The Changing Nature of Dairy Rations and How it Affects Forage Demand

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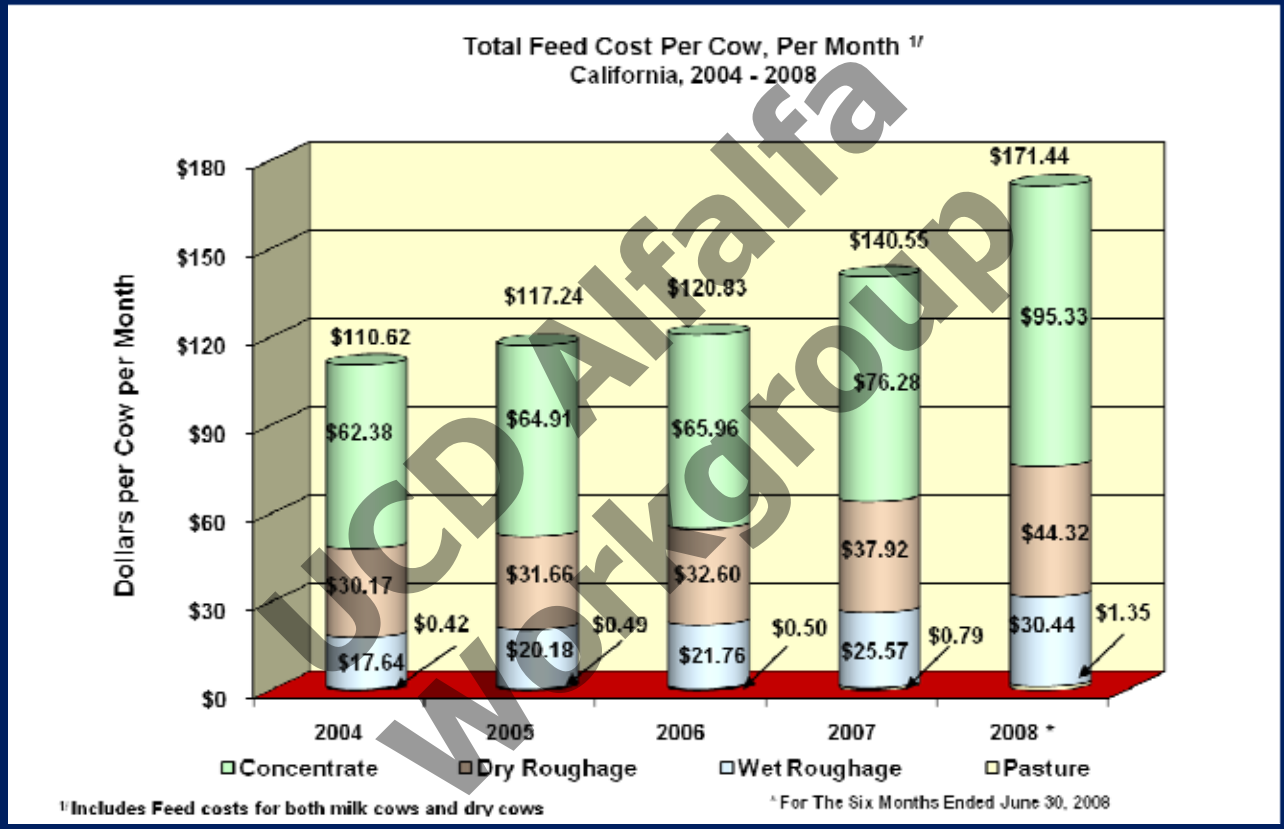
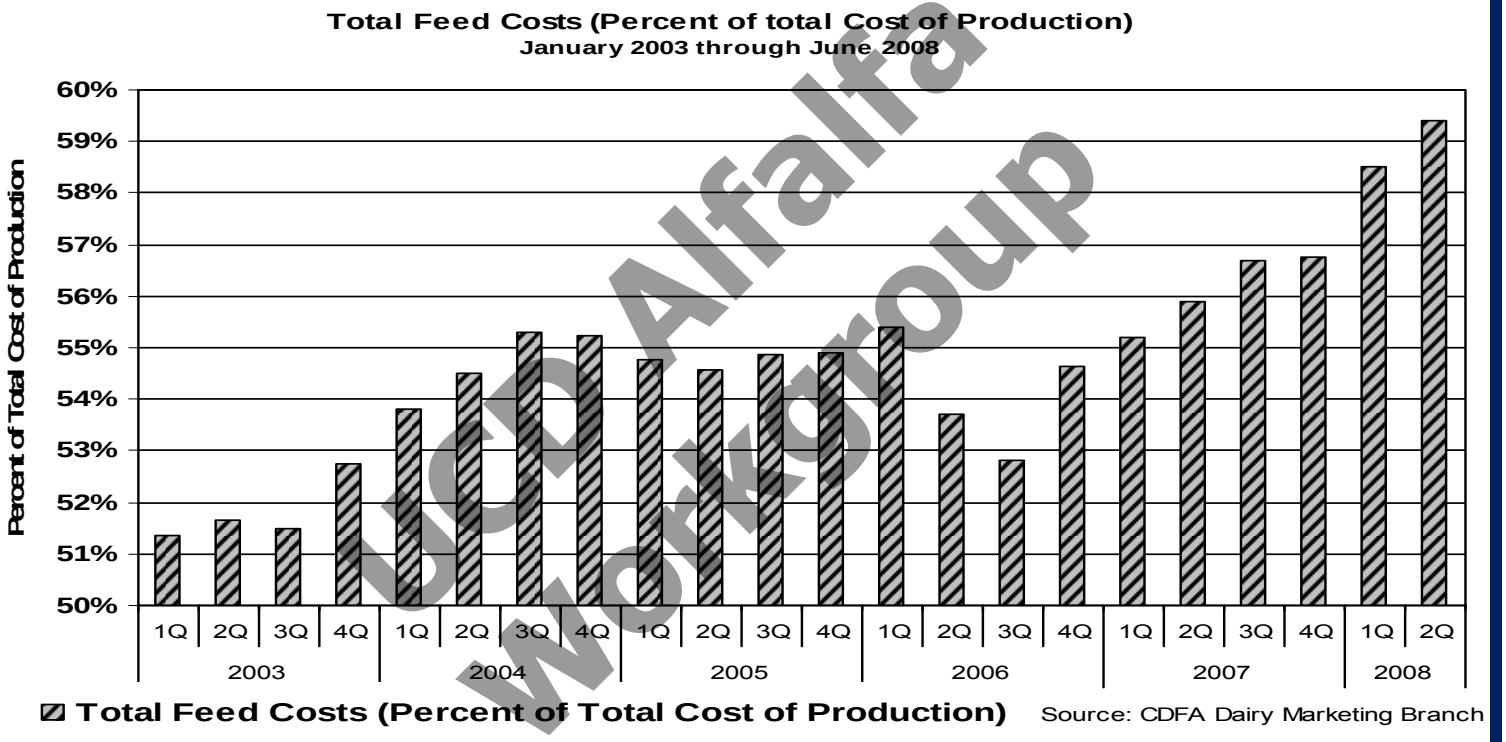
If you don't like something change it; if you can't change it, change the way you think about it.

Mary Engelbreit





What have been the reasons for the high feed costs?

1. Ethanol production

Ethanol background

- The passage of The Clean Air Act of 1990 required use of oxygenated fuel for reformulated gasoline for utilization in areas where ozone problems exist.
- The Energy Policy Act of 2005 established a renewable fuels standard (RFS) that mandated the use of ethanol and other renewable fuels in gasoline. The RFS requires use of 11.5 billion gallons of ethanol by year 2012.
- The latest development was the 2007 State of the Union address which highlighted the need to reduce gasoline consumption by 20% over the next 10 years and to increase renewable and alternative fuels by up to 35 billion gallons which is at least five times the present mandate by the year 2017.

Ethanol Issues

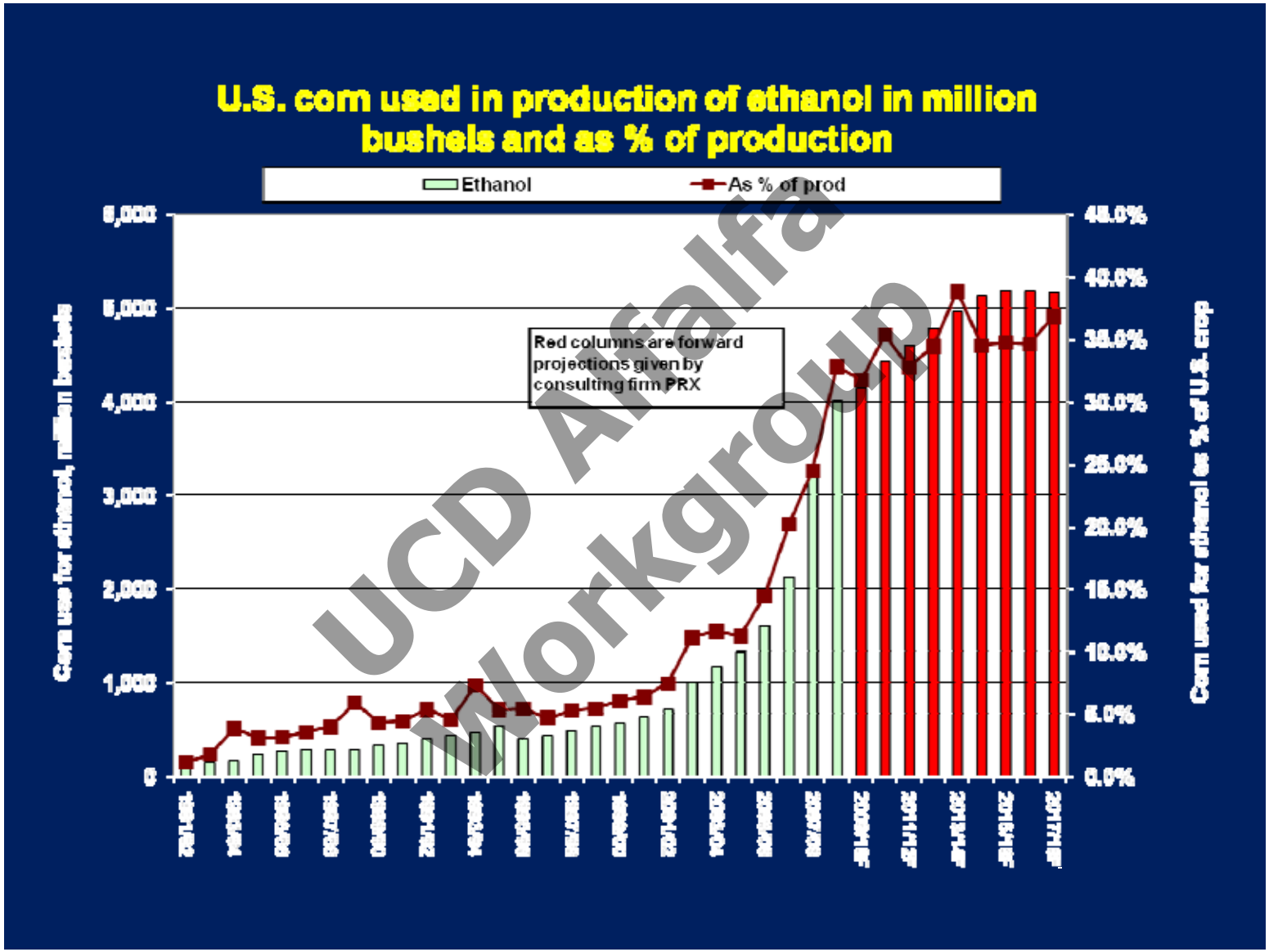
- Ethanol has come under heavy criticism for a number of reasons.

1. Foremost has been the huge escalation in food costs being blamed on high corn prices due to greater ethanol output.

2. The livestock, dairy, and poultry industries have been in an uproar over the rise in what is their largest expenditure.

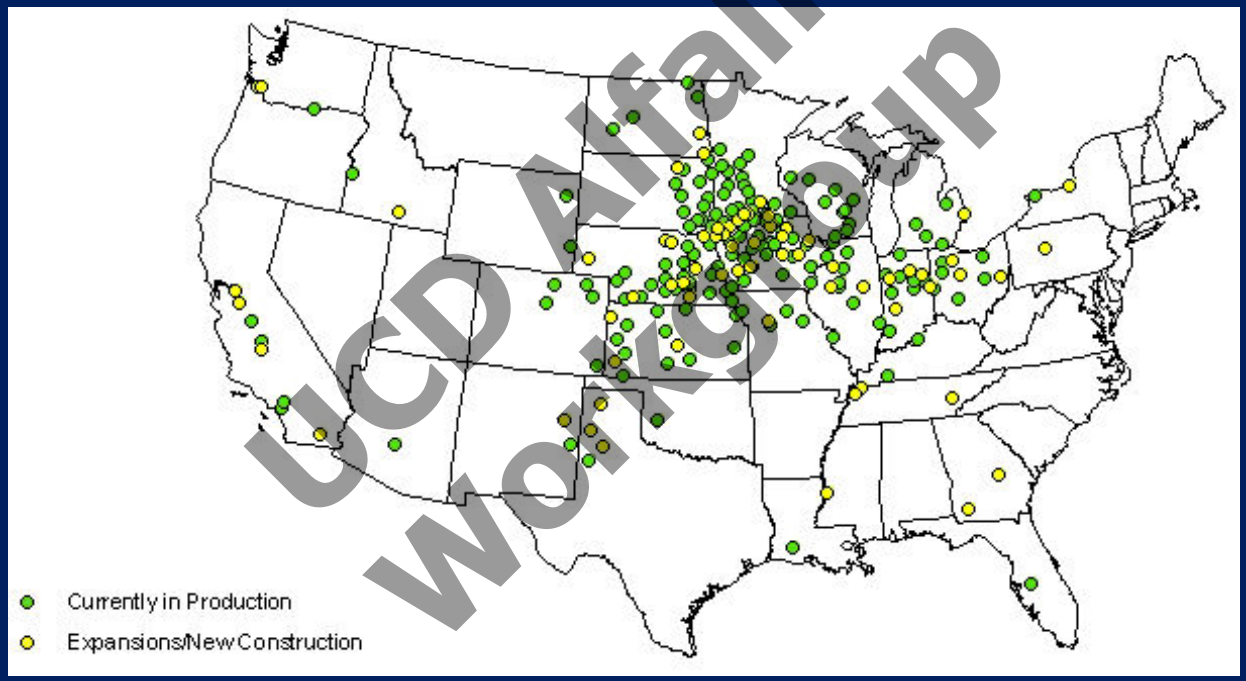
3. In this election season, there has been increased scrutiny over Federal and state subsidy payments to the ethanol industry along with the onerous import tariff that prevents cheaper foreign product from coming into the U.S.

4. Finally, talk of shifting feedstock from corn to other sources being blunted by reports that commercially feasible cellulosic ethanol production is still years away.


U.S. corn used in production of ethanol in million bushels and as % of production
Ethanol
As % of prod
Red columns are forward projections given by consulting firm PRX
UCD Alfalfa Workgroup

Let’s all get on the bandwagon!

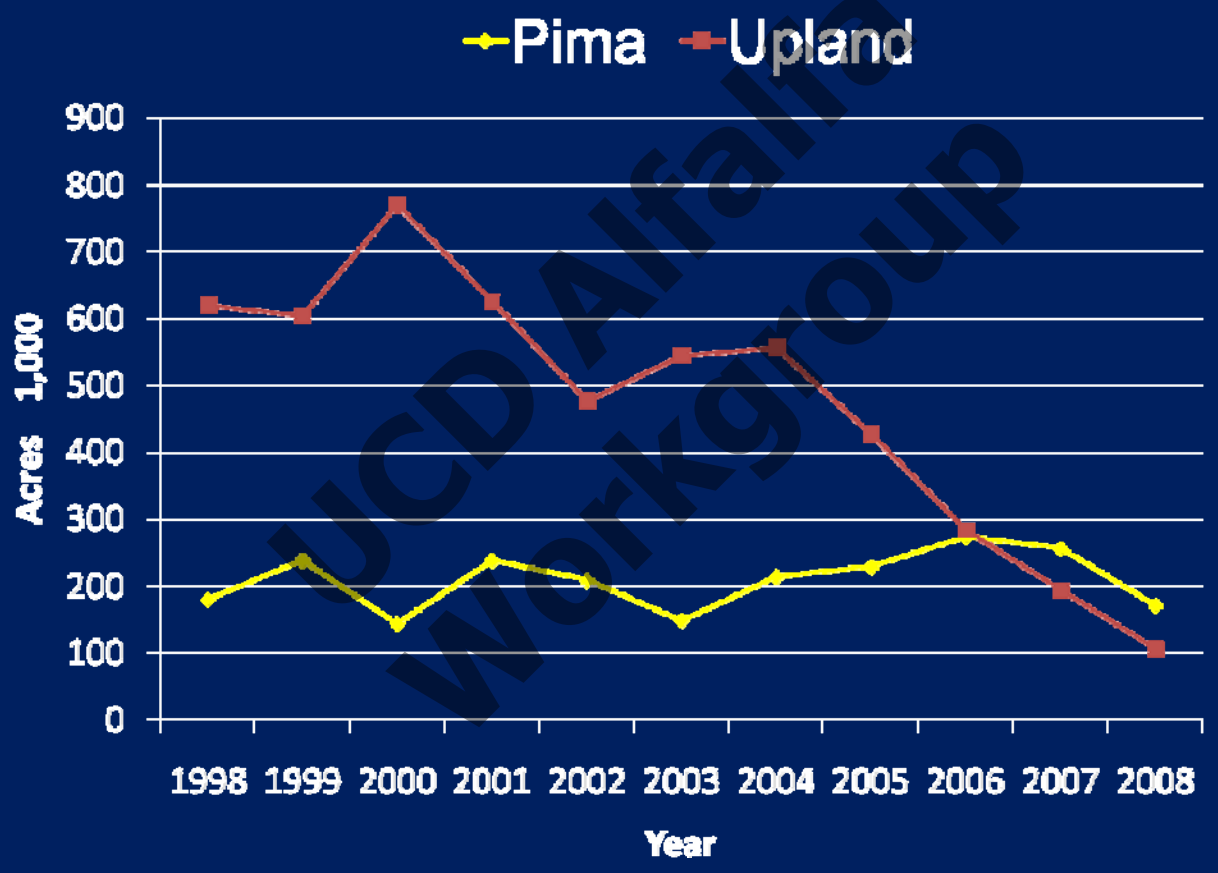
Ethanol plants currently in use or under construction



What have been the reasons for the high feed costs?

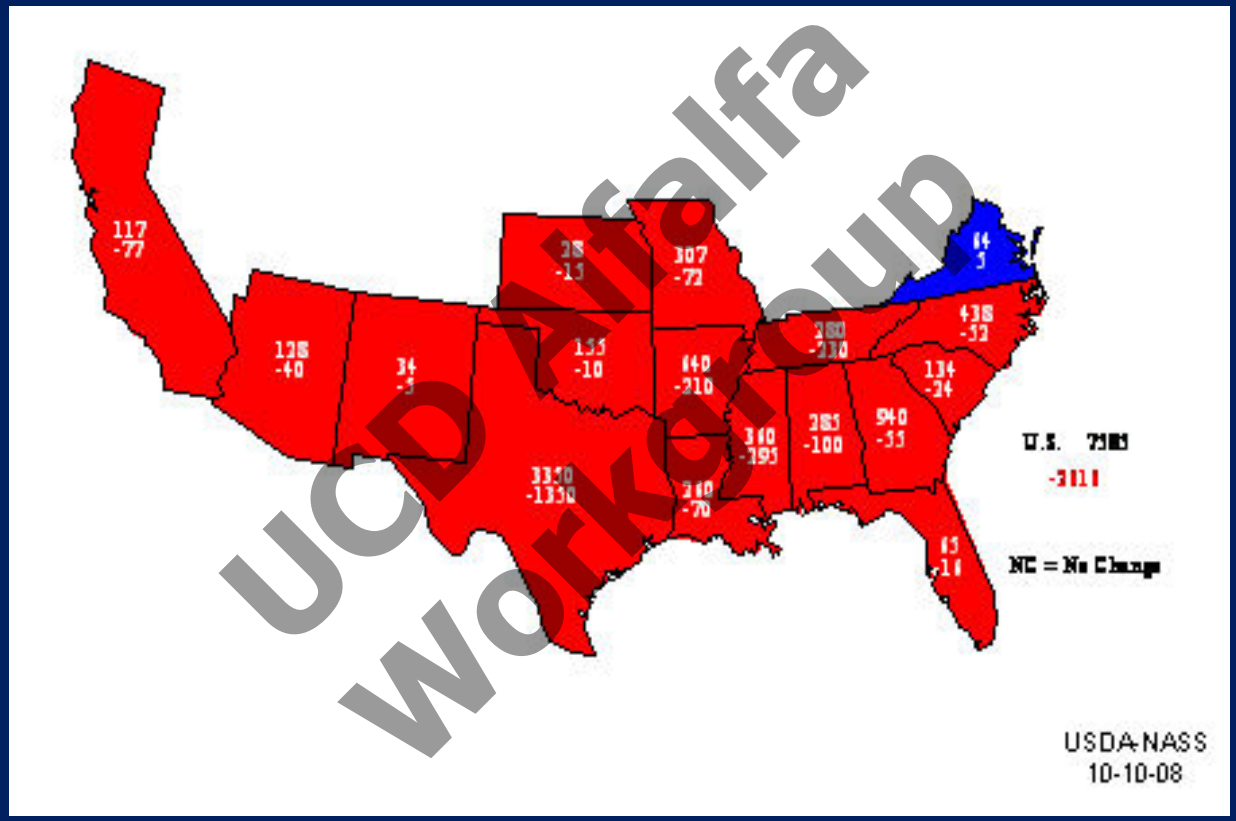
2. Pressures from reduced cottonseed production

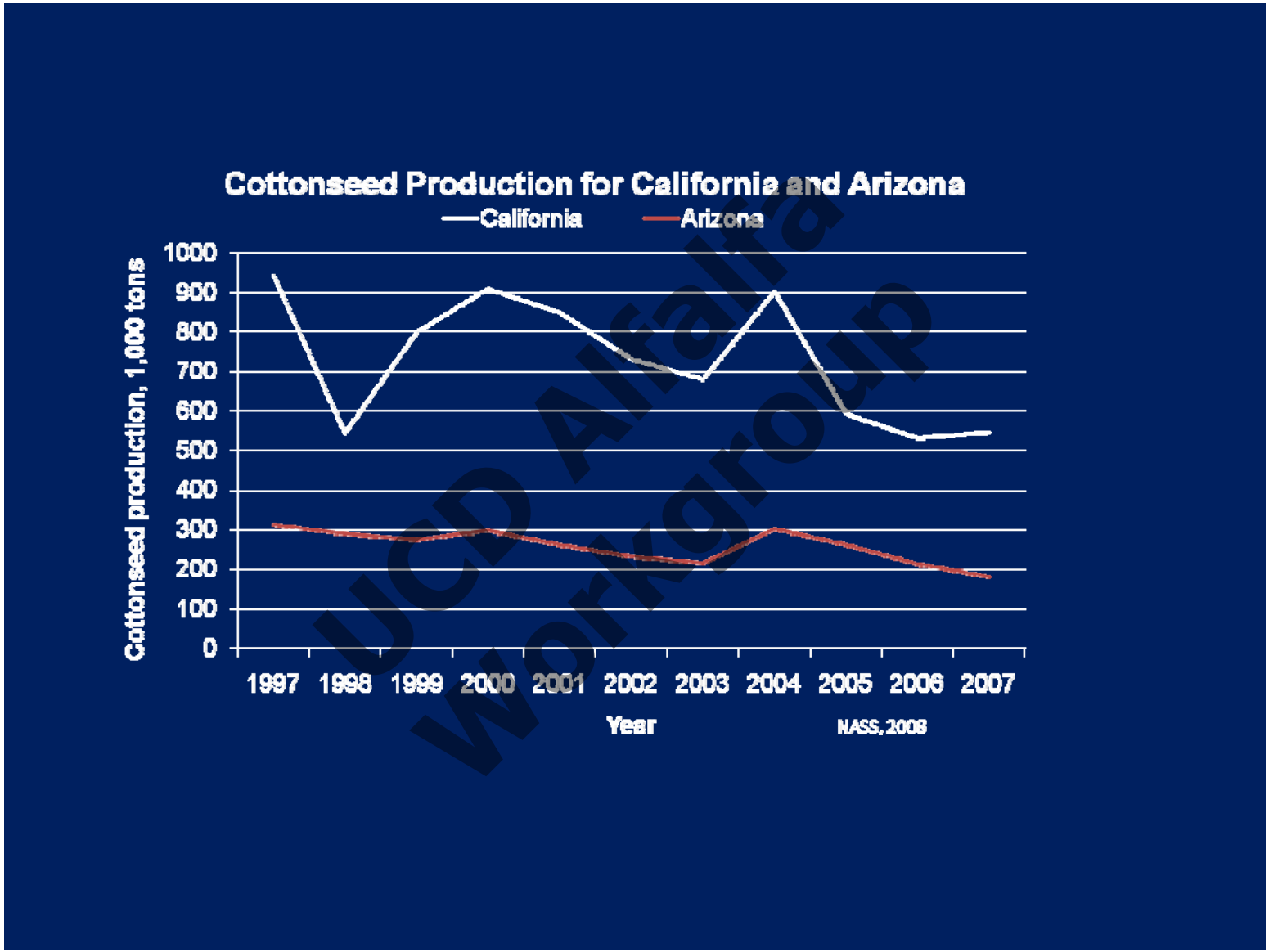
Pima and Upland Cotton Production - CA



2008 Upland Cotton Harvested Acres

Acres (1,000) and change from previous year




Cottonseed Production for California and Arizona
California
Arizona
Cottonseed production, 1,000 tons
1000
900
800
700
600
500
400
300
200
100
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
Year
NASS, 2008
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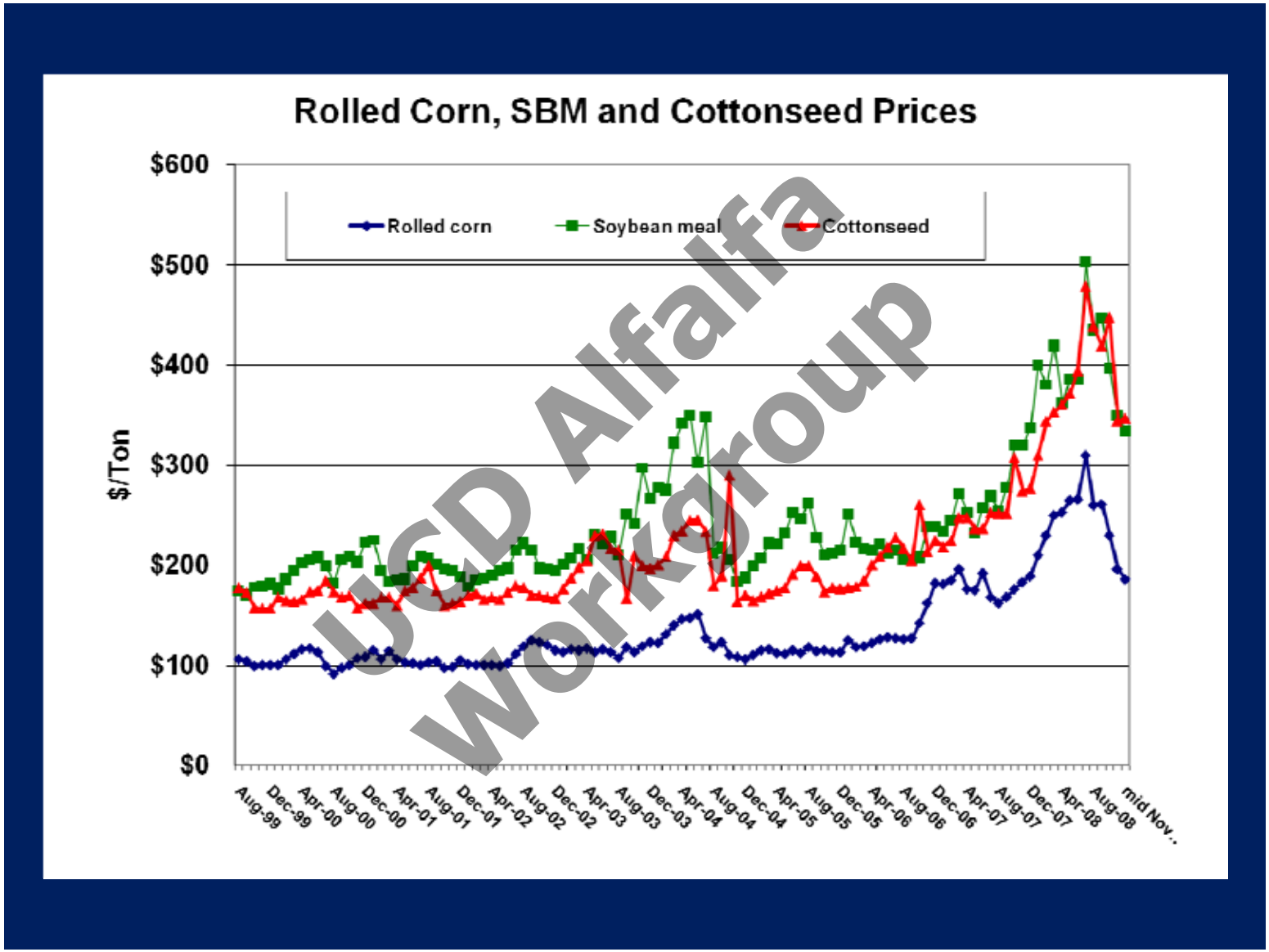
Rolled Corn, SBM and Cottonseed Prices
$600
$500
$400
$300
$200
$100
$0
$/Ton
Rolled corn
Soybean meal
Cottonseed
Aug-99
Dec-99
Apr-00
Aug-00
Dec-00
Apr-01
Aug-01
Dec-01
Apr-02
Aug-02
Dec-02
Apr-03
Aug-03
Dec-03
Apr-04
Aug-04
Dec-04
Apr-05
Aug-05
Dec-05
Apr-06
Aug-06
Dec-06
Apr-07
Aug-07
Dec-07
Apr-08
Aug-08
mid Nov.
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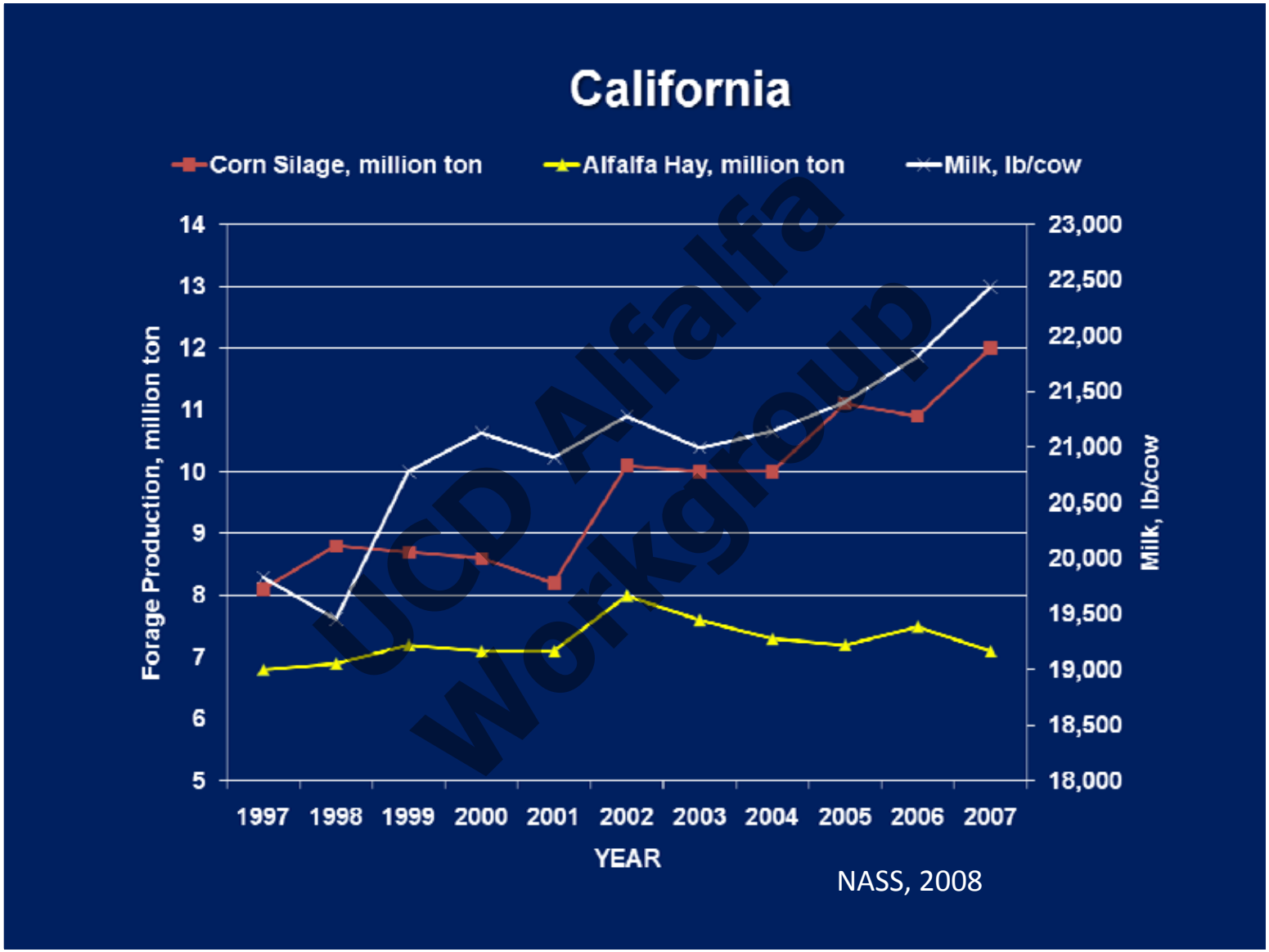
How Will We Feed Cows in the Future?

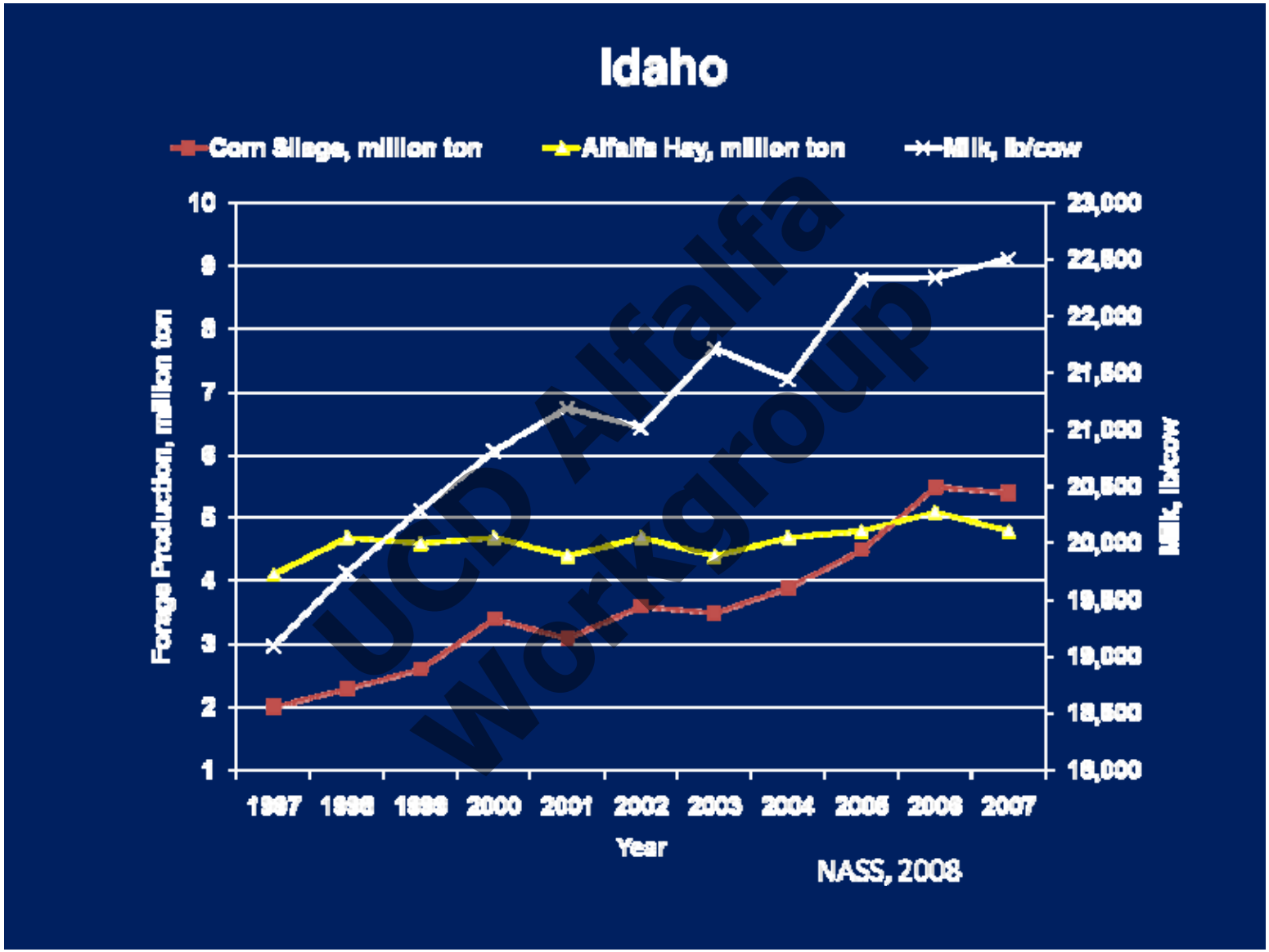
- Future Trends
  - ❖Forages
  - ❖Byproduct feeds

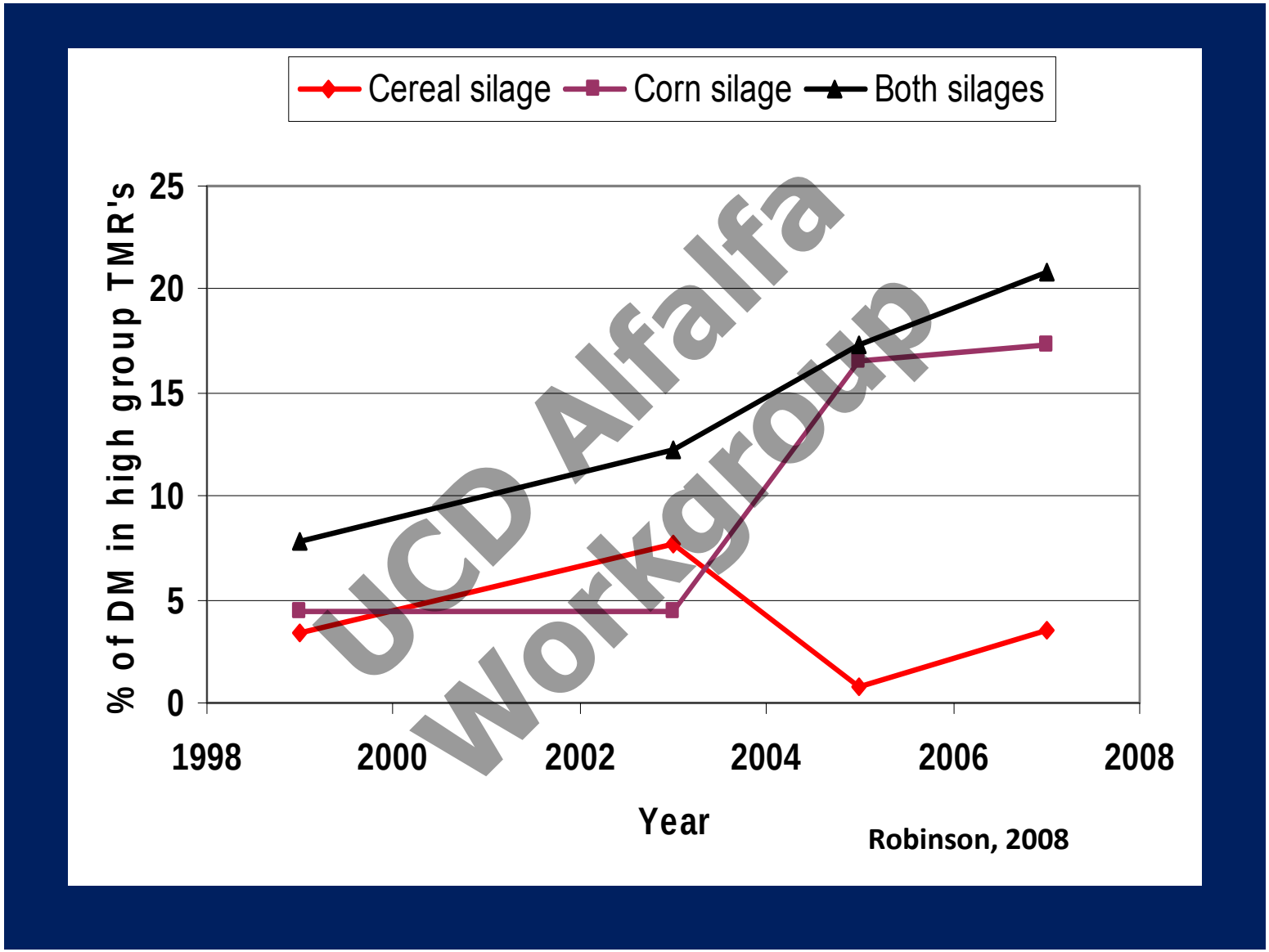
Forage Feeding Trend

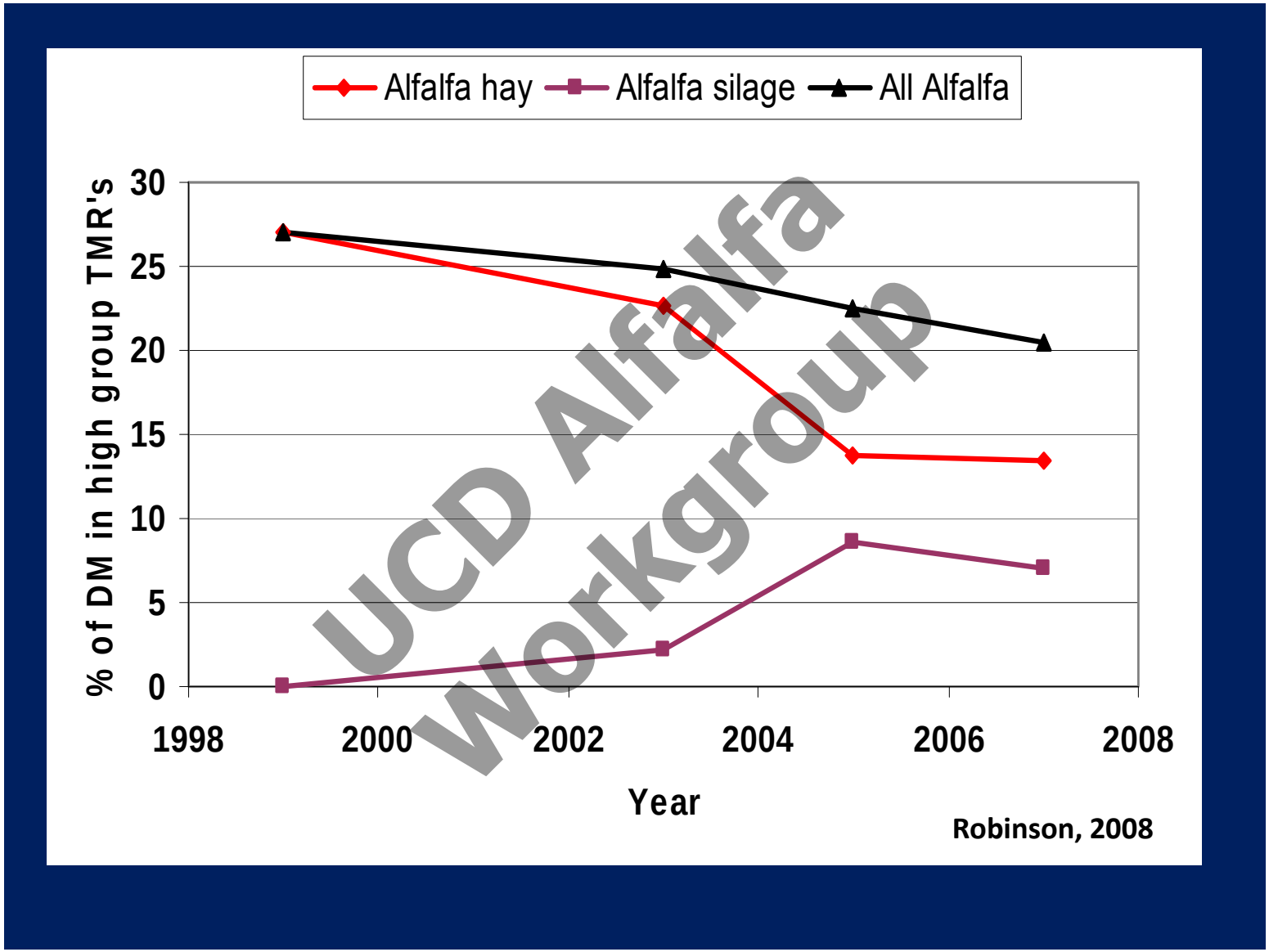
- Feeding more corn silage and fewer legumes and grass forages

- Corn Silage
  - Fiber source
  - Starch Source
  - Decreases corn grain in the diet.

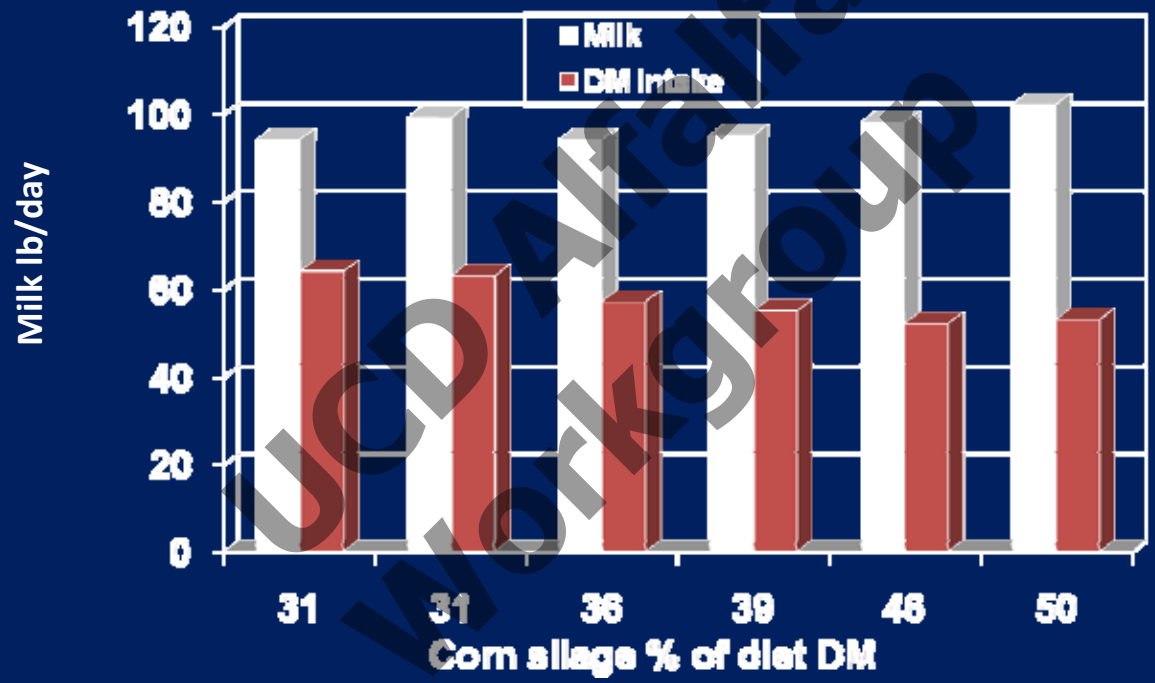

California
Corn Silage, million ton
Alfalfa Hay, million ton
Milk, lb/cow
Forage Production, million ton
Milk, lb/cow
14
13
12
11
10
9
8
7
6
5
23,000
22,500
22,000
21,500
21,000
20,500
20,000
19,500
19,000
18,500
18,000
1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007
YEAR
UCD Alfalfa Workgroup
NASS, 2008


Idaho
Corn Silage, million ton
Alfalfa Hay, million ton
Milk, lb/cow
Forage Production, million ton
Milk, lb/cow
Year
NASS, 2008
UCD Alfalfa Workgroup


Cereal silage
Corn silage
Both silages
% of DM in high group TMR's
25
20
15
10
5
0
1998
2000
2002
2004
2006
2008
Year
UCD Alfalfa Workgroup
Robinson, 2008


Alfalfa hay
Alfalfa silage
All Alfalfa
% of DM in high group TMR's
30
25
20
15
10
5
0
1998
2000
2002
2004
2006
2008
Year
UCD Alfalfa Workgroup
Robinson, 2008

Production Response to Corn Silage
Multiparous Cows – Early Lactation



Corn grain, %	28	22	16	15	6	0
Alf hay %	15	→				15

Allen (2001), Univ. of Minnesota

Why the Trend for Increased Corn Silage Feeding?

Agronomic Factors

Factor	Alfalfa	Corn Silage
Planting	Tri-annual?	Annual
Harvest	6-8/year	1/year
Process	Cut	Cut/chop
	Rake	
	Chop/bale	
Yield	7.2 Ton/acre[1]	27 Ton/acre[1]

[1]As fed basis- NASS, 2008

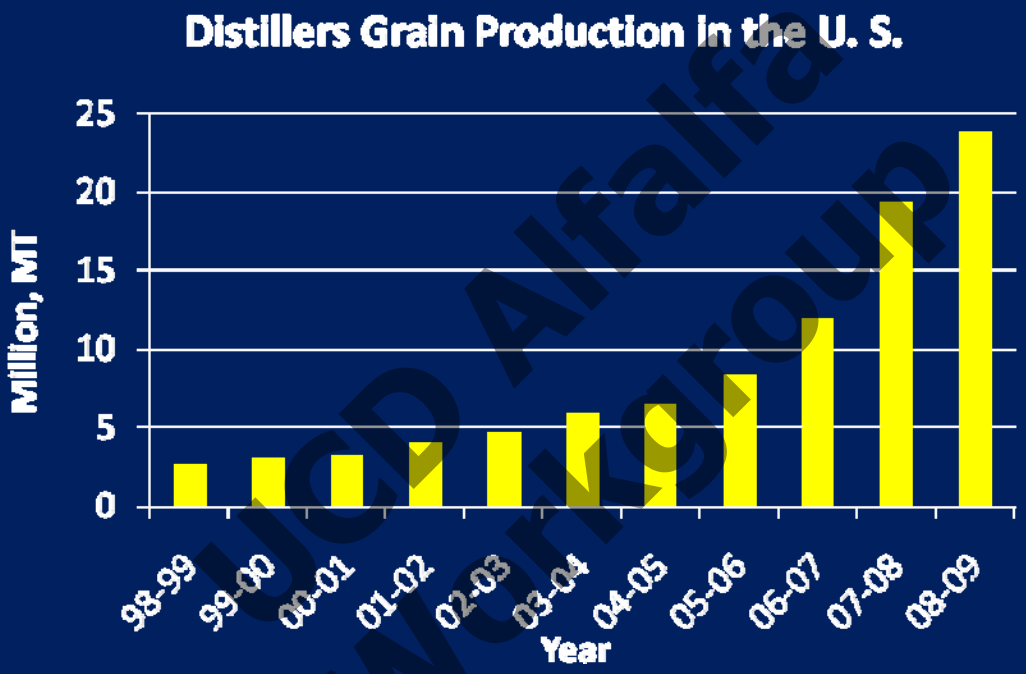
Corn silage advantages

- More consistent rations
- More palatable ration
- More Mcal of energy per acre
- Corn ground can handle heavy levels of manure

CHALLENGES WITH HIGHER CORN SILAGE LEVELS

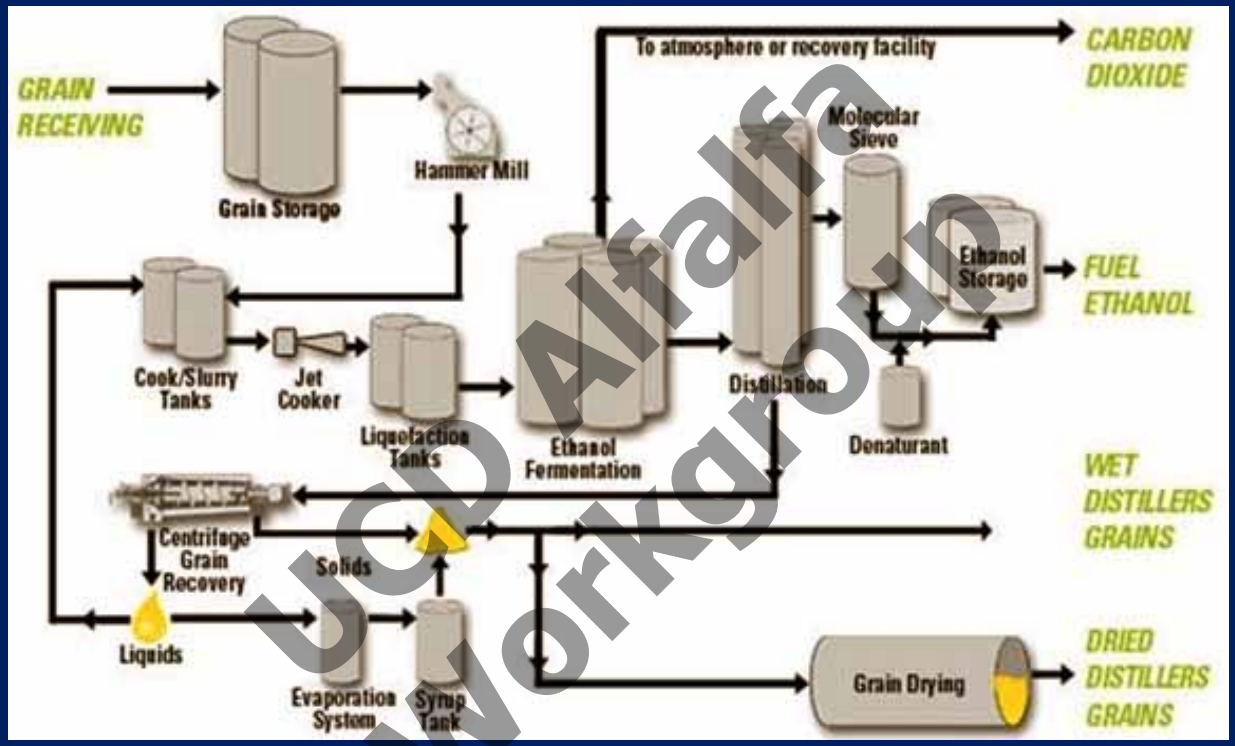
- Increased purchased proteins
- May require dry hay or straw for proper effective fiber
- Particle size can be important. Processed corn silage has definite advantages over unprocessed corn silage.
- Eggs are in “one basket” to a great degree. That’s good if you harvest high quality corn silage but bad if corn silage digestibility is low.
- Need to have two to three months of additional inventory. Corn silage fermented less than two months doesn’t perform as well as fully fermented corn silage.
- Greater risk of acidosis if effective fiber is not managed properly.

Trends in Byproduct Feeding



The national dairy herd of approximately 9 million cows would need to consume 7.2 lb of DG per day over a 305 d lactation to balance the supply.

Ethanol Production Process



- Wet Distillers Grains
  - Corn is processed, mixed with yeasts that converts the starch into ethanol and CO^2. The ethanol is distilled off and the remaining liquid is spun off to remove water. Residue is called wet distillers grains. Around 35% dry matter.

- Condensed Distillers Solubles
  - Liquid removed by centrifuging is usually dried and becomes condensed distillers solubles. The solubles are added back to the wet distillers grains, making wet distillers grains with solubles.. The wet products are either fed as is or are heat dried, producing dried distillers grains with solubles.

Limitations to Feeding Byproducts

- Starch
  - Highly fermentable by rumen bugs. Produces propionic acid. Converted to glucose by liver. Used to make milk.
  - ~25% diet DM for high milk production.

Feed	% starch (as fed)
Corn	**62.0**
Corn Gluten Feed	12.0
Cottonseed	1.0
Distillers Grains	**10.0**
Soybean hulls	1.0
Millrun	21.0

  - Most byproducts have little to no starch but they do contain significant quantities of sugars, organic acids, fructans, glucans and pectins. Provide energy to rumen microbes.

Limitations to Feeding Byproducts

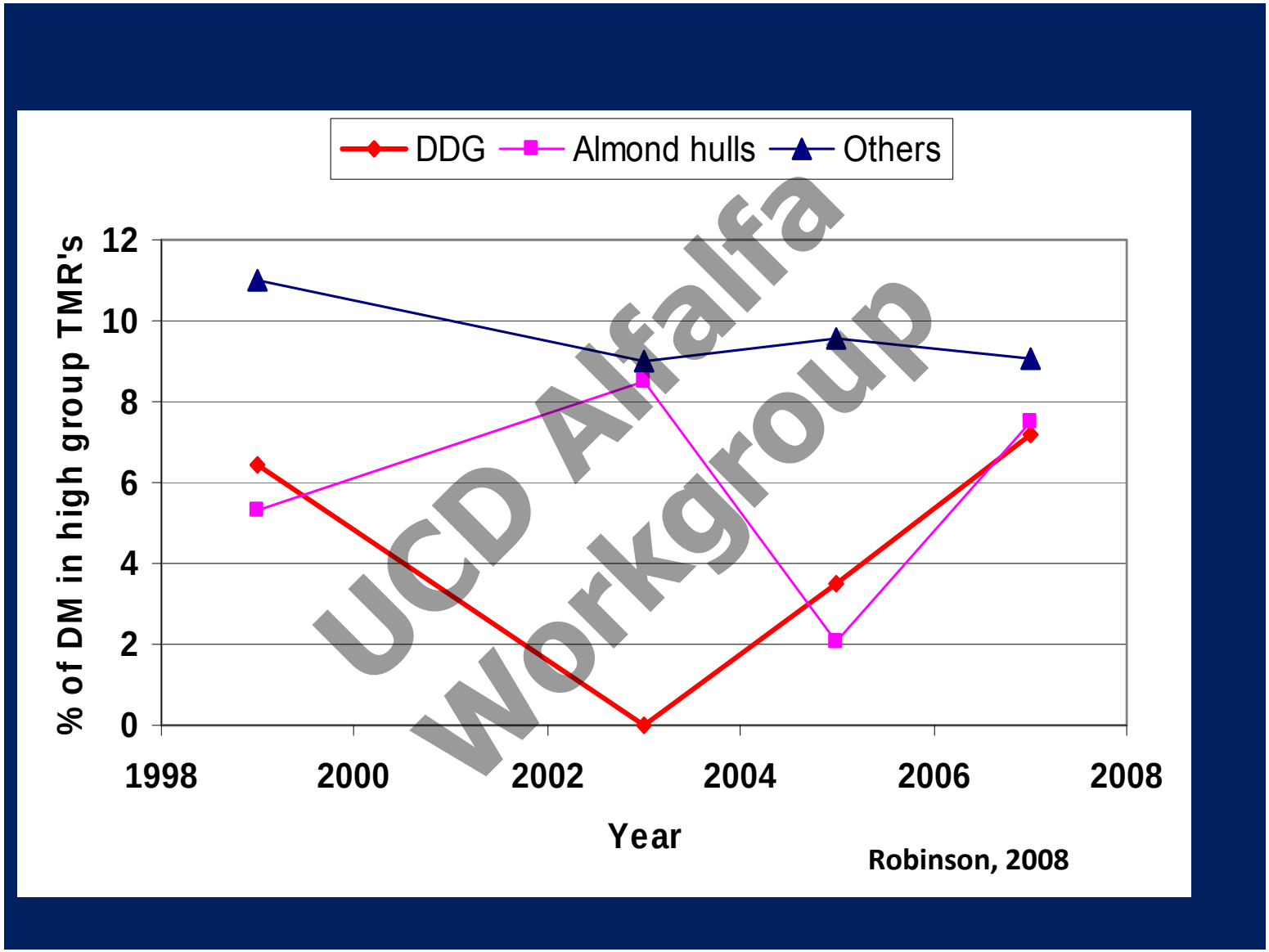
- Phosphorus
  - Most by-products 2-3x corn.
  - Increased P excretion in manure.

Feed	% P (as fed)
Corn	**0.27**
Corn Gluten Feed	1.00
Cottonseed	0.60
Distillers Grains	**0.70**
Soybean hulls	0.10
Millrun	0.80

Limitations to Feeding Byproducts

- Protein
  - Most byproducts 2-3x corn.
  - Increased N excretion.
  - May cause issues in the waste management area.

Feed	% CP (as fed)
Corn	**9**
Corn Gluten Feed	24
Cottonseed	24
Distillers Grains	**28**
Soybean hulls	10
Millrun	19


DDG
Almond hulls
Others
% of DM in high group TMR's
0
2
4
6
8
10
12
1998
2000
2002
2004
2006
2008
Year
UCD Alfalfa Workgroup
Robinson, 2008

Studies examining levels of dried distillers grains for lactating cows.

n[1]	DG, (% of DM)	DMI, (lb/d)	Milk, (lb/d)	Fat, (%)	Protein, (%)
29	0	48.9b	72.8ab	3.39	2.95a
13	4 to 10	52.2a	73.6a	3.43	2.96a
34	10 to 20	51.6ab	73.2ab	3.41	2.94a
15	20 to 30	50.3ab	73.9a	3.33	2.97a
7	>30	46.1c	71.0b	3.47	2.82b

[1]=# of treatment comparisons included in meta-analysis (24 total studies). Kalcheur et al., 2005

[ab]Means in columns with different superscripts differ ($P<0.05$)

What are Distillers Grains Worth?

- Generally replaces corn and soybean meal
- CP (28%) and Energy 0.80 Mcal/lb) ~same as a 50:50 mix of corn and 47% soybean meal
- Therefore, on an energy and CP basis:

  1 lb distillers grains replaces:

  0.5 lb corn and 0.5 lb SBM

  - Break-even price of DDGS ($/ton)-

    ={Corn ($/bu) x 17.85} + {SBM ($/Ton) x 0.5}

    Example: ($7 x 17.85) + ($275 x 0.5)

    Distillers Price= $263

Summary

- Increased growth of ethanol plants across the U.S. has increased the demand for corn grain.
- This has resulted in historically high corn prices.
- By increasing forages such as corn silage, partial replacement of corn can be achieved.
- Use of distillers grains or other by-products in dairy rations can also be utilized to also offset higher grain prices.
- Milk production caps from creameries will also dictate to some degree what feedstuffs are utilized in dairy rations.