



Dairy Nutrition under Drought Conditions

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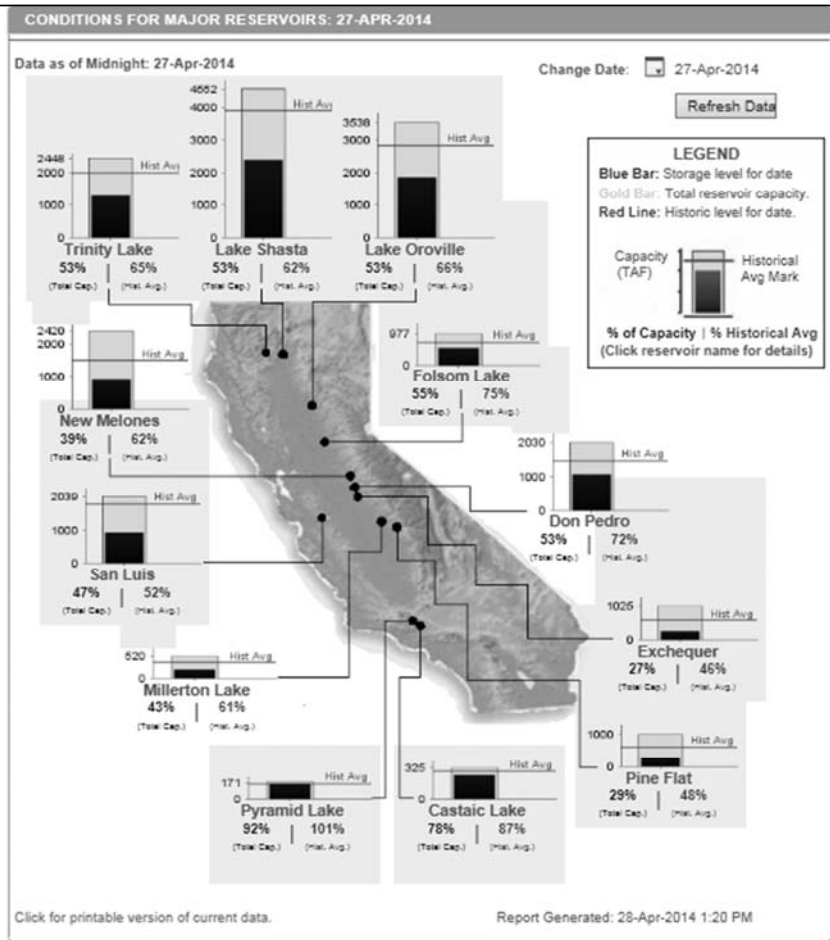


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- Evolution of dairy farms, where we are?
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 - Lactating cows fiber requirements
 - Forages and fiber (NDF) balance
 - Alternative forage sources
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Major reservoirs conditions

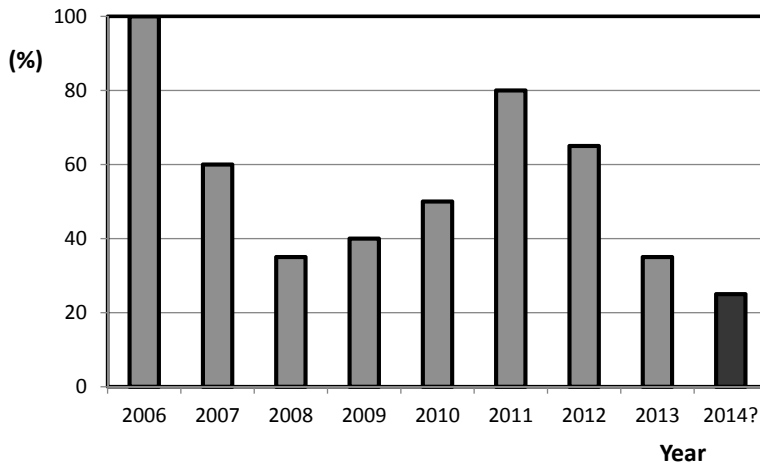
(CA Data Exchange Center)



<http://cdec.water.ca.gov/cdecapp/resapp/getResGraphsMain.action>

California water allocation (2006-2013)

California water allocation history *



(* Last 100% water allocation 2006. *Delta pumping restrictions to protect threatened & endangered fish, even in wet years.*)

(California Department of Water Resources, 2014)

California drought prompts first-ever 'zero water allocation'

January 31, 2014 | By Bettina Bonal

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Officials Friday said that for the first time ever, the State Water Project that helps supply a majority of Californians may be unable to make any deliveries except to maintain public health and safety.

They also said they were cutting releases from large reservoirs in the northern part of the state to preserve supplies in the face of what could be the worst drought in modern California history.



The State Water Project's zero allocation, which means no delivery, "May 11, 2014" (McClatchy-Dallas)

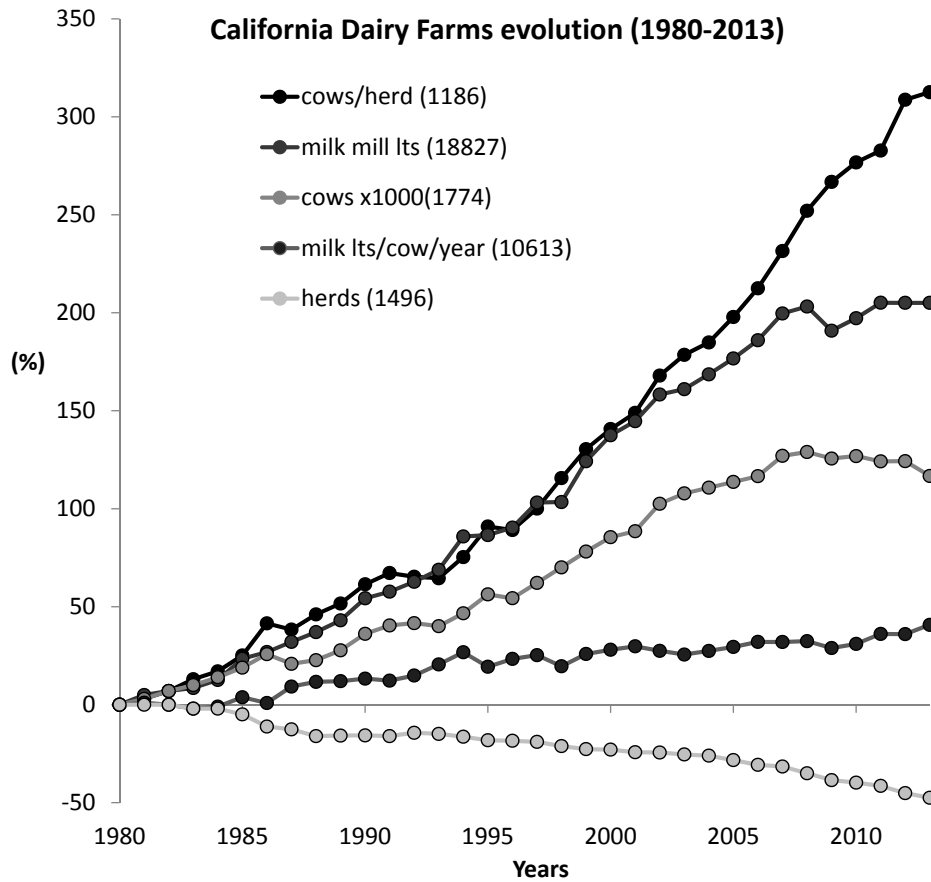


Water allocation situation?

- Allocations: 1-3? acre feet/dairy farm
- Corn water requirements, 4-5 acre feet
- Challenge to produce summer forages (alfalfa & corn)
- Alternative forage sources?
- Ground water pumping?



Evolution of dairy farms, where we are?



California Dairies evolution & trends:

- More cows per farm
- More production per cow
- High scale dairy farms
- Availability of land for forage production?
- **Nutritional challenges ... forage production!**

Forage / NDF balances

**Total Forage Requirement (Ton DM & NDF /year) =
(1. total animal requirements) - (2. total on-farm forage
availability)**

where:

1. total animal requirements = replacement + dry cows + lactating cows
2. total on-farm forage availability = forage harvested/bought before 2014 + winter forage recently harvested

Based on Forage/ NDF balances:

- Make a plan with your nutritionist
- Estimate your on-farm production and buy forage according to your deficit
- Compare different alternative high-water efficient forages sources
- Manage calving scenario as needed
- Reduce replacement/lactating cows?
- Minimize/eliminate cows in the hospital pen



Alternative forages for emergency situations

1. Alternative forages may be lower in protein and energy compared alfalfa hay and corn silage, respectively.
2. The use of alternative forages required nutrient content chemical analysis.
3. Work close to your nutritionist to periodically check the rations to maintain high animal production efficiency.

Alternative forages in dairy rations

Sorghum vs. corn silage			
Forage	Irrigations (plan/harv)	dNDF ₃₀ (% NDF)	TDN (% DM)
Sorghum grain	3	30.1	63
Sorghum forage	3	31.8	61
Corn silage	8	48.0	69

(More details, see CA Dairy Newsletter, April 2014)

Corn straw* for high cows			
Item		Control	Corn straw
Milk yield	Lb/cow/day	97.7	96.6
Fat	%	3.06	3.21
Protein	%	3.03	3.07
EMC**	Lb/cow/day	83.6	84.7

* NaOH treated (J. Dairy Sci. 2014)

** ECM energy corrected milk

Some drought related nutritional risks

- **Nitrates**: reduced oxygen carrying capacity, drought increase nitrates, manure fertilization, ensiling reduce about half (test?).
- **Prussic acid**: typical Sudan-grass, frosted forages (wait 7 days), ensiling not always resolved the problem, harvest Sudan-grass > 30 inches high.
- **Silo gas poisoning**: cut forages higher than normal, be alert for bleach odor, yellowish brown fumes at the base of the silo, stay clear of the silo 3 week after filing, ventilate the silo before entering.
- **Rumen acidosis**: check milk fat content, mild diarrheas, rumination, and cows leaving the milking barn.



Home message

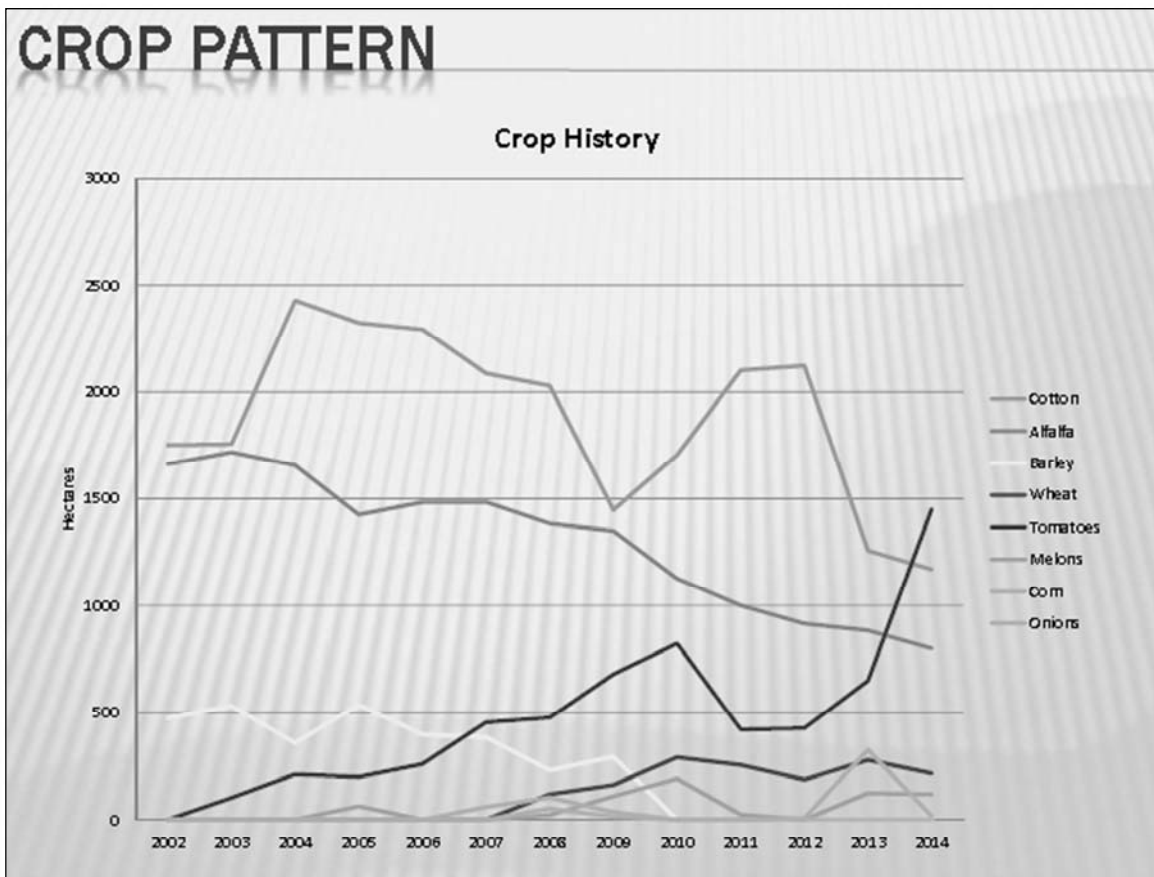
- Consider alternative summer forages based on your water allocations
- Make a forage/fiber balance at least for one year
- Balance diets based on chemical analysis
- Permanently reevaluate your forage balance and diets with your nutritionist
- Be ready for a zero water allocation



University of California Agriculture and Natural Resources

THANKS!!

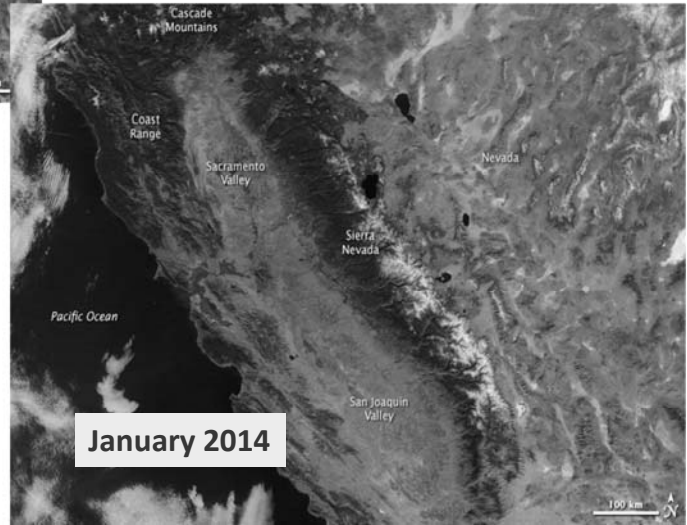
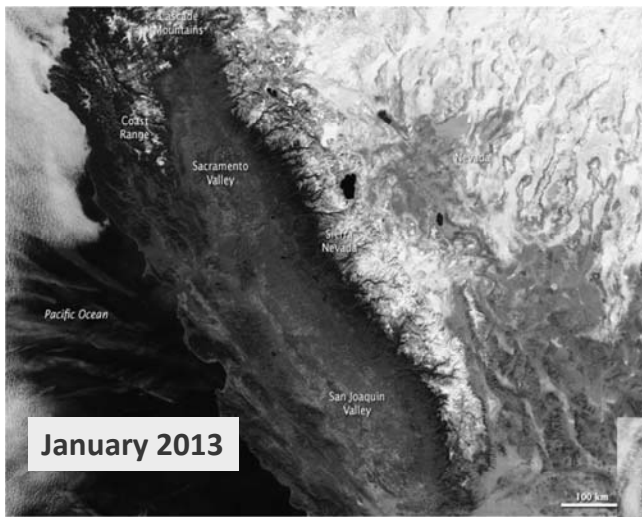
CROP PATTERN



(Cannon Michael, Bowles Farm, personal communication)

California drought

(UC ANR, California Institute for Water Resources)



Nitrates levels in dairy diets

NITRATE: ION (NO ₃)	NITROGEN: (NO ₃ -N)	RECOMENDATIONS
%	ppm	
0.0-0.44	0-1000	Safe to feed under most conditions
0.45-0.75	1000-1700	Gradually introduce to ration Feed some energy concentrates Test all feed and water Dilute NO ₃ in the ration to safe levels Restrict single meals
0.75-1.00	1700-2300	Possible acute toxicosis Feed as TMR including energy concentrates Dilute NO ₃ in the ration to safe levels Restrict single meals

(“Drought-related issues in dairy nutrition”, Penn-State University, July 2012)