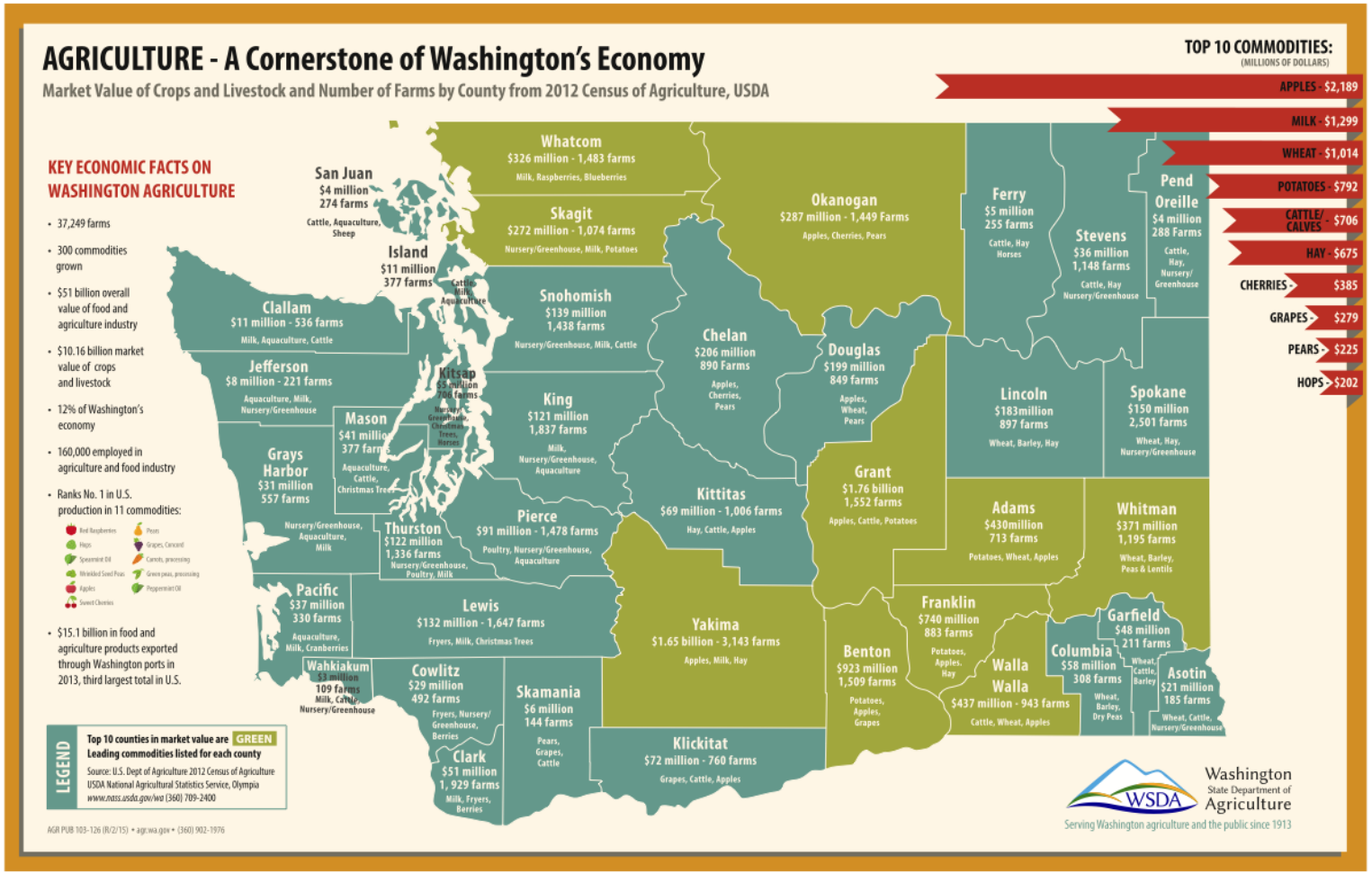
Putting Drift in Perspective

- Prepared on behalf of the Washington Friends of Farms and Forests
- Steve Savage, Ph.D.

Washington Agriculture Is A Large Industry

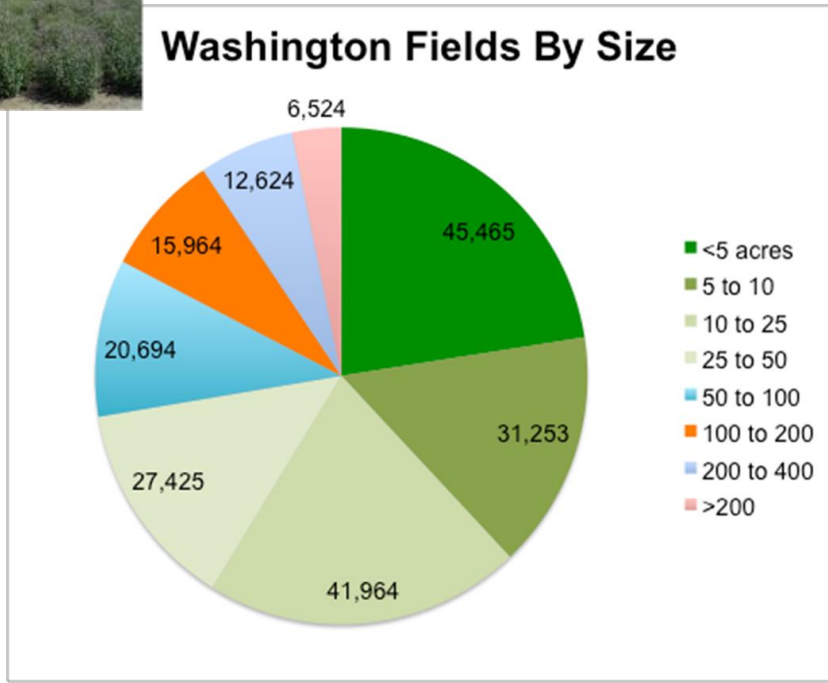


37,249 farms, 4.3 million acres, in every county

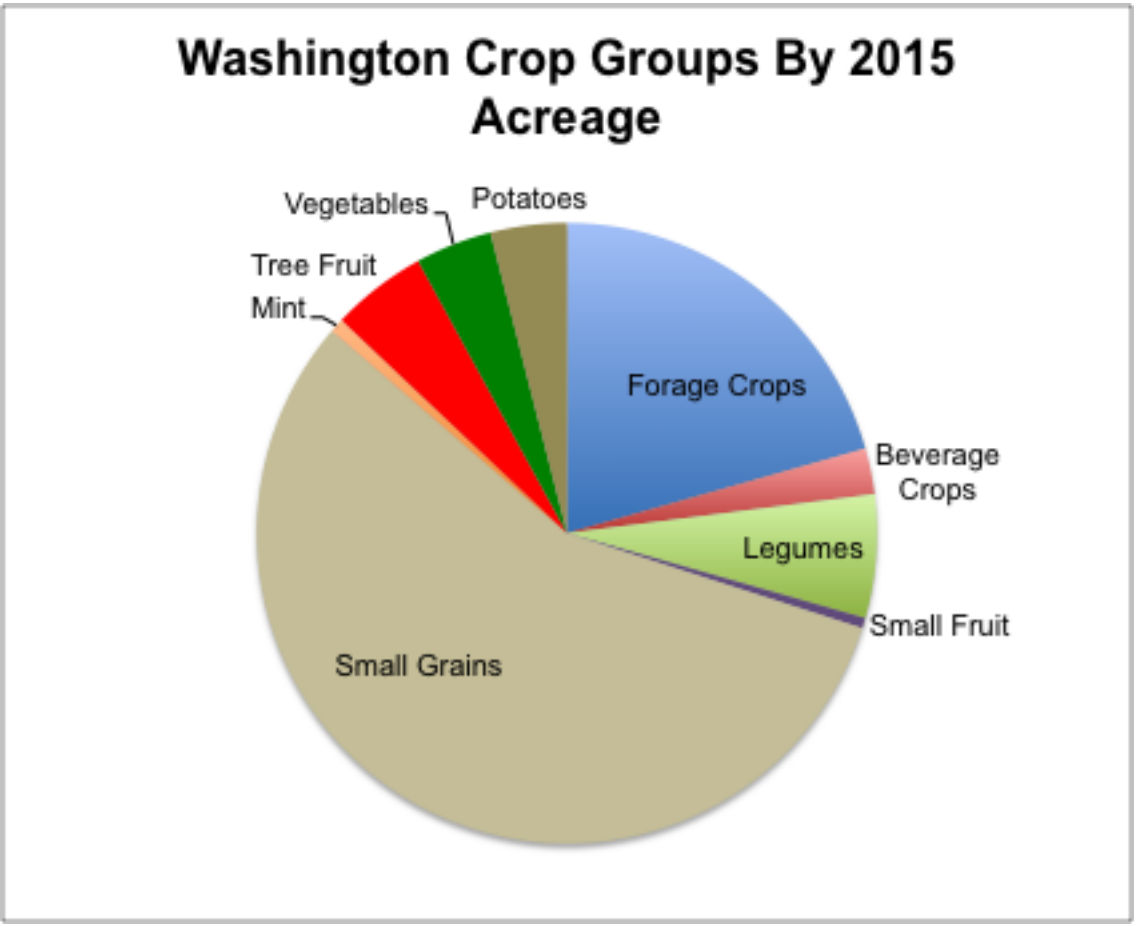
Washington Agriculture Is Diverse

300 commodities grown (fruits, vegetables, grains, pulses, flavorings, forages…)

Fields vary from small (76,000 <10 acres) to large (35,000 >100 acres)



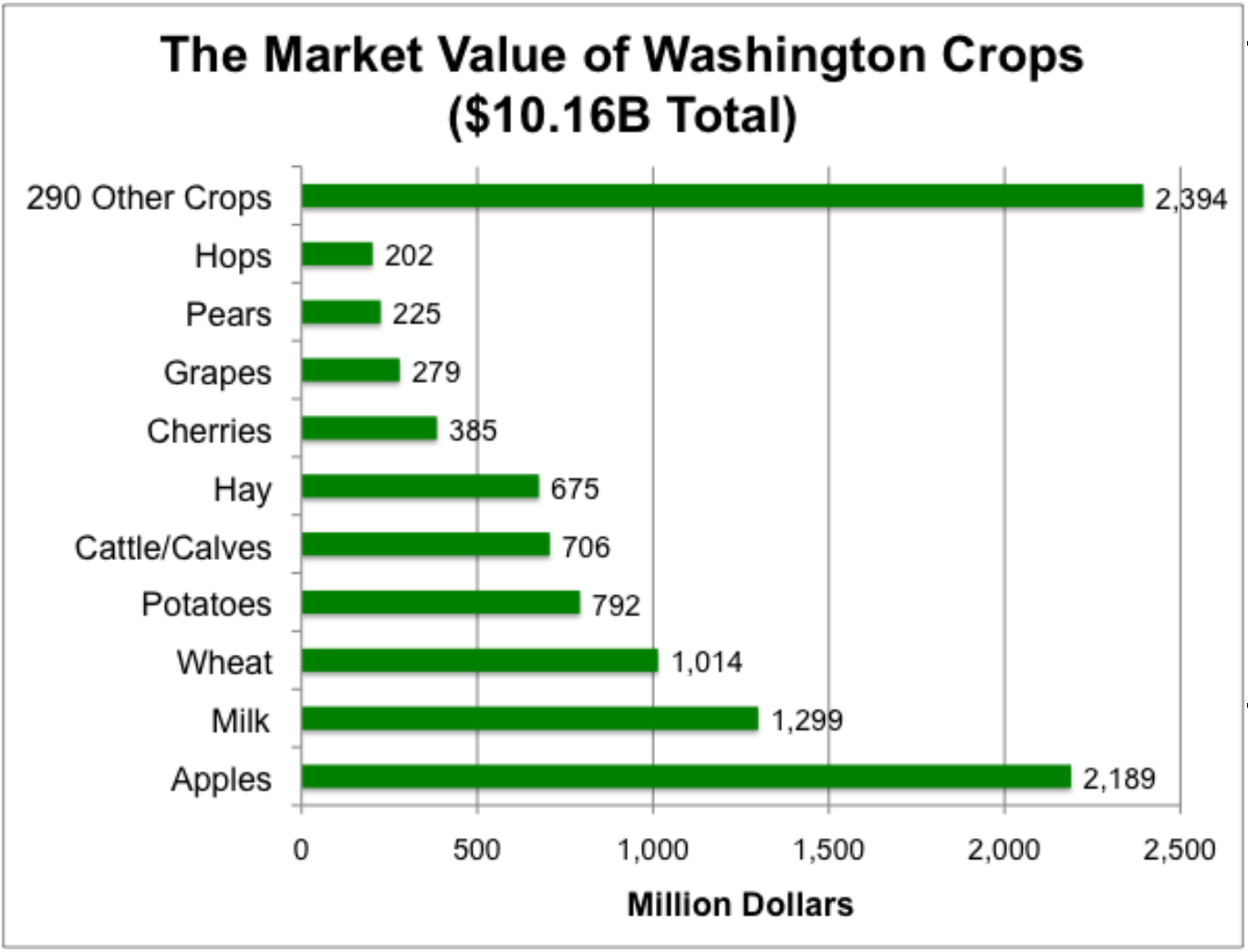
Washington Ag By Crop



Washington is #1 for

- Apples
- Sweet cherries
- Pears
- Hops
- Mint
- Red raspberries
- Blueberries
- Concord grapes
- Carrots for processing

Washington State Agriculture Is Economically Important



- $10.2B market value, $51B overall value, $15B exports (#3 in US)
- 12% of WA economy, 160,000 jobs
- #1 in US for 11 commodities

Source: WA Dept. Agriculture

But Washington Crops Need to be Protected from Pest Damage

Insects

Fungal diseases

But Washington Crops Need to be Protected from Pest Damage

Nematodes

Mites

Pests include competitive, invasive, and/or toxic weeds

Pests must be controlled to maintain access to export markets

Maggots of the Cherry fruit fly. "If uncontrolled, the pest can ruin almost all the fruit on a tree." California and other export markets have a zero tolerance for this pest in packed cherries.

Pests can degrade the quality of popular beverages

New invasive pests represent a significant part of the challenge

The spotted wing drosophila is an exotic pest introduced to Washington in 2009

Spotted Wing Drosophila

The serrated ovipositor of the fruit fly allows it to lay eggs in ripening, but undamaged fruit

This cherry could have looked fine when picked, only to have maggots emerge in the store or the consumer's refrigerator

Since 2011 the potato psyllid has been spreading a bacterial disease that causes “Zebra Stripe” symptoms. Infection can render an entire field unsuitable for processing

Zebra Strip Symptoms

Potato Psyllid

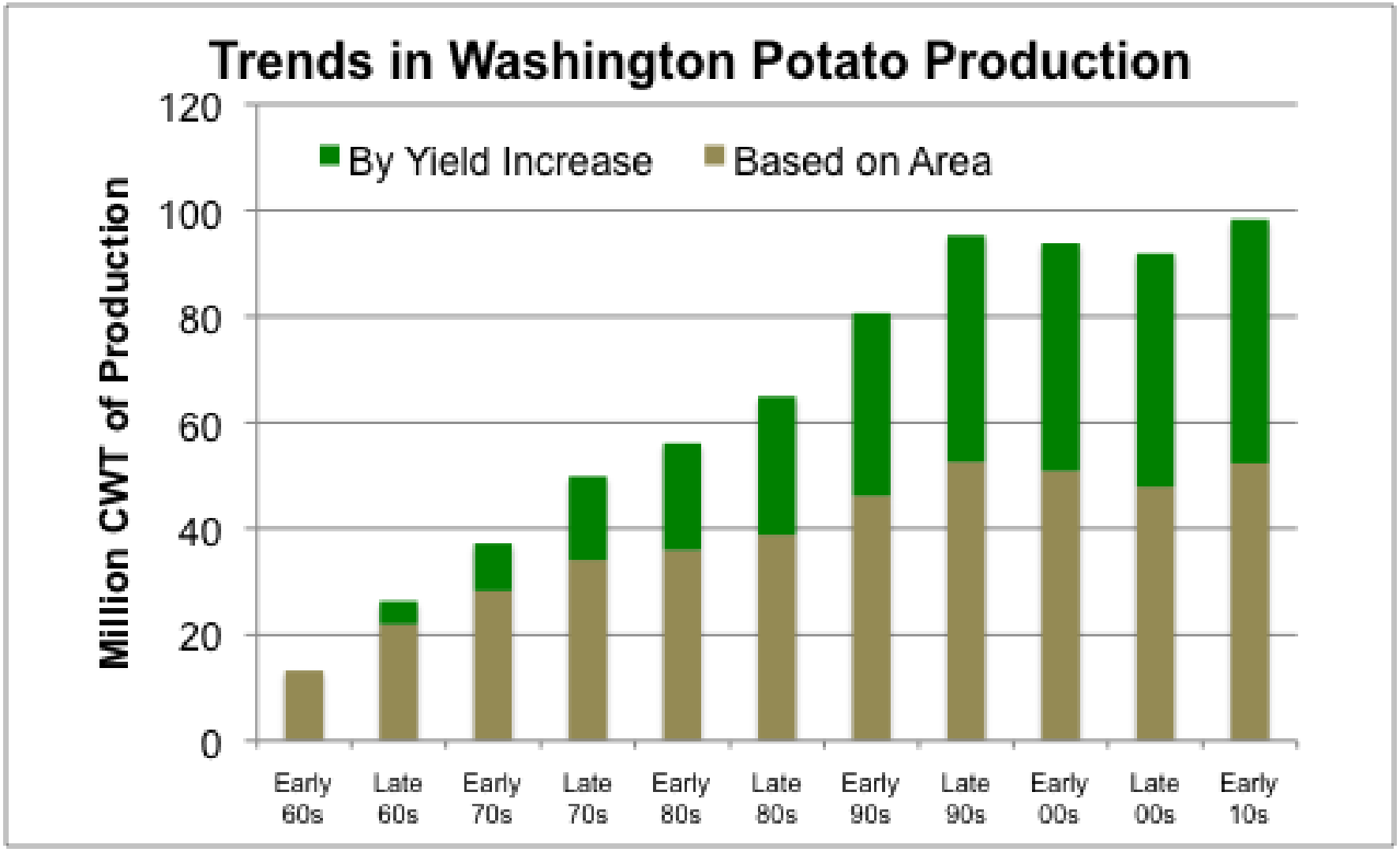
Washington pests include those that at one time caused widespread famine

1. Symptoms Potato Late Blight infection

2. Unsprayed plot in foreground, fungicide treated plot in background

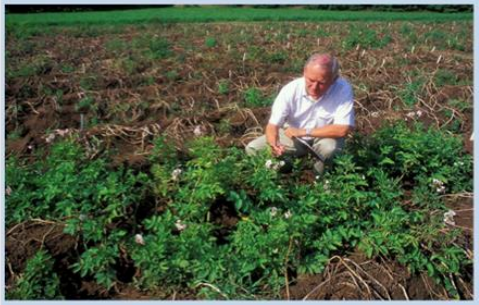
3. “Great Hunger” memorial in Dublin commemorating 1MM deaths and 1MM emigrations in the late 1800s following a Late Blight epidemic

Pest control is also critical in order to continue feeding a growing population mainly from the same land-base

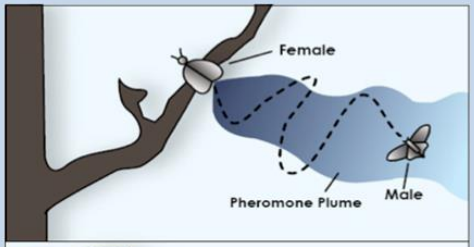


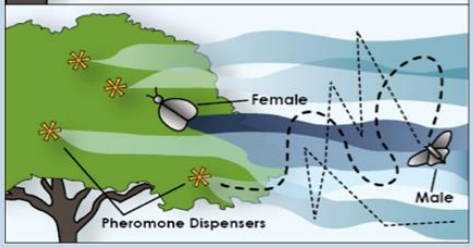
So how do farmers control pests? by using programs that integrate multiple methods and approaches (IPM)

Six Ways Farmers Control Pests



Employ the plant's own genetic defenses





Disrupt the pest's life cycle

Avoid or exclude the pest

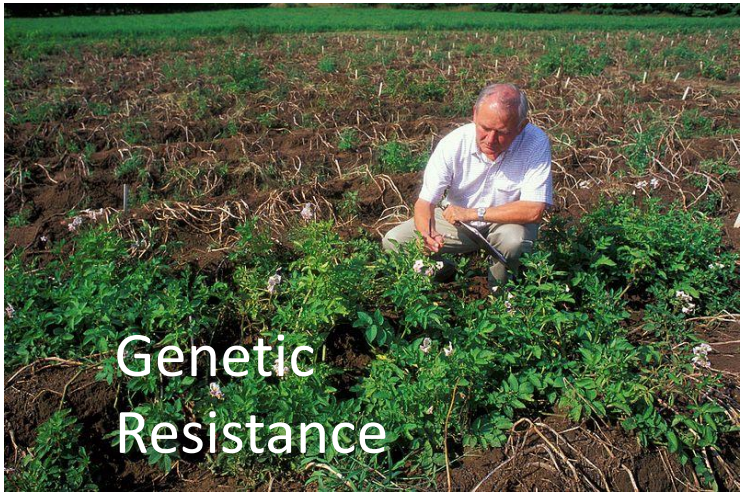
Modify the climate

Favor and/or deploy beneficial organisms

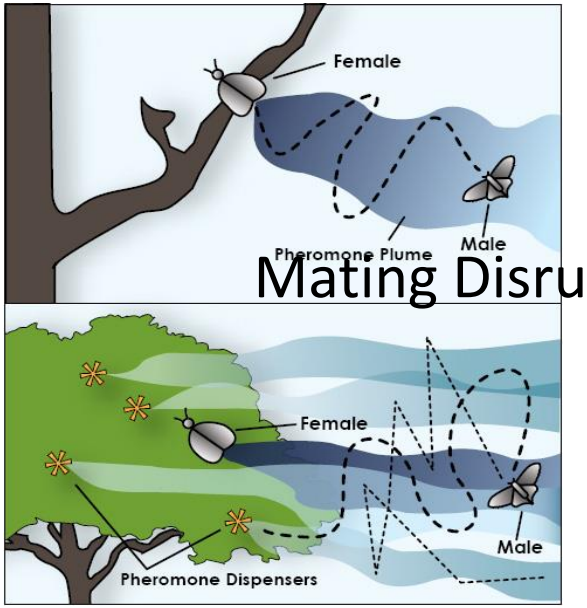
Use targeted applications of crop protection chemicals and/or biocontrol agents

Element of an IPM System

Complimentary Role of Crop Protection Agents



Prevent the development of pest resistance to the plant defense genes



Mating Disruption

Keeping overall populations low enough so that this strategy can work

Element of an IPM System

Complimentary Role of Crop Protection Agents

Use of selective sprays that to preserve beneficial populations

Preventing newly introduced populations from getting out of control

Element of an IPM System

Crop Protection Products

Complimentary Role of Crop Protection Agents

Manage the pests that are not inhibited by the climatic changes

Preventing the selection of pests resistant to key CP tools

Sources of Information For This Report

- Washington State Department of Agriculture
  - Geo-referenced inventory of agricultural land use
  - Database of periodic pesticide use surveys by crop (USDA-NASS, grower groups, meeting polls…)
- USDA-NASS – crop acreage and yield history
- Interviews
  - WSU Extension
  - WSU Faculty
  - Commodity organizations
  - Growers
- Other resources
  - Sprayers101.com
  - MSDS databases and product labels

WSDA

WASHINGTON STATE UNIVERSITY EXTENSION

Sprayers101

CDMS | Applied® Intelligence

To put the number of reported spray incidents in perspective requires estimates of the scale of crop protection application in the state

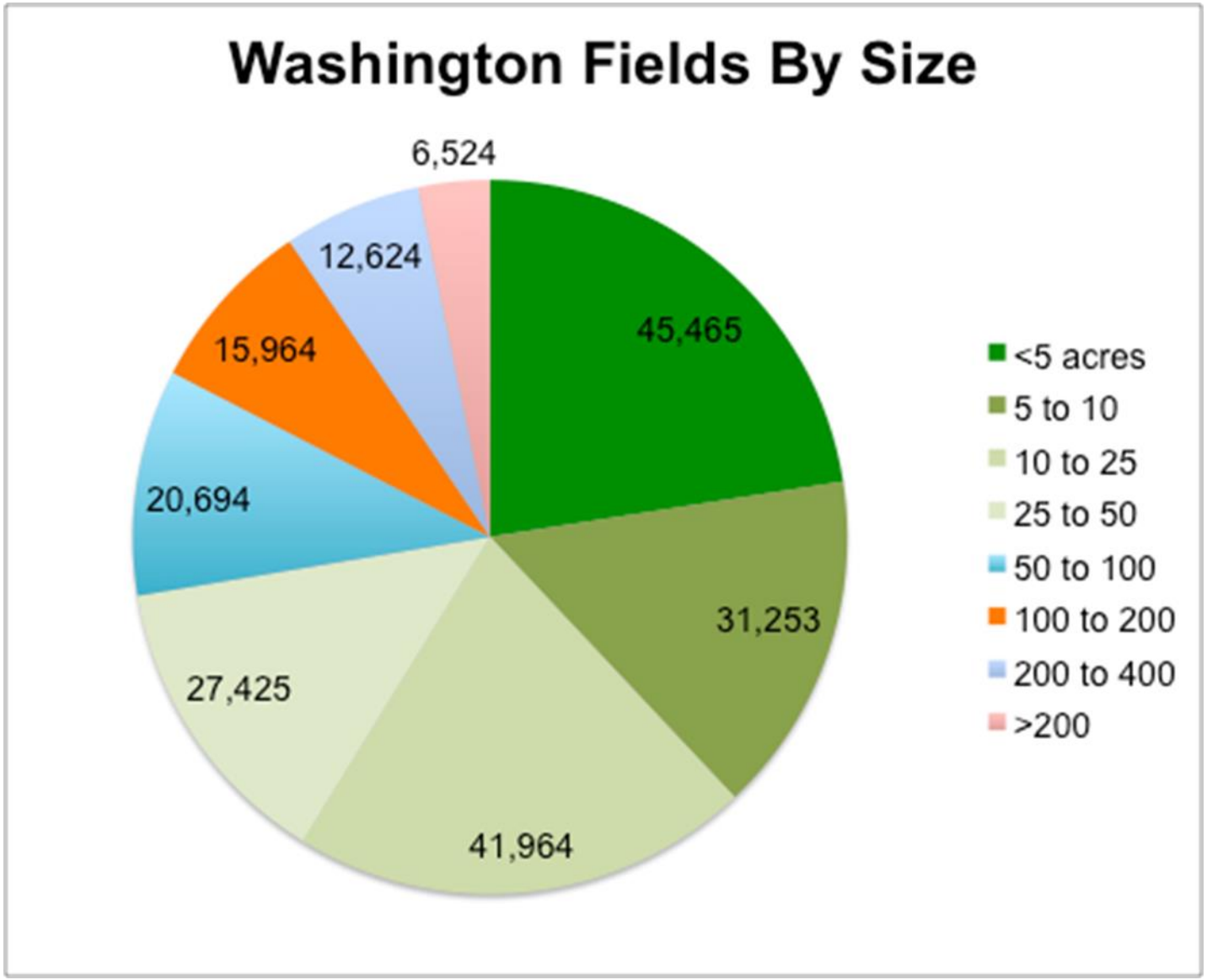
- The WA ag database covers ~4.2MM acres composed of 96,846 field units

To put the number of reported spray incidents in perspective requires estimates of the scale of crop protection application in the state

- The WA ag database covers ~4.2MM acres composed of 96,846 field units

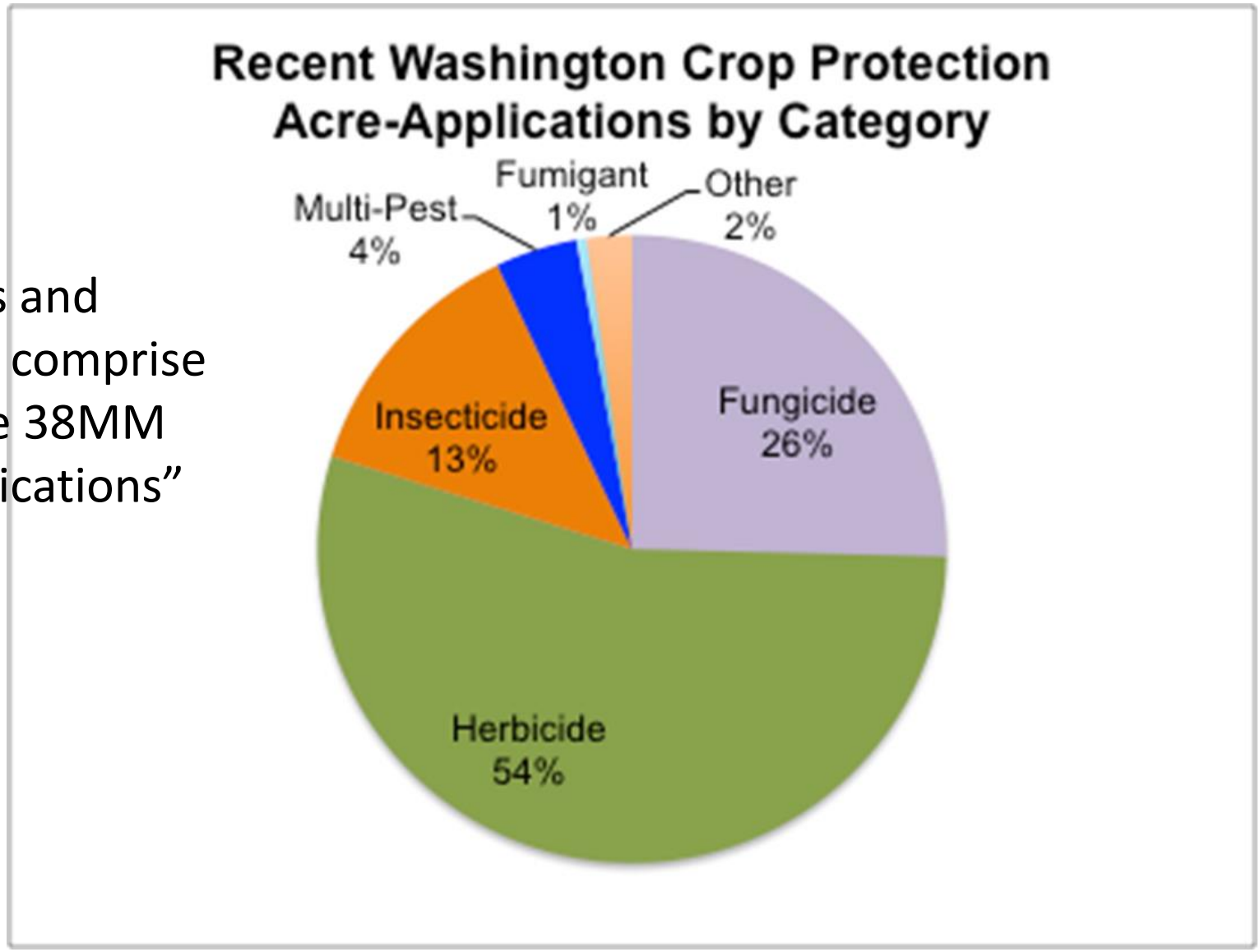
- Use surveys suggest that 38MM “acre-applications” of CP products are made each year. It is useful to “unpack” that 38MM number by crop and crop protection chemical categories

The 96,845 field units include everything from very large to very small areas

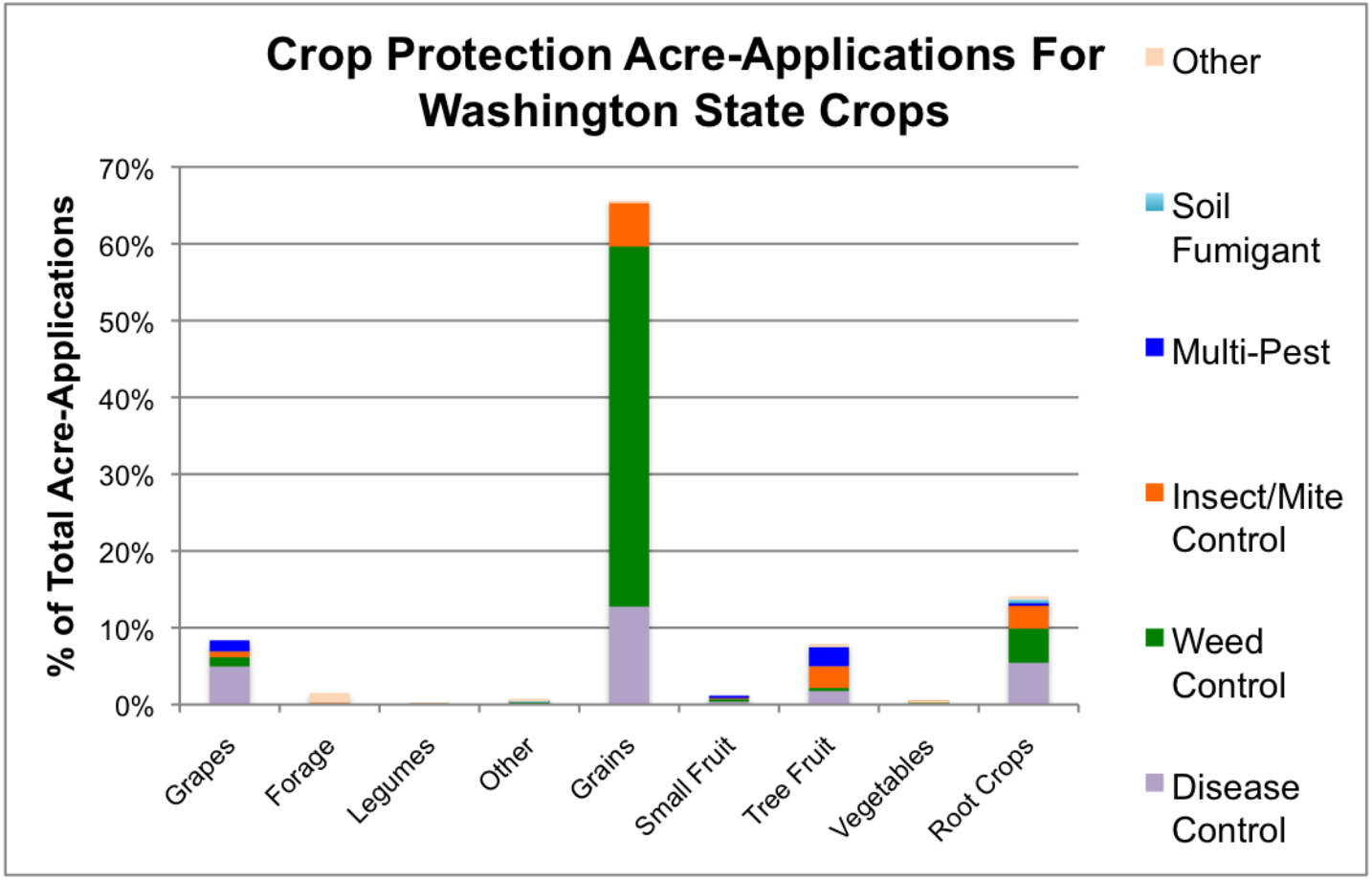


What are the crop protection materials being applied?

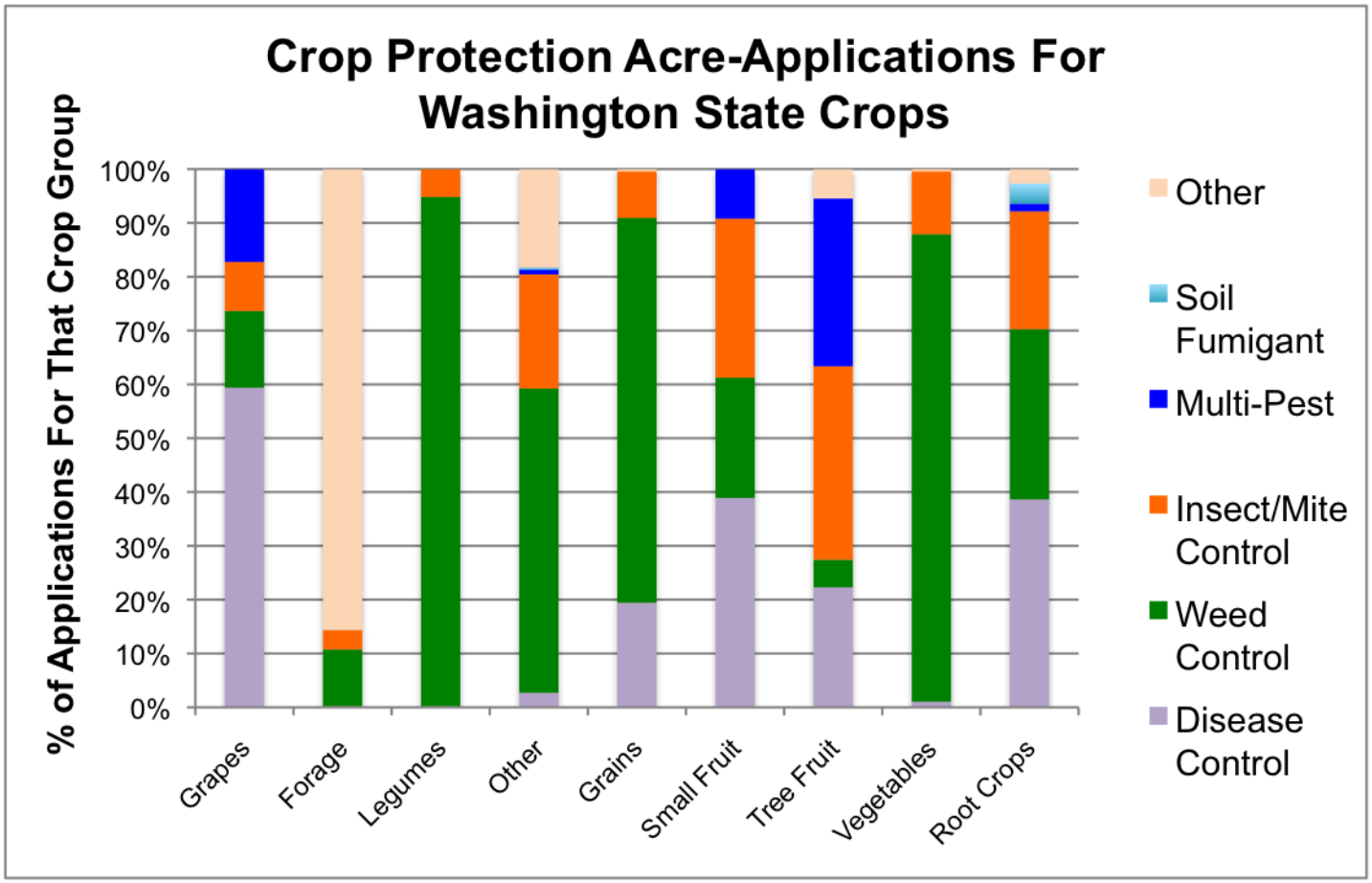
Herbicides and fungicides comprise 80% of the 38MM "acre applications"



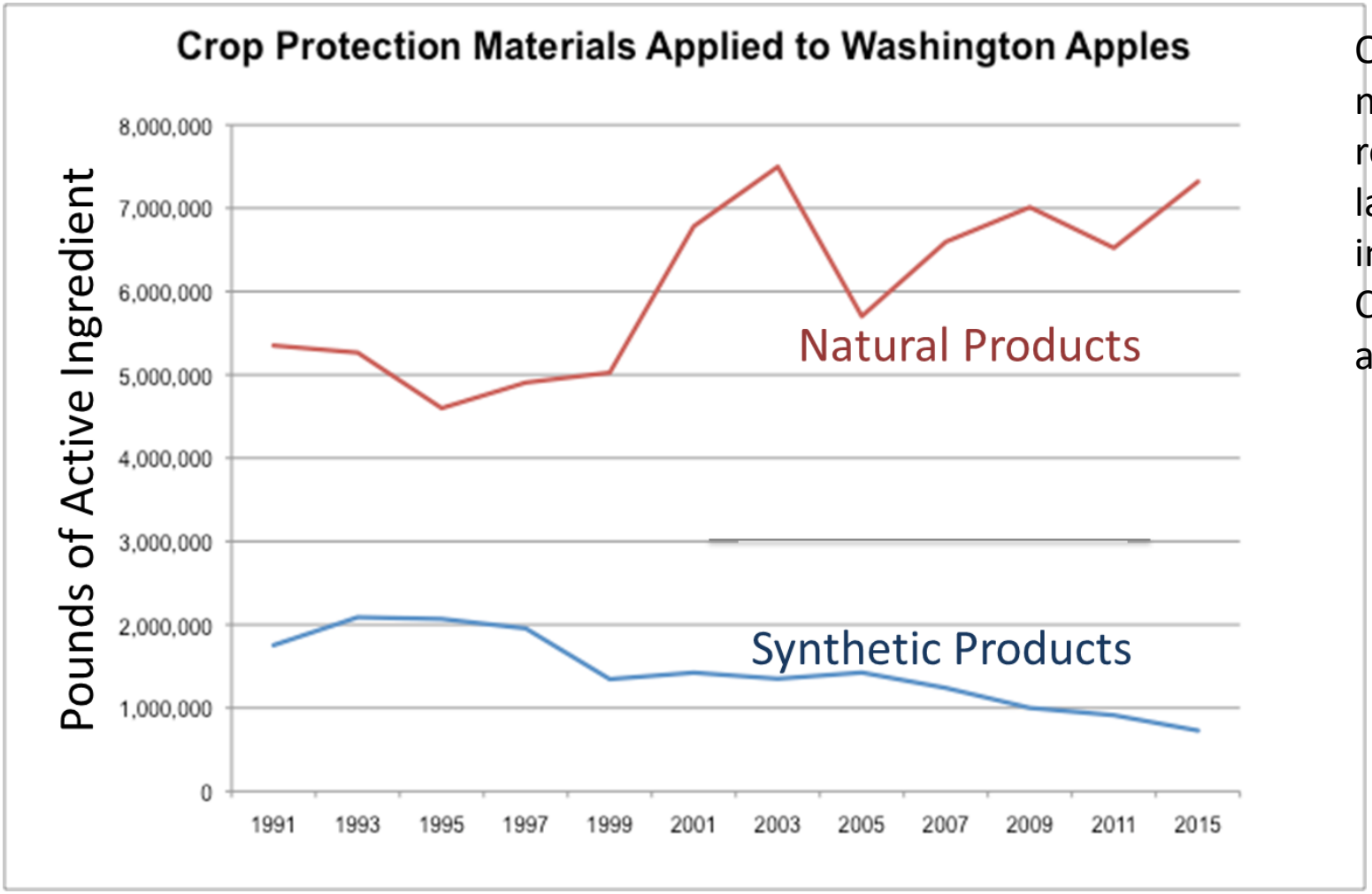
Because grain crop are grown on so many acres, they account for more total acre-applications



The mix of crop protection needs varies by crop group

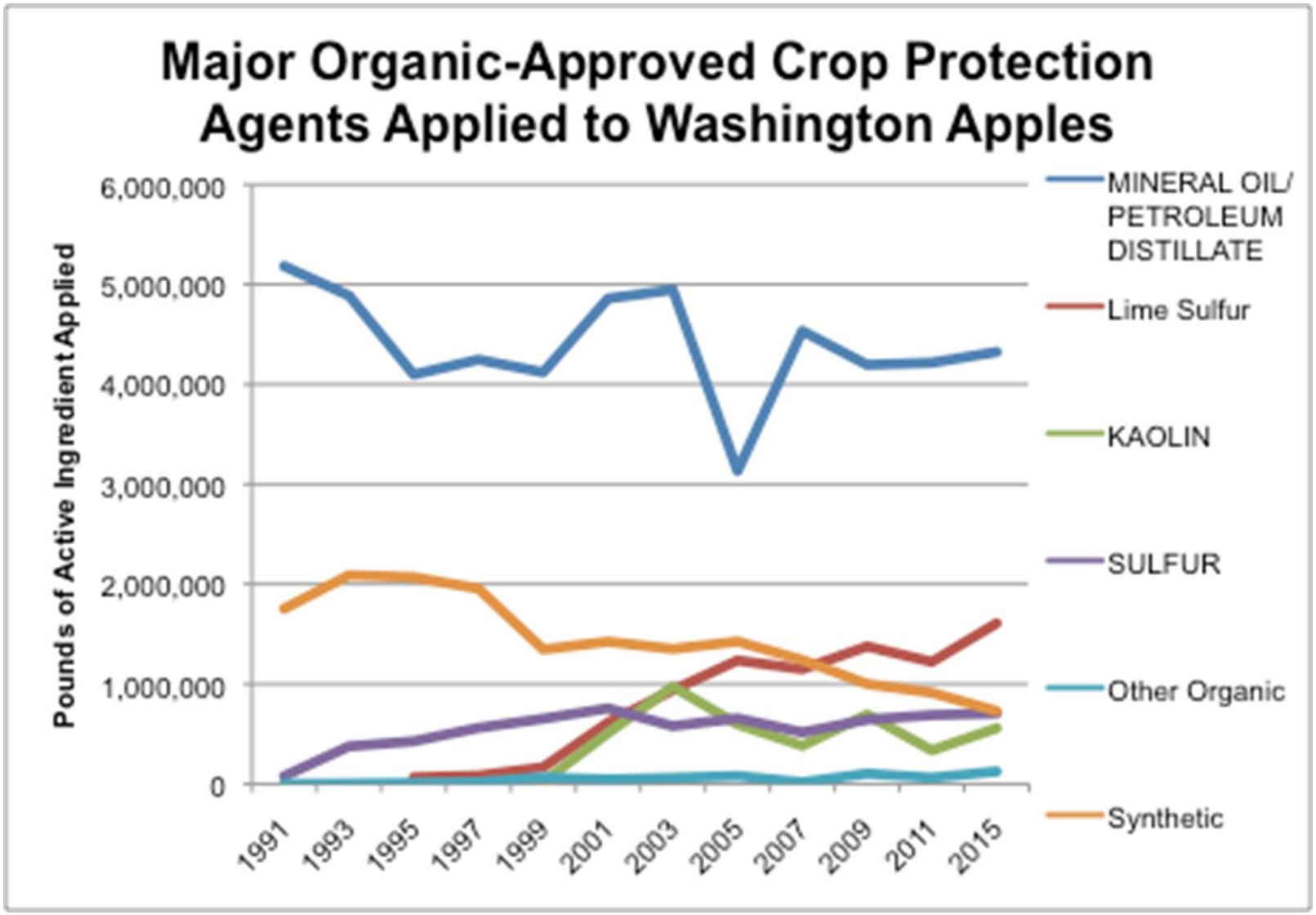


Both organic and conventional growers need and use crop protection products



One a weight basis, natural products represent the largest and increasing share of CP materials being applied

The increase in natural product use has mainly been with lime sulfur, elemental sulfur and kaolin clay. These options are used by both organic and conventional growers



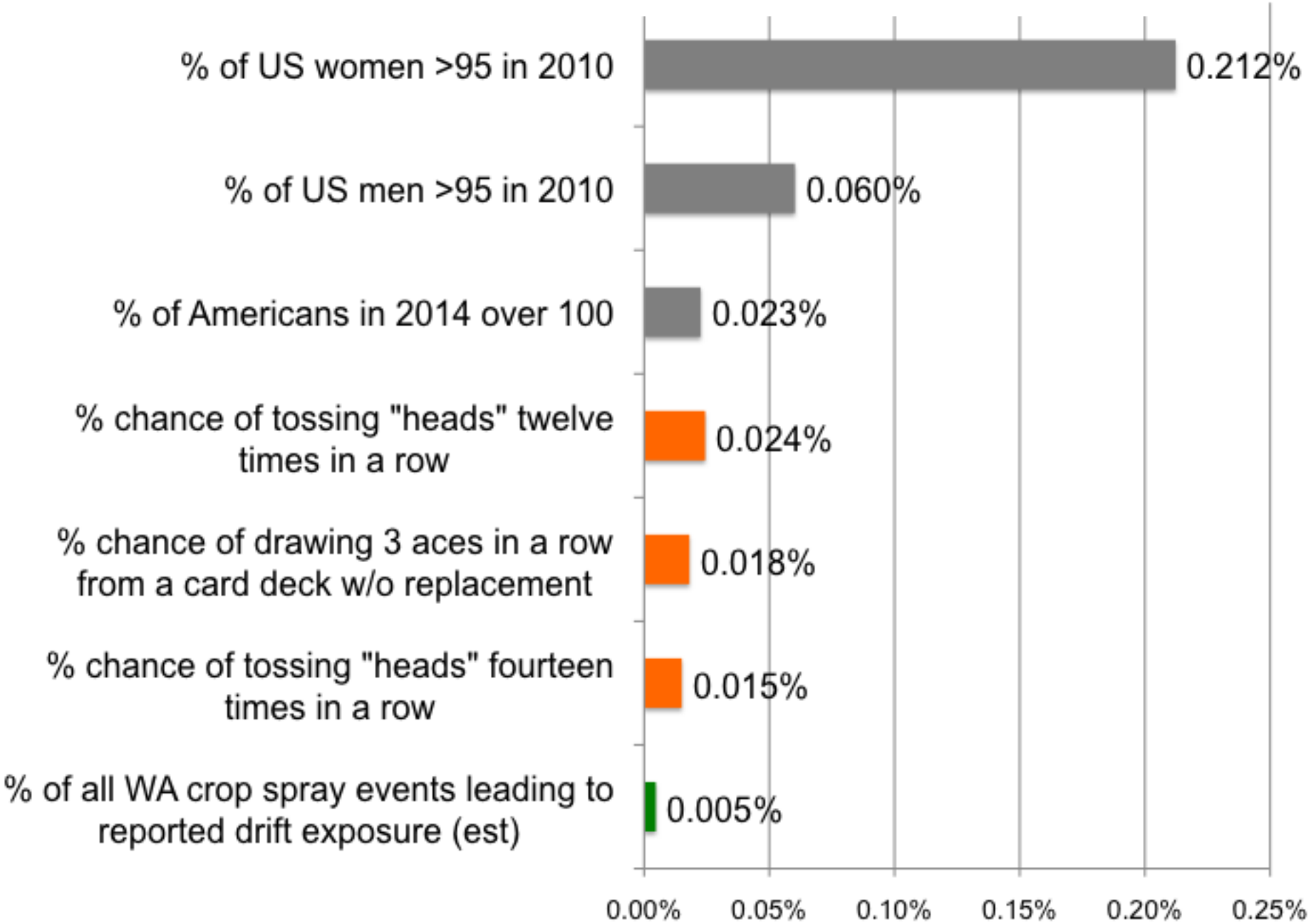
To put the number of reported spray incidents in perspective requires estimates of the scale of crop protection application in the state

- The WA ag database covers ~4.2MM acres composed of 96,846 field units
- Use surveys suggest that 38MM “acre-applications” of CP products are made each year
- Assuming an average tank mixing rate of two products, these number combine for an estimate of 472,047 “field spray events” each year

To put the number of reported spray incidents in perspective requires estimates of the scale of crop protection application in the state

- The WA ag database covers ~4.2MM acres composed of 96,846 field units
- Use surveys suggest that 38MM “acre-applications” of CP products are made each year
- Assuming an average tank mixing rate of two products, these number combine for an estimate of 472,047 “field spray events” each year
- In a year with 22 reported drift events that would mean that 99.995% of sprays were non-incidents

How rare is 0.005%



Some of the factors that help explain the low incidence of drift issues

- Highly trained applicator base
- Good neighbor-to-neighbor communications
- Modern spray equipment
- Extensive dilution prior to spray
- 54% downward sprays for weed control

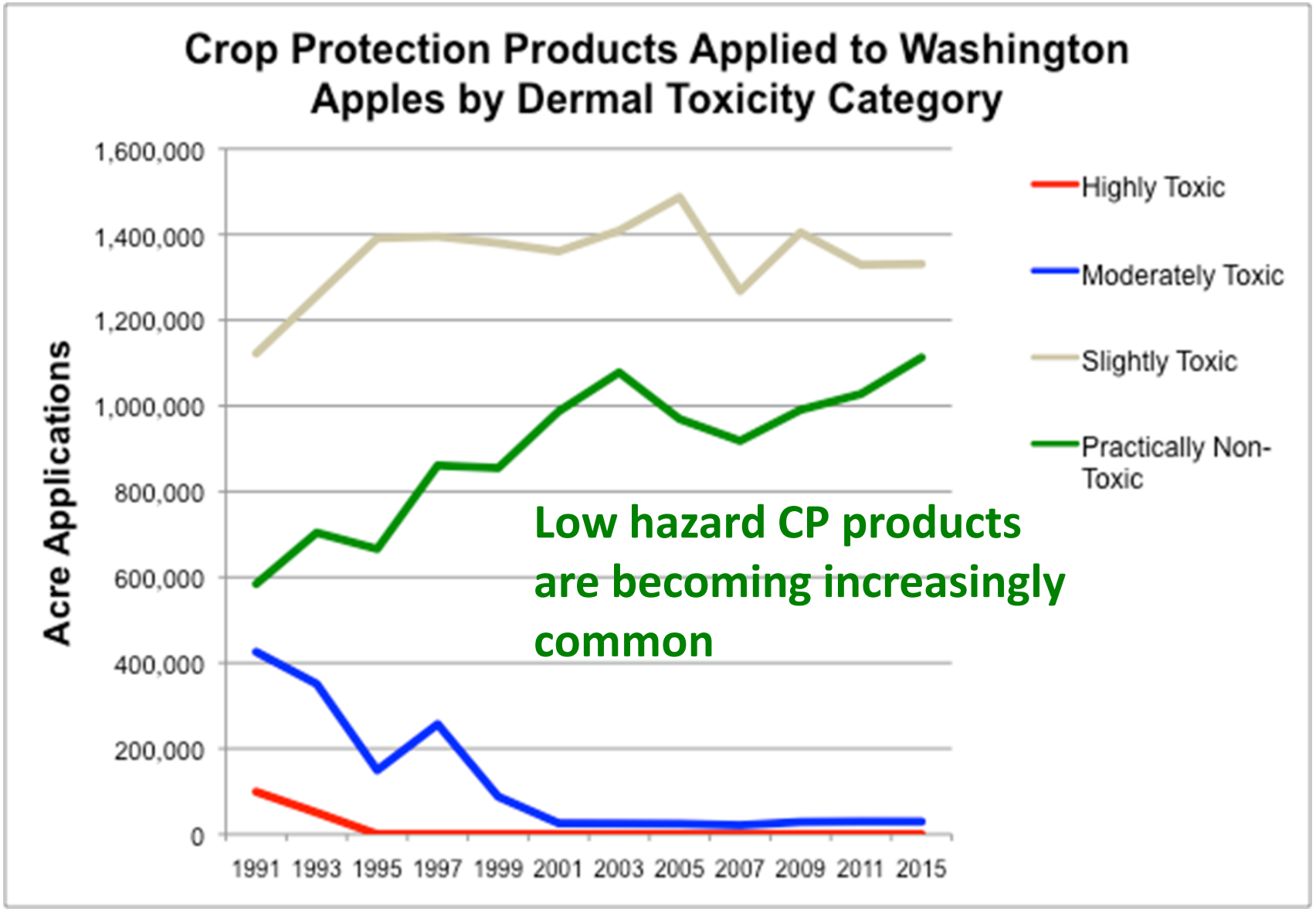
In the US and in WA we enjoy the legacy of nearly 5 decades of regulatory oversight

- Regulation can foster investment in and adoption of positive changes if it is
  - Science-driven and evolving with the science
  - Independent of politics
  - Cognizant of risk/reward trade-offs
  - Has reasonably predictable time-lines
  - Prioritizes training
- For agriculture this system has resulted in a trend towards the use of lower hazard crop protection materials

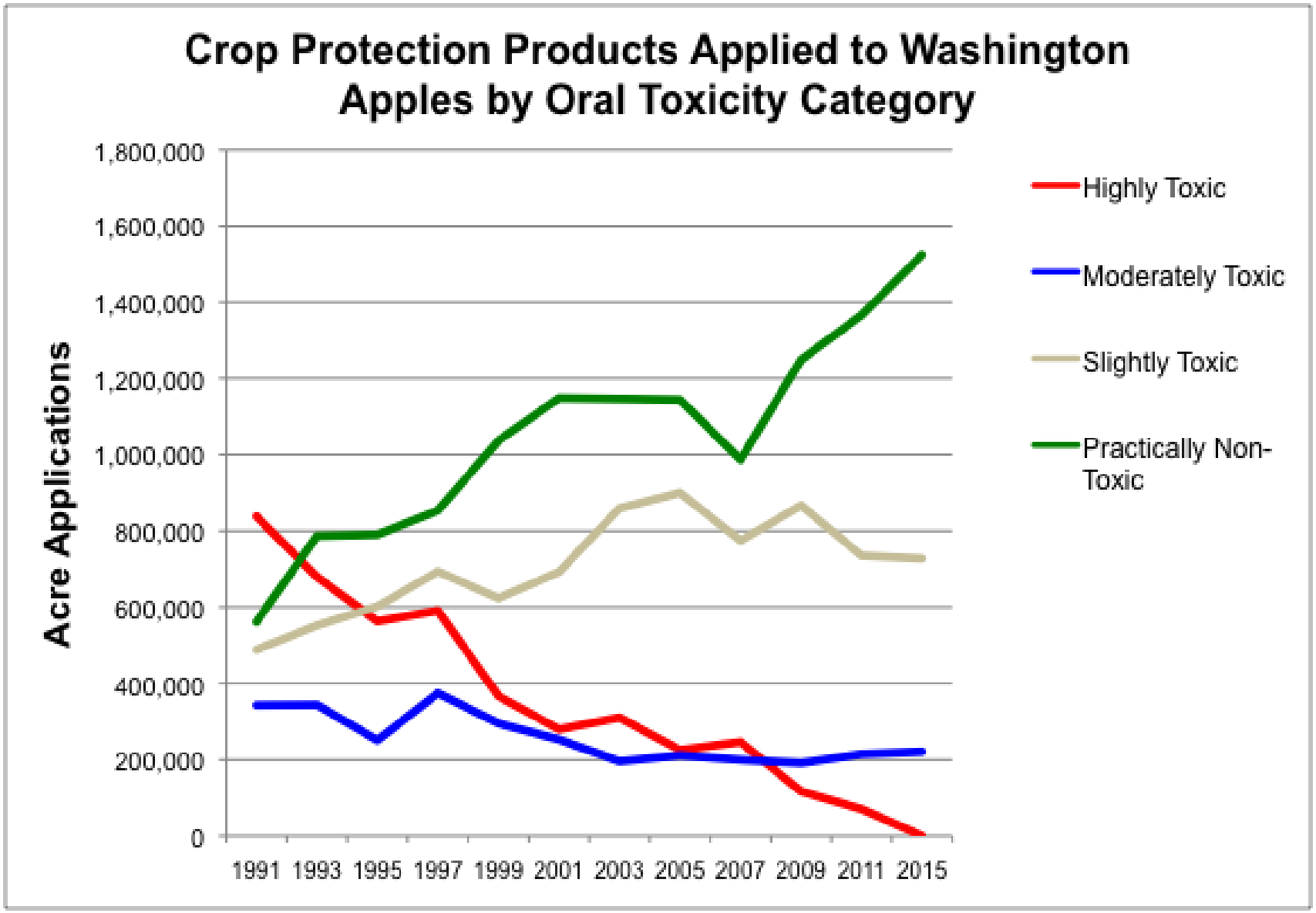
Explaining the difference between hazard and risk

The Safe Use of Electricity: low hazard forms and means of preventing exposure to various degrees of hazard

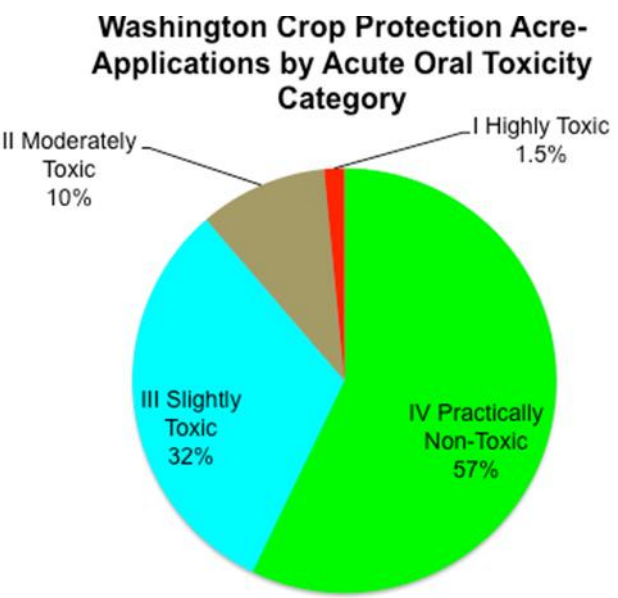
Data from apples exemplified the trend towards lower hazard crop protection materials



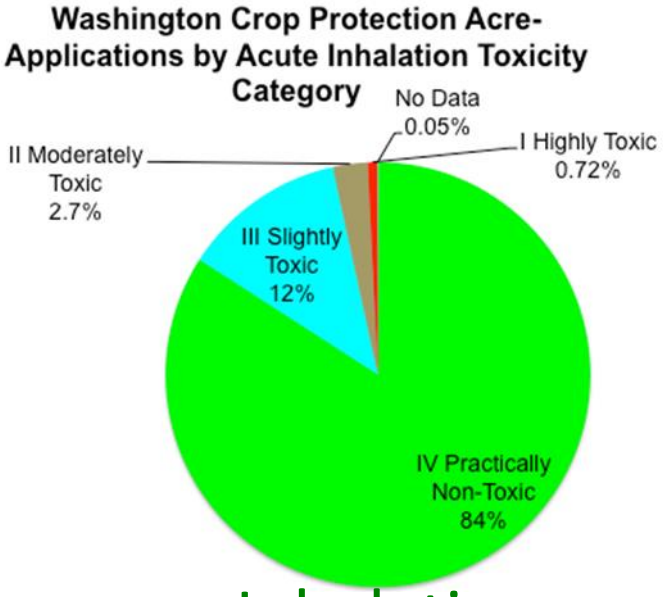
A similar trend can be seen towards materials that are less toxic via ingestion



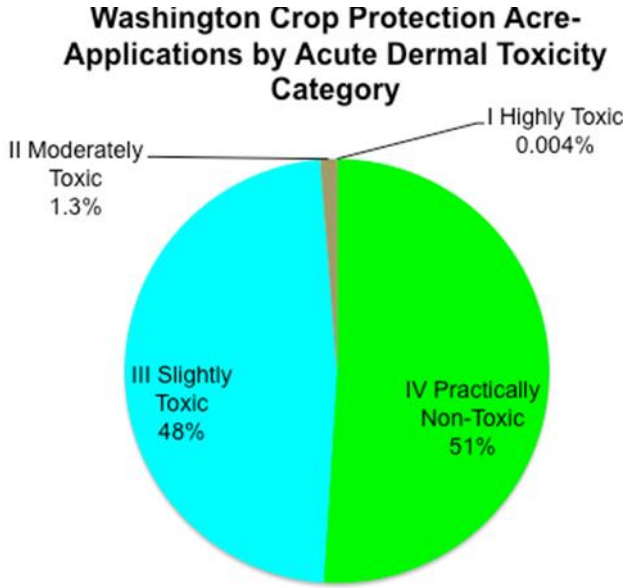
Most CP materials applied today to WA crops are practically non-toxic or only slightly toxic in terms of acute effects



Ingestion



Inhalation

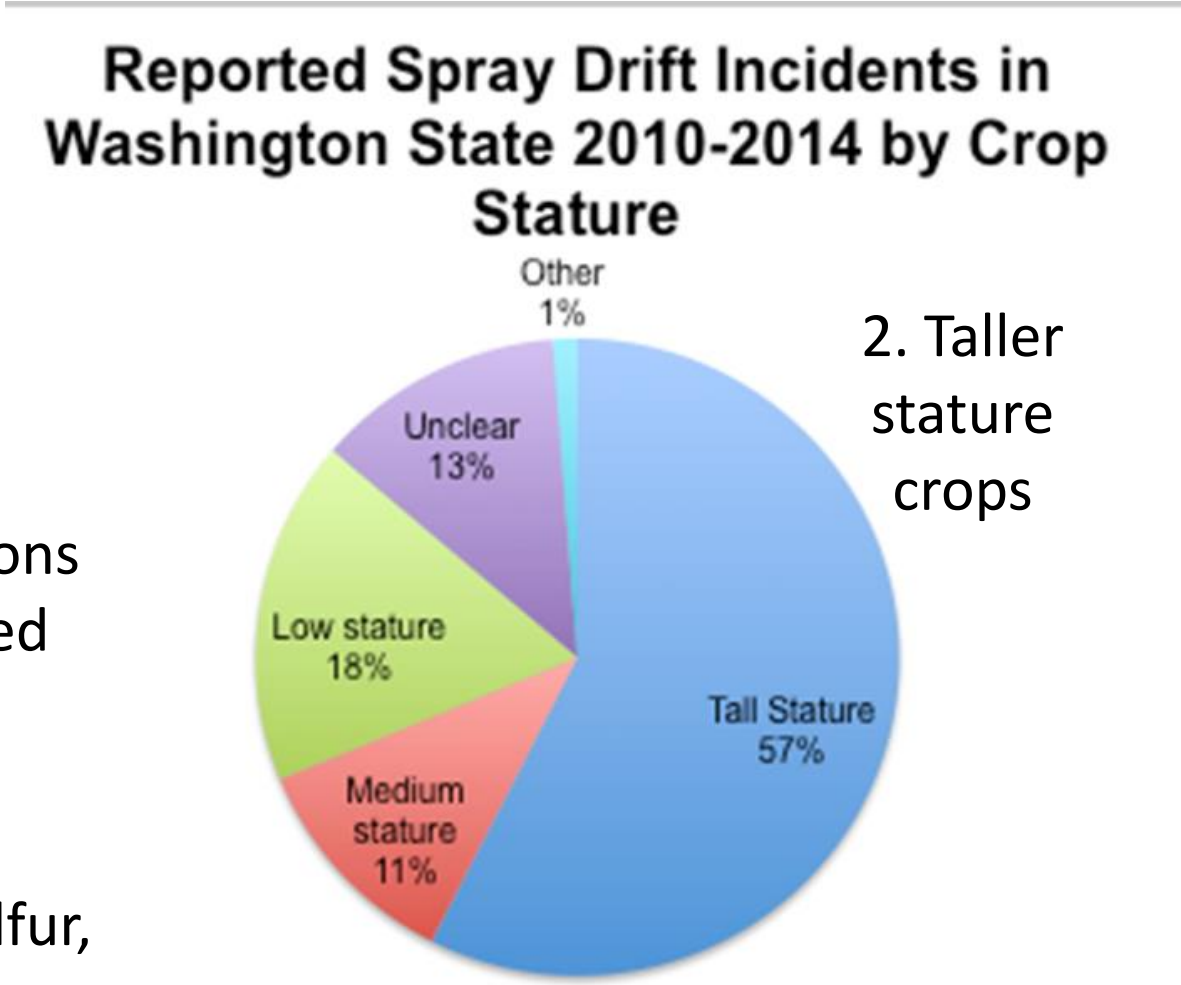


Skin Exposure

There are some situations that can make drift management more challenging

1. Early season applications (weather issues, limited canopy)

3. High use-rate, natural products, e.g. lime-sulfur, sulfur

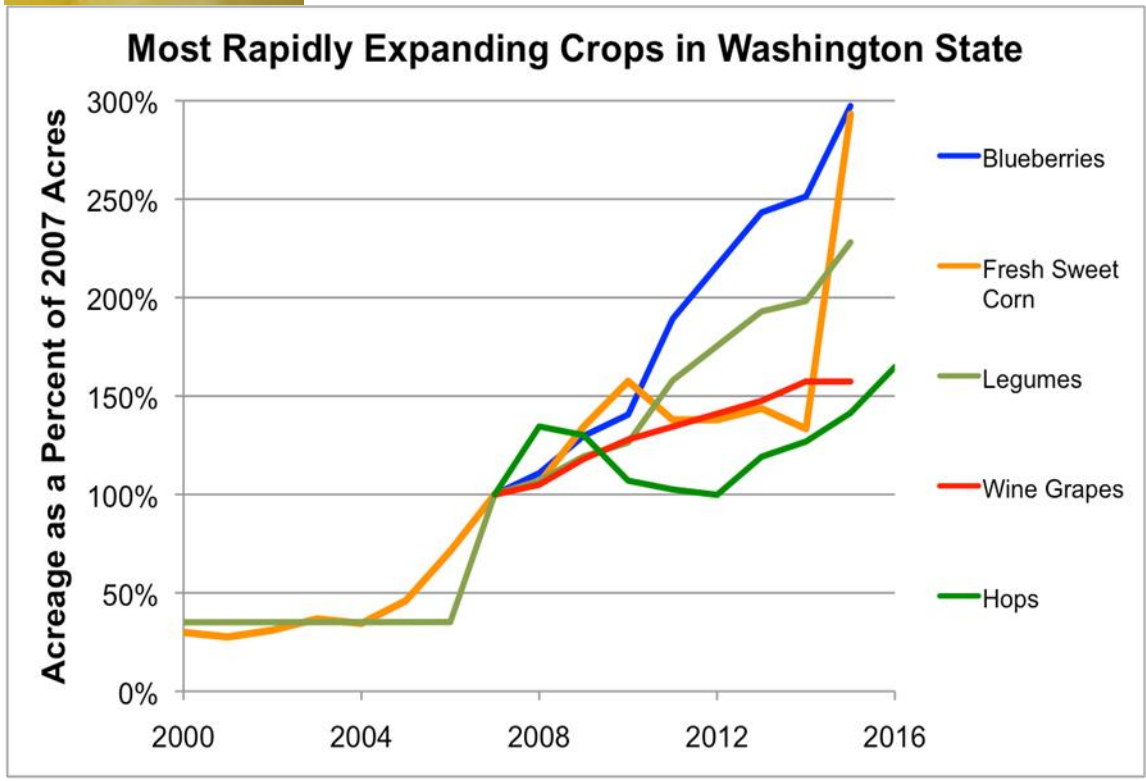


2. Taller stature crops

Some on-going trends may add to the challenge of drift management

- More exotic, invasive pests are requiring control

- The acreage of high value, specialty crops is expanding
- The organic sector is growing and often requires more frequent treatments



USDA ORGANIC

However, there are also several on-going trends that can ease the challenges of drift management

- Continuing training
- Shift to high density, trellised orchards
- New spraying-related technologies
- Delivery through irrigation systems (extensive dilution, large droplets)
- Real-time, geo-referenced wind apps for applicators

Constructive approaches to further improve the record (1 of 2)

- Continued applicator education/training
- Expanded farm worker training with perspective on the nature of CP materials, PPE options…
- Letting the ag community continue to find practical, diverse and innovative means of neighbor-to-neighbor communication

Constructive approaches to further improve the record (2 of 2)

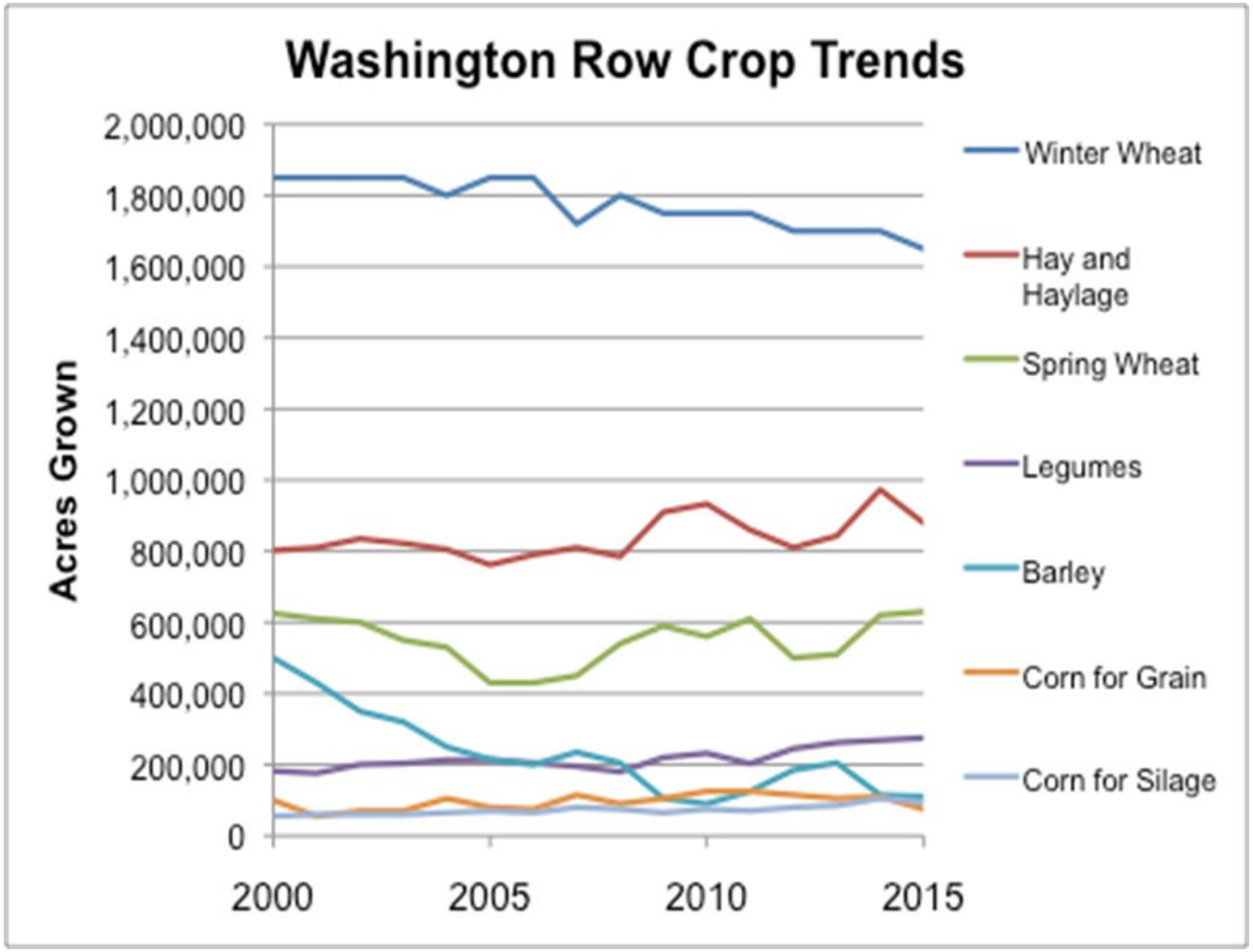
- Research support to optimize integrated control options for new invasive pests
- Encourage approaches that are scale-neutral – e.g. won't put the most constraints on small-scale farmers
- Encourage viable production of WA-adapted crops vs imports from regions lacking the overall environmental and safety legacy of our domestic industries

More Detailed Discussions

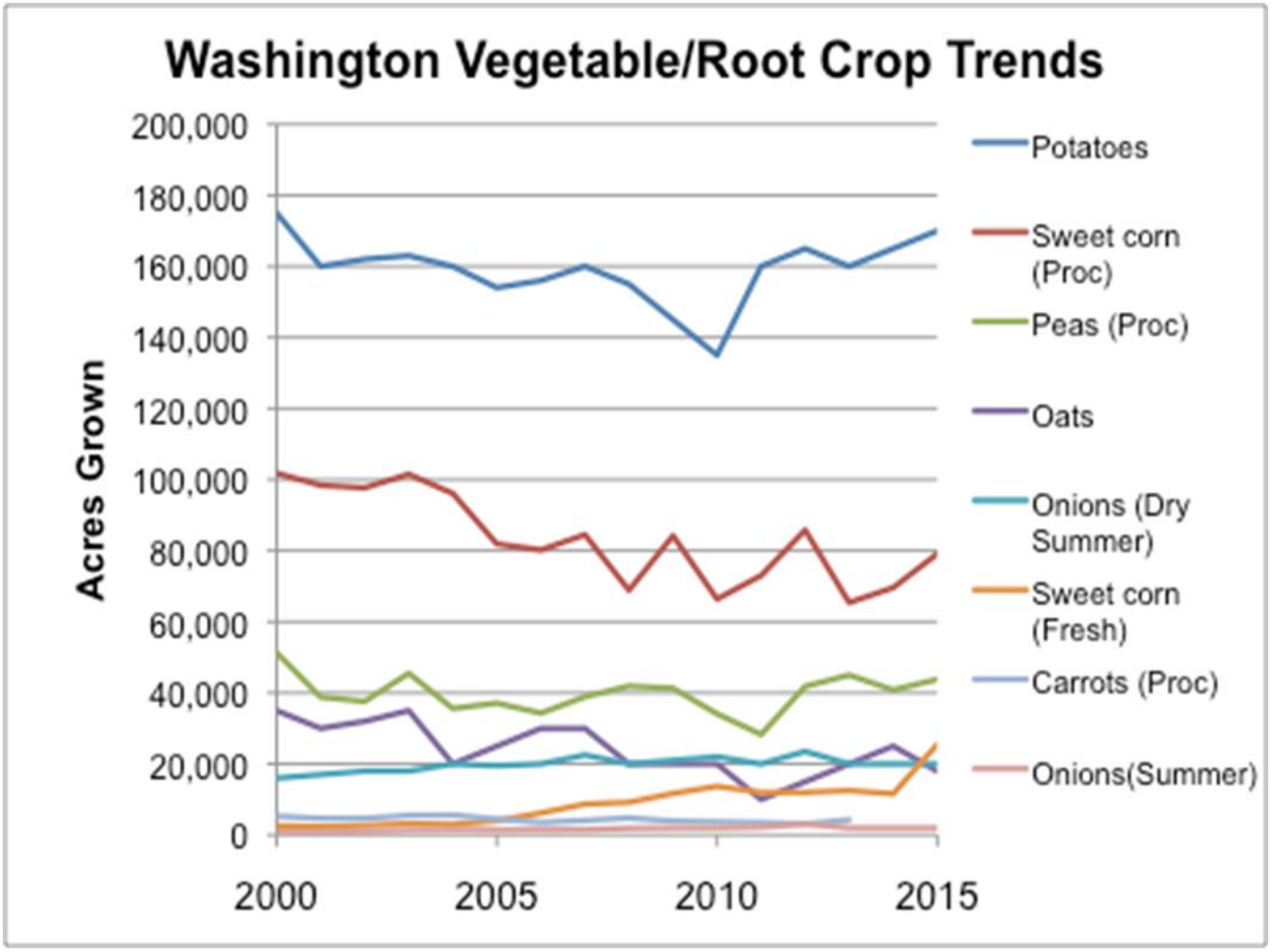
A. Trends In Crop Acreage in Washington State

B. Field Size Distribution of Washington State Crops

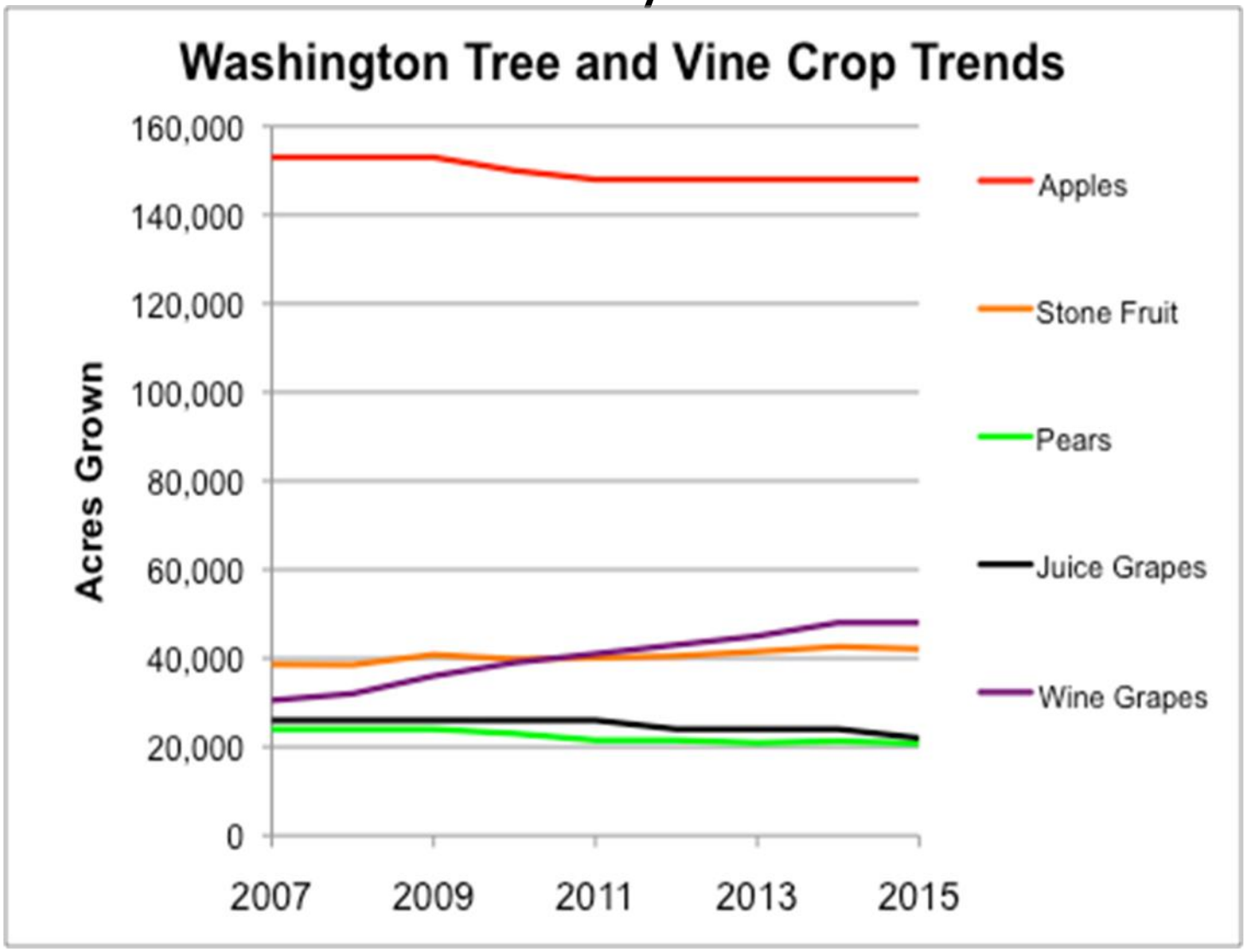
The large, row crop segment is relatively stable in terms of acreage



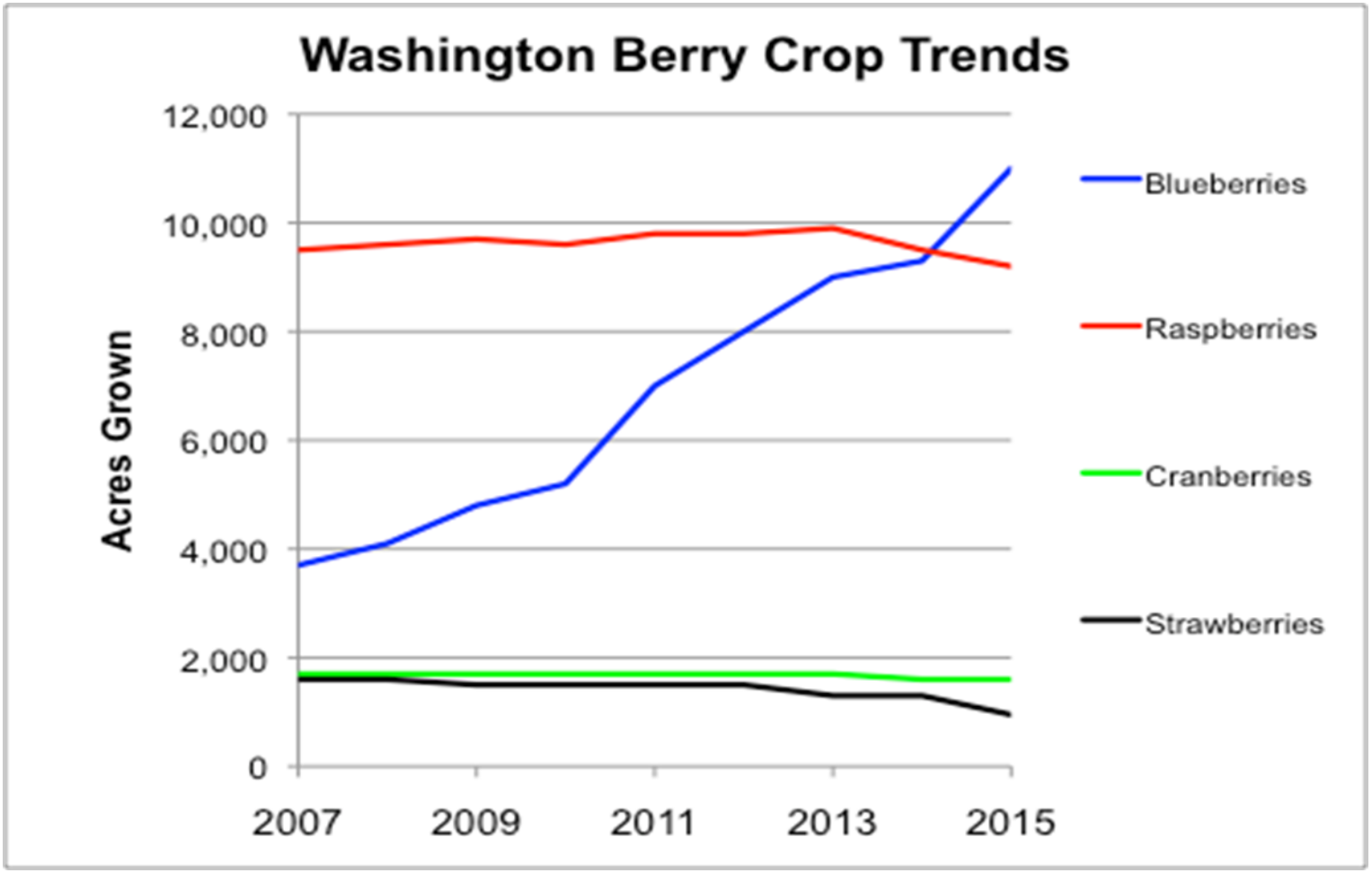
Vegetable acreage trends vary by crop



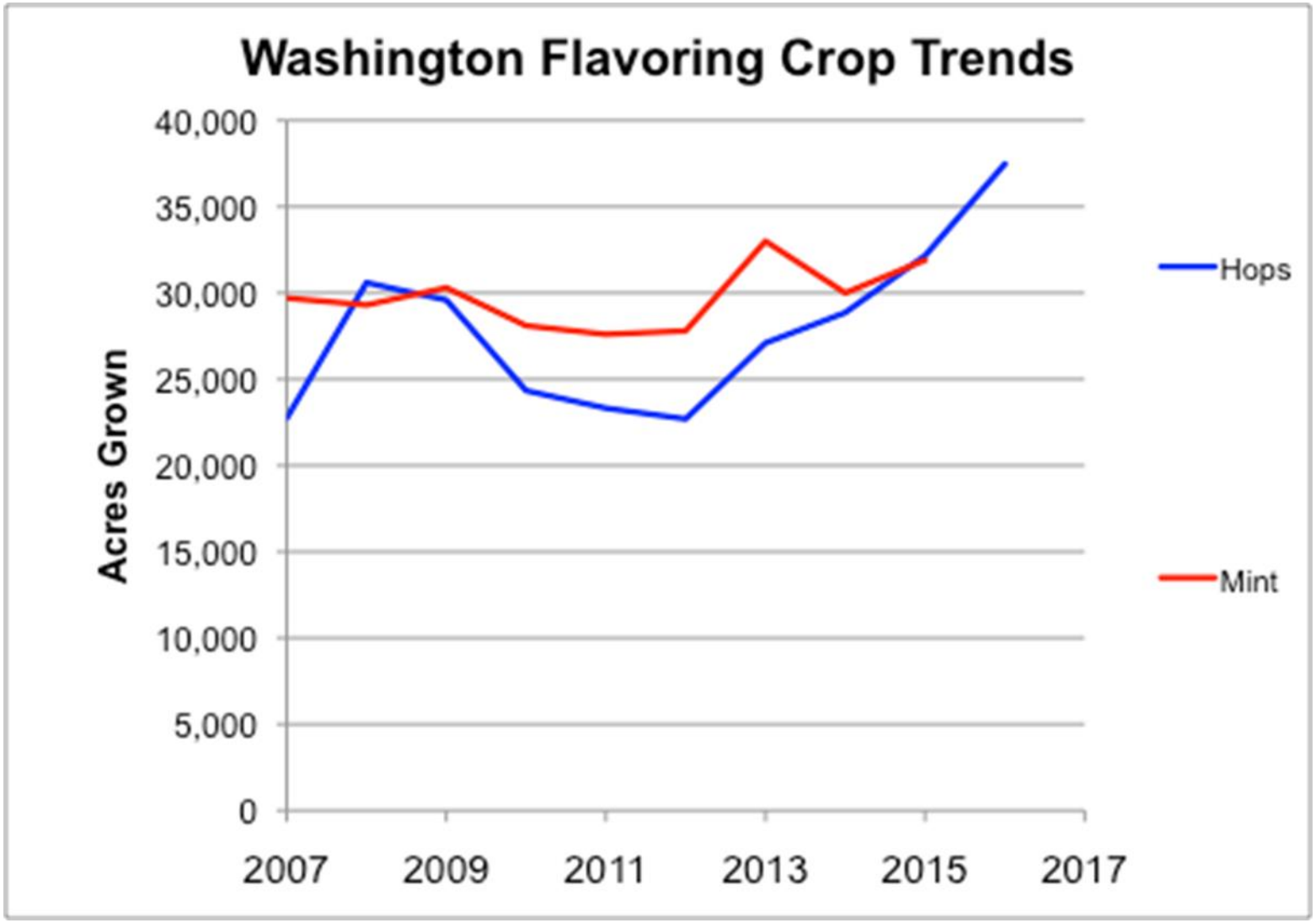
Other than wine grapes, tree and vine acreage is also fairly stable



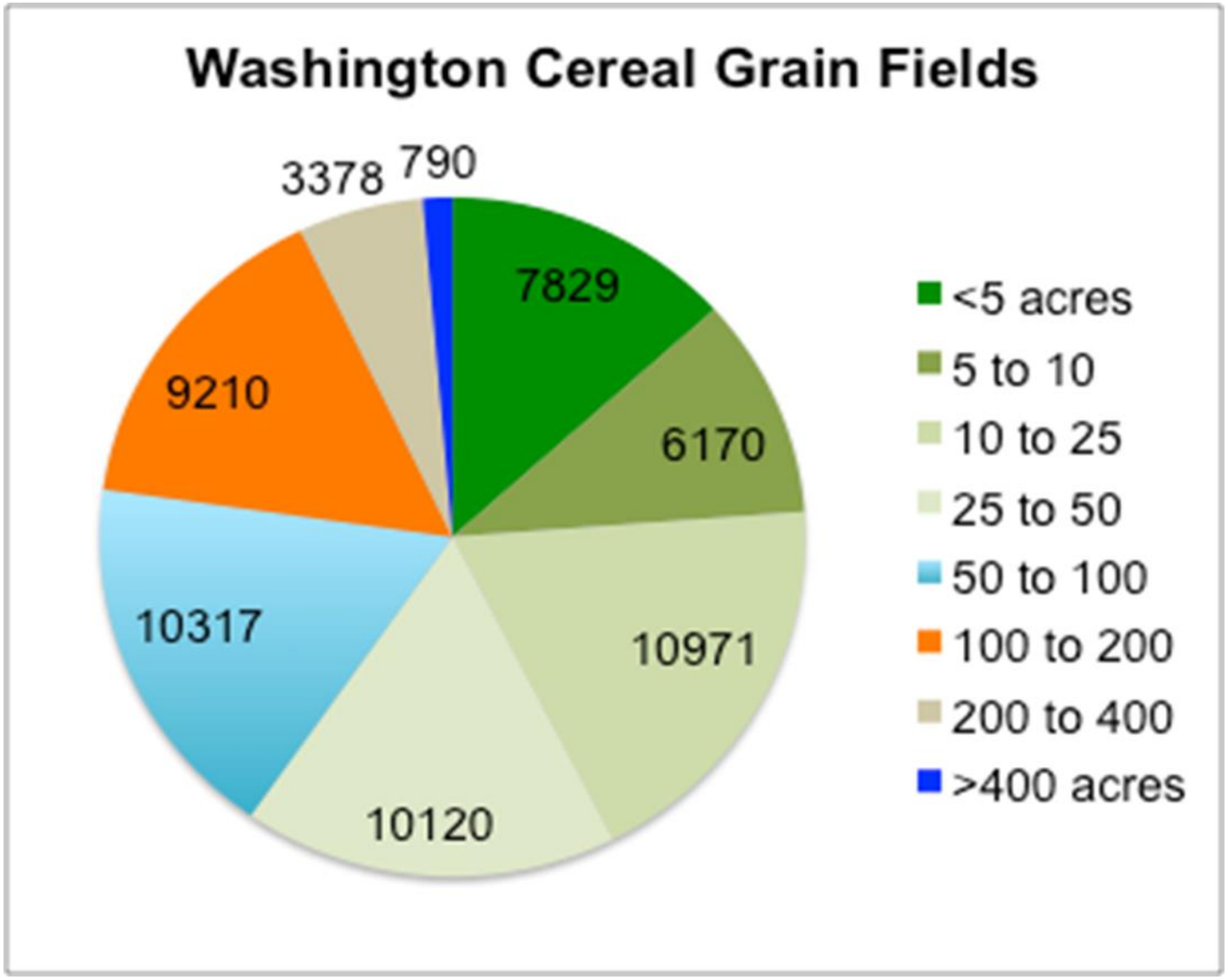
Of the berry crops, the most expansion has been with blueberries



Acreage has been increasing for mint and even more so for hops



Some grain fields are large, but many are also small



Orchards and berry fields tend to be relatively small