



# Beekeeping and Agriculture: A Beekeepers Perspective

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# **US Beekeeping exists primarily to meet the pollination need of agricultural crops**

- Approximately ½ of all commercially managed colonies are in California Almonds
- 60% or more of a commercial beekeepers income is from pollination



# Managed Bees contribute to 35% of global food production

## More than 90 crops in US Pollinated by Honey Bees

Acerola	Broccoli	Coconut	Guava	Naranjillo	Safflower	Tung tree
Alfalfa	Brussels sprouts	Coffea spp. arabica, Coffea canephora	Hazelnut	Oil palm	Sainfoin	Turnip, Canola
Allspice	Bucket orchid	Cola nut	Hog plum	Okra	Sapodilla	Vanilla
Almond	Buckwheat	Coriander	Hyacinth bean	Onion	Scarlet runner bean	Vetch
Alsike clover	Cabbage	Cotton	Jack bean, Horse bean, Sword bean	Papaya	Service Tree	Walnut
American Pawpaw	Cactus, Prickly pear	Cowpea, Black-eyed pea, Blackeye bean	Jujube	Passion fruit. Maracuja	Sesame	Watermelon
Apple	Cantaloupe, Melon	Cranberry	Karite	Peach, Nectarine	Sour cherry	White clover
Apricot	Carambola, Starfruit	Crimson clover	Kiwifruit	Pear	Soybean	
Arrowleaf clover	Caraway	Crownvetch	Lemon	Persimmon	Squash (plant), Pumpkin, Gourd, Marrow, Zuchini	
Atemoya, Cherimoya, Custard apple	Cardamom	Cucumber	Lima bean, Kidney bean, Haricot bean, Adzuki bean, Mungo bean, String bean, Green bean	Pigeon pea, Cajan pea, Congo bean	Stanhopea	
Avocado	Carrot	Durian	Lime	Plum, Greengage, Mirabelle, Sloe	Star apple, Cainito	
Azarole	Cashew	Eggplant	Longan	Pomegranate	Strawberry	
Beet	Cauliflower	Elderberry	Loquat	Quince	Strawberry tree	
Black currant, Red currant	Celery	Feijoa	Lupine	Rambutan	Sunflower	
Blackberry	Chestnut	Fennel	Lychee	Rapeseed	Sweet Cherry	
Blueberry	Chilli pepper, Red pepper, Bell pepper, Green pepper	Fig	Macadamia	Raspberry	Tamarind	
Boysenberry	Chinese cabbage	Flax	Mammee apple	Red clover	Tangelo	
Brazil nut	Clover (not all species)	Grape	Mango	Rose hips, Dogroses	Tangerine	
Broad bean	Cocoa	Guar bean, Goa bean	Mustard	Rowanberry	Tomato	



# **Managed Honey Bees Must Reside Adjacent to Production Agriculture.**





# We are part of Agriculture production



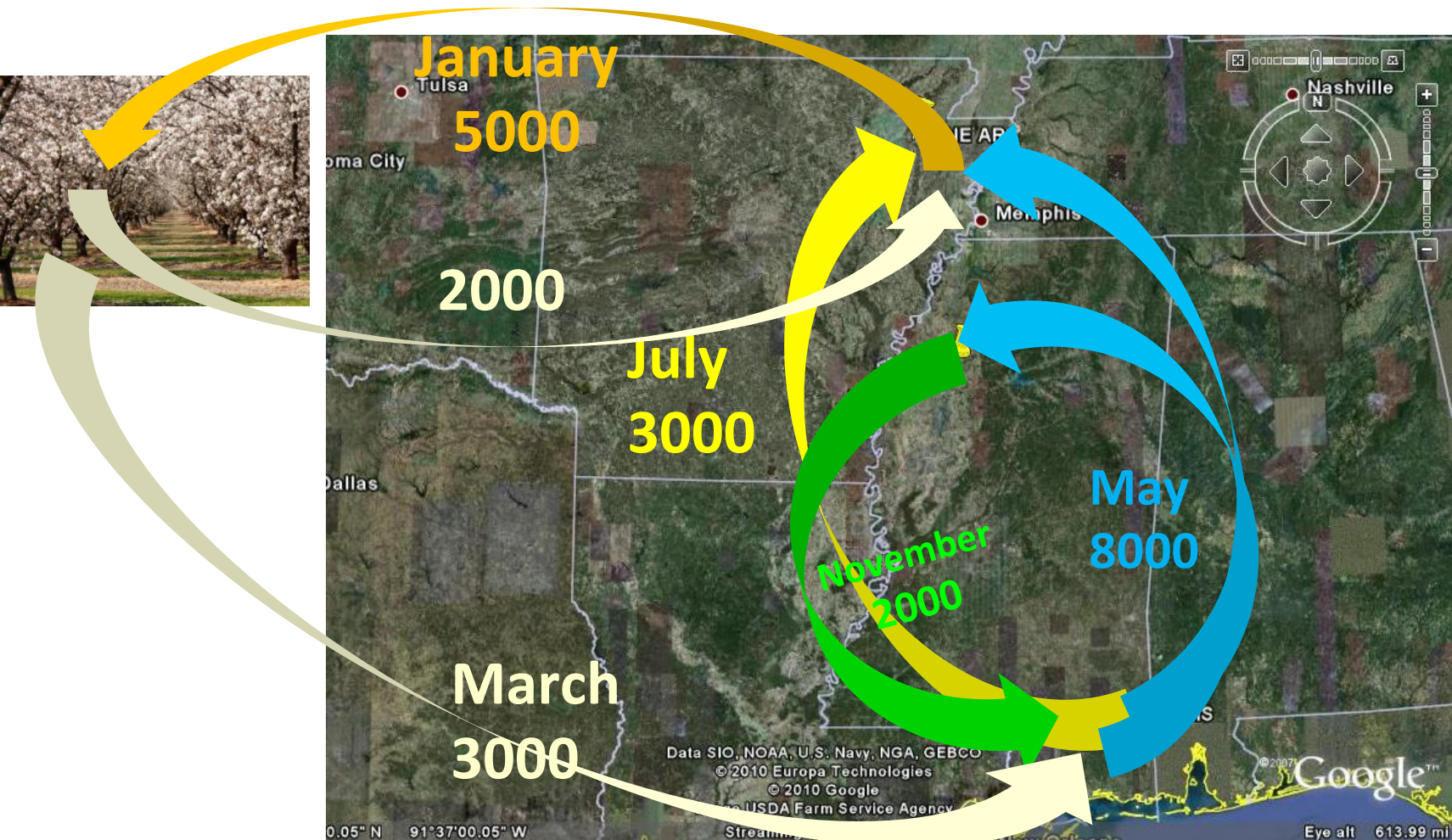


# We Farm Where We Live





# Coy's Honey Farm's Annual Migration



**Pollinators are an important part of the ecosystem and should be protected from harm caused by pesticide use.**

- Moving bees to facilitate pesticide applications of crops and weeds in bloom is not a sustainable management model, financially or ecologically.
- Where can we go where a pest insect does not exist?
- When one producer in an area sprays they all spray.
- **The Label is the Law**

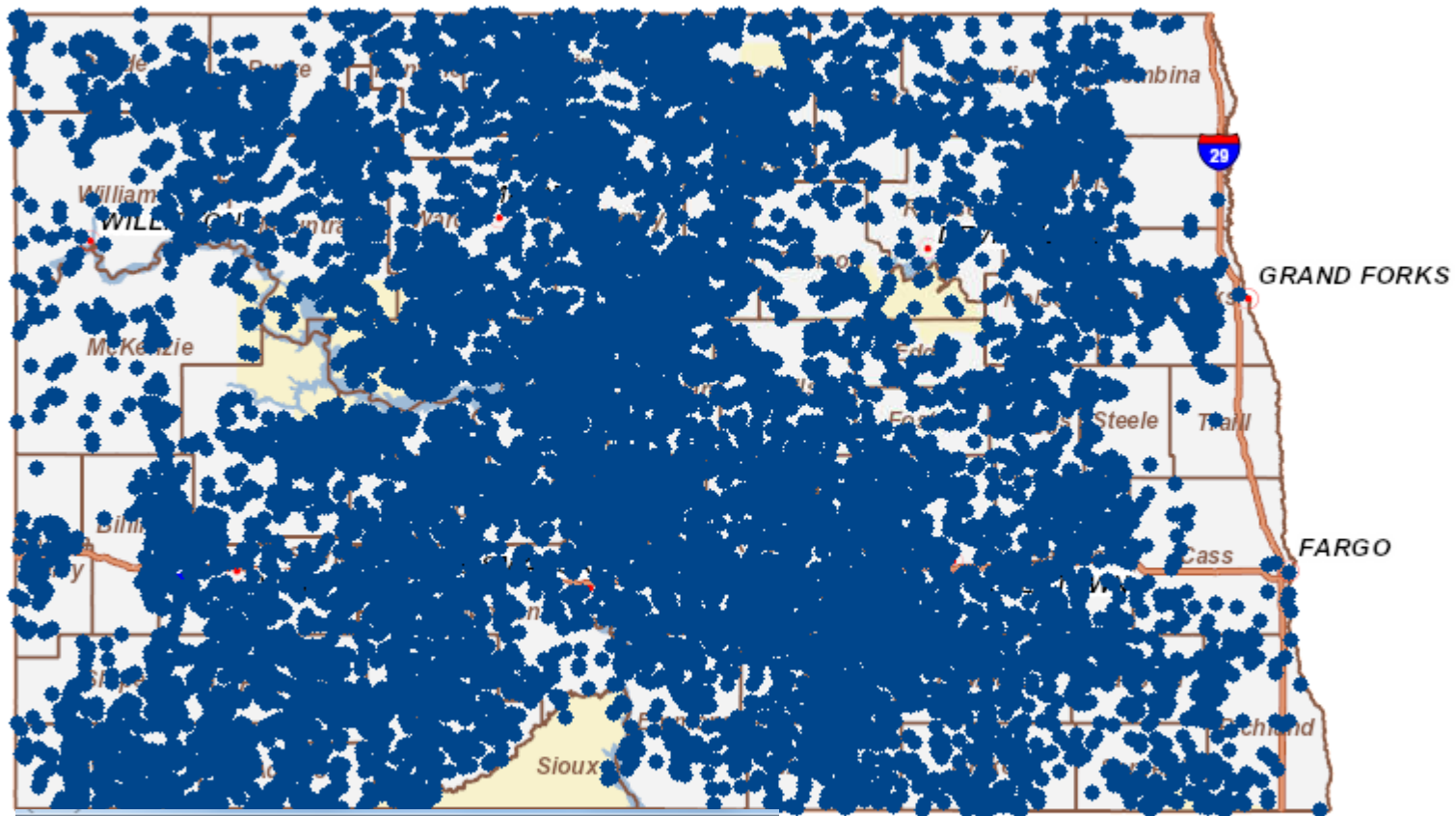




# Moving Bees



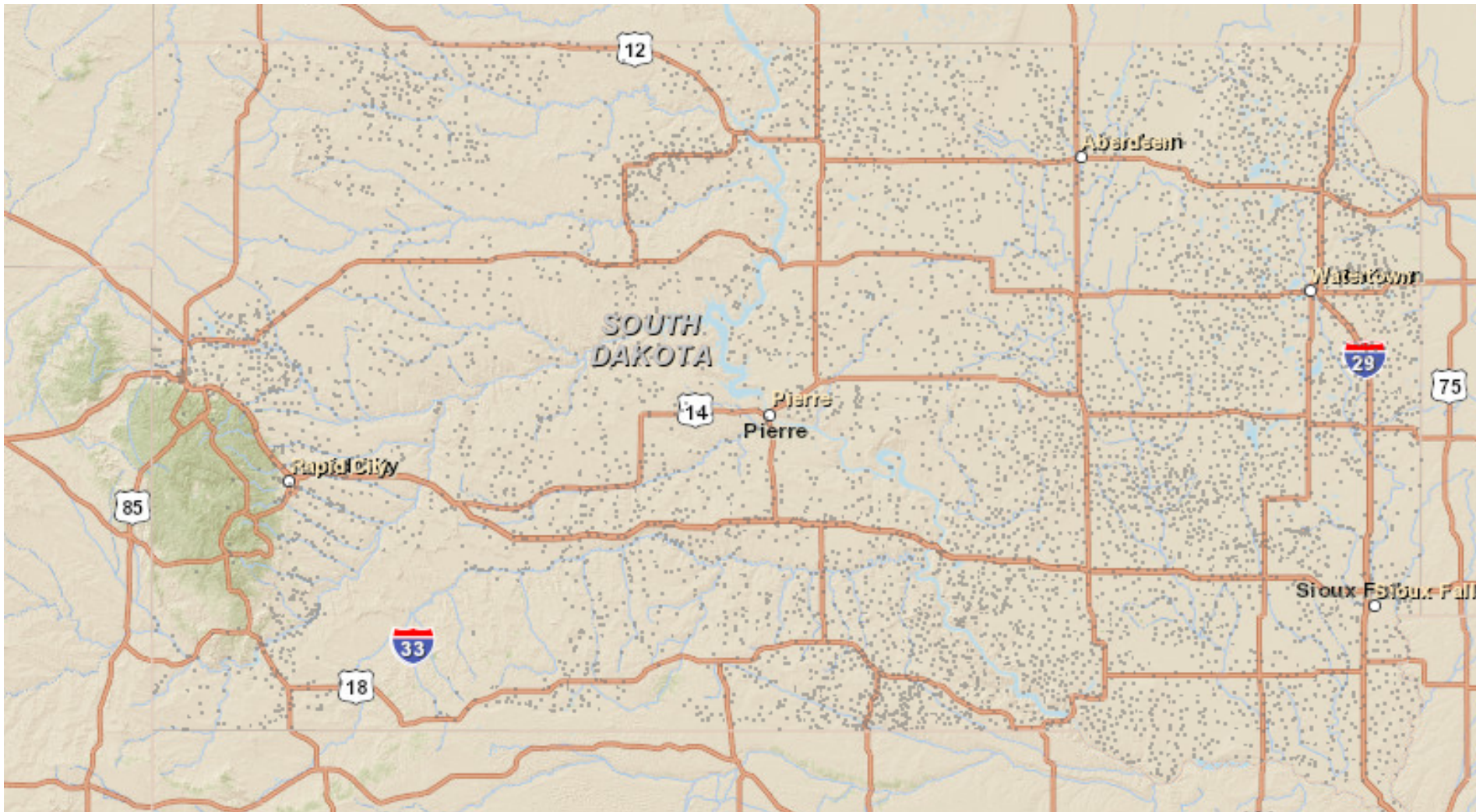
# Bee Locations in North Dakota



North Dakota  
Department of Agriculture



# Bee Locations in South Dakota



1 million colonies spend the summer in  
N. Dakota, S. Dakota, Minnesota and Wisconsin

# Agriculture Producers are the Original Environmental Stewards

- Beekeepers are an important part of Agriculture
- We are each other's neighbor and everyone should be a good steward of the environment.





# This Is Not Good Stewardship

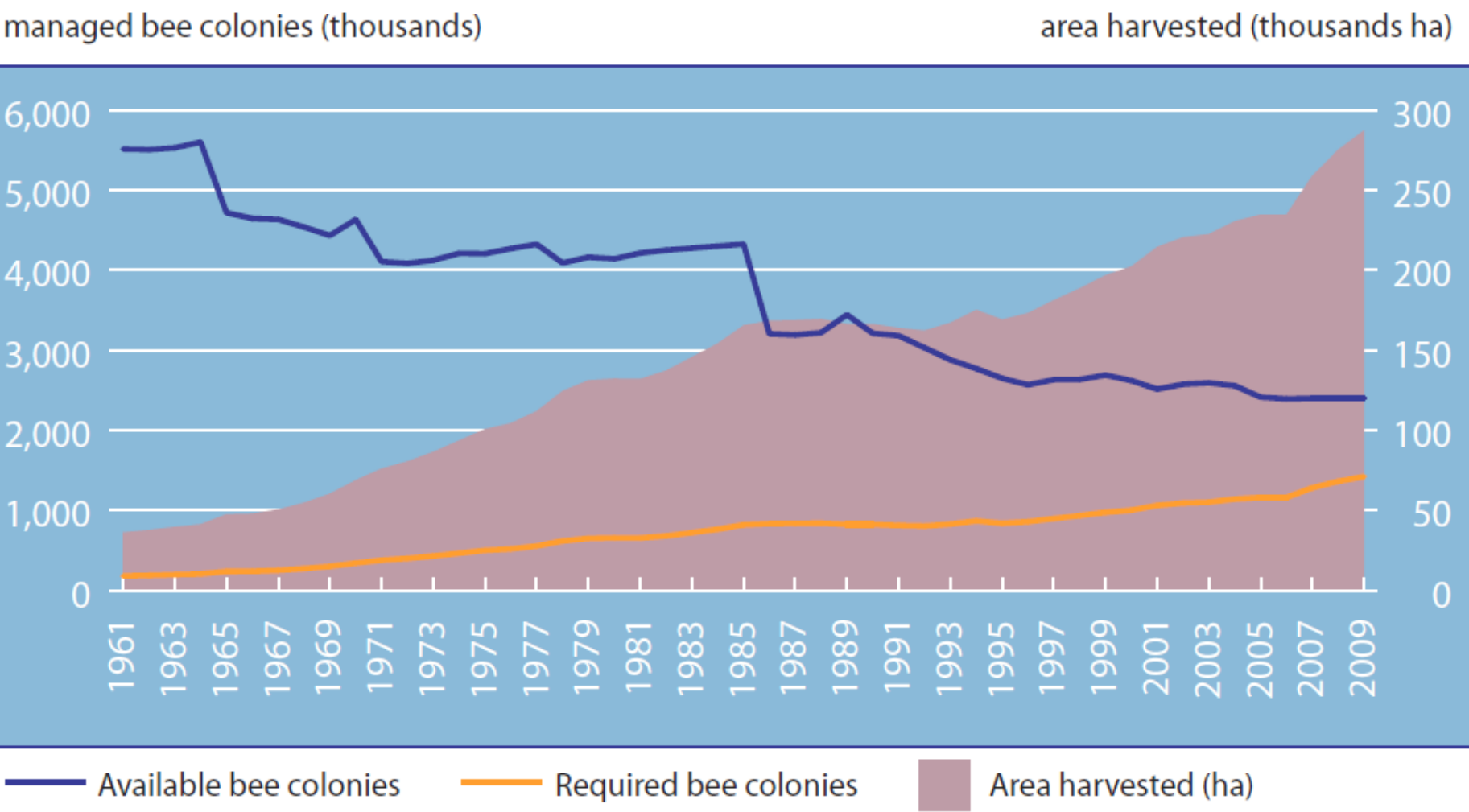


# **Rabobank Report**

## **The Plight of the Honey Bee** 2011

- A long-term trend of a declining number of bee colonies per hectare
- Global production of pollination-requiring crops is growing faster than the amount of bee colonies. Consequently, the amount of bee colonies per hectare planted with these crops is in decline.
- The United States is a key risk region as the number of bee colonies per hectare of pollination-requiring crops has declined by 90% in the past 50 years. In Europe, the decline of colonies per hectare requiring pollination is estimated at 20%-25%.

Figure 4: Almond Production and Bee Colony Convergence



Source: FAOSTAT, 2010



# Conclusions of Rabobank Article

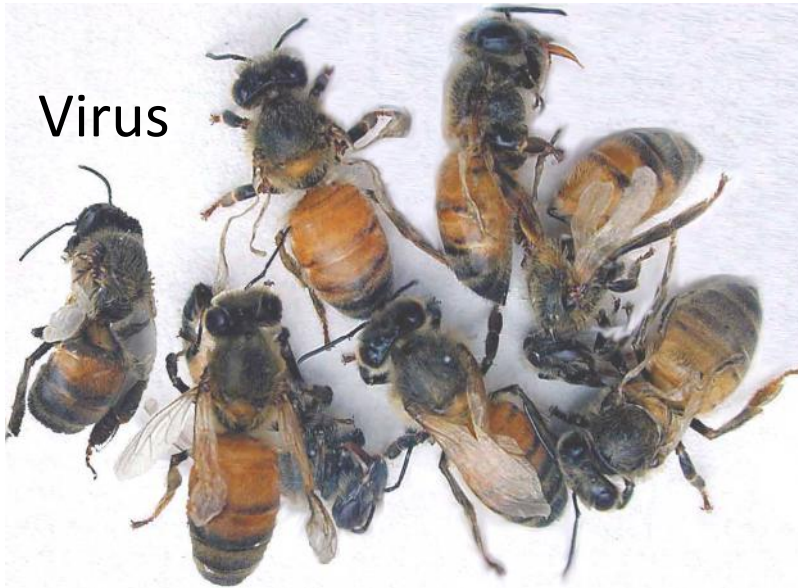
- There must be cooperation between the academic world, governmental bodies, apiarists and companies directly dependent on pollination.
- Biodiversity in agricultural areas should be increased to provide nutritional variety for bees
- While pesticide use cannot be eliminated, application should take place in cooperation with beekeepers
- Avoid pesticide use when bees are foraging (during daylight hours).
- Pollination should not be considered as a production factor which should be taken for granted.

# My Perspective

- Last fall was just preparation for this spring
  - Timing of mite treatments
  - Need for supplemental feeding
- Late splits equals a short crop
  - Window of nectar availability
- 3 requirements for successful beekeeping (Industry)
  - Good bees
  - Good locations
  - Good weather



# Honey Bee Diseases and Pests



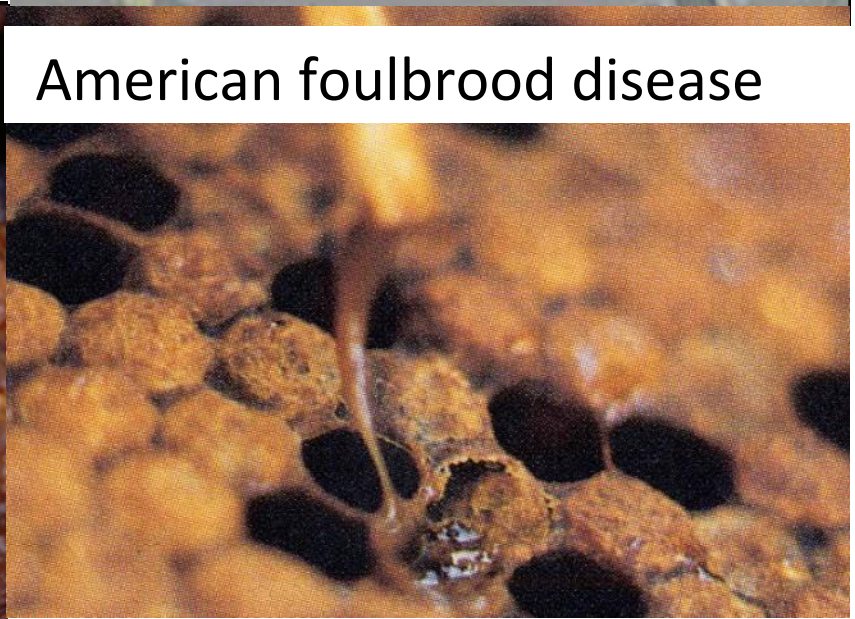
Virus



Nosema a gut parasite

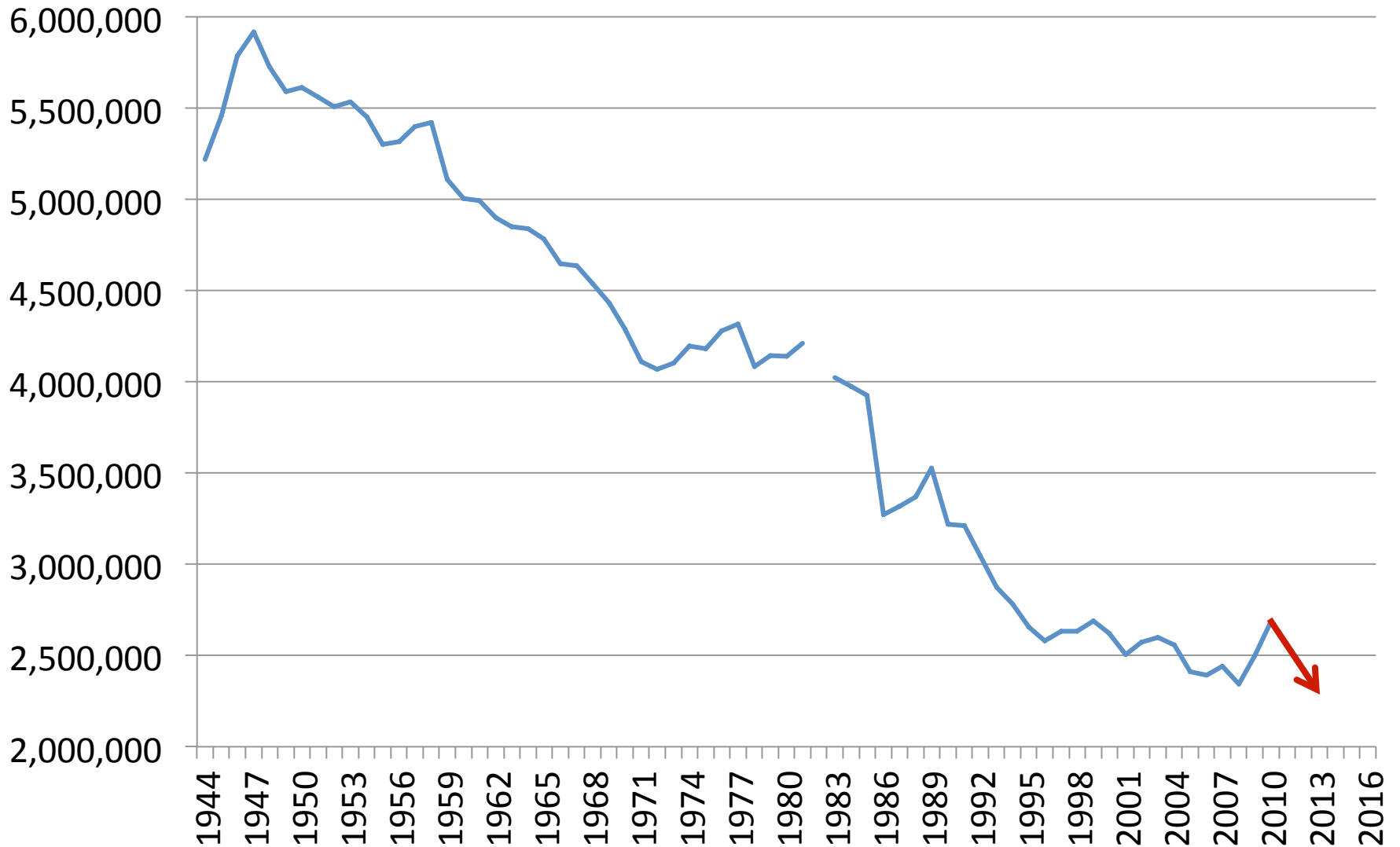


Parasitic Varroa mites



American foulbrood disease

## Managed Colonies in US





# Working Hypothesis

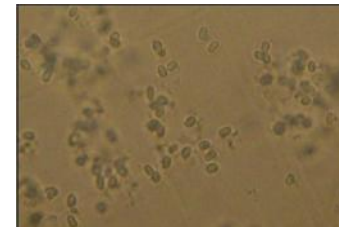
## Primary Stress



## Varroa Mites



## Management Nutrition Pesticides



## Nosema

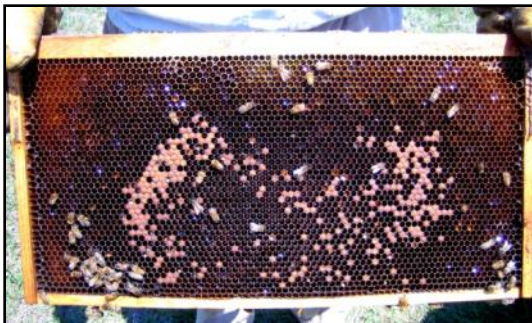


## Fungi

## Viruses



## Secondary Pathogens



TheRapture  
Varroa  
pollution  
cellphones  
SmallHiveBeetles  
transportation  
pathogens  
nutrition  
viruses  
Nosema  
contrails  
GMOcrops  
pesticides

A word cloud illustrating various factors that contribute to honeybee health issues. The words are arranged in a cluster, with 'pesticides' and 'viruses' being the most prominent. Other significant words include 'Nosema', 'Varroa', 'pathogens', 'transportation', 'contrails', 'SmallHiveBeetles', 'TheRapture', 'GMOcrops', 'nutrition', 'pollution', and 'cellphones'. The colors of the words range from yellow to dark green.

pesticides

viruses

pathogens

transportation

contrails

SmallHiveBeetles

TheRapture

Nosema

Varroa

cellphones

pollution

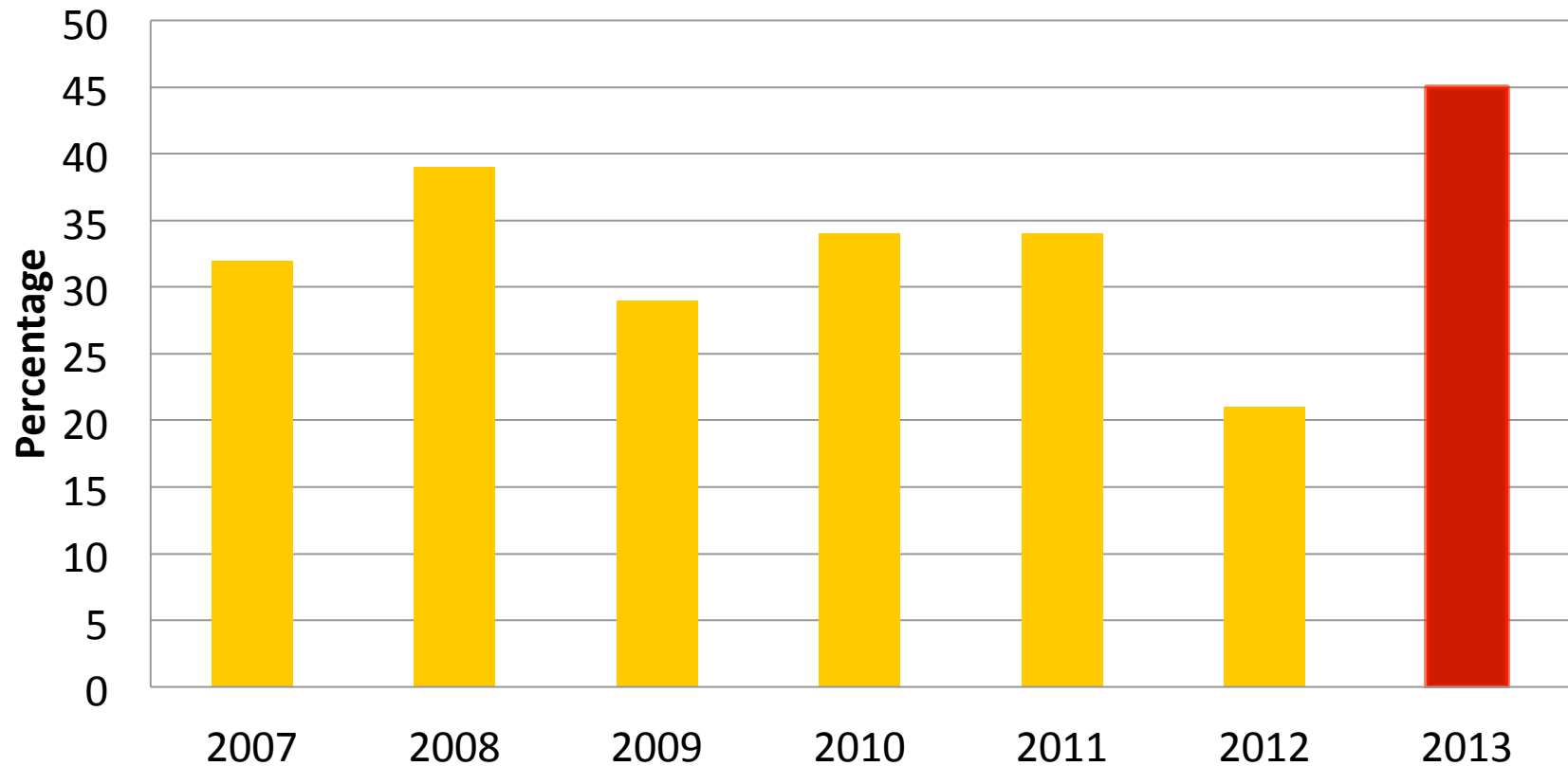
nutrition

GMOcrops



# What Creates this Result ?

Colony Loss Estimates



vanEngelsdorp et al. 2007, 2008, 2009 and 2011

A word cloud of factors affecting honeybee health. The words are arranged in a cluster, with 'nutrition' at the top in orange, 'pesticides' in the middle in dark red, and 'pathogens' at the bottom in green. Other words include 'GM0crops' (yellow), 'viruses' (orange), 'transportation' (dark red), 'Nosema' (yellow), 'cellphones' (red), 'contrails' (dark red), 'pollution' (orange), 'Varroa' (orange), 'TheRapture' (green), and 'SmallHiveBeetles' (green).

nutrition  
pesticides  
pathogens  
GM0crops  
viruses  
transportation  
Nosema  
cellphones  
contrails  
pollution  
Varroa  
TheRapture  
SmallHiveBeetles

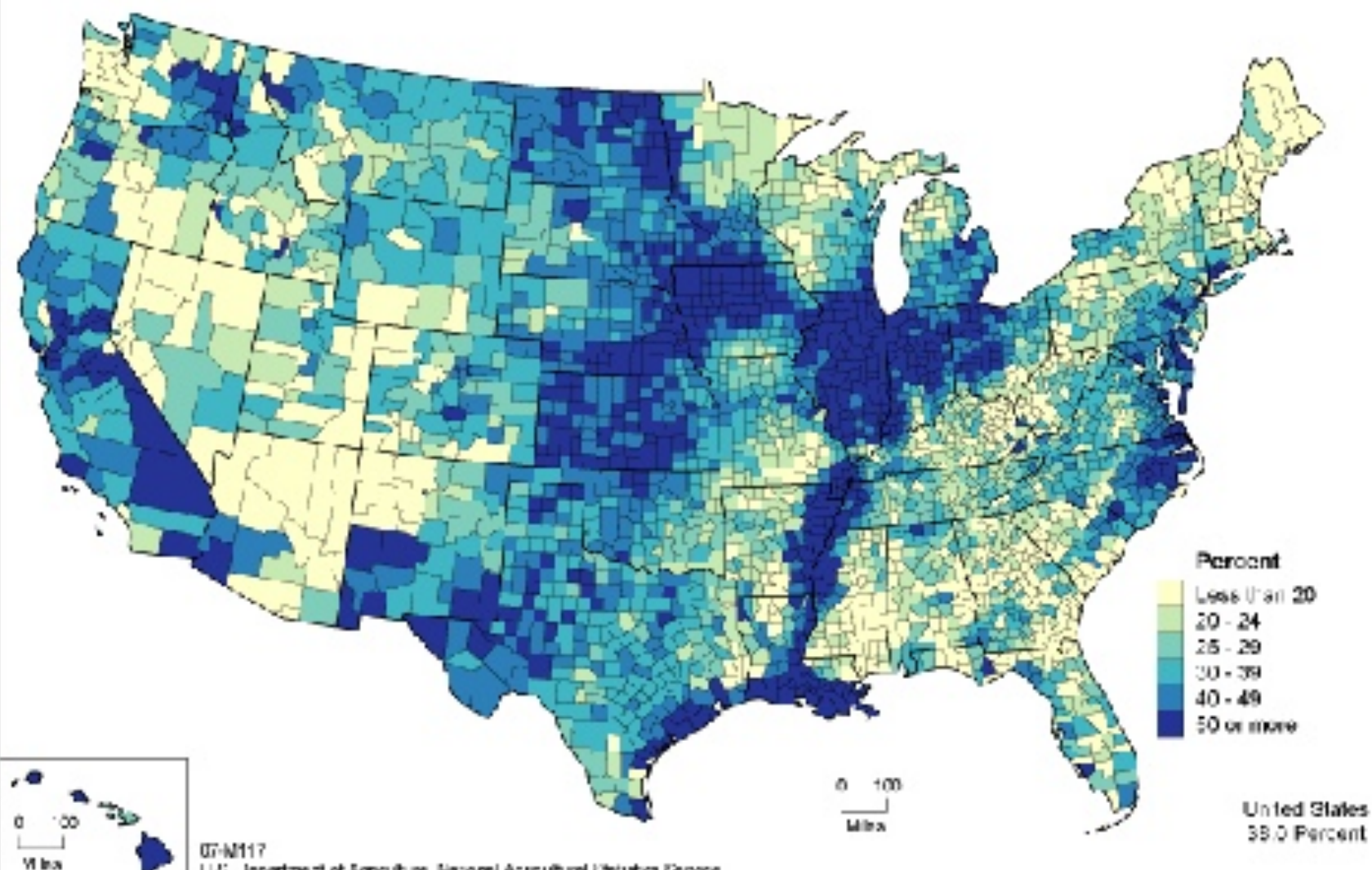
Why the losses this year?

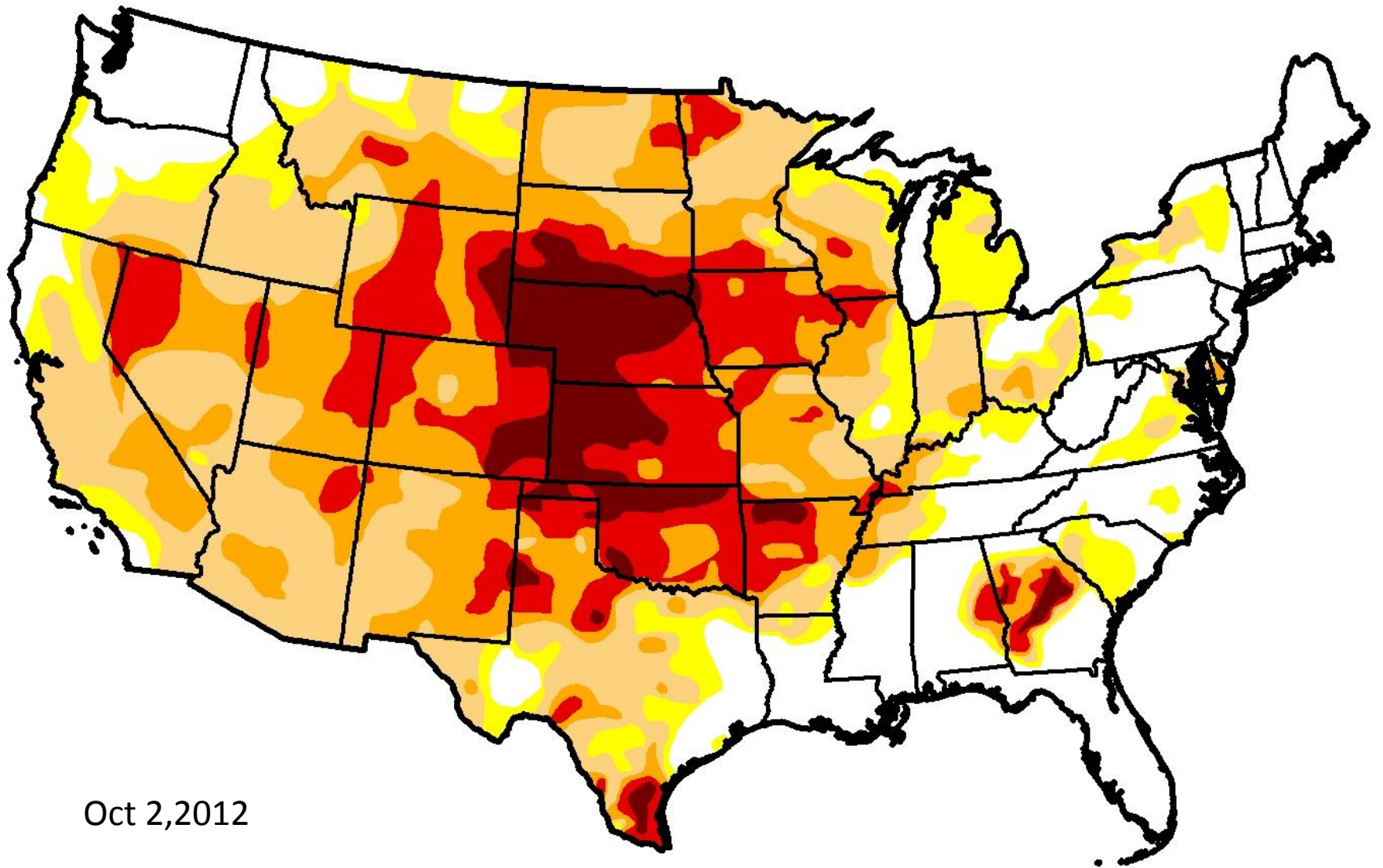


0 500  
1  
Miles



## Percent of Land in Farms Rented or Leased: 2007





Oct 2, 2012

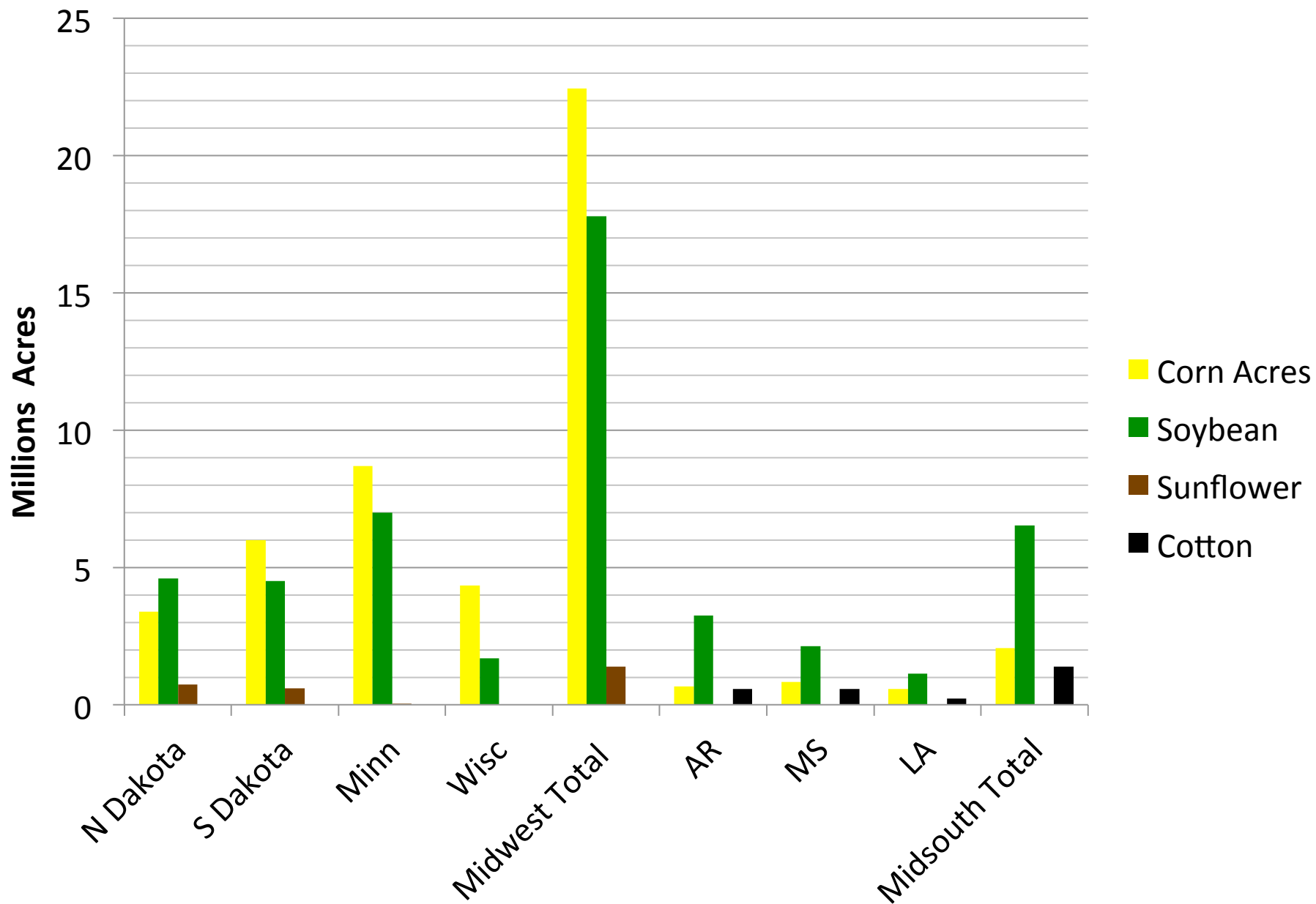
# What Happened Last Fall ?

State	# Colonies Dead	% Operation Dead
Wisconsin	3,200	25
S Dakota	8,300	30
N Dakota	10,000	50
	42,000	40
	14,000	47
	6,000	60
	5,000	50
Montana	2,000	30
Arizona	1,500	30
California	2,500	35
	4,100	65
	3,300	33
	4,600	42



## **NASS 2012 Acreage Report**

Corn	96.4 million highest acreage since 1937
Soybean	76.1 million record high acreage in NY, ND, SD* and Penn.
Cotton	12.6 million decrease of 14%



# Almond Pollination 2013

- January 31, 2013 It's too early to realize the full impact of the bee shortage this year.
- I know several beekeepers who have lost 50% or more of their colonies.
- Most Almond growers are looking for several hundred colonies
- More than 300 trucks short (125,000 – 155,000 colonies)
- There will be plenty of boxes this year QUALITY is the issue. A lot of 3-4 framers are going in as bee hives.
- Some growers are cutting back from 3 hives/acre down to 2 hives/acre to have some bees on everything.
- The train wreck will happen this summer if we do not have good weather in the Midwest.



**My operation started last spring with a high count of 3150 hives, today I have 992 alive, most in severely weakened condition ...**

**- Jeff Anderson, Minnesota**

