

# Overview of Commercial Beekeeping

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# Beekeeping



# Commercial Beekeeping

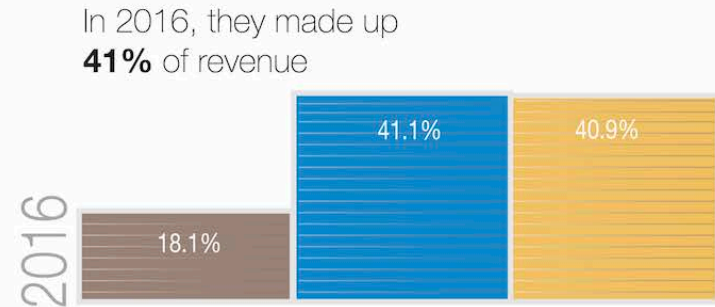
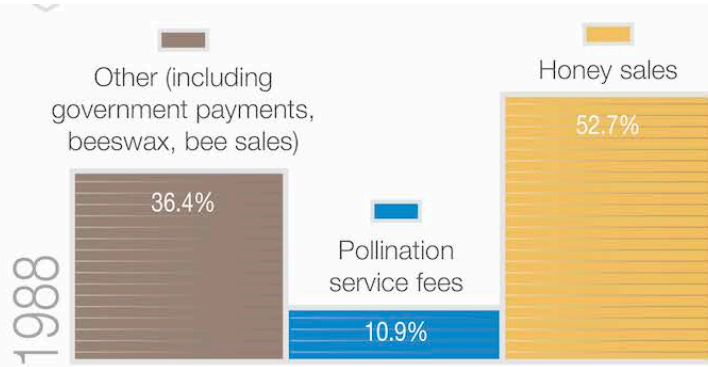


# 2002 Distribution of U.S. Beekeeping Operations

	<u>Farm Size (No. of Colonies)</u>				<b>Total</b>
	<b>&lt;25</b>	<b>25-299</b>	<b>300-1,999</b>	<b>&gt;2,000</b>	
# farms	10,759	2,631	1,104	273	14,767
% distribution	72.9	17.8	7.5	1.8	100
# colonies	51,938	222,671	841,667	1,117,915	2,234,191
% distribution	2.3	10	37.7	50	100
Avg Colonies/ Operation	5	85	762	4095	151

Source: Daberkow et al. (2009), 2002 Census of Agriculture

# Beekeeping Revenue

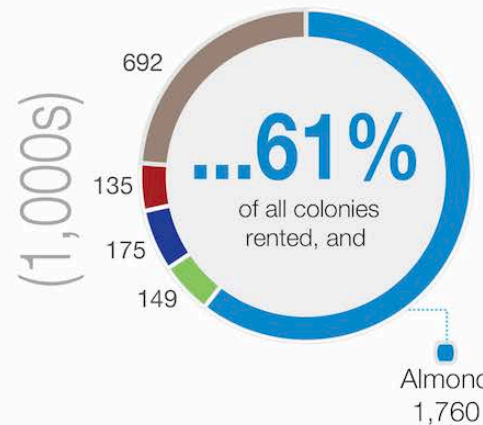


Most pollination service **revenue** comes from **almonds** which comprise. . .

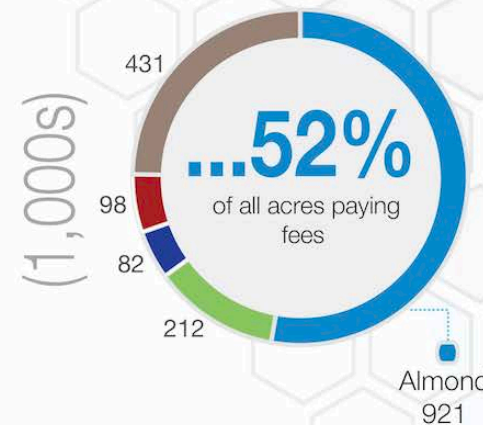
Pollination services fees paid



Colonies rented for pollination

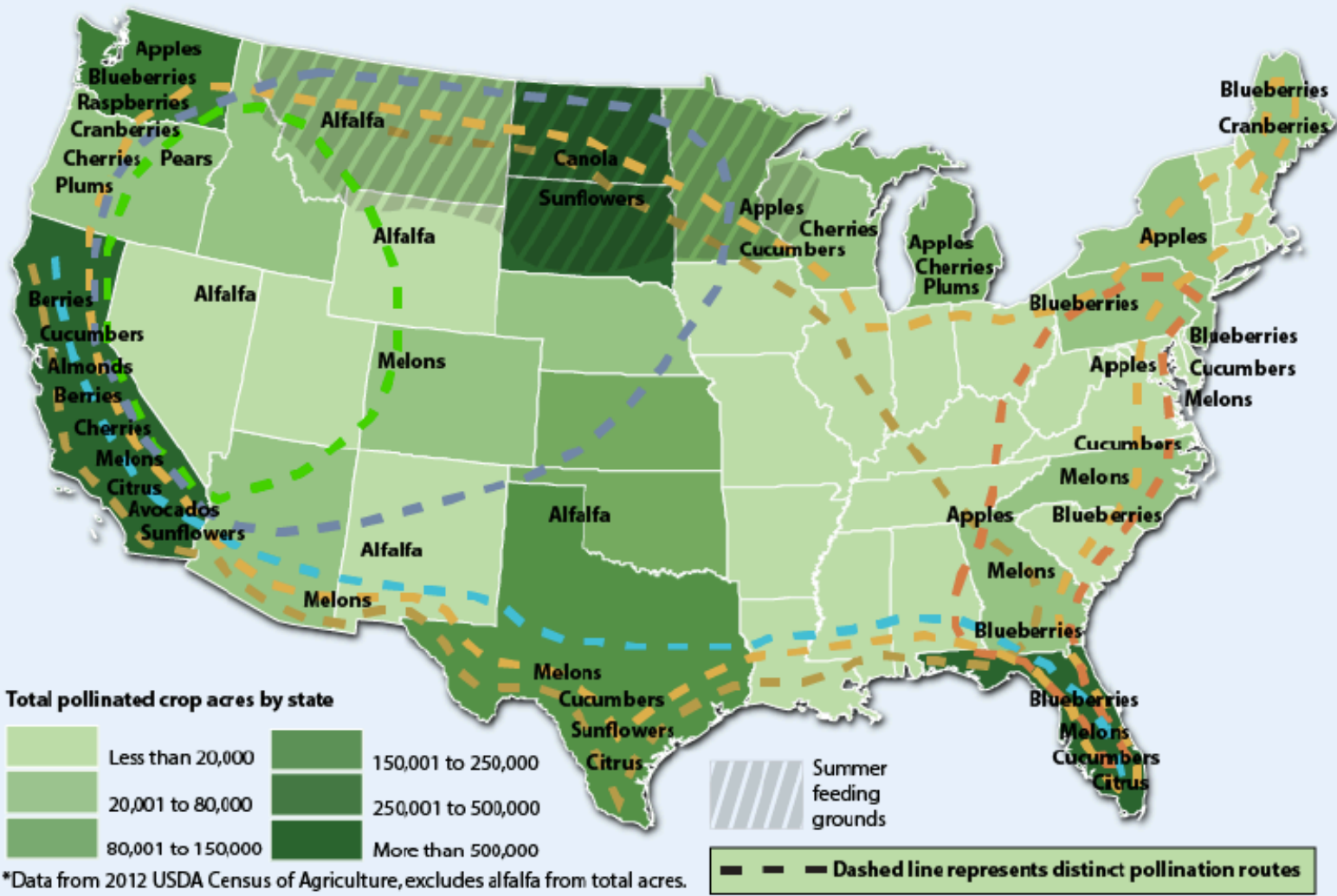


Acres paying fees



Source: Peyton M. Ferrier, Randal R. Rucker, Walter N. Thurman, and Michael Burgett. Economic Effects and Responses to Changes in Honey Bee Health, ERR-246, USDA ERS, March 2018.

# Pollinator Movements and Crops in the U.S.



# Almond Pollination Services

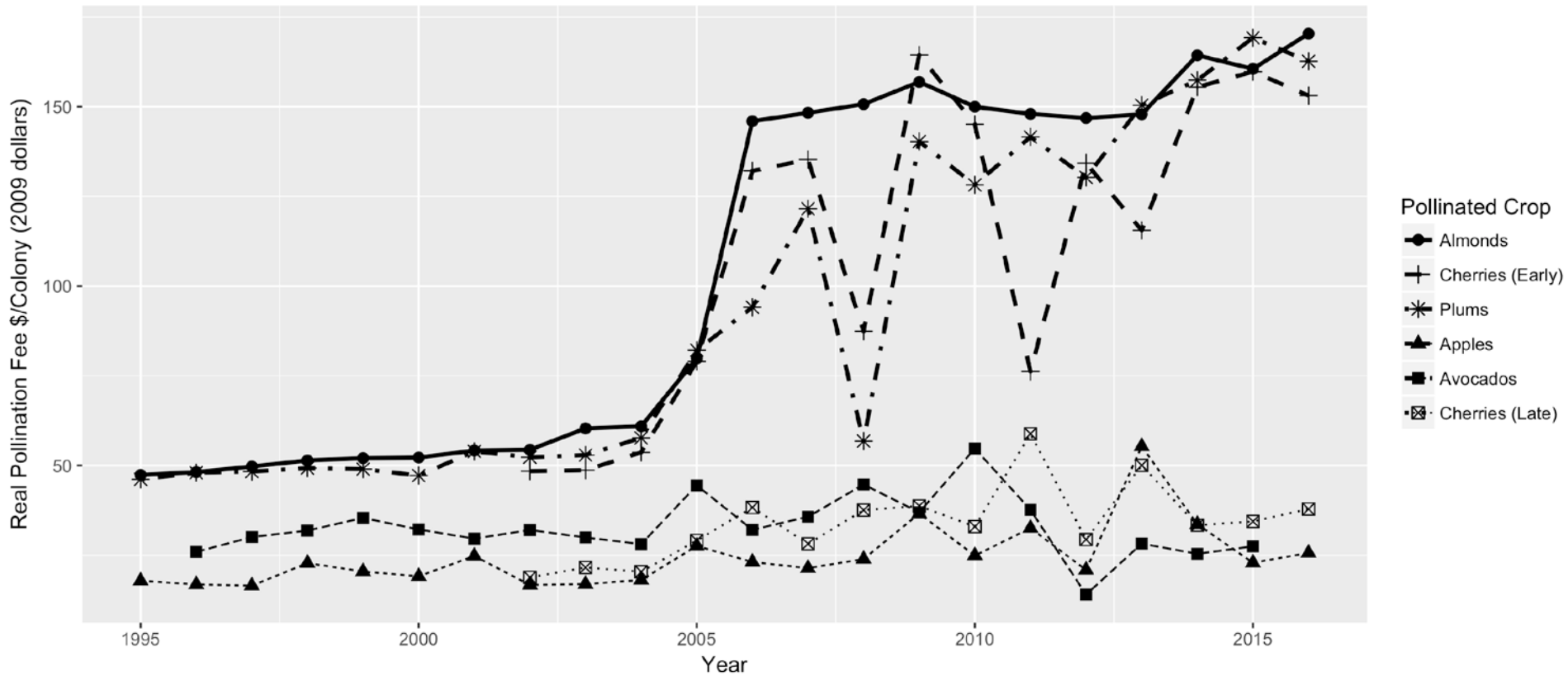
- California produces >80% of world almonds
  - Requires >68% of honey bee colonies in U.S.
    - 2017: ~ 1 million almond acres required  
~1.8 million colonies
- Largest market for pollination services in world
  - \$360 million in pollination contracts exchanged between beekeepers and almond growers

FEATURE

A photograph showing two beekeepers in full protective suits (hats, veils, and gloves) working with stacks of white beehives in an almond orchard. The background is a dense canopy of almond trees. The text 'The Super Bowl of Beekeeping' is overlaid in large white font at the bottom of the image.

# The Super Bowl of Beekeeping

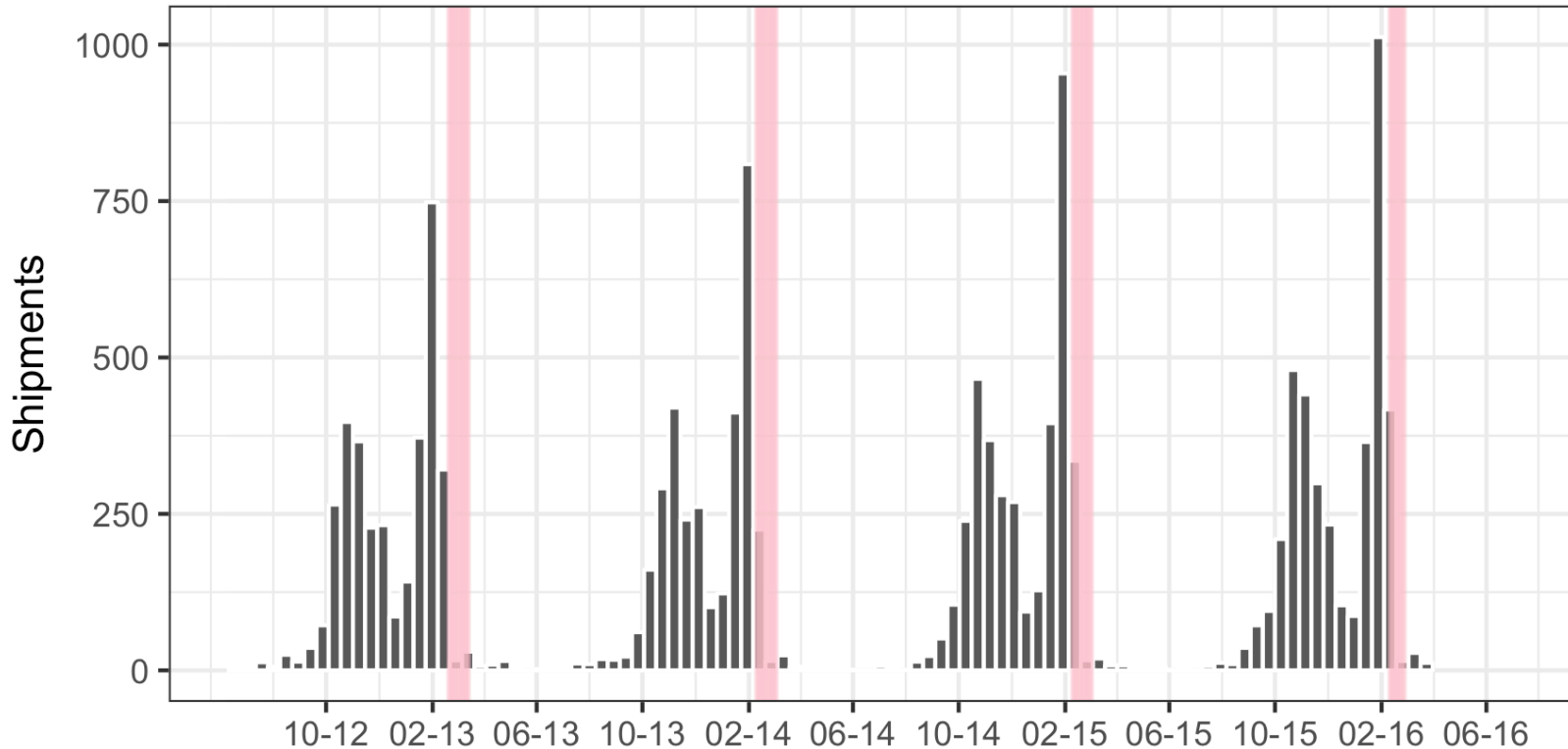
# Pollination Fees



Source: CSBA Pollination Fee Surveys 1995-2016



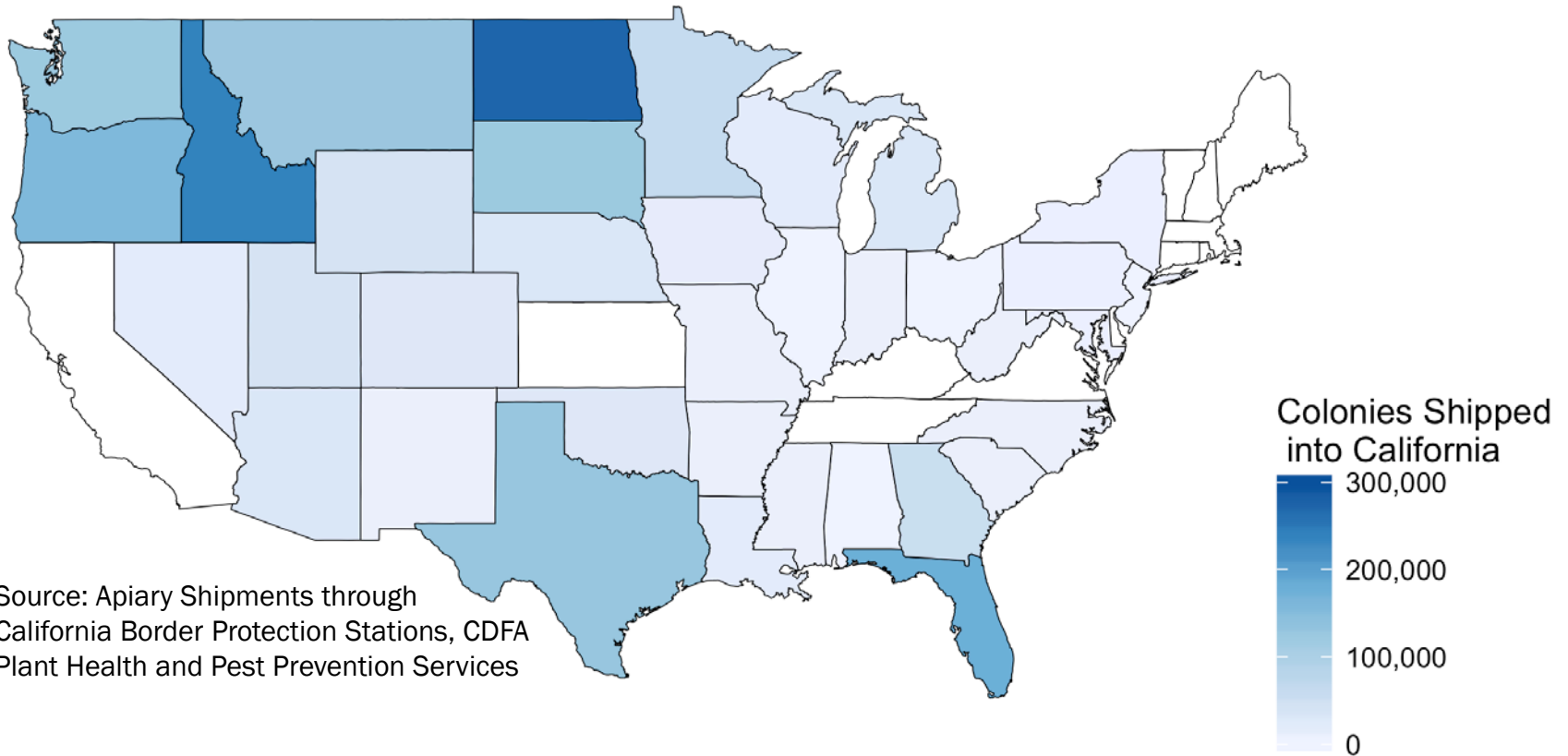
# Bee Shipments



Source: Apiary Shipments through California Border Protection Stations, CDFA Plant Health and Pest Prevention Services

- 2017 Almond Pollination: >4300 Truckloads
- Bee shipment cost: \$3-\$3.25/mile
  - Round trip: Clanton, AL→Fresno, CA: 4,410 miles
  - \$14,400 for 450 hives: \$32/hive

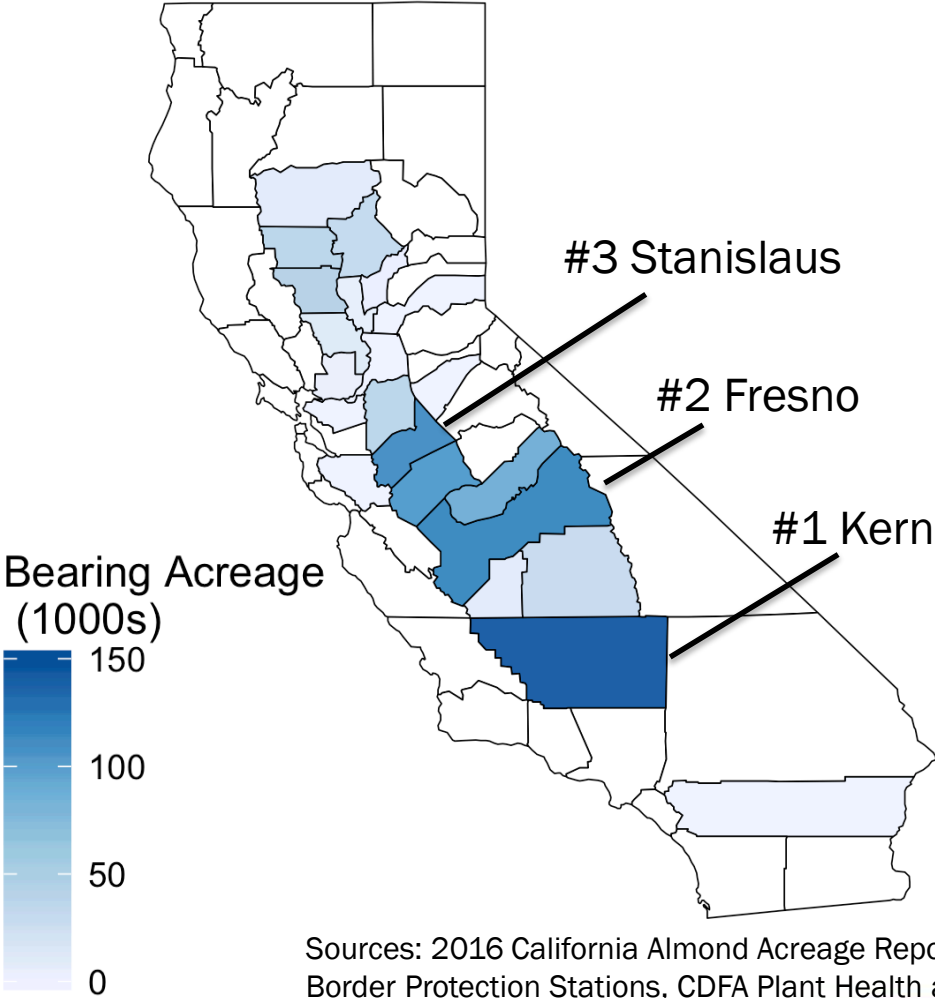
# 2017 Colony Shipments into California for Almond Pollination



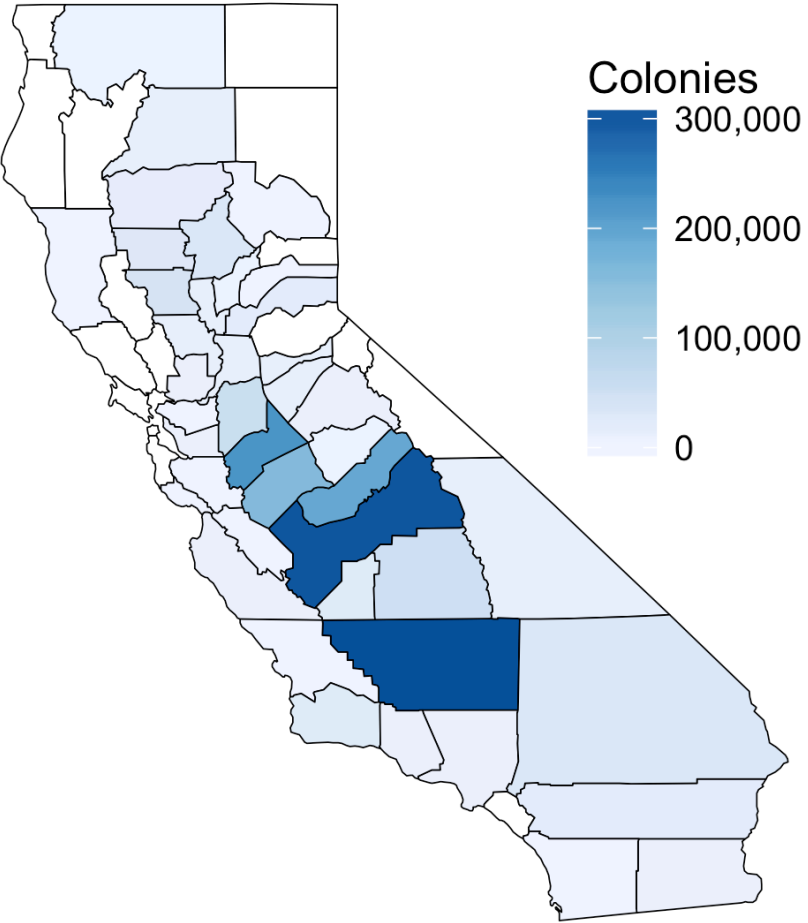
Number of colonies available for shipment relates closely to colony health and overwinter losses

# 2016 Almond Acreage and Colony Shipments

Bearing Almond Acreage  
by CA County



Colonies Shipped into  
CA County



Sources: 2016 California Almond Acreage Report; Apiary Shipments through California Border Protection Stations, CDFA Plant Health and Pest Prevention Services





# Almond Acreage and Pollination Fees

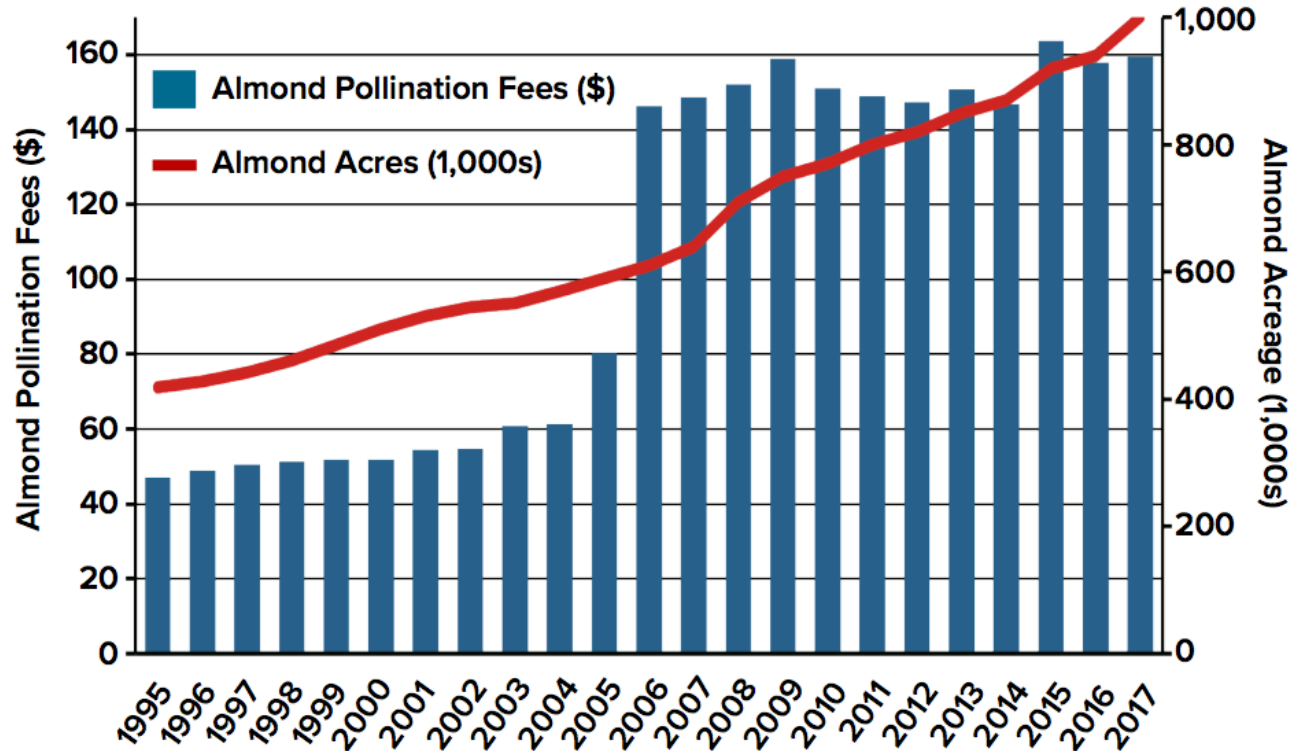


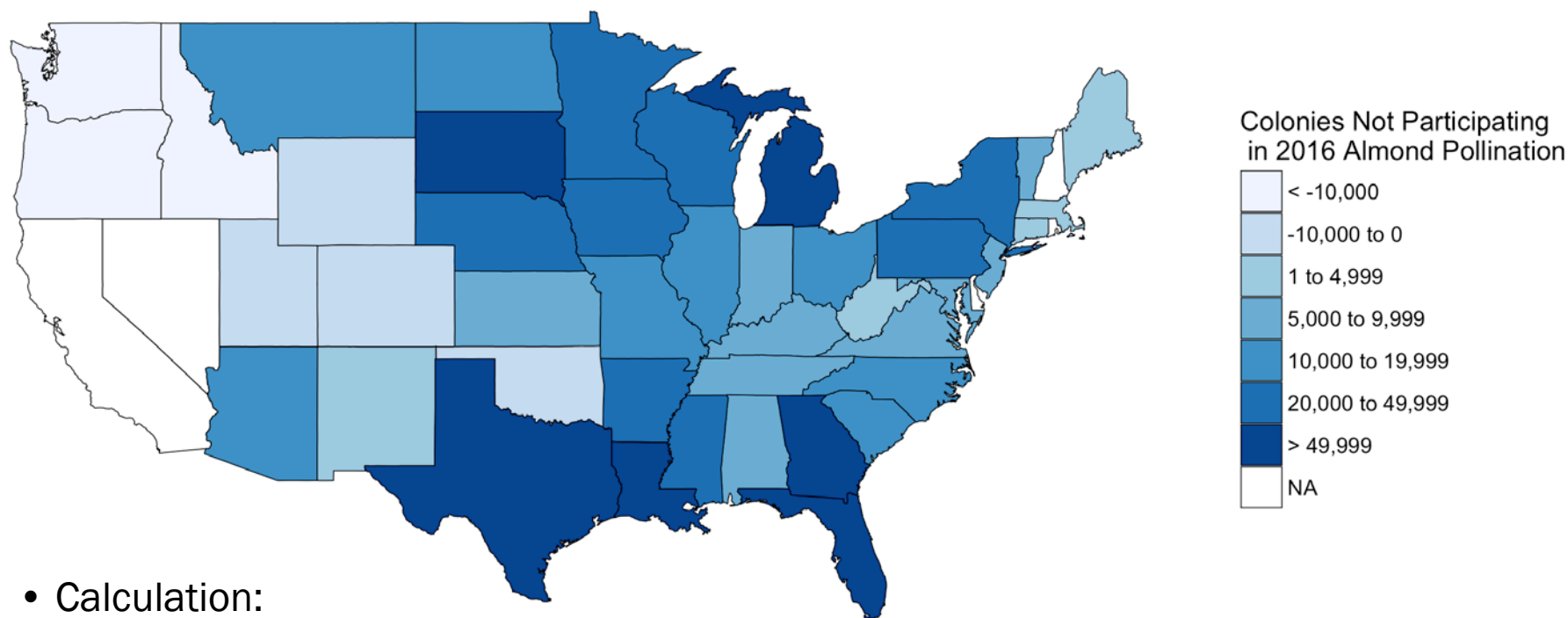
Figure 1. Almond Pollination Fees and Acreage, 1995–2017

Note: Pollination fees adjusted for inflation using GDP deflators with 2010=100

Source: California State Beekeepers Association (CSBA) pollination survey (various years) for fees and USDA National Agricultural Statistics Service (NASS) for acreage.

Lee et al. (2017)

# Estimated Colonies Available for 2016 Almond Pollination (But not utilized)



- Calculation:

- USDA max honey bee colony population Oct-December 2015
- Subtract 2015-2016 winter mortality rates
- Subtract 2016 colony shipments

Sources: Apiary Shipments through California Border Protection Stations, CDFA Plant Health and Pest Prevention Services; USDA Honey Bee Colonies Report May 2016; Bee Informed Partnership (BIP) 2015-2016 Winter Mortality Rate

# Honey Production

## Top 10 Honey Producing States

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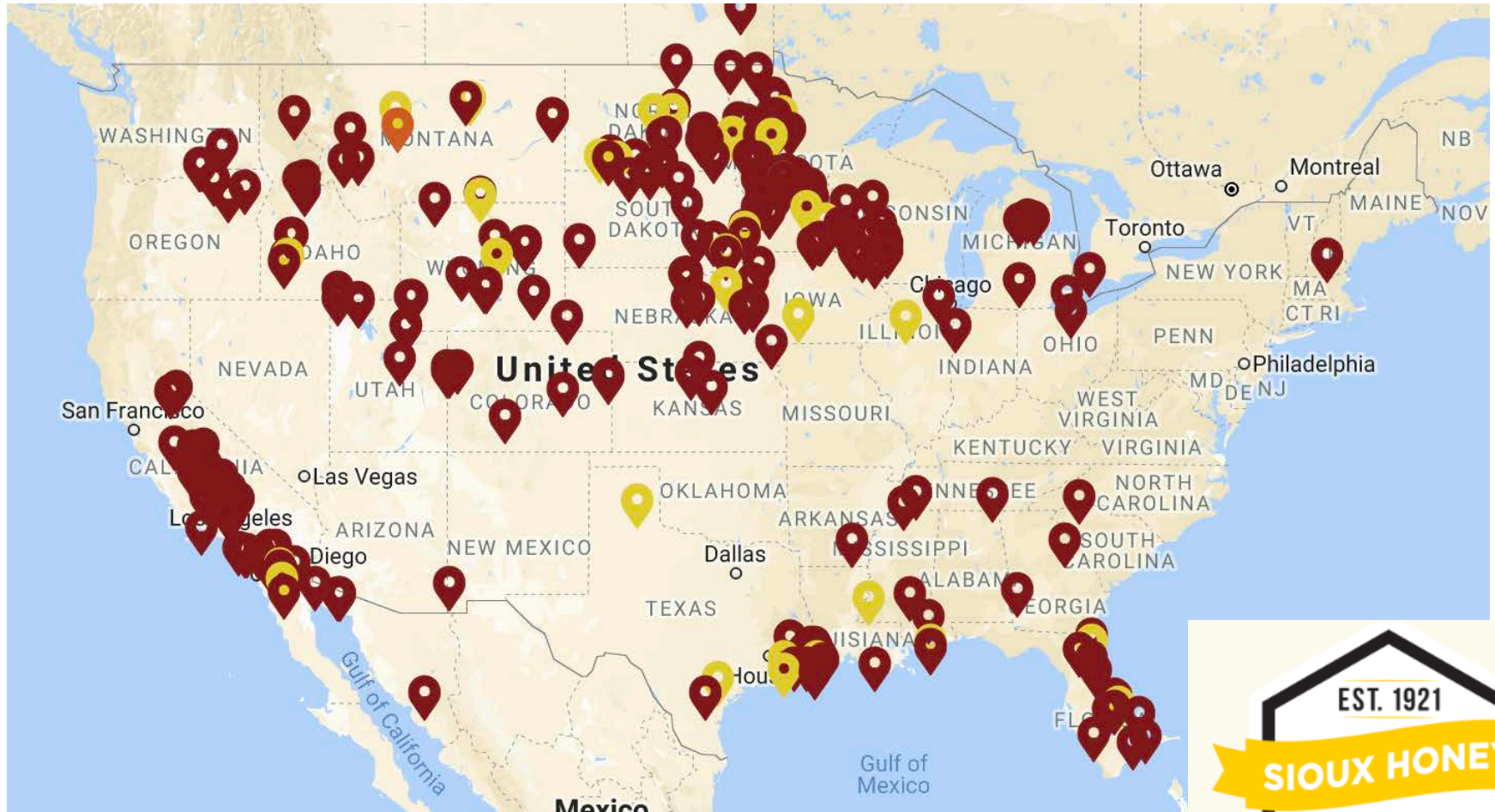
State	Colonies	Honey Production (1,000 lbs)	Lbs/Colony
North Dakota	455,000	33,670	74
South Dakota	255,000	14,535	57
California	335,000	13,735	41
Montana	145,000	10,440	72
Florida	205,000	8,815	43
Texas	120,000	7,920	66
Minnesota	126,000	7,812	62
Idaho	95,000	4,180	44
Michigan	87,000	3,915	45
Louisiana	43,000	3,483	81

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Source: USDA Honey Report, March 2018



# Honey Packers and Coops



# Honey Prices

Color class	2017 Price/lb
Water white, extra white, white	\$2.00
Extra light amber	\$2.03
Light amber, amber, dark amber	\$1.98
All other honey, area specialties	\$2.86
All honey	\$2.01

Source: USDA Honey Report, March 2018



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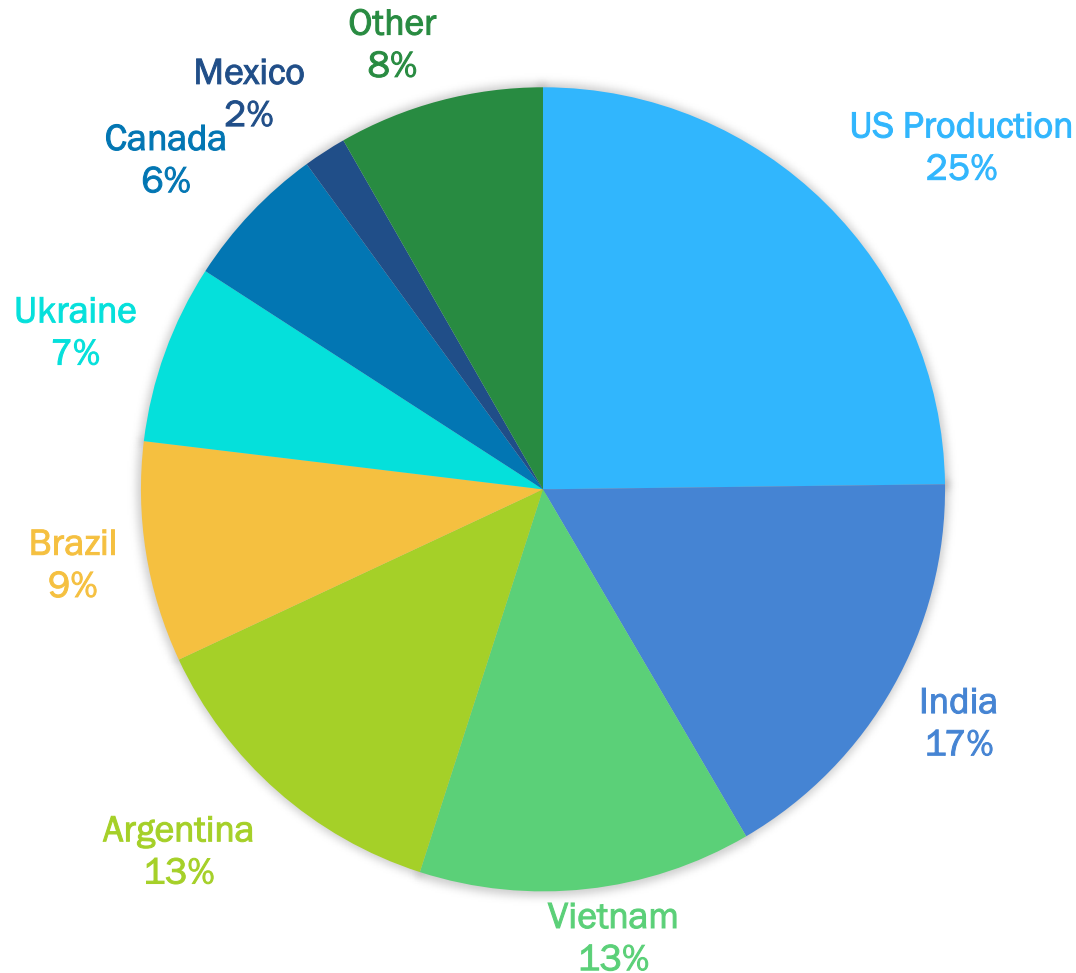
# HONEY SAUCE



INGREDIENTS: HIGH FRUCTOSE CORN SYRUP, CORN SYRUP, SUGAR, HONEY, FRUCTOSE, CONTAINS LESS THAN 2% OF: CARAMEL COLOR, MOLASSES, WATER, CITRIC ACID, NATURAL AND ARTIFICIAL FLAVOR, MALIC ACID.  
Packaged exclusively for use by KFC and its franchisees.  
KFC, Louisville, KY 40232 ©2010

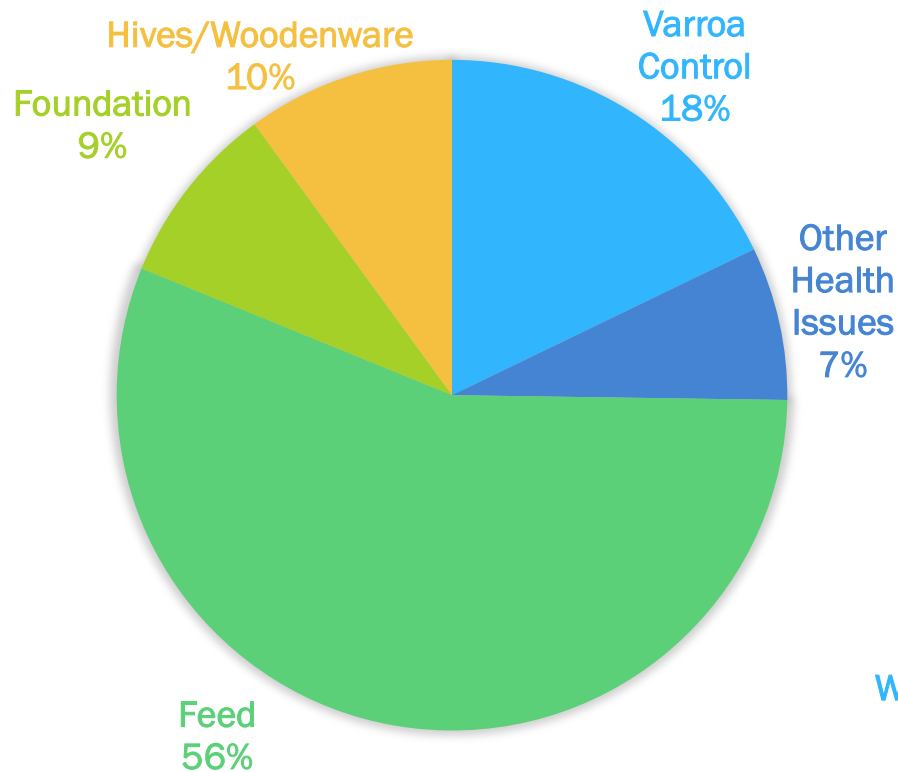
7% REAL HONEY

# 2017 U.S. Honey Consumption

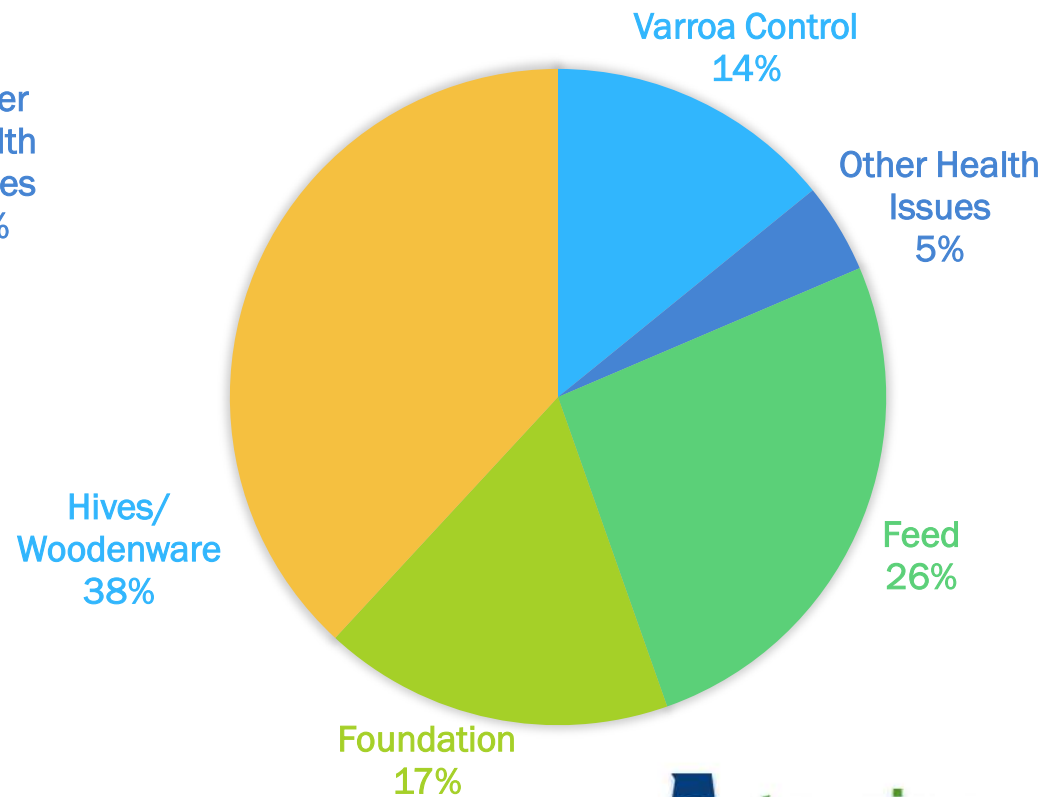


# Beekeeping Expenditures

Operations >5 Colonies



Operations <5 Colonies



Source: USDA NASS Honey Report (March 2017)

# What do you feed bees?

High Fructose Corn Syrup or Sugar:  
10,000 hive operation ~ 1 million lbs



# Also...Pollen Substitute



- Pollen sub:  
Soy, yeast, sugar, some pollen




# Beekeeping is capital intensive

2005 UFL Study of Investment Costs:  
\$284/hive







# But...Beekeepers typically don't own the land they put bees on

- Daberkow et al. 2009: Commercial bee operations owned 100-150 acres
  - In honey production: 40 hives/apiary
  - At most 1 apiary per square mile (640 acres)
  - 10,000 hives~300 apiaries with 40 hives each
- Pay “rent” to other land owners in the form of honey
  - But will buy other bee operations for the “rights” to landowner’s relationship

# Beekeeping Labor

- First or second most expensive cost for commercial beekeepers
  - 2<sup>nd</sup> to shipment costs
  - Roughly 1 worker per 700 hives
  - 10,000 hive operation: 15-20 workers
    - Seasonal
- Commercial beekeepers often use H2A labor

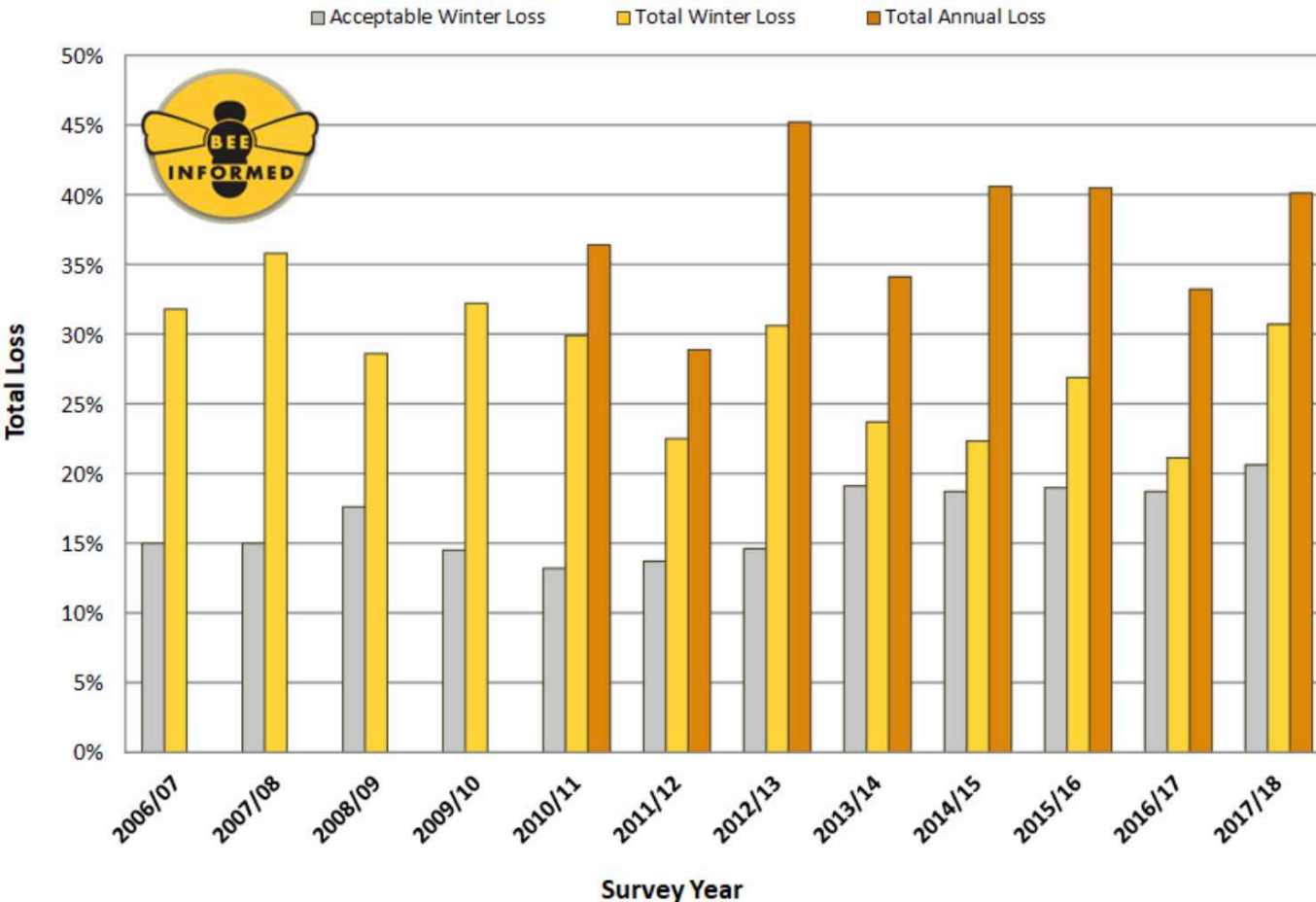
# Beekeeping is risky

- 40% of colonies died during 2017/2018
- 10,000 colony beekeeper
  - 4,000 colonies x \$200/colony = \$800,000 loss



# Honey bee health

Total US managed honey bee colonies loss estimates



It's not an easy fix!

Many concerns:

- Varroa mites
- Pesticides
- Nutrition
- Other pests and diseases
- Queen failure

# USDA Programs Available for Beekeepers

- Emergency Assistance for Livestock, Honey Bees and Farm-Raised Fish (ELAP)
  - Recently lifted cap for expenditures
- Apiculture Rainfall Index Insurance
  - Just like Pasture, Rangeland and Forage insurance, just substitute colonies for acres
- Honey Loan Program

# Questions?

Contact:

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# Sample Pollination Contracts

- Project Apis m.
  - <https://www.projectapism.org/uploads/1/0/5/7/105706229/pollination-contract-template.pdf>
- Cornell Extension
  - <https://pollinator.cals.cornell.edu/sites/pollinator.cals.cornell.edu/files/shared/documents/Pollination%20Services%20Contract%20Example.pdf>
- Penn State Extension
  - <https://extension.psu.edu/hives-for-hire-are-you-getting-your-moneys-worth>
- University of Florida Extension
  - <http://edis.ifas.ufl.edu/aa169>