the continuing efforts to educate consumers about diets and nutrition, labeling meat is a step forward to help consumers make healthy diet choices.

The nutrition facts will either be made available at the Point of Purchase (POP) or they will be included on the label for major meat cuts. The label has to be affixed to ground meat product packages. Product packages that do not bear a label will be considered "misbranded." FSIS will consider misleading and false those products without nutrition labeling information because the product does not provide consumers with sufficient information.

On the label for the major meat cuts, consumers are given a rough indication of the fat content, but, because there is so much variability within a product, the specific nutrient information and the serving size per container will not be available. Manufacturers will instead use data from the USDA's National Nutrient Data Bank or the USDA's National Nutrient Database for Standard Reference. All skinless chicken breasts will have similar nutrition information, and all chuck roasts will have similar nutritional data; it will not be specific to each individual piece of meat – it will be an average. On the other hand, FSIS recognizes it is easier to obtain the nutrition information for ground products; all ground or chopped product will indicate the precise fat content.

### Small Businesses Exempt

Small businesses are exempt from the ground meat rules if the products are produced at a facility that employs less than 500 persons and produces no more than 100,000 pounds of a particular product per year. Small businesses will still be expected to provide nutrient information for major cuts of meat at the POP. The FSIS is making POP materials available on the Internet free of charge ([www.fsis.usda.gov/Home/index.asp](http://www.fsis.usda.gov/Home/index.asp)).

Kellie Chichester is a University of Wyoming Extension educator based in Laramie and serves Albany, Carbon, Goshen, Laramie, and Platte counties. She can be reached at (307) 721-2571 or at [kelliec@uwyo.edu](mailto:kelliec@uwyo.edu).

# Montana v. Wyoming before the U.S. Supreme Court

By Kristi Hansen and Alan Schroeder

A recent United States Supreme Court decision, *Montana v. Wyoming*, which interprets Wyoming, Montana, and North Dakota irrigators' water rights under the 1951 Yellowstone River Compact, poses a question which, on its face, may seem silly to readers: can being more efficient ever be illegal?

While the United States Supreme Court decided that increased irrigation efficiency did not violate the compact, thoughtful irrigators and policymakers may be less dogmatic in applying the court's decision within their states and in subsequent compacts.

## The Case

In 2007, the state of Montana sued the state of Wyoming in the United States Supreme Court claiming, among other things, that Wyoming, by allowing irrigators to increase their irrigation efficiency, violated the Yellowstone River Compact – the agreement that governs water allocation in the Yellowstone River system among users in Montana, North Dakota, and Wyoming.

## Yellowstone River and Yellowstone River Compact

The Yellowstone River begins in Wyoming and flows through Montana before joining the Missouri River in North Dakota. Several Yellowstone River tributaries (the Clarks Fork, Tongue, Powder, and Bighorn rivers) also begin in Wyoming before meeting the Yellowstone River in Montana.

During the middle of the 20th century, increasing agricultural

demand for water placed pressure on existing supplies. As a result, Congress in 1932 authorized the states of Montana, North Dakota, and Wyoming to negotiate how waters on the Yellowstone would be divided between the three states. The resulting Yellowstone River Compact was ratified by the three states and approved by Congress in 1951. According to the compact, all water rights existing at the time the compact was ratified (referred to as pre-1950 rights) "shall continue to be enjoyed in accordance with the laws governing the acquisition and use of water under the doctrine of appropriation." Thus, in a dry year, "junior," post-1950 rights-holders may be curtailed in order to satisfy Wyoming and Montana pre-1950 water rights.

## Montana's Argument

Montana alleged that new, post-1950 appropriations in Wyoming (for irrigating new acreage, building new storage facilities, pumping additional groundwater, and increasing consumption on existing acreage by installing more efficient irrigation systems) were interfering with Montana's pre-1950 rights.

## Efficiency Improvements

The more contentious issue was whether efficiency improvements on existing acreage by Wyoming's pre-1950 users are acceptable under the compact. Since 1950, Wyoming pre-1950 irrigators have installed sprinkler irrigation systems, which may have increased their consumptive use. Thus, although their diversions



Kristi Hansen



Alan Schroeder

The key question in this case was whether the compact allows Wyoming's pre-1950 users to increase irrigation efficiency even if doing so reduces flows to Montana's pre-1950 users.

have remained the same, their return flows to the river system may have decreased. The Montana attorney general argued that traditional flood irrigation consumed 65 percent of the water diverted from the river with the remaining 35 percent returning to the stream either as surface runoff or ground water percolation.

The attorney general claimed that Wyoming irrigators' adoption of sprinkler irrigation increased consumption to 90 percent and decreased return flow to the stream to 10 percent. The key question in this case was whether the compact allows Wyoming's pre-1950 users to increase irrigation efficiency even if doing so reduces flows to Montana's pre-1950 users.

The United States Supreme Court said yes; increased irrigation efficiency is within the scope of the original appropriative right.

## The Governing Law

Justice Clarence Thomas, writing for the majority, noted the compact protects water rights established before 1950 under the doctrine of prior appropriation, which is the principle set of laws governing water allocation in Western states. Under the doctrine of prior appropriation, the

first water user on a waterway to develop water and put it to beneficial use has a more senior right than other users who subsequently develop water: "first in time, first in right."

Thomas examined how two prior appropriation rules in Western states' water laws deal with increased efficiency: "no-injury" and "recapture." First, the *no-injury rule* states that water users cannot make changes in the point of diversion or changes in the place or purpose of use that would harm other water users. The court determined that improvements to irrigation systems fall outside the scope of the no-injury rule.

Second, the *recapture rule* states that an appropriator who has diverted water may recapture and reuse this runoff and seepage as long as he recaptures it while it is still on his property and as long as he reuses the water for the original purpose on the same land.

Additionally, the court noted that water law scholars have determined that increasing on-farm efficiency may reduce the amount of water available to downstream users, but that users nonetheless have a right to eliminate waste by improving the technical efficiency of their irrigation systems.

## Implications for Water Law and Allocation

In making its decision in favor of Wyoming, the court relied on a standard interpretation of Western water law. However, the decision of the court was not unanimous. Justice Antonin Scalia did not disagree with the court's reading of Western water law, but he read the compact's terms as deviating from standard Western water law by giving Wyoming's pre-1950 users only the right to the net consumptive use they enjoyed in 1950 rather than their full 1950 diversion rights.

Wyoming is a headwaters state; it has compacts with downstream states in all four directions and governing how water is allocated among users across states.

These compacts are designed to ensure that existing water users' rights are protected even as water conditions and human water use patterns change in the future. As the Supreme Court noted, the language in the various compacts differs. If the same question were raised under these other compacts, outcomes could potentially be quite different.

The "no-injury" rule may continue to protect junior prior appropriation rights-holders when changes in use or location are involved. The court's interpretation of Western water law leaves junior prior appropriation rights-holders exposed to increased irrigation efficiency regardless of how long or how invested they are in seepage or runoff from senior appropriators.

Additionally, it provides a way for water rights purchasers to avoid the "no-injury" rule by renting more efficient irrigation technology prior to making their change request and then claiming a right to transfer the increased consumed amount.

Stay tuned.

Kristi Hansen is an assistant professor and water resources economics specialist with the University of Wyoming Extension. She can be reached at (307) 766-3598 or at [khansen18@uwyo.edu](mailto:khansen18@uwyo.edu). Alan Schroeder is an associate professor and extension agricultural and natural resources law specialist. He can be contacted at (307) 766-5133 or at [conrad@uwyo.edu](mailto:conrad@uwyo.edu). Both are members of the Department of Agricultural and Applied Economics in the College of Agriculture and Natural Resources.



## RESOURCES FOR ARTICLE

Information for this article was drawn from the Yellowstone River Compact (<http://yrcc.usgs.gov/support.docs/YellowstoneRiverCompact.pdf>) and the Supreme Court decision (131 S. Ct. 1765; 179 L. Ed. 2d 799; 2011 U.S. LEXIS 3369 (2011), also available at <http://www.supremecourt.gov/opinions/10pdf/137orig.pdf>). Please see *Water Law in a Nutshell* (Getches 2001) for more information on Western water law.





# Make a flood irrigation system work for you

By Sandra Frost

Many Wyoming irrigation districts deliver water using inexpensive gravity feed because of our high-elevation snowpack and low-elevation pasture/crop lands. A series of canals, pipes, or ditches deliver water to fields or subdivisions for irrigation.

Fields are flooded when siphon tubes flow from the ditch to the crop row or gated pipe gates are opened. Water rushes down furrows to the end of the field.

Typically, crop rows are irrigated eight hours (a "set"), and then the water is moved. Soil type determines when the soil is saturated and will not absorb more water. For example, a sandy loam has large pore spaces, and water drains quickly through it, while clay loam has small, tight pore spaces that take up and release water more slowly.

## Correct Amount of Water

There is more to managing a flood irrigation system than opening gates. Irrigators should consider not only how quickly water reaches the end of the furrow but also how much water is needed and how it is distributed.



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Factors, such as soil type, crop water use, and root depth, determine the correct amount of water to apply. In addition, soil texture will determine how fast water will infiltrate soil and move out of the furrow. Soil may absorb water quickly at first. Absorption slows after an hour or two and maintains a more uniform rate during the irrigation set time.

A handy tip is to use solar-powered butterfly valves in pipe to switch the water destination. This sends a surge of water down a series of furrows for a distance. When the valve switches to the alternate group of furrows, the first group is absorbing water and settling soil particles to form a

smoother surface. When the valve switches water back into the first group of furrows, the water will travel further down the row, faster, before soaking in.

Producers have also used polyacrylamide (PAM), a water-soluble polymer that binds soil particles together, to reduce erosion and enhance water distribution across a field. Soils with low infiltration rates can have longer field lengths while soils with fast infiltration rates may have shorter field lengths.

## Avoid Saturated Soils

Efficient water application saves water and avoids saturating soil. Three undesirable things can happen in saturated soils:

1. Fertilizers will leach away with draining water.
2. Small soil organisms can be killed when water fills all the pore spaces, excluding oxygen from soil.
3. Water from pastures irrigated too long usually moves downhill to a neighbor's property where it may not be wanted.

It is possible to calculate the gross depth and uniformity of application over a field (see Resources).

Water must be applied equally from the upstream to the downstream end of the field. Crop yields on either end can be adversely affected by too much or too little water. Efficient furrow length (runs) differs for each soil type: sandy soil 600 feet; medium-texture soils 1,300 feet; some tight soils 2,600 feet.

Shortening row length is one way to reduce the time necessary to advance water across a field. Stream size in each furrow must be such it does not cause erosion.

A cutoff ratio evaluates how appropriate the set time and stream size are. The cutoff ratio is the time it takes for water to advance to the end of the furrow to the total set time. Different soil textures have different cutoff ratios that promote uniform irrigation along the length of a furrow (see Resources).

Irrigating every other row may be a successful technique when the crop needs water quickly, depending upon soil texture and crop row spacing. This technique is useful on soils with high infiltration rates and low water-holding capacity.

Of concern in some states is irrigation runoff water that leaves the bottom of fields (tail water). Producers work hard to use only the amount of water needed for a

crop on any given day. Irrigation water, a production cost, is becoming more expensive. Electronic data loggers can tell a farmer how much water is in the soil, how much the crop is using, and local weather data. Some states have Web-based electronic monitoring systems to provide information for irrigation decisions.

Sandra Frost is the University of Wyoming Extension educator in Park County specializing in crops. She also serves Big Horn, Fremont, Hot Springs, and Washakie counties and the Wind River Indian Reservation. Frost can be reached at (307) 754-8836 or at [sfrost1@uwyo.edu](mailto:sfrost1@uwyo.edu).

## RESOURCES

NebGuide G1338 (Revised May 2003)

Go to [www.extension.unl.edu](http://www.extension.unl.edu), click the UNL Extension Publications link, then type G1338 in the Search Publications field.

### Managing Furrow Irrigation Systems

By C. Dean Yonts, et al.  
<http://water.unl.edu/web/cropwater/furrow>