KSU BEEF STOCKER FIELD DAY

September 25, 2014
KSU Beef Stocker Unit

PROCEEDINGS

Beef Stocker Field Day 2014
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Table of Contents

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Welcome to the 15th annual KSU Beef Stocker Field Day. We appreciate your attendance and support of this educational event. We are fortunate to have assembled an outstanding list of presenters and topics that we believe are relevant to your bottom line.

As always, if you have any questions on the program or suggestions for future topics, please let us know. Our strength in delivering relevant information lies in working closely with you, our stakeholder.

Sincerely,

Dale A. Blasi, PhD
Extension Beef Specialist
Department of Animal Sciences and Industry
College of Agriculture

THANK YOU

We would like to express a special "THANK YOU" to Merial Animal Health for their support of today's educational program and activities for the beef stocker segment. With their financial assistance, we are able to deliver the caliber of programming that today's events have in store for you. Please take a moment to stop by their display to see the line of products that they have to offer.

MERIAL
A SANOFI COMPANY

Beef Stocker Field Day 2014
September 25, 2014
KSU Beef Stocker Unit

9:30 a.m.	Registration/Coffee
10:15 a.m.	Introductions
10:30 a.m.	**Forward Planning Implications for Herd Rebuilding Phase: Where Does the Stocker Segment Fit?** *Dr. Glynn Tonsor, Kansas State University*
11:15 a.m.	**Producer Panel: Receiving and Growing Nutrition Philosophies** *Wes Ishmael, BEEF Magazine, moderator* *Brian Barnhardt, Lebo, KS* *Chad Cargill, Isabel, KS* Jaret Moyer, Emporia, KS Jay Rezac, Onaga, KS
12:15 p.m.	Barbecue Brisket Lunch- View Posters
1:15 p.m.	**Stocker Parasite Control: A New Frontier** *Joe Dedrickson, DVM, Merial Animal Health*
2:15 p.m.	**Management Strategy Response to the FDA Phase Out of Antibiotics** *Mike Apley, DVM, Kansas State University*
3:00 p.m.	**Break**
3:30 p.m.	**Break-out Sessions (30 minutes each)**
	Coccidiosis: The Robber Baron *Gregg Hanzlicek, DVM, Kansas State University*
	Livestock Watering Options *KSU Watershed Specialists: Ron Graber, Central Kansas; Herschel George, Southeast Kansas; Will Boyer, Northeast Kansas; Stacie Minson, Big Creek, Middle Smoky Hill River; and Jeff Davidson, Flint Hills*
	Evaluating Environmental Impact of Small Receiving/Growing Facilities *KSU Watershed Specialists*
5:30 p.m.	Cutting Bull's Lament 2014

Notes – Notes -- Notes

Forward Planning Implications for Herd Rebuilding Phase: Where Does the Stocker Segment Fit?

Dr. Glynn Tonsor
Kansas State University

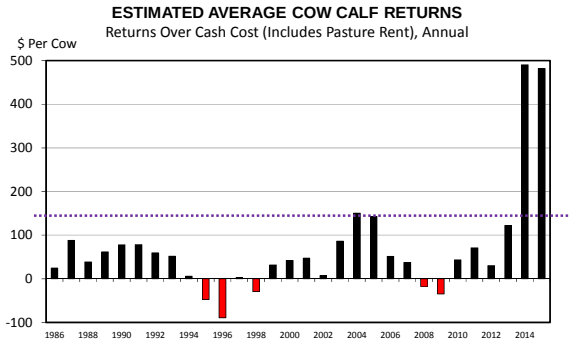
Situation Summary

(Shared here last year)

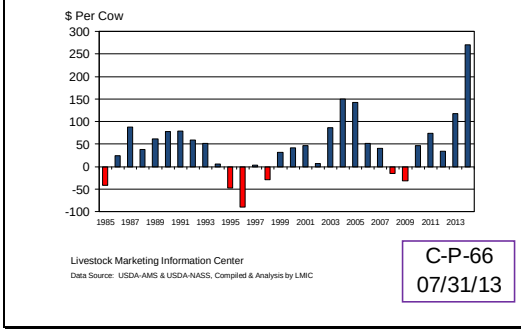
- Historically tight supplies & high prices
- Industry is in midst of multiple changes
- Many "old" as well as "new" issues will guide profitability and characterize future of the industry…
- Stocker segment will have to adjust accordingly

Overarching Beef Industry Economic Outlook

- Supplies
  - Continued pull down, both in # of head & beef lbs
    - Mixed expansion signals…
- Demand
  - Confusing yet positive: Q2.2014 best since Q4.2004
    - Reinforced by record setting pork demand
- Combined:
  - "Historic" price levels, excitement, & uncertainty…

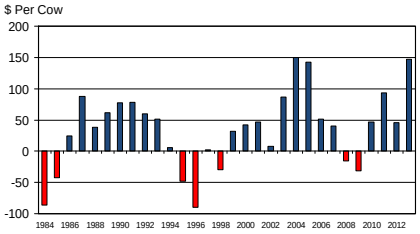


What will it take to trigger herd expansion?



What will it take to trigger herd expansion?

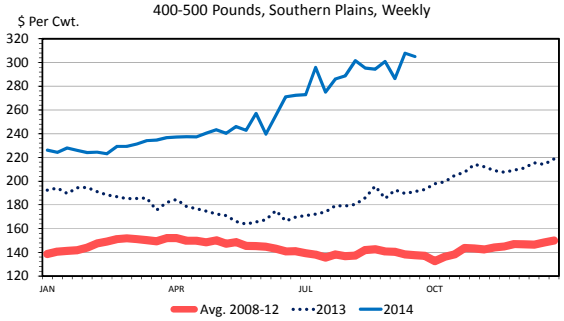
ESTIMATED AVERAGE COW CALF RETURNS
Returns Over Cash Cost (Includes Pasture Rent), Annual



Livestock Marketing Information Center
Data Source: USDA-AMS & USDA-NASS, Compiled & Analysis by LMIC

C-P-66
08/09/12

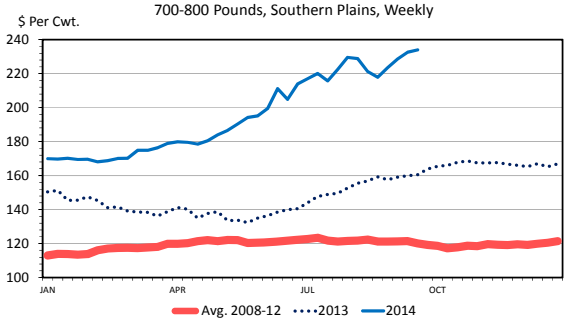
MED. & LRG. #1 STEER CALF PRICES
400-500 Pounds, Southern Plains, Weekly



Data Source: USDA-AMS, Compiled & Analysis by LMIC
Livestock Marketing Information Center

C-P-49A
09/22/14

MED. & LRG. #1 FEEDER STEER PRICES
700-800 Pounds, Southern Plains, Weekly



Data Source: USDA-AMS, Compiled and Analysis by LMIC
Livestock Marketing Information Center

C-P-49
09/22/14

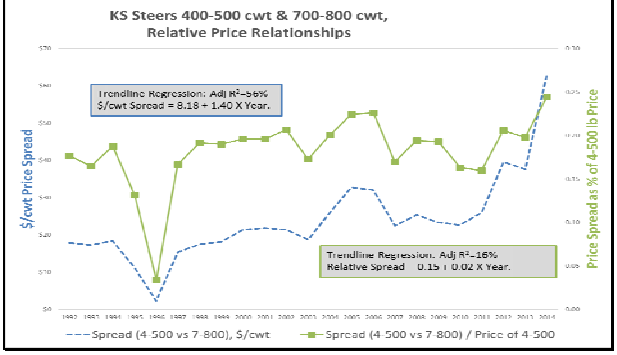
KS Steers Assessment
400-500 cwt vs. 700-800 cwt Relationships

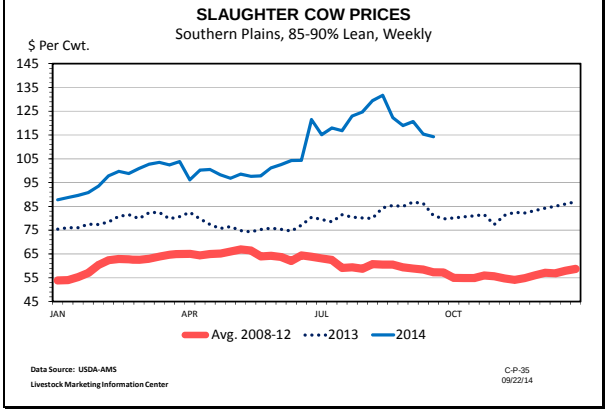
- $/cwt price spread has increased = sticker shock…
- BUT look at relative price …
  - **Old rules of thumb need not apply**

Year	Spread (4-500 vs 7-800), $/cwt	Spread (4-500 vs 7-800) / Price of 4-500
1992-1995	16.20	0.17
1996-2000	14.92	0.16
2001-2005	24.13	0.20
2006-2010	25.17	0.19
2011	25.99	0.16
2012	39.53	0.21
2013	37.57	0.20
2014	62.69	0.24

KS Steers Assessment
400-500 cwt vs. 700-800 cwt Relationships

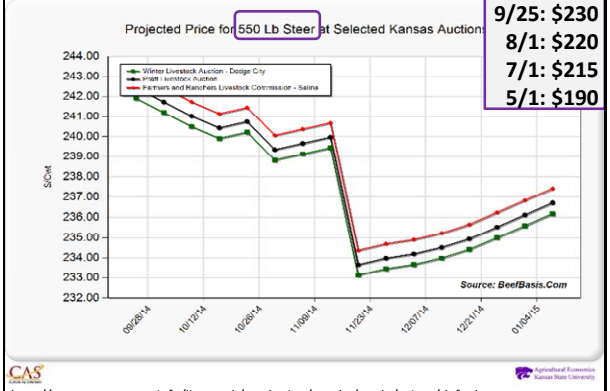
- **Old rules of thumb need not apply** (Peel, 9/22 Cow-Calf Corner)





As of: 9/25/14'

Oct FC:
9/25: $230
8/1: $220
7/1: $215
5/1: $190



http://www.agmanager.info/livestock/marketing/graphs/cattle/prices/default.asp

12

As of: 9/25/14'

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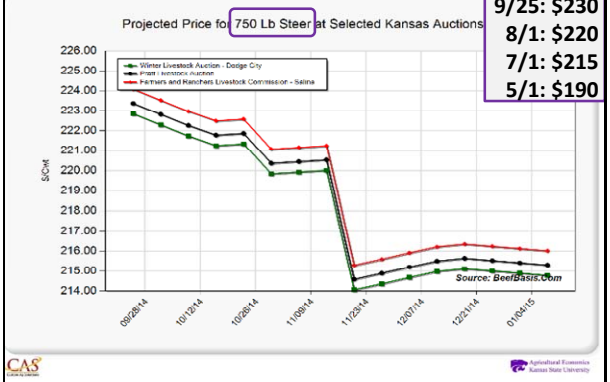


http://www.agmanager.info/livestock/marketing/graphs/cattle/prices/default.asp

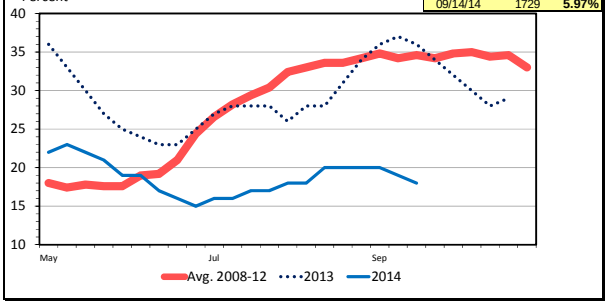
13

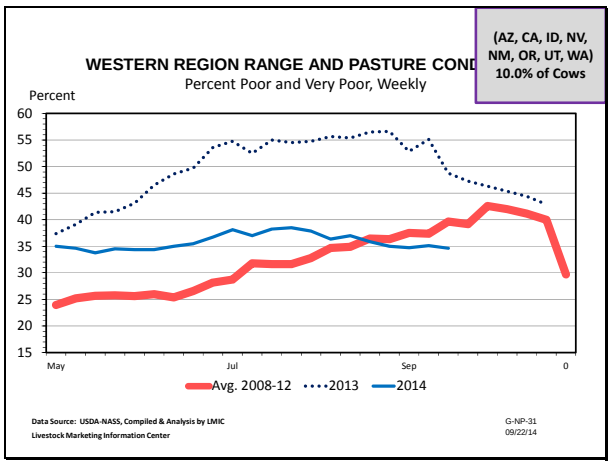
Data Source: USDA-NASS, Compiled & Analysis by LMIC
Livestock Marketing Information Center

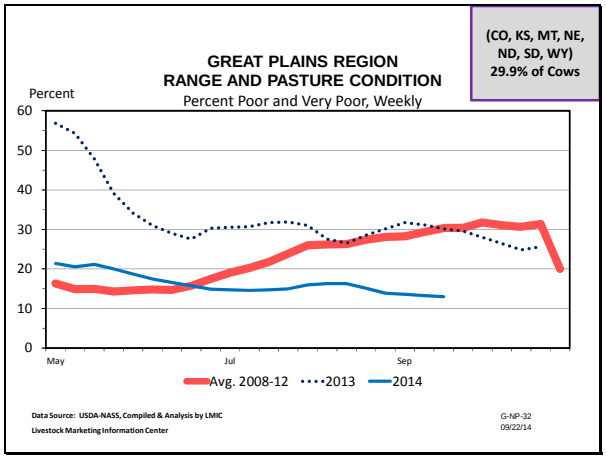
G-NP-30
09/22/14

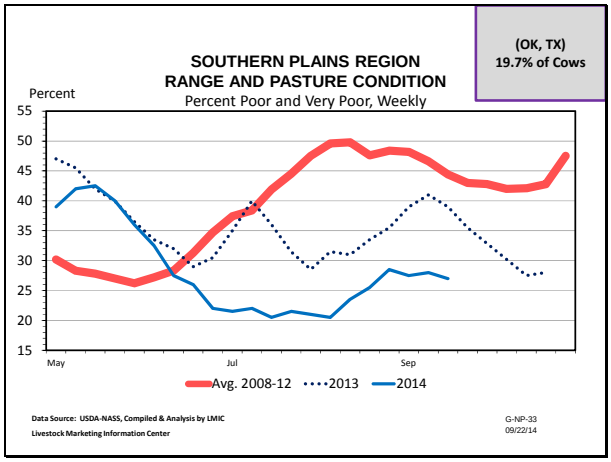
US RANGE AND PASTURE CONDITIO
Percent Poor and Very Poor, Weekly

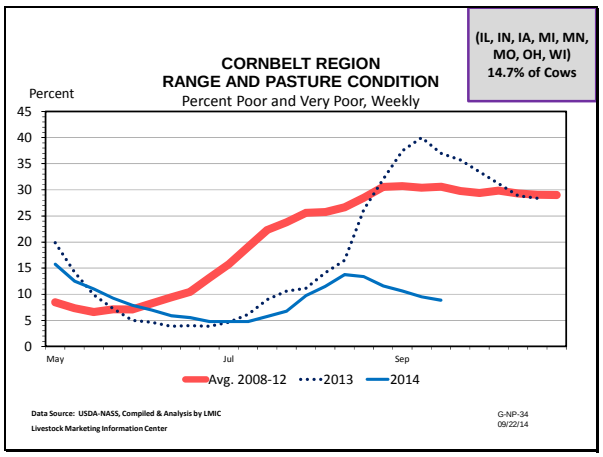
Beef Cows in states with 40% Poor to Very Poor		
Last year	Cows	% of Total
09/01/13	9427	**32.26%**
09/08/13	8917	**30.51%**
09/15/13	9789	**33.50%**
This Year		
08/31/14	1503	**5.19%**
09/07/14	1503	**5.19%**
09/14/14	1729	**5.97%**

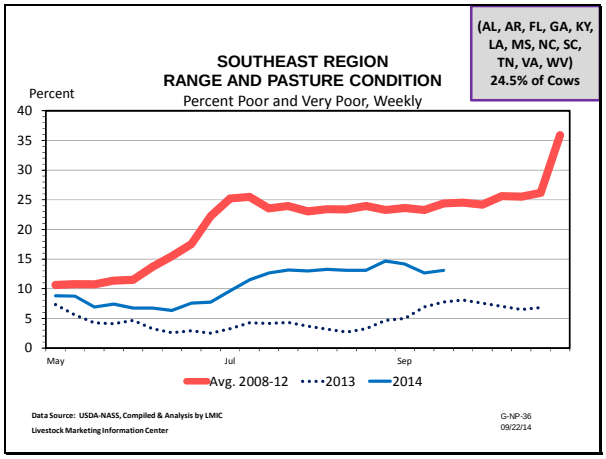


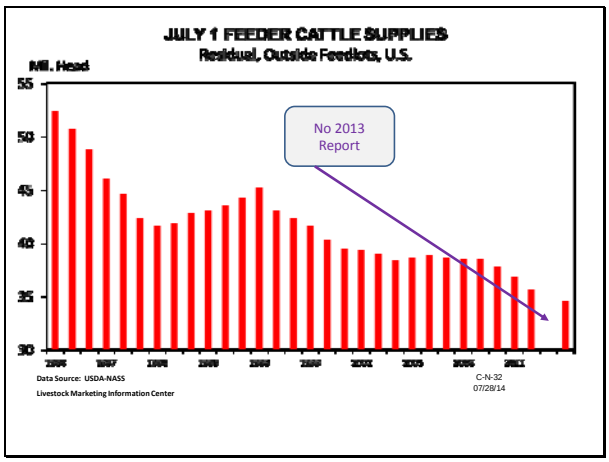

WESTERN REGION RANGE AND PASTURE COND
Percent Poor and Very Poor, Weekly
(AZ, CA, ID, NV, NM, OR, UT, WA)
10.0% of Cows
Percent
60
55
50
45
40
35
30
25
20
15
May
Jul
Sep
0
Avg. 2008-12
2013
2014
Data Source: USDA-NASS, Compiled & Analysis by LMIC
Livestock Marketing Information Center
G-NP-31
09/22/14

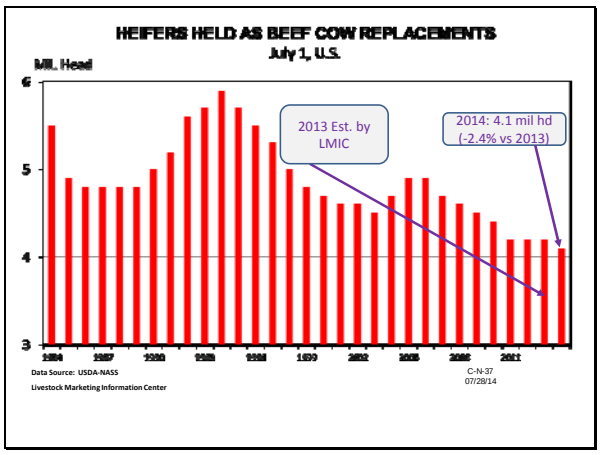

GREAT PLAINS REGION
RANGE AND PASTURE CONDITION
Percent Poor and Very Poor, Weekly
(CO, KS, MT, NE, ND, SD, WY)
29.9% of Cows
Percent
60
50
40
30
20
10
0
May
Jul
Sep
Avg. 2008-12
2013
2014
Data Source: USDA-NASS, Compiled & Analysis by LMIC
Livestock Marketing Information Center
G-NP-32
09/22/14

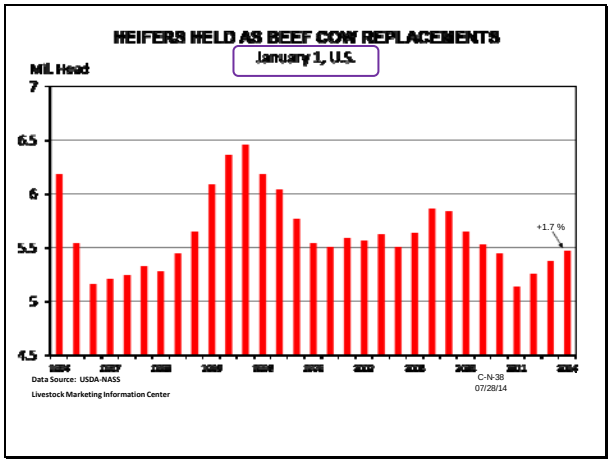

SOUTHERN PLAINS REGION
RANGE AND PASTURE CONDITION
Percent Poor and Very Poor, Weekly
(OK, TX)
19.7% of Cows
Percent
55
50
45
40
35
30
25
20
15
May
Jul
Sep
Avg. 2008-12
2013
2014
Data Source: USDA-NASS, Compiled & Analysis by LMIC
Livestock Marketing Information Center
G-NP-33
09/22/14


(IL, IN, IA, MI, MN, MO, OH, WI)
14.7% of Cows
CORNBELT REGION
RANGE AND PASTURE CONDITION
Percent Poor and Very Poor, Weekly
Percent
45
40
35
30
25
20
15
10
5
0
May
Jul
Sep
Avg. 2008-12
2013
2014
Data Source: USDA-NASS, Compiled & Analysis by LMIC
Livestock Marketing Information Center
G-NP-34
09/22/14

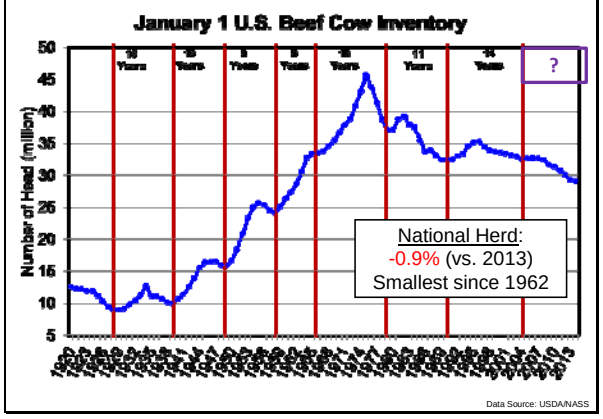

(AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, WV)
24.5% of Cows
SOUTHEAST REGION
RANGE AND PASTURE CONDITION
Percent Poor and Very Poor, Weekly
Percent
40
35
30
25
20
15
10
5
0
May
Jul
Sep
Avg. 2008-12
2013
2014
Data Source: USDA-NASS, Compiled & Analysis by LMIC
Livestock Marketing Information Center
G-NP-36
09/22/14


JULY 1 FEEDER CATTLE SUPPLIES
Mil. Head
55
50
45
40
35
30
No 2013
Report
Data Source: USDA-NASS
Livestock Marketing Information Center
C-N-32
07/28/14

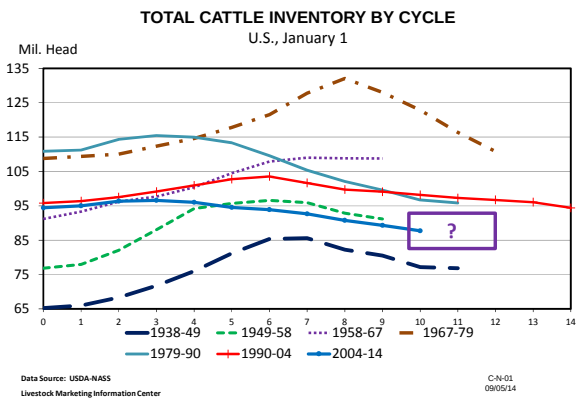




Pending Expansion? – How Fast?, How Large?, How Long?…

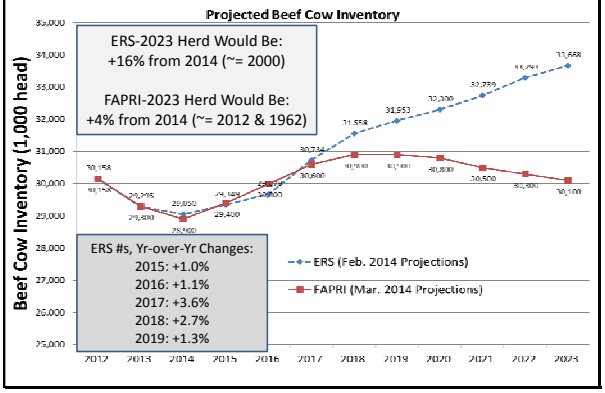


Pending Expansion? – How Fast?, How Large?, How Long?…



How Much Expansion? ERS & FAPRI Herd Projections

http://www.ers.usda.gov/publications/oce-usda-agricultural-projections.aspx
http://www.fapri.missouri.edu/outreach/publications/2014/FAPRI_MU_Report_02_14.pdf



Economic Outlook Overview: Stockers

- Attractive Values of Gain (VOG) vs. COG
  - For those in many stocker/backgrounding areas …
  - Notably higher VOGs than feedlot COG projections…
- Salina, KS 9/25/14 situation:
  - Buy 550 lb steer on 10/1/14 ($246.09)
  - Sell 750 lb steer on 1/7/15 ($217.44) {2.02 ADG}
    - VOG: $138.64/cwt
    - ***IF COG $90/cwt*** THEN Expected Profit = $97/hd
      - **Note Total Cost > $1,500/hd, reduces ROI for given $X/hd**

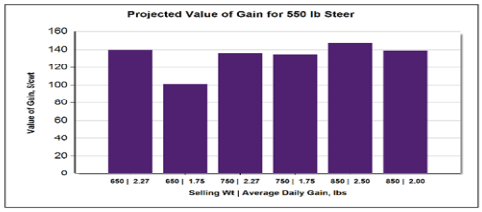
http://www.beefbasis.com/VOG.aspx

Economic Outlook Overview: Stockers

- Salina, KS 9/24/14 situation:

Buy Date	Buy Wt	Sell Wt	Sell Date	ADG	Proj. VOG ($/cwt)
10/1/14	550	650	11/25/14	1.8	105.85
10/1/14	550	750	1/20/15	1.8	137.08
10/1/14	550	850	3/16/15	1.8	136.82
10/1/14	550	650	11/11/14	2.4	143.26
10/1/14	550	750	12/23/14	2.4	138.05
10/1/14	550	850	2/3/15	2.4	142.48
10/1/14	450	650	1/20/15	1.8	144.42
10/1/14	450	750	3/16/15	1.8	144.23
10/1/14	450	850	5/11/15	1.8	145.76
10/1/14	650	750	11/11/14	2.4	152.71
10/1/14	650	850	12/23/14	2.4	152.08

http://www.beefbasis.com/VOG.aspx



Projected Value of Gain

Begining Weight, lbs	Ending Weight, lbs	Date	Weight Gain, lbs/hd	ADG, lbs	Value of Gain, $/cwt
550	650	11/08/2014	100	2.27	$139.55
550	650	11/21/2014	100	1.75	$101.19
550	750	12/22/2014	200	2.27	$136.44
550	750	01/17/2015	200	1.75	$135.13
550	850	01/23/2015	300	2.50	$147.62
550	850	02/22/2015	300	2.00	$138.89

Note: Projections derived for the Salina, KS market using BeefBasis.com
Related information is available at: BeefBasis.com
9/26/2014

http://www.agmanager.info/livestock/marketing/graphs/cattle/prices/VOG.asp

28

Economic Outlook Overview: Feedlots

- 2014 to-date has been MUCH better than 2013
- Fed-cattle break-even prices have risen rapidly…
- Excess capacity concerns persist:
  - Calf Crop, Heifer Retention, Plant Closures, & MCOOL…

Historical and Projected Kansas Feedlot Net Returns
(as of 9/10/14')
(http://www.agmanager.info/livestock/marketing/outlook/newsletters/FinishingReturn

July 14': +$310/steer (best ever)
(7th straight mo > $125/steer – first sequence ever)

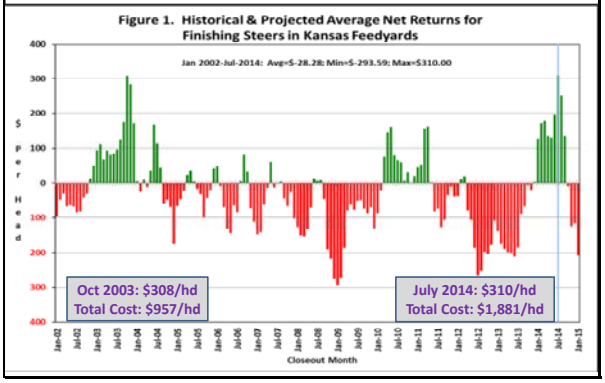
Oct LC:
9/25: $155
8/15: $146
8/1: $156
5/1: $140

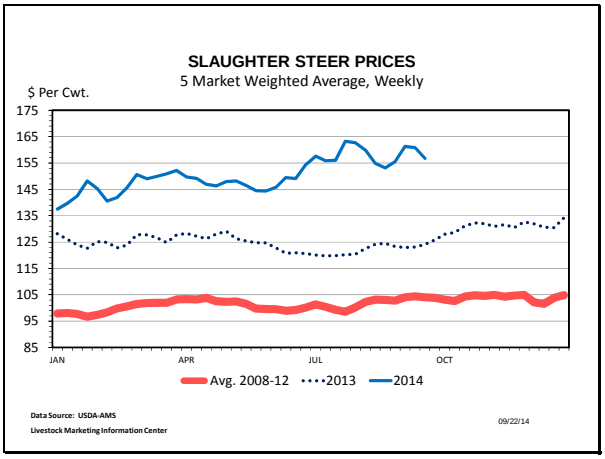
Table 1. Projected Values for Finishing Steers in Kansas Feedyards*

Closeout Mo-Yr	Net Return	FCOG**	Fed Price	Feeder Price	Breakeven FCOG**	Breakeven Fed Price	Breakeven Feeder Price
Aug-14	251.35	88.20	156.35	169.69	131.91	138.81	198.99
Sep-14	135.59	88.97	149.96	173.24	112.14	140.39	189.54
Oct-14	-9.31	88.07	152.64	191.44	86.38	153.29	190.36
Nov-14	-124.17	86.05	153.04	206.84	63.37	161.90	192.32
Dec-14	-115.91	84.97	152.92	211.02	65.89	160.88	197.38
Jan-15	-207.55	83.36	152.84	220.95	47.20	167.55	196.15

Representative Barometer for Trends in Profitability

Historical and Projected Kansas Feedlot Net Returns
(as of 9/10/14')
(http://www.agmanager.info/livestock/marketing/outlook/newsletters/FinishingReturns/default.asp)



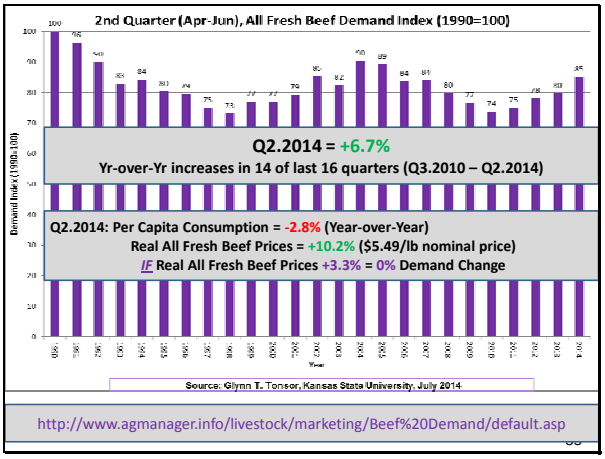


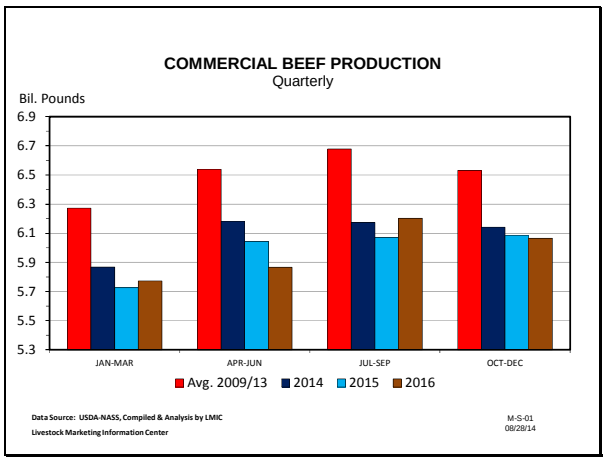
Quarterly Forecasts (LMIC: 8/31/14)

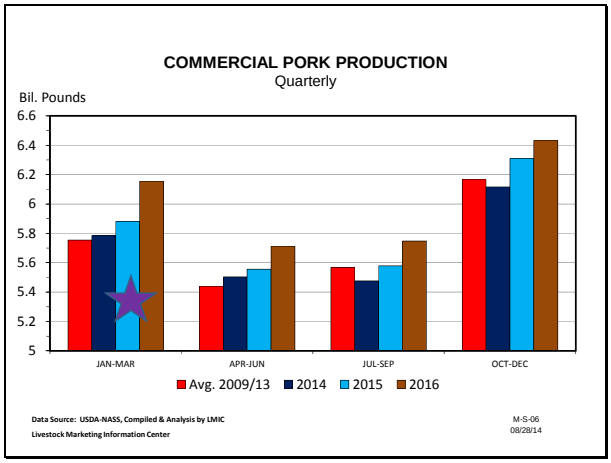
Year Quarter	Comm'l Slaughter	% Chg. from Year Ago	Average Dressed Weight	% Chg. from Year Ago	Comm'l Beef Production	% Chg. from Year Ago
2014						
I	7,375	-5.2	795.7	0.3	5,868	-5.0
II	7,836	-5.9	789.0	0.9	6,183	-5.1
III	7,685	-7.6	807.4	1.7	6,205	-6.1
IV	7,636	-5.0	807.8	1.0	6,168	-4.0
Year	30,532	-5.9	800.0	1.0	24,425	-5.0
2015						
I	7,137	-3.2	802.4	0.8	5,727	-2.4
II	7,602	-3.0	795.1	0.8	6,044	-2.2
III	7,494	-2.5	812.5	0.6	6,089	-1.9
IV	7,510	-1.7	812.5	0.6	6,102	-1.1
Year	29,743	-2.6	805.6	0.7	23,962	-1.9
2016						
I	7,143	0.1	807.9	0.7	5,771	0.8
II	7,325	-3.6	800.5	0.7	5,864	-3.0
III	7,581	1.2	820.1	0.9	6,217	2.1
IV	7,427	-1.1	819.2	0.8	6,084	-0.3
Year	29,476	-0.9	812.1	0.8	23,936	-0.1

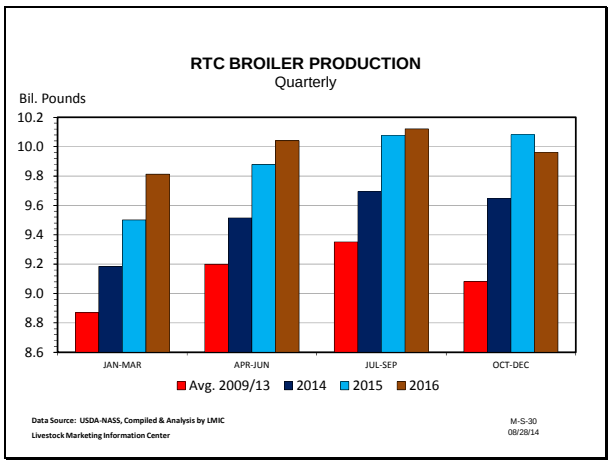
Quarterly Forecasts (LMIC: 8/31/14)

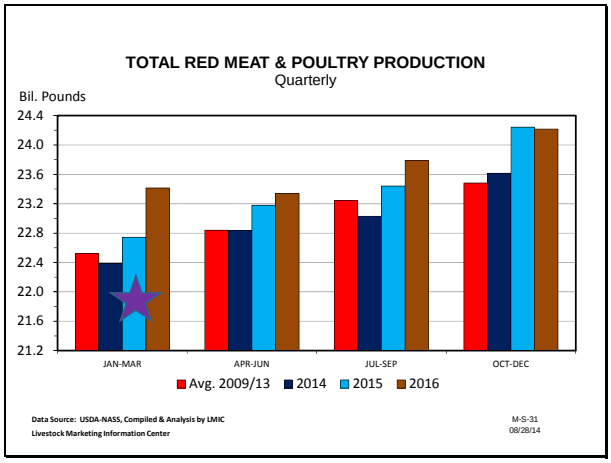
Year Quarter	Live Sltr. Steer Price 5-Mkt Avg	% Chg. from Year Ago	Feeder Steer Price Southern Plains 7-800#	5-600#
2014				
I	146.34	16.6	171.77	209.30
II	147.82	18.3	193.16	227.67
III	155-157	27.6	216-220	257-262
IV	156-159	20.4	211-216	246-252
Year	151-153	20.7	198-200	235-238
2015				
I	156-160	8.0	210-216	249-256
II	156-161	7.2	212-220	254-263
III	154-160	0.6	211-220	250-260
IV	155-162	0.6	206-216	245-256
Year	156-160	3.9	211-217	250-258
2016				
I	156-164	1.3	208-219	251-264
II	157-166	1.9	211-225	255-269
III	154-164	1.3	209-223	250-265
IV	155-166	1.3	204-218	245-261
Year	157-163	1.3	210-219	252-263




COMMERCIAL BEEF PRODUCTION
Quarterly
Bil. Pounds
6.9
6.7
6.5
6.3
6.1
5.9
5.7
5.5
5.3
JAN-MAR
APR-JUN
JUL-SEP
OCT-DEC
Avg. 2009/13
2014
2015
2016
Data Source: USDA-NASS, Compiled & Analysis by LMIC
Livestock Marketing Information Center
M-S-01
08/28/14


COMMERCIAL PORK PRODUCTION
Quarterly
Bil. Pounds
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
JAN-MAR
APR-JUN
JUL-SEP
OCT-DEC
Avg. 2009/13
2014
2015
2016
Data Source: USDA-NASS, Compiled & Analysis by LMIC
Livestock Marketing Information Center
M-S-06
08/28/14


RTC BROILER PRODUCTION
Quarterly
Bil. Pounds
10.2
10.0
9.8
9.6
9.4
9.2
9.0
8.8
8.6
JAN-MAR
APR-JUN
JUL-SEP
OCT-DEC
Avg. 2009/13
2014
2015
2016
Data Source: USDA-NASS, Compiled & Analysis by LMIC
Livestock Marketing Information Center
M-S-30
08/28/14



Expansion Implications for Stockers

- Short-Run, Impact of Lower Feeder Cattle Supplies
  - Be flexible in buy/sell decisions
    - Consider alternative weights and rates…
      - Can you increase ADG from 1.8 to 2.4 for less than $30/cwt?

Buy Date	Buy Wt	Sell Wt	Sell Date	ADG	Proj. VOG ($/cwt)	2.4 vs 1.8
10/1/14	550	650	11/25/14	1.8	105.85	
10/1/14	550	750	1/20/15	1.8	137.08	
10/1/14	550	850	3/16/15	1.8	136.82	
10/1/14	550	650	11/11/14	2.4	143.26	37.41
10/1/14	550	750	12/23/14	2.4	138.05	0.97
10/1/14	550	850	2/3/15	2.4	142.48	5.66

- Can you run 66 head from 550 to 850 lbs instead of 100 head from 550 to 750 lbs (*same total lbs added & similar VOG projections*)?

http://www.beefbasis.com/VOG.aspx

Expansion Implications for Stockers

- Long-Run Impacts **(Some shared here last year)**
  - Will stocker segment become ever more specialized?
    - Will former backgrounders focus on adding cows?
  - Will geographic origin of calves/yearlings shift NW?
  - Will geographic destination of feedyards shift NE?
  - Increasing social issues dialogue
    - Likely more changes in stocker production practices
  - Increasing quality signaling & coordination
    - Likely more changes in stocker production practices & information sharing/exchanging

Take-Home Summary Points

- Tight meat & live animal supplies +
- Strong retail meat demand +
- Pending (slow?) herd expansion =
- Record:
  - Prices throughout industry
  - Cash at-stake (so ROI may not be record)
  - Opportunity/Threat … in the eye of the beholder…

More information available at:

AGMANAGER.INFO
Kansas State Research & Extension
www.agmanager.info

This presentation will be available in PDF format at:
http://www.agmanager.info/about/contributors/individual/tonsor.asp

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43

webinars

Beef-Cattle Economics

Beef-Cattle Economics webinar series

Series of quarterly webinars on beef-cattle markets and other industry-related issues.

Remaining 2014 session:
November 11th

For details about specific topics and registering for webinars see additional information on AgManager.info AND http://www.meatingplace.com/Industry/Webinars

Utilize a Wealth of Information Available at AgManager.info

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AgManager.info website is a comprehensive source of information, analysis, and decision-making tools for agricultural producers, agribusinesses, and others. The site serves as a clearinghouse for applied outreach information emanating from the Department of Agricultural Economics at Kansas State University. It was created by combining departmental and faculty sites as well as creating new features exclusive to the AgManager.info site. The goal of this coordination is to improve the organization of web-based material and allow greater access for agricultural producers and other clientele.

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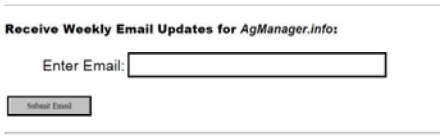


http://www.AgManager.info/Evaluation/Email.htm

www.agmanager.info

Notes – Notes -- Notes

Management Strategy Response to the FDA Phase Out of Antibiotics

Mike Apley, DVM
Kansas State University

Regulations today: Wading through VFDs, VCPRs, Prescriptions, ELDU prohibitions, proposed and final rules, and guidance documents

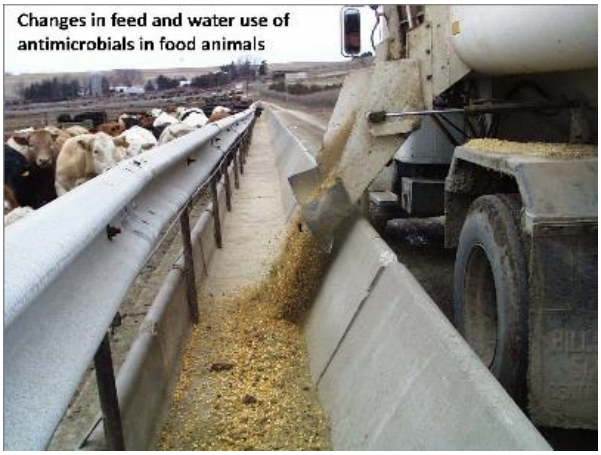
Mike Apley
Kansas State University

Reuters Special Report: Poultry Firms Systematically Feed Low-Dose Antibiotics to Flocks (9-16-2014)

AMDUCA?

- The same regulations as published in the Federal Register in 1996 still applies today.
  - The AMDUCA regs were utilized to limit the ability to use cephalosporins in an extralabel manner in food animals.

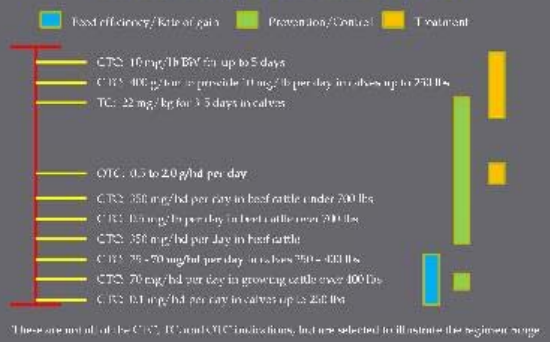
"However, the Agency believes that it is not limited to making risk determinations based solely on documented scientific information, but may use other suitable information as appropriate."



Guidance Documents

- **Guidance for Industry (GFI) 209 – April, 2012**
  - Imagining a delineation between growth promotion, prevention/control, and therapy
  - "judicious" vs. "hazard"
- **Principle 1: The use of medically important antimicrobial drugs in food-producing animals should be limited to those uses that are considered necessary for assuring animal health.**

U. S. CTC, TC and OTC Cattle Approval Examples (Feed and Water)



These are not all of the CTC, TC and OTC indications, but were selected to illustrate the regimen range

Who defines medically important?

- **Appendix A, GFI #152**
- **List is determined by an expert FDA panel managed by the Center for Drug Evaluation and Research (CDER) Within the FDA**
- **The World Health Association also has a list of medically important antibiotoics**
  - Human health
  - Animal health

WHO Prioritization…

- within the critically important designation
  - Glycopeptides
  - Fluoroquinolones
  - Cephalosporins
  - Macrolides

Antimicrobials Not Classified as "Medically Important"

- Ionophores: monensin, lasalocid
- Flavophospholipol: bambermycins (e.g., Flavomycin®, Gainpro®)
- Bacitracin
- Pleuromutilins: Tiamulin
  - Not medically important in the U.S., but classified as highly important by WHO

Medically Important Antimicrobials with Feed or Water Labels

- Aminoglycosides: gentamicin, neomycin
- Lincosamides: lincomycin
- Macrolides: tylosin, tilmicosin (Pulmotil® currently requires a VFD in swine and cattle)
- Penicillins (natural): penicillin G included in combination products
- Florfenicol: CHPC included as highly important drug in GFI #152 appendix A, Florfenicol is considered medically important. Existing VFD status for feed in aquaculture.

Medically Important Antimicrobials with Feed or Water Labels

- Streptogramins: virginiamycin
- Sulfonamides: Includes both potentiated (e.g., trimethoprim/sulfa) and non-potentiated sulfonamides.
- Tetracyclines: chlortetracycline, oxytetracycline, tetracycline

Tylosin

- "For reduction of incidence of liver abscesses associated with *Fusobacterium necrophorum* and *Arcanobacterium* (*Actinomyces*) *pyogenes*. "
- "As tylosin phosphate. Each animal must receive not more than 90 milligrams per day and not less than 60 milligrams per day. Feed continuously as sole ration."

Chlortetracycline/Sulfamethazine

- Pioneer NADA 035-805 (Zoetis)
- Amount: Chlortetracycline, 350 milligrams plus sulfamethazine, 350 milligrams per head per day.
- Indications: Aid in the maintenance of weight gains in the presence of respiratory disease such as shipping fever.
- Limitations. Feed for 28 days. Do not use in calves to be processed for veal.

Guidance 209

- Principle 2: The use of medically important antimicrobial drugs in food-producing animals should be limited to those uses that include veterinary oversight or consultation.

What are we using in food animals?

Table 1. Antimicrobial Drugs Approved for Use in Food-Producing Animals: 2011 Sales and Distribution Data Reported by Drug Class

	Antimicrobial Class	Annual Totals (kg[1])	
Domestic	*Aminoglycosides*	214,895	1.6%
	Cephalosporins[2]	26,611	0.2%
	Ionophores	4,123,259	30.4%
	Lincosamides[2]	190,101	1.4%
	Macrolides	582,838	4.3%
	Penicillins[2]	880,163	6.5%
	Sulfas[2]	371,020	2.7%
	Tetracyclines[2]	5,642,573	41.7%
	NIR[2,3]	1,510,572	11.2%
Export[4]	*Tetracyclines*[2]	15,321	
	NIRE[2,3]	185,333	

2 – Includes sales labeled for use in other veterinary species

3 – Not individually reported: aminocoumarins, amphenicols, diaminopyrimidines, fluoroquinolones, glycolipids, pleuromutilins, polypeptides, quinoxalines, and streptogramins

TABLE 5. NATIONAL ESTIMATE OF TOTAL KILOGRAMS OF SWINE IN-FEED ANTIMICROBIALS FOR ALL PRODUCTION CYCLES IN A YEAR BY ANTIMICROBIAL AND REASON

	Antimicrobial	Growth promotion	Prevention	Therapy	Any reason 'yearly basis'
Antimicrobials or classes listed as Highly Important in Guidance 152 Appendix A	Chlortetracycline[b]				533,973
	as Chlortetracycline alone	83,331	206,076	217,622	507,029
	as Chlortetracycline/Sulfathiazole/ Penicillin G (CSP)	942	14,673	3,784	19,398
	as Chlortetracycline/Sulfamethazine/ Penicillin G (ASP)	2,735	3,663	1,148	7,546
64% of medically important use	Lincomycin[c]	356	4,246	20,844	25,446
	Neomycin				
	as Neomycin/Oxytetracycline	4,008	2,632	16,394	23,034
	Oxytetracycline[d]				154,956
	as Oxytetracycline alone	2,615	31,689	97,547	131,852
	as Neomycin/Oxytetracycline	4,008	2,632	16,394	23,034
66% of medically important P and T	Penicillin				
	as Chlortetracycline/Sulfathiazole/ Penicillin G (CSP)	471	7,336	1,892	9,669
	as Chlortetracycline/Sulfamethazine/ Penicillin G (ASP)	1,367	1,832	574	3,773
	Virginiamycin[f]	26,108	54,858	493	81,459
Antimicrobials or classes listed as Critically Important in Guidance 152	Tilmicosin[e]	1,008	46,906	22,786	70,761
	Tylosin[g]				
	as Tylosin alone	25,641	37,893	91,160	154,694
	as Tylosin/Sulfamethazine	7,500	149	3,660	11,309
		15%	39%	46%	165,803

[a]Only powdered sulfonamides are listed in Guidance 152, Appendix A.
[b]The tetracycline class representative in Guidance 152, Appendix A is tetracycline.
[c]The lincosamide class representative listed in Guidance 152, Appendix A is clindamycin.
[d]The streptogramin class representative in Guidance 152, Appendix A is dalfopristin/quinupristin.
[e]The macrolide class representatives listed in Guidance 152, Appendix A are erythromycin, azithromycin, and clarithromycin.
Antimicrobials are grouped according to classification or lack of classification in Appendix A of FDA/CVM guidance 152.

Guidance for Industry 213

- December, 2013
- This guidance document puts forth nonbinding recommendations for companies to comply with Guidance 209.
- There was a 3 month period for companies to communicate with the FDA/CVM regarding their intent to comply with the voluntary recommendations in Guidance 209.
- A 3 year period for companies to comply ends in December of 2016.

GFI 213

- CVM updates every 6 months on progress…
  - June 30th, 2014 – all 26 sponors committed to complying with guidance, 283 products affected,
    - 2 label changes approved, 1 pending
    - 31 labels withdrawn
  - Summary table of affected labels and status is available on the FDA website

GFI 213

- A company may remove the label indications for growth promotion and insert label requirements for veterinary authorization without being subjected to other requirements such as updating the label in other areas (e.g., microbial safety).

How will you be involved?

VFD Proposed Rule

- User friendly reorganization of the VFD rule
- Continued access to Category I type A medicated feed articles by unlicensed feed mills
  - Currently, a VFD drug is automatically a Category II medicated feed, which means that the type A feed article for that drug would only be available to the limited number of licensed feed mills. The proposed regulation would not require a VFD drug to automatically become a Category II medicated feed.

VFD Proposed Rule

- Increased flexibility for animal producers purchasing VFD feeds
- Lower recordkeeping burden for all involved parties
  - Duration of record keeping is proposed to be dropped from 2 years to 1 year

VFD Proposed Rule – Increased Flexibility

–The current regulation requires veterinary "supervision" for a VFD to be written.

–The proposed regulation changes this to "supervision or oversight".

VFD Proposed Rule – Increased Flexibility

- The proposed regulation removes the explicit veterinary-client-patient relationship (VCPR) provision and replaces it with the requirement that veterinarians ordering the use of VFD drugs must be "in compliance with all applicable veterinary licensing and practicing requirements".
- This defers the VCPR standard to the veterinary profession and the individual states to determine the requirements of a valid VCPR.

VFD Proposed Rule

- GFI #120 is a Q and A document for the VFD, updated March 26, 2009.
- A lot of information about the current VFD rule.
- In this document, the FDA/CVM clarifies that their interpretation of "licensed" means licensed in the state in which the animals reside.

VFD Proposed Rule – Increased Flexibility

- The veterinarian will be required to specify duration of use, approximate number of animals to be fed the medicated feed, and level of VFD drug in the feed. However, they will not be required to specify the amount of medicated feed to be dispensed.
- Duration?
  - Likely on a drug by drug basis

Concurrent Use?

- The FDA is currently evaluating how a veterinarian might specify what feed drugs are authorized to be fed with the drug that is subject to the VFD.
- Any feed drug fed with the VFD drug will also need to be a subject of the VFD.

Some Other Hot Topics

Antimicrobial Use Reporting

- Legislative or regulatory initiated?
- DART (Delivering Antimicrobial Transparency in Animals) - Waxman
- Previous ADUFA hold by Feinstein
- How would we analyze the data and compare them to antimicrobial resistance trends?

Prevention and Control Uses?

- Preservation of Antibiotics for Medical Treatment Act (PAMTA) HR 1150
  - Slaughter and 55 cosponsors
- Preventing Antibiotic Resistance Act of 2013 S1256
  - Feinstein and 5 others

Penicillin/Tetracyclines in Animal Feed

- 1977 NOOH on the use of penicillins and tetracyclines in animal feed
- 2011 – NRDC, CSPI, UCS, FACT filed a law suit in U.S. District Court to force the CVM to have the hearings
- 2012 – Judge says CVM must have the hearings
- 2012 – Appeal by HHS/FDA/CVM
- 2014 – Ruling in favor of FDA
- Appeal?

Executive Order 9-18-2014

- The Executive Order directs establishment of the Task Force for Combating Antibiotic-Resistant Bacteria, co-chaired by the Secretaries of Defense, Agriculture, and Health and Human Services (HHS).

Executive Order 9-18-2014

- The Executive Order directs the Secretary of HHS, in consultation with the Secretary of Agriculture, to establish a Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria, to be composed of leading non-governmental experts

President's Council of Advisors on Science and Technology

Report to the President on
Combating Antimicrobial Resistance
9-18-2014

PCAST Action Steps

1. Improved surveillance of antibiotic-resistant bacteria to enable effective response, stop outbreaks, and limit the spread of antibiotic-resistant organisms.

2. Increased longevity of current and new antibiotics, by promoting appropriate use, preventing the spread of antibiotic-resistant bacteria, and scaling up proven interventions to decrease the rate at which microbes develop resistance.

3. Increased rates of discovery and development of new antibiotics.

PCAST

- "Elsewhere in this report (see Section 2), PCAST recommends the establishment of a national capability for microbial surveillance, including surveillance projects related to agriculture.
- This capability will facilitate collecting the types of data that should ultimately provide a deep understanding of the relationship between antibiotic resistance in agriculture and humans."

PCAST

- "In the meantime, a combination of data on sales, data on resistant bacteria in food from NARMS, and representative information about antibiotic usage at the farm level, collected in an appropriate manner, should help assess the impact of the new guidances.
- We urge FDA to work with USDA and CDC to develop such a comprehensive approach to gathering information and assessing progress."

The Overton Window

- Unthinkable
- Radical
- Acceptable
- Sensible
- Popular
- Policy

Prohibition of therapeutic uses of medically important antimicrobials

Prohibition of prevention and control uses of medically important antimicrobials

Prohibition of growth promotion uses of medically important antimicrobials

Question: What is the evidence that separates any of these 3 categories as to the effect of this use on antimicrobial resistance in human therapeutics?

So, where to from here

- Realities
  - I don't think sales of antimicrobials for food animals are going to change significantly due to 209 and 213
  - A usable, acceptable method of end-user antimicrobial use to evaluate actual applications of antimicrobials in food animals isn't going to be in place before December, 2016.
    - Even if it could, what was the baseline?

So, where to from here

- Realities
  - Routine prevention and control will be the next highly scrutinized use…
    - when our only metric is reduction in use

…from here

- The days of verbal treatment protocols are gone
- The days of unacceptable treatment records are gone
- The days of nontransparent use of antimicrobials in food animals are coming to an end
- Neither veterinarians or producers can be passive in these efforts.

Antimicrobial Stewardship

- Antimicrobial stewardship refers to coordinated interventions designed to improve and measure the appropriate use of antimicrobials by promoting the selection of the optimal antimicrobial drug regimen, dose, duration of therapy, and route of administration.
- Antimicrobial stewards seek to achieve optimal clinical outcomes related to antimicrobial use, minimize toxicity and other adverse events, reduce the costs of health care for infections, and limit the selection for antimicrobial resistant strains.

Infectious Disease Society of America

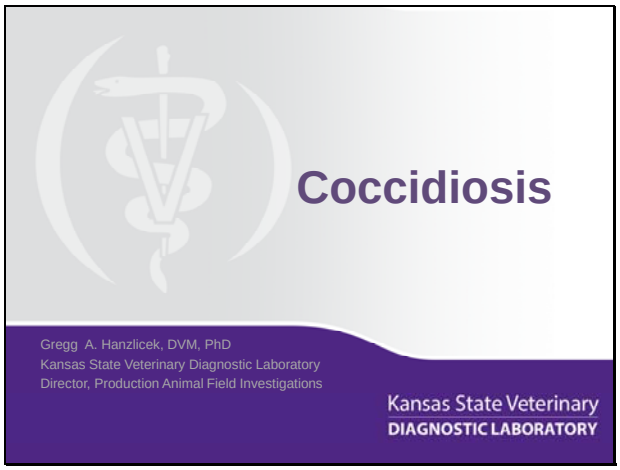
The veterinary profession is not only going to be responsible for all medically-important antimicrobial uses in food animals…

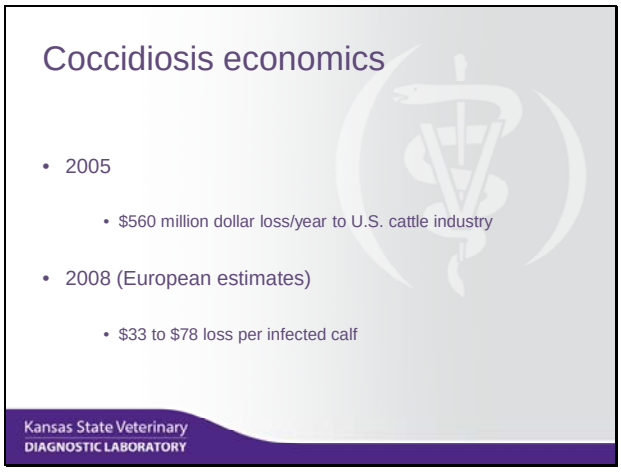
we are going to be accountable

Notes – Notes -- Notes

Coccidiosis: The Robber Baron

Gregg Hanzlicek, DVM
Kansas State University





95% of “losses” can’t be seen

Diarrhea
Anorexia

Reduced ADG

Reduced feed efficiency

Immune suppression

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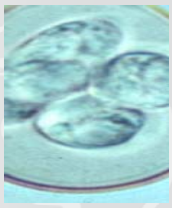
Coccidia: What?

A protozoa
(related to Crypto)

NOT a virus or bacteria



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Coccidia: Where?

- Found on EVERY operation
- Once cattle are infected: develop immunity
- Many animals become carriers
- Have Coccidia in the intestine BUT immunity keeps the numbers to a non-harmful level

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DIAGNOSTIC LABORATORY

Coccidia: Where?

- Most common in confinement cattle
  - Stocking density
  - Ground becomes highly contaminated (feces)
  - Water contaminated (feces)
- Pastured animals
  - Low lying areas where animals are drinking
  - Water contaminated (feces)

>1,000,000,000 cocci/gm feces

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DIAGNOSTIC LABORATORY

Coccidiosis: Who?

- 3-6 months of age most susceptible
- All young stock become infected
  - 90% are infected within 10 days of entry
- Develop an immunity after exposure
- Rare to see clinical signs in adults
  - But they are carriers
  - 33% of adults within a herd

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DIAGNOSTIC LABORATORY

Coccidia: How?

Spread: fecal-oral

Beef

Ingestion:

Feces
Feces contaminated ground
Feces contaminated feed/bunks
Feces contaminated water

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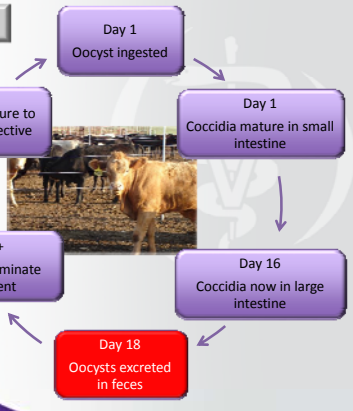
Coccidia lifecycle



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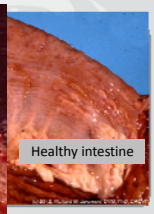
Coccidia damage the large intestine



Coccidia infected intestine

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Coccidiosis: When?

- Most common
  - Early fall
    - Temperatures begin to drop
    - Cocci survive better in lower temperatures/higher humidity
  - Dry lot or pasture
    - Contaminated ground/grass = few exposed
      - Round bale feeders, etc. concentrate organisms = many exposed
    - Contaminated water source = all exposed
      - Standing water = huge risk

Kansas State Veterinary DIAGNOSTIC LABORATORY

Coccidiosis: Clinical signs

- Low numbers coccidia ingested = subclinical or mild diarrhea
- Previous exposure then ingested = mild/subclinical disease
- High numbers ingested = severe diarrhea/death

Kansas State Veterinary DIAGNOSTIC LABORATORY

Clinical signs

- Diarrhea
- Anorexia
- Straining
- Rough hair coat

Kansas State Veterinary DIAGNOSTIC LABORATORY

Coccidia effects on calves

- Reduced weight gain
  - Injured intestine cannot absorb nutrients
  - Appetite is also reduced
- Immuno-suppressed
  - Are more susceptible to other diseases, esp.—bovine respiratory disease (BRD)
- Death
  - Those most heavily infected/injured

Kansas State Veterinary DIAGNOSTIC LABORATORY

Straining w/no fecal material produced

Straining w/mucus production

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Clinical signs

- Can lead to rectal prolapse

Kansas State Veterinary
DIAGNOSTIC LABORATORY

Clinical signs/course

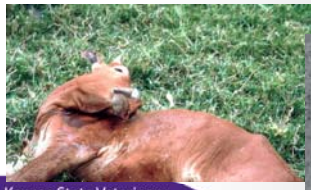
- Usually over in 4 – 14 days
  - Much longer for full recovery of intestinal tissue
    even if "firmed-up" not absorbing nutrients well
- Some calves never recover; become poor-doers
- Death rates usually low
  - Some reported greater than 25% within a pen
  - Death due to electrolyte loss & starvation

Kansas State Veterinary
DIAGNOSTIC LABORATORY

Nervous coccidiosis

From acting normal to falling on the ground and seizure to act normal again……..

Brought on by moving (stress)



Brain electrolyte abnormality

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DIAGNOSTIC LABORATORY

Clinical signs

Most of the time blood is NOT seen in the manure.

FALSE:
if there is blood it is cocci, and if there isn't blood it isn't cocci

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Clinical signs

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Diagnosis

- Age
- Diarrhea +/-blood
- Few to many calves with clinical signs (not single calves)
- Time of year
- All of the above: Probably coccidiosis
- Follow up with fecal flotation

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Diagnosis

- A definitive diagnosis can be made by your veterinarian
  - Fecal flotation completed correctly followed by microscopic examination
- Can have negative fecal flotation: still be coccidiosis
  - Completed late in the course disease
- Other causes diarrhea/bloody diarrhea
  - Salmonella
  - Clostridium perfringens Type C
  - Acidosis
  - Internal parasites
- Talk to you veterinarian before initiating any treatment

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Control/Prevention

- Avoid overcrowding
  - More animals/area = more coccidia contamination
- Maintain proper pen drainage and hygiene
  - Difficult to do in large pen/rainy weather situations
  - Fence off standing water if possible
- Coccidiostats/cidals YES!!!!!!
  - Ionophores: Monensin (Rumensin®), Lasalocid (Bovatec®), Amprolium (Corid®), Decoquinate (Deccox®)
  - NO extra label use of feed additives!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

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Control/Prevention

- Goal
- Minimize exposure
- Enhance immunity
- Minimize effects
  - Lower ADG, immunosuppression, etc.

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Treatment

- Most cases will be self-limiting
  - Don't know which ones….
- If you have several clinical cases: the entire pen is infected and should be treated
- If possible, remove those with severe diarrhea
  - >1,000,000,000 cocci/gm feces
  - They expose pen mates to huge numbers of coccidia

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Treatment

- Mass medication (in feed or water)
  - Amprolium (Corid®)
    - If still on-feed
    - Palatable pellet

    May need to drench those calves off feed and water
  - If off-feed
    - – Water treatment

    Antibiotic: prevent secondary bacterial infections

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Treatment

- Individual animal treatment (needed if not eating)
  - Labeled for treatment: SulfaSURE ® SR Cattle Bolus, Sulmet Oblets ®, Sulfaquinoxaline Solubilized ®
  - Not labeled for treatment: Albon®, Sustain III®, etc…)
  - Amprolium (Corid®) drench

Kansas State Veterinary DIAGNOSTIC LABORATORY

Treatment

- Sulfaquinoxaline : water
  - S.Q. 20% Solution™
- Sulfamethazine: bolus
  - SulfaSURE SR™
  - Sulka-S Bolus™
- Not sulfadimethoxine
  - Albon™
  - Di-methox oral solution™
- Amprolium
  - Corid™ (5 day period)
    - (medicated feed, liquid)

Prevention

- Amprolium
  - Corid™ (21 day period)
- Dequoquinate
  - Deccox Type A Medicated Article™
- Monensin
  - Rumensin™ (constant)
- Multiple feed additive combinations

Your veterinarian is the BEST source of advice!!

Kansas State Veterinary DIAGNOSTIC LABORATORY

Thank you

Kansas State Veterinary DIAGNOSTIC LABORATORY

Notes – Notes -- Notes

Livestock Watering Options

KSU Watershed Specialists:
Ron Graber, Central Kansas
Herschel George, Southeast Kansas
Will Boyer, Northeast Kansas
Stacie Minson, Big Creek, Middle Smoky Hill River
Jeff Davidson, Flint Hills

Livestock Waste Management

Considerations for Site Selection and Management of Cattle Feeding Facilities to Protect Water Quality.

The site selection and management of cattle feeding facilities has a substantial impact on water quality in Kansas. Site location within the prevailing topography and management of cattle feeding pens is imperative to maintaining quality in the waters of the state. There are several factors which should be given consideration when selecting the site that cattle feeding facilities will be constructed, as well as factors that demand attention when managing an existing facility.

Number of Cattle in the Pen
Over 700 lbs = 1 animal unit
Under 700 lbs = 0.5 animal unit

Amount of Use
Occupying pens for 7 months or more is considered full time usage

Rainfall and Rainfall Intensity
Influences surface runoff

Extraneous Drainage
Runoff from upslope that will potentially drain through pens should be diverted

Slope of Pen
1 to 3 % is desirable

Slope from Pen to Flooded Soils
< 1 to 2% is desired

Distance from Pen to Flooded Soils
Greater distance preferred

Buffers Are Essential
Should be downslope from pen with Permeable soils and covered with dense grass

Buffer Size
Ideally should be 2 times the size of the pen

Management of Feeding Pens

- Clean pens regularly to reduce solids leaving pens and to ensure buffer vegetation is vigorous and free of weeds.
- Hay the buffer area to remove nutrients from the system.
- Runoff leaving pens should flow evenly into and across the buffer to avoid channeling.
- Register with Kansas Department of Health and Environment (KDHE) if confining 300 animal units or more.
- Lots with lagoons and/or sediment basins must be permitted by KDHE
- A federal permit is required if confining over 1,000 head.

Additional Concerns

- Depth to groundwater - certain areas of the state have a shallow depth to groundwater which requires caution.
- Wells downslope of the pen and buffer
- Distance to nearest occupied dwelling
- Presence of springs or seeps

Kansas Center for Agricultural Resources and the Environment

Our mission is to develop and deliver knowledge that helps Kansans balance 'utilization' and 'protection' of natural resources today and into the future.

For more information, contact KSU Watershed Specialists:

Central Kansas Watersheds	Ron Graber	620-727-5665
Flint Hills Watersheds	Jeff Davidson	620-583-4437
South East KS Watersheds	Herschel George	913-294-6021
North East KS Watersheds	Will Boyer	785-587-7828
Smoky Hill River WRAPS	Stacie Minson	785-769-3297

Limited Access Watering Points

Overview

Ponds and streams are common sources of livestock water in Kansas. However, allowing unlimited access can cause severe bank erosion, poor water quality and other related problems.

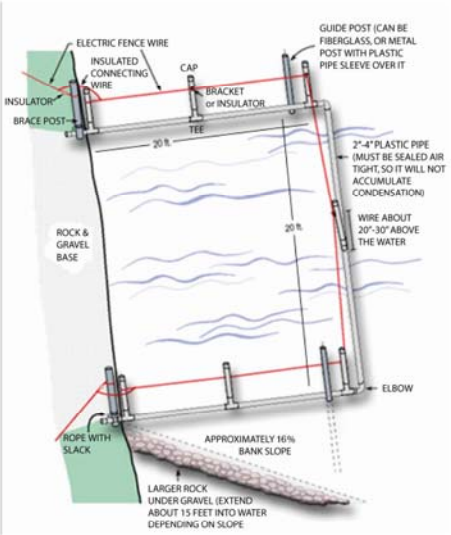
Cattle prefer clean water and avoid steep, muddy approaches to water sources whenever possible. Developing access watering points with a hardened surface and fencing is often fairly simple and solves many of these concerns.

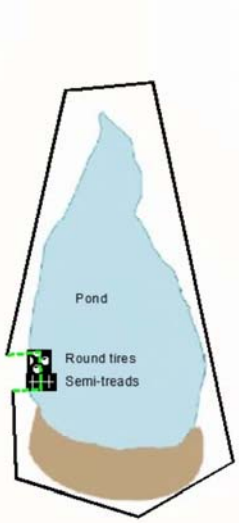
Advantages

- Simple and inexpensive
- Improved livestock safety and health, less foot rot and fewer leg injuries
- Reduced bank erosion
- Less sediment and fewer nutrients entering streams and ponds
- Extended pond life
- Applicable to new and existing ponds
- Increased water intake may mean better livestock gains
- Works with "Pit ponds" and exclusion fences

Limitations

- Not adapted to large streams
- Fence maintenance required when stream floods
- Few options for location of watering point
- Few examples in Kansas





Design Considerations

To encourage animal use, an access ramp or walkway should have a maximum slope of 6:1 run to rise (17%) or a 10 degree slope. Ramps as steep as 4:1 have been used. However, a flatter slope (8:1 to 20:1) is generally better when space allows, especially when conditions are icy. The ramp surface should be compacted and non-slip (crushed rock, gravel or concrete). A 3:1 slope (or flatter) for the sides of the ramp is preferable when site conditions permit.

Width may vary (recommendations range from 4 to 80 feet) but a minimum guideline is 10 feet plus one foot for each 10 head of cattle – for example, 15 feet for 50 head. Fencing is generally desirable to exclude livestock from other parts of the pond or stream, especially if they congregate and loaf during hot days.

A floating fence made of PVC pipe can be used to restrict access to the pond reservoir at a cost of $200-300. A 16-foot stream crossing/access point for small streams, using gravel with geotextile and sand base, can be constructed for less than $500.

This practice may require permits.

Extracted from "Water and Water System Handbook", http://www.ksre.ksu.edu/library/lvstk2/s147.pdf

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Jeff Davidson – K-State Flinthills Watershed Specialist - 620-583-4437 Jdavidso@ksu.edu

Tire Tank installation guidelines:

(Prepared by Herschel George - K-State watershed specialist)

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Southeast Kansas Watershed Specialist
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Uniontown, KS 66779
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Hgeorge@ksu.edu

1. **Choose size of tire and type of opening.**
   - Small circles for drinking
   - Whole tire (I really like 30.5x32 (combine tires) and 48x31x20 (front tire on fertilizer trucks.)
   - Half tire (the large mining tires that are cut like a bagel, up to 13 ft. diameter)

2. **Cut tire opening.**
   - Tools
     - Tire chalk
     - Reciprocating saw with metal cutting blade with 5 to 6 tpi (teeth per inch).
     - Special cleaning and lubricating fluid (I use a mixture of Dawn and water)
   - Mark the desired cut line with tire chalk
   - Cut tire and remove the center

3. **Select site for tank.**
   - Needs a minimum of about 2 psi (4 ft) difference between water level in pond and top of water in full tank
   - Ideal to have overflow line that drains to daylight

4. **Plumb water lines to and from proposed site.**
   - Ideal to have 1 ½ or 2 inch waterline to and from the tank
   - Ideal to have flexible connector on the incoming lines below the tank
   - Ideal to have Brass (or Galvanized) nipple coming into tank to connect to float valve
   - Plumb intake line so bottom of threads on the metal pipe is even with top of concrete line (top of bead inside the tank).
     - Lightly thread a PVC female adapter onto the top of the pipe nipple with about 1 ft. of pipe in it to prevent concrete from getting into the nipple or threads and to allow you to maintain as perfectly vertical as possible pipe placement. Do not glue these pieces; they will be removed when concrete is cured.
   - Plumb the drain and overflow so the top of the PVC collar connector is installed to be just flush with the top of the concrete (even with the top of bead inside of the tank).
     - Lightly place a 1 ft or longer piece of spare pipe into connector, but do not glue it! This is to protect the pipe from being filled with concrete and to allow you to maintain the pipe as vertical as possible. This will be removed after the concrete in cured.
5. **Firm, tamp and fill center of tank** so there are 4 to 6 inches of space left for the concrete. There can be greater space, but it requires more concrete.

6. **Level and set tire into site.**
   - The tank should set on a slightly elevated area.
   - Ideal to have geotextile under the tank and gravel to extend the life of the gravel from sinking into mud
   - Firm and tamp the gravel base under tank.
   - Level tank using a tube level.

7. **Install a bead of silicone** onto the center of the bead that will be in the concrete.
    - Install a bead of silicone onto the incoming and outgoing lines about 2 inches down from the top of concrete line.
    - An optional 2nd bead of silicone can be installed on the bead and on all pipes about 4 inches from the top of the concrete line (top of tire bead inside the tank).
    - Put the silicone on the bead and pipe immediately before placing the concrete into the tire.

8. **Mix the concrete for the tank.**
    Tire tank concrete mixture tips from Herschel George: I have been using bagged concrete mix with additions. I add a bit of Portland cement to the mixture to make it a bit richer and stronger. I also add a bit of "fiber" to the mixture. Fiber helps to prevent the concrete from cracking. (Some tell me this is unnecessary, but for the cost it makes me feel better. Fiber adds about $5.00 to the cost of a yard of concrete.) It takes about 4 or 5 bags to do the tires I am demonstrating on today (5 ft diameter with 24 inch bead).
    - Mix the concrete mixture (with additives) for the tire.
    - Place concrete into the center through the bead opening only.
    - Work the concrete under the tire as best as you can. You may need a trowel and a sledge hammer to make the concrete move under the tire well.
    - Make sure the pipes are straight.
    - Continue poring concrete until area below the tire is full up to the top of the bead. Trowel the area. You can have a ½ inch of crown to the concrete if you desire. Check the level of the bottom of the threads and the top of the drain collar to make sure they are at the desired depths.

9. **Run water into the tire outside the concrete area**, until the water softly flows across the concrete and covers the concrete by 2 inches.
    - Leave the project (with the water on the top of the concrete!).
    - Clean all tools.
    - The tank can be filled with up to 24 inches of water in top of the concrete.

10. **After the concrete cures** (ideally 3 weeks or so), you can install the water level valve with float.
    - Consider the refill rate of the tank when selecting a valve. Small valves cost less but may have slow flow or refill rates.
    - Tanks installed using gravity flow from a pond may have very low pressure, select the valve accordingly.
        - I recommend the use of stainless steel chains on all floats.
        - The valve I often show is from: Watson Manufacturing Inc., Stock Water Control Products, P.O. Box 397, Morrill, NE 69358, 1-800-292-2987, 1-308-247-2281
        - http://floatvalveusa.com/index.html
    - HG - I recommend installing a "Break-a-way" connection below the valve to protect the metal pipe threads and valve in case your neighbor's ornery cow tries to take a bath in the tank.
    - HG - I recommend, where possible, installing a winter minimum continuous flow valve to prevent freezing and an overflow line.
    - Set the float level for the desired water level.

11. **Place additional gravel** to the sides of the tank, leaving at least 1ft. of tank showing above the finished gravel layer.

Herschel George – 912-294-6021 Hgeorge@ksu.edu
12 August, 2014

K-STATE Research & Extension
Kansas State University

AEN-79

COOPERATIVE EXTENSION SERVICE
UNIVERSITY OF KENTUCKY • COLLEGE OF AGRICULTURE

Using Geotextiles For Feeding and Traffic Surfaces

Larry W. Turner, Extension Agricultural Engineer
Department of Biosystems & Agricultural Engineering

Mud robs Kentucky beef and dairy producers of performance from their cattle herds in winter and spring. To help avoid the problems associated with mud and reduced performance, producers should consider using concrete pads or lower-cost all-weather surfaces wherever animals congregate (e.g., feeding areas, animal traffic areas, and loafing areas). Although concrete is probably the most desirable surface for durability and low maintenance, an all-weather surface can be constructed of geotextile fabric, rock, and fine surface cover for less than one-third of the cost of concrete. Rock over bare soil in Kentucky requires approximately 12 inches of depth for stability, but using rock over geotextile fabrics can reduce rock depth by half. Repeated maintenance usually required for rock pads is also reduced because the fabric keeps the rock in place.

Floor or Pad Construction

Geotextile fabrics are basically of two types: a "geotextile" fabric material, or a plastic-derivative cross-hatched "snow fence" type grid material. Both are used in the highway industry to support rock bases for roadbeds and to distribute the loads of vehicle traffic. Figure 1 illustrates the recommended construction details for animal-use pads.

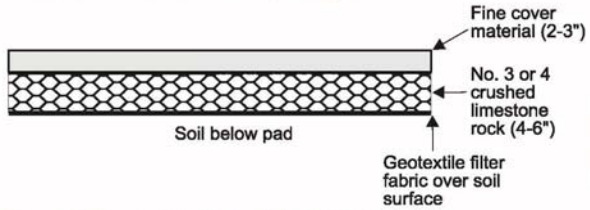

Figure 1. Construction details for animal-use pads.

The geotextile fabrics are porous, so water and moisture pass through the material while the rock is held in place. Even with mud and manure buildup on the surface, the animals have a solid footing so that they do not sink in mud. In Kentucky, recommendations are for a 4- to 6-inch layer of No. 4 crushed limestone rock for the base material. A 2- to 3-inch cover of sifted lime or "dense grade" (sometimes called "road mix") material will allow for easier scraping of the surface and less loss of rock through the box manure spreader. Using the finer aggregate for surface cover instead of crushed rock also improves animal comfort and welfare and reduces the potential for foot injuries. A sand surface was also tested, but the sand tended to shift easily and did not provide as firm a footing.

The dense grade material is generally available from suppliers of highway surface material and is typically composed of aggregate no larger than 0.75 inch, with mostly finer aggregate and fines. The lime surface should be sifted so that it will not have a large portion of fines. However, some fines are desirable for packing and stability.

On-farm trials and a trial installation on the University of Kentucky Woodford County beef unit have been very successful in illustrating the effectiveness and durability of geotextile and rock pads. An Extension publication (AEU-68) developed by the Biosystems and Agricultural Engineering Department at the University of Kentucky provides additional construction information and a list of suppliers of the geotextile fabric materials (Turner, 1996). A list of suppliers is also available at the following Biosystems and Agricultural Engineering Web site: <http://www.bae.uky.edu/> under "Departmental Research and Extension Information/Resources."

Costs

As shown in Table 1, the cost of geotextile pads is about $\$0.49/ft^2$, while concrete costs in the range of $\$1.50/ft^2$. One reason for the lesser cost is that less rock is required for stability when geotextile fabrics are used.

Table 1. Geotextile-based rock pad costs

Geotextile Filter Fabric	$\$0.10/ft^2$
Rock Base (No. 4 Crushed Limestone)	$\$0.18/ft^2$
Fine Cover Material	$\$0.09/ft^2$
Total Materials	$\$0.37/ft^2$
Labor/Grading Work	$\$0.12/ft^2$
TOTAL COST	$\$0.49/ft^2$

Facility Layout

Width, slope, and drainage. Feeding pads next to a bunk should be at least 10 to 12 feet wide, depending on the animals' size. Slopes should be 3/4 to 1 inch per foot away from the feed bunk. The bunk and pad should be located in a generally well-drained area that offers good drainage away from the site and where excess manure buildup can be stored if the pad is not scraped daily. For traffic surfaces, widths should be 8 to 12 feet. Traffic lanes should be slightly crowned in the center of the lane.

Layouts. Figures 2, 3, and 4 present typical layouts for feeding pads and facilities for cattle using geotextile pads. These installations will improve animal performance, while reducing erosion and runoff from feeding sites.

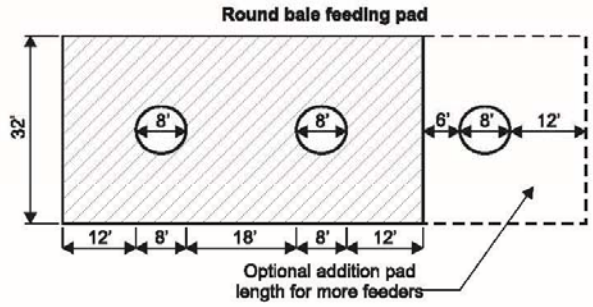

Figure 2. Large round bale feeding pad using hay rings.

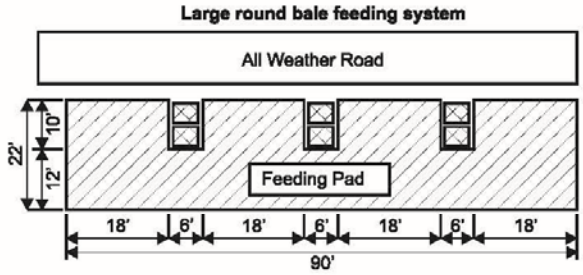

Figure 3. Large round bale feeding pad with drive-by all-weather road feeding.

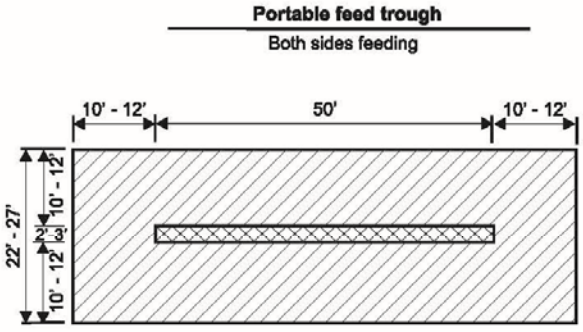

Figure 4. Geotextile pad for feeding with portable trough.

References

Turner, L.W. 1996. "Reducing Mud Using Highway-Type Filter Materials," AEU-68, Department of Biosystems and Agricultural Engineering, Cooperative Extension Service, College of Agriculture, University of Kentucky, Lexington.

"All-Weather Geotextile Surfaces for Livestock and Vehicle Areas." VAE-1051. Length: 11:06. Cooperative Extension Service video, available from the University of Kentucky Cooperative Extension Service, Department of Agricultural Communications Services.

Turner, L.W. 1997. Listing of Geotextile Fabric Sources. Biosystems and Agricultural Engineering Web Site: <http://www.bae.uky.edu/> under "Departmental Research and Extension Information/Resources."

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Solar Water Pumping

Solar water pumping is the process of pumping water with the use of power generated by sunlight. Solar pumping systems are reliable stand-alone systems that require no fuel and very little attention. Solar panels generate maximum power in full sun conditions when larger quantities of water are typically needed.

Panels-

This demonstration unit has two 85 Watt panels convert the solar energy into electrical energy. In this system it is the only energy. No batteries are attached. They normally carry a 25 year warranty.

Sun Tracker-

Some system uses a tracker to follow the sun to increase the solar panel efficiency. The system I have used have passive tracking, meaning they take no power from the system, it operate from the heat of the sun striking the frame members. The frame member is warmed causing the Freon inside to move from one cylinder to the other as it follows the suns heat. The tracker allows the system to pump an estimated 30-40% more water during the summer. Most likely it increases the pumping in the early parts of the morning and the late afternoon. Currently we are not using a tracker. They cost about $500-600. The trackers come with a 10 year warranty.
This system we demonstrate here uses panels with more wattage and does not use the tracker.

Controller -

This electronic "magic" box converts the variable energy from the solar panel to the constant voltage for the pump. The controller include a pump speed control circuit, a remote switch circuit, a sensor-less low water cut-off circuit, an electronic circuit breaker and indicator lights.

Pump -

This is the part that does the actual pumping of the water. It is a diaphragm pump. This means the pump works on a positive displacement process. The pump has the capacity to pump water to greater height (greater head) without much decrease in volume. Pumping to greater height does require more energy from the solar panel. This pump has the capacity to pump to 100 ft of head (43 psi).

Do I need a water storage tank?

Storing water in a cistern or tank has many advantages. It's less expensive, more trouble-free and more efficient than storing power in batteries. Since water is always a critical issue, we recommend the tank should be able to store a minimum 3 to 6 days worth of water or whatever you think your needs may be during cloudy weather or in case of a system failure.

Generally speaking, animals, plants and humans use less water on cloudy days. Conversely, the sunniest days are when we consume the most water and when the solar panels are providing the pump with the most power.

Should I use batteries in my solar pumping system?

While batteries may seem like a good idea, they have a number of disadvantages in pumping systems. First, they reduce the efficiency of the overall system. Second, they are another source of problems and maintenance. Third, they add cost to the system.

Solar Pump System suppliers indicate livestock producers should "Store water and not power when possible and you will have much better performance and reliability with your solar pumping system."

Solar Pump System costs

for demonstration unit

Photovoltaic Panels	
2 - 85 watt panels Solarland 85 Watt	**$470**
Fixed Rack	
DP-TPM2 Solarland 85	**$205**
Controller	
SolarJack PCA 30-M1D	**$275**
Pump Wire	
10-2 w/grn. 100 ft x $1.55/ft	**$155**
MC4 interconnect	**$ 38**
Pump	
Sun Pumps SDS-Q-130	**$976**
Freight to Eastern Kansas about	**$155**
Prices - April 25, 2012	**$2,274**

Sunpumps: (diaphragm pump, brass and stainless steel, with brushes, design for shallow well), (air filled motor cavity), (DC power only).

Grundfos: Sqflex pumps, CU200 controller, Pole Mount ,Solar Panels, **$3152**
(Helical rotor pump, stainless steel, brushless, design for deep wells), (oil filled motor cavity for lubrication and heat dissipation), (AC or DC powered)

Bison: BSP pump, SPC Controller, Pole Mount, Solar Panels, **$2425**
(Helical rotor pump, stainless steel, brushless, design for deep wells), (oil filled motor cavity for lubrication and heat dissipation), (AC or DC powered)

How much water can a solar pump supply?

These Sunpumps can pump at the rate 4 to 5 gallon per minute in full sun for about 2000 gallon per day. The maximum head of water = 100 ft (or 43 psi), (a slower rate pump can pump up to 200 ft head (or 86 psi)).

The Grunfos and Bison pumps can pump similar gallons with the same wattage of panels, these pumps have the capability to pump 300+ ft head..

Below is a list of the dealers that I know of for the eastern Kansas area:

Sun Pumps	Safford, Arizona	(Jim Allen)	800-370-8115	www.sunpumps.com
Panhandle Sales & Service	Beaver, Oklahoma (Brandy Nelson)	580-525-1919	580-646-0911	www.solarwellpumps.com
Solar Water Technologies Inc.	317 S Sindny Baker St, Kerrville, TX		800-952-7221	www.solarwater.com
Robinson Solar System	207 West Main, Canton, OK		866-519-7892	www.solarpumps.com
Oak Grove Fabrications	RR1 Box 69, 15221 Schmedemann Rd , Alta Vista, KS		785-499-5311	
Lyman Inc.	Medicine Lodge, Kansas (Dean)		620-886-5731	
Preferred Pump	1441 N. Wabash, Wichita, KS	(John Blaine)	888-669-9897	620-960-7344 (mobile)

Solar Pumping System options

When wishing to have a **pressurized water system**,
I have found the following item effective:
2 gal pressure tank ($40)
Pressure switch (preset at 15-30 psi. or less) ($15),
Pressure Gauge ($7), check valve ($7)
(with all other connections and adapters ,
the system will cost about $100 total)

Any **float valve** can work.
I have found the Hudson float valve effective ($30

When wanting to store energy to be used at nights or cloudy weather, batteries are required.
This system requires 24 Volt DC.
Use 2-12 Volt Marine-type **deep cycle batteries** ($65 each).
I believe we should include a **charge regulator** when using storage batteries.
I have used a Morningstar SS-10L-24V ($65)

Herschel George, K-State Watershed Specialist, 913-294-6021

K-STATE Research and Extension

Identification and Management of Blue-green Algae in Farm Ponds

MF-3065 Animal Safety

Blue-green algae include several different species of photosynthetic cyanobacteria that live in water. Cyanobacteria are bacteria capable of photosynthesis. These cyanobacteria can produce toxins that can sicken or kill livestock. Problems with blue-green algae and their associated toxins are most common during the summer and may become widespread in years with long periods of hot, dry weather.

Occasionally, blue-green algae rapidly reproduce and form blooms, or large colonies, that are visible as a scum on the water's surface. They also may change the water color of a pond. Such blooms of toxic cyanobacteria are often referred to as harmful algal blooms, or HABs. These are typically most severe in stagnant areas, such as coves or inlets, where wind disturbance of the water surface is minimal and water temperatures are higher. Floating algal scums may accumulate at the downwind shores of lakes and ponds.

The causes of harmful algal blooms are not completely understood. They are related to increased nitrogen and phosphorus concentrations in water, but the exact relationships between nutrient concentrations and blooms are complex and difficult to predict.

Although agricultural nutrient runoff is a known risk factor, harmful algal blooms also are found in ponds surrounded by rangeland, where agricultural nutrient loading is rarely an issue. Other environmental factors that may favor the formation of blooms include hot, sunny weather with little wind. Ponds with relatively clear water, or low turbidity, may be more likely to produce harmful algal blooms due to high sunlight availability throughout the water column.

Most toxins that are produced during harmful algal blooms are stored within the cyanobacteria until they die. As the cyanobacteria decompose, they release stored toxins into the water. Toxins are not evenly dispersed in a pond. *Mycrocystis* species, which are generally the most problematic blue-green algae in Kansas, self-regulate their position in the water. They are often buoyant at or near the surface to capture the most sunlight for photosynthesis. When the wind blows in a relatively constant direction, these organisms accumulate on the downwind side of the pond, where toxin concentrations may increase. Other blue-green algae species are less buoyant and may be more widely dispersed.

Toxin concentrations can vary dramatically, even at nearby locations in the same pond. Pockets of water that contain lethal quantities of toxins may be within a few feet of areas with low concentrations, so it is impossible to determine whether or not a water body is toxic by using a single water sample. Generally, if measurable toxin levels are found, it is prudent to suspect the entire pond is toxic, and the pond should not be used for livestock or human drinking water. Cyanobacterial toxins also may irritate skin, eyes, and the respiratory system, so wading or touching the

Microcustis aeruginosa, a toxic species of blue-green algae.

A toxic species of blue-green algae in the genus Anabaena.

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water should be avoided. Some toxin types may cause the meat of fish to be poisonous. Fish caught from these ponds should not be eaten.

A pond containing a harmful algal bloom may be covered with a scum that looks like bright green paint, but other colors are possible, varying from blue-green to grey, and occasionally red or brown. Some types are filamentous and may form slimy strands when many are clinging to each other. Blue-green algae can be distinguished from duckweed by size, as individual duckweed plants are visible without a microscope. To view images of these plants, visit the website *aquaplant.tamu.edu/plant-identification*. Water from a pond with a harmful algal bloom often will have an unpleasant smell. Most livestock will avoid water with this smell, but some dogs are attracted by the smell and are at risk of drinking the water or ingesting scum at the edges of the pond. This behavior may lead to lethal exposures.

If blue-green algae are suspected, a water sample can be collected and sent to the Kansas State Veterinary Diagnostic Laboratory. (Directions for collecting and submitting water samples are at the end of this publication.) Because toxin concentrations can fluctuate widely within the same pond, animals drinking from the pond may or may not consume significant levels of the toxin. Because toxin consumption cannot be forecast with any degree of accuracy, water from a pond that tests positive for blue-green algae is considered unsafe for livestock consumption. The level of toxin in the water is generally not analyzed due to the cost of testing and because toxin concentrations vary so much by location and time within the same pond.

If a pond contains a harmful algal bloom, there are few choices for the livestock owner. Copper sulfate can be used to kill the blue-green algae. This chemical, however, will also kill competing organisms such as green algae, which help keep blue-green algae in check. Copper does not break down, but remains in pond sediment, where it can affect pond ecology for many years. Sheep are sensitive to copper. Hazardous levels of copper may remain in water and plants growing near treated ponds for several years after treatment. As blue-green algae die after the chemical application, toxins are released from the organisms and dispersed more widely.

A second option is to reduce the amount of sunshine available to the blue-green algae. Increasing turbidity through stirring up bottom sediment is not recommended. Instead, spreading a buoyant straw such as wheat or barley straw in a thin layer across the surface will shade the algae and may result in a decrease in blue-green algae bloom size. Straw will need to be replaced as it sinks. This method of control will have little lasting effect on the pond.

The third option is to provide an alternative water source for livestock. Using well water may necessitate drilling a well, which is not always an option. It takes time to have the well drilled, have the water tested, and set up a pumping unit and stock tank. Hauling water is expensive and time consuming but may be the only feasible way to supply clean water to livestock. Animals can be moved to another pasture with clean pond water or access to another water source.

The duration of harmful algal blooms is difficult to predict and is influenced by weather conditions. The condition may last from days to months. Cooler, cloudy weather with high wind speeds generally shortens the duration. Before allowing livestock to drink water from a pond that was previously determined to have a harmful algal bloom, another water test should be

Signs may be posted at lakes or ponds where blue-green algae have been found. Do not assume a body of water without a warning sign is safe.


Shorelines where algae collect are a good location to collect a water sample. Use care not to let the water contact exposed skin while sampling.

taken to make certain that hazardous concentrations are no longer present.

Harmful algal blooms are serious threats to livestock health and may be fatal. Testing suspect water sources is important to minimize livestock loss and poor animal performance. Once the presence of a harmful algal bloom has been confirmed, the best management practice is to find a different water source.

How to Collect a Water Sample to Submit for Blue-green Algae Detection

1) Find a location in the pond where algae is most concentrated. This may be a scummy area along the pond shoreline, or a patch of discolored water. If in doubt as to the best location, sample on the downwind side of the pond. Inlets and coves, where wind disturbance is minimal, are also good sites for collecting a sample.
2) Use a clean plastic bottle with a screw lid to collect the sample. The bottle does not have to be sterile. A 20-ounce or 1-quart soft-drink bottle will work well. Rinse the bottle with pond water before collecting the sample. If present, be sure to include some of the pond scum in the sample. Avoid touching the water or wear gloves while collecting samples.
3) Fill the bottle with pond water, screw on the lid, and immediately place it into a cooler with ice or transport it to a refrigerator.
4) Keep the sample cool until it is shipped to the lab. Although the sample can be kept cool for a few days before submitting it to the lab, it is recommended that it be shipped the same day it is collected. It is preferable to avoid collecting and shipping samples on days when they will arrive at the lab on the weekend and sit 1 to 2 days before being processed.
5) Fill out a sample submission form that includes your name, preferred contact method, and contact information (phone, fax, email, or address). A submission form can be found at: *www.vet.k-state.edu/depts/dmp/service/pdf/general.pdf*. Fill out the owner/producer section of the form. Specify the test you are requesting as "blue-green algae" in the history section at the bottom. Add any information you may need to identify where the sample was taken (Bottle 1, Jedlicka pasture, west pond). Place the form in a resealable zipper bag so moisture from the ice packs doesn't cause it to disintegrate or the ink to run.
6) Wrap the joint between the lid and the bottle with tape to seal it. Put the bottle in a resealable zipper bag and seal it. Place the bottle in a box or small polystyrene foam container and surround it with ice packs. Place enough packing insulation and ice packs around the bottle to keep it cool until it arrives at the lab. Multiple bottles can be included in one shipping container, but each should be clearly marked with the site where it was collected so results can be matched with water source.

Ship the water sample to :
Kansas State Veterinary Diagnostic Laboratory
Mosier D-117
1800 Denison Avenue
Manhattan, KS 66506-5601

Results should be available within 24 to 48 hours after the sample arrives.

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Kansas State University Agricultural Experiment Station and Cooperative Extension Service

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Options for Stock Water Development

Herschel George, K-State Watershed Specialist, SE Kansas

Developing alternative stock water sources can improve the quality and reliability of stock water and minimize erosion on ponds and stream banks. I would like to provide suggestions for various concepts of enhancing water availability and sources of cost-share funding for water development projects.

Let us start today's discussion about the cost to care for your livestock. What is the most expensive part of a cow herd budget? Feed? K-State economists show the cost for pasture and purchased feeds to be between $400-450/beef cow/year (2012 data). That is about 50% of the total cost to keep the cow. What is the most limiting nutrient in a Beef Cows diet? Do you know the nutrients? Do you know the nutrients in her diet? I will make it easier, the 5 nutrients of a beef cow are:

- Vitamins
- Minerals
- Protein
- Carbohydrates (some divide this into starches and fats)
- Water

Which is the most limiting nutrient? (the answer in normally protein or energy "carbohydrates")

Which nutrient costs the most? (the answer is normally energy "carbohydrates" or protein)

Which nutrient is needed in the greatest quantity? (Water)

Which nutrient can have the greatest impact on health and performance? (Water)

Across ,Kansas livestock producers rely on surface water often stored in farm ponds. The choice to use a pond with unrestricted access has been common. Recently, these costs of have become more visible and increasing; while the options are becoming more manageable.

A discussion of the costs of using a pond would include: the cost of the land, the costs of construction of the pond, the cost to clean out the pond whenever necessary. An additional set of cost for using a pond with unrestricted access includes

- the risk of livestock falling through the ice,
- the risk of livestock getting stock in the mud,
- the risk of health related issues, such as foot rot and other diseases transmitted in wet environments,
- and the risk of Blue-Green Algae issues.

You can read many articles about Blue Green Algae from many sources. Much of the work we do related to livestock water quality is to reduce the Phosphorus and Nitrogen levels in streams, rivers, lakes and ponds. The Phosphorus and Nitrogen levels in the stream affect the downstream uses of the water by the public; it also directly impacts the occurrence of Blue Green Algae in the streams and ponds on your acreage.

An article from Kentucky indicates “Blue-green algae are simple plants that exist naturally in water and wet environments. They prefer warm, stagnant, nutrient-rich water and are found most often in ponds, lakes, and slow moving rivers. Farm ponds contaminated with fertilizer run-off or direct manure and urine contamination are prime places for algae to thrive.”

The difficult question about Blue-Green algae is what to do once it is in your pond. Producers can test to confirm the problem, but the choices about what to do are few. The only sure solution is to find an alternate supply of water and fence the livestock out of the problem pond.

My work for Kansas State University relates to “Water Quality”. As part of my work I try to help livestock producer to better understand the impact of their livestock on Water Quality and the impact of water Quality on their livestock. This all has to do with what happens to the nutrient produced by their livestock.

The easiest solution would be to suggest that everyone use a clean water supply such as municipal or **rural water** or from a well. A close second would be water from a pond or reservoir that is either **pumped or gravity flows** to the cattle. Not all producers want to think about a water bill each month. The cost of pumping and maintaining their own pump system is not far behind in the producer’s dislikes. Many dairymen will attest to the increased production by switching to a clean water supply. It is much more difficult to measure the increased production of a beef cow herd.

Drilling a producing well in Eastern Kansas has its limitations. But a reliable well can be a most valuable resource

Developing the springs helps to protect the water quality and also prevents the livestock from trampling the resource. Each spring is a challenge to develop. The process to capture the water is different with each spring. A working protected spring is a valuable resource to preserve.

If a pumped or gravity flow system is available, it is often the wise decision to **add pipeline** to additional pastures where water supplies are need. Pipelines can normally be installed for $2.00 per foot or less which can be a wise choice over constructing an additional pond.

My efforts often focus on helping producers develop a watering system from their own ponds. Ideally, ponds are centrally located in a grazing area with adequate elevation drop behind the pond to place livestock waterer. Ideally, a 2 inch PVC line was installed in the pond when the pond was constructed. In those cases, the process is simple, chooses from the many types of waterers, installs the tank, and the exclusion fence around the pond.

Livestock waterers come in many types and sizes. Some of the questions to ask about what type tank are:

- Will the waterer be used during the summer, winter or both?
- How much pressure will be available to serve the tank (refill rate)?
- How many head will use the waterer?
- What will happen if the tank has no use during the winter?
- What will it take to periodically drain and clean the tank?

Pond users often choose between the concrete “behind the dam” type, which are easier to prevent from freezing, and the tire tanks which can be made of many types of construction or agricultural tires. I will guarantee that the tires tanks will freeze in Eastern Kansas. However, there are things to reduce the freezing problems.

It is possible to **install a pipeline into an existing pond**. It is a 4 hour process with a contractor, but the process can place a 2 inch line into the pond with the riser in the deepest parts of a pond. Syphon systems are only a temporary solution.

Producers may choose to consider a “**limited access**” to a pond when the pond has no elevation behind the dam. A limited access is basically a hardened surface constructed similar to a boat ramp into one edge of a pond. The pond can be fenced. Often producer choose to use a portable electric fence at least across the hardened surface access. There are not a lot of these available for producers to see. I have a short list of ponds for producers to see. The process is most easily installed at the time a pond is built or cleaned. Ask me about a solution in a pond with water and is in use. See the information included in your program.

Producers which have working **windmills and wells** have choices as well. Their concerns are weather the well will hold up to the water demands. Most Windmills have mechanical problems which restrict their use. The solution in these cases may be to install a **solar pump system**. The technology is getting easier to work with and now can be installed for about $2,500 from wells that are no deeper than 85 or 90 ft. Most of the pumps for livestock uses have a pumping rate of 4 to 5 gallons per minute; of course, that rate is only available during about 6 to 8 hours per day. Deeper wells and higher volumes can be pumped; it just takes more solar panels and selecting an appropriate pump.

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