

# The Good, the Bad, and the Ugly: Sheep Breeding in the US

Ron Lewis

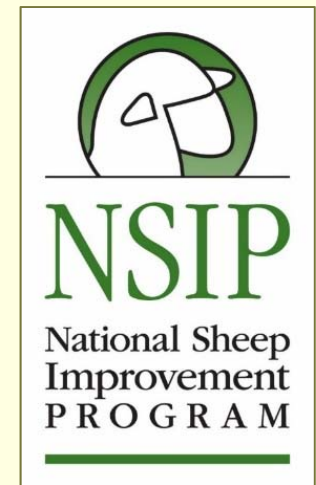
Sheep Breeders Round Table

Eastwood Hall, Nottingham (November 21, 2015)

# Outline

---

- U.S. sheep industry
- NSIP
  - Timeline
  - Roles
  - Traits
  - Breed-types
  - Recording
- An illustration
  - Terminal sires
- R&D funding
- Genomics
- Summing up

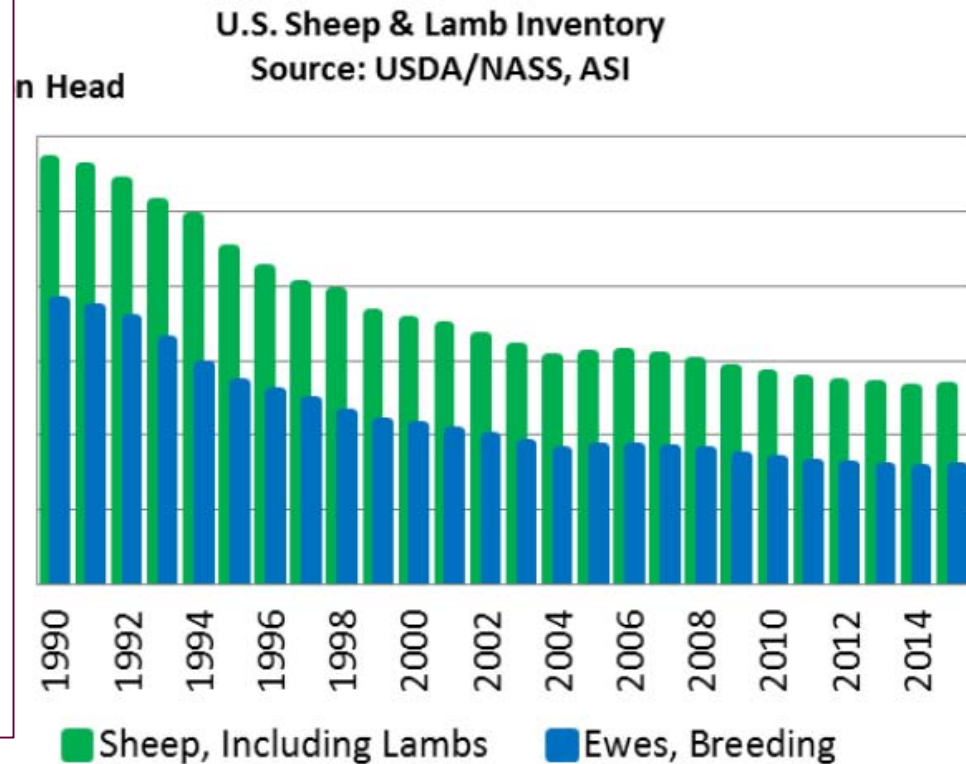


# U.S. sheep & lamb inventory

**Top 10 U.S. Sheep States, Jan. 2015**

		<i>1,000 Head</i>
1	TEXAS	720,000
2	CALIFORNIA	600,000
3	COLORADO	420,000
4	WYOMING	345,000
5	UTAH	290,000
6	S. DAKOTA	255,000
7	IDAHO	260,000
8	MONTANA	215,000
9	OREGON	195,000
10	IOWA	175,000

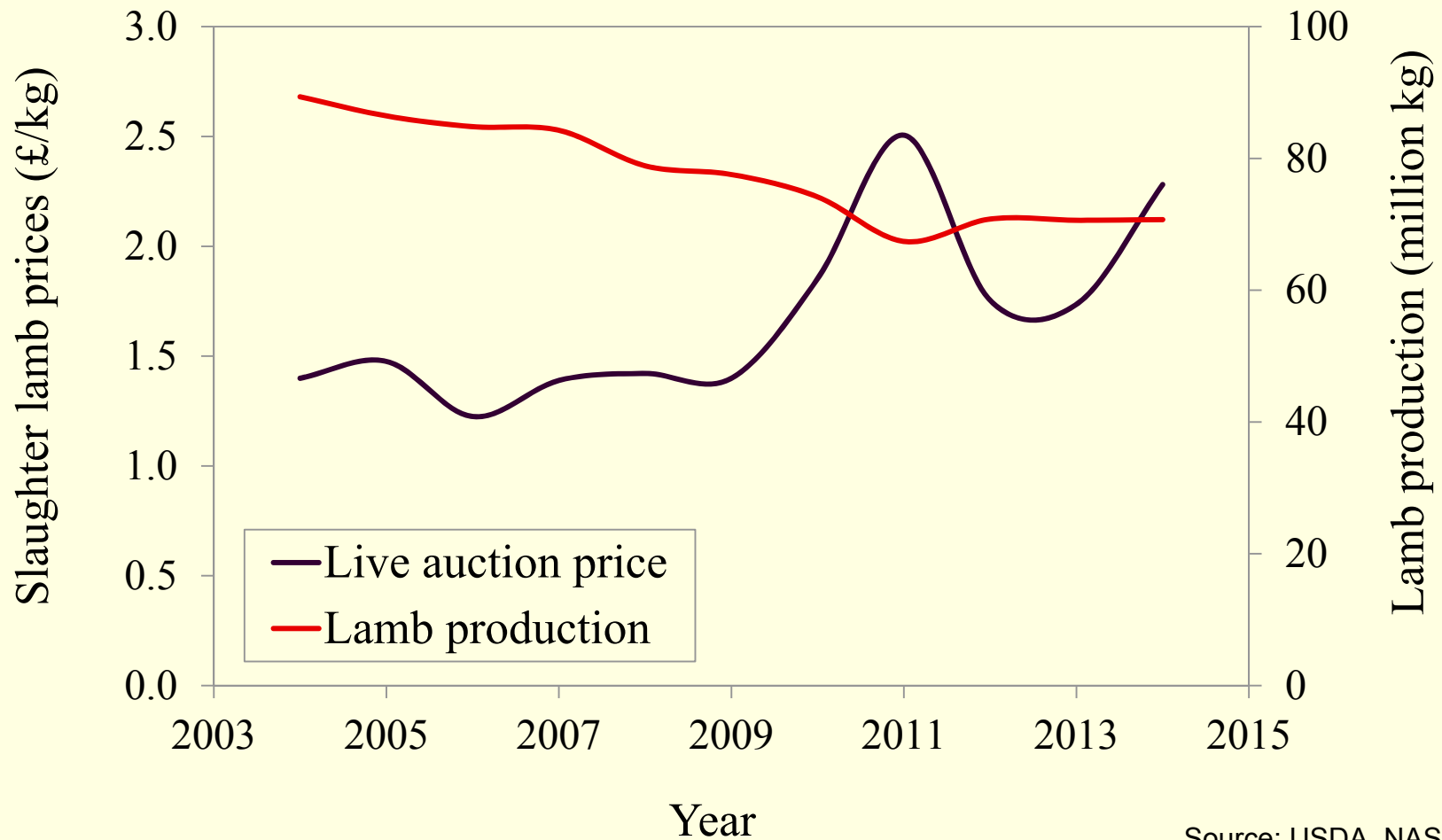
Source: U.S. Department of Agriculture, National Agricultural Statistics Service (NASS), Jan. 2015, ASI



# U.S. sheep & lamb inventory



# U.S. slaughter lamb prices & production



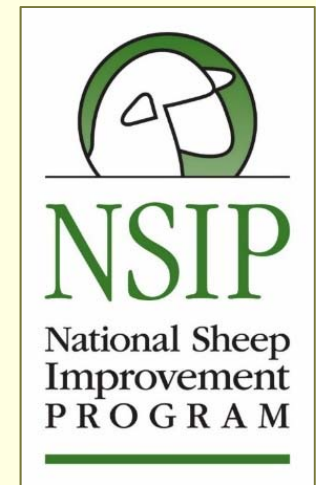
Source: USDA, NASS

# National Sheep Improvement Program (NSIP)

---

## NSIP's timeline

- In 1987
  - Established at Iowa State University
  - Provided only with-in flock evaluations
  - Funded by the American Sheep Industry (ASI) Association with some USDA and University support
- In 1995
  - Began across-flock evaluations



# NSIP's timeline

---

## ■ In 2000

- Virginia Tech became Genetic Evaluation Center
- Funding almost exclusively from member fees

## ■ In 2010

- Established partnership with LAMBPLAN (Australia)
- LAMBPLAN has since done data processing for NSIP
  - Breeding value estimation
  - Index calculation

# NSIP's roles

---

- Primary role (Mission)

- Produce Estimated Breeding Values (EBV) for the U.S. sheep industry

- Supplemental roles

- Support and facilitate genetic improvement in U.S. sheep
  - Develop breeding objectives and selection indices
  - Validate, evaluate and promote use of EBV
  - Develop and add new traits
- Facilitate the use of genomic information (?)



# NSIP traits

---

## ■ Weight/carcass

- Birth weight
- Weaning weight
- Post-weaning weight
- Yearling weight
- Hogget weight
- Ultrasound muscle & fat depth

## ■ Disease

- Fecal egg count (FEC)

## ■ Maternal/reproductive

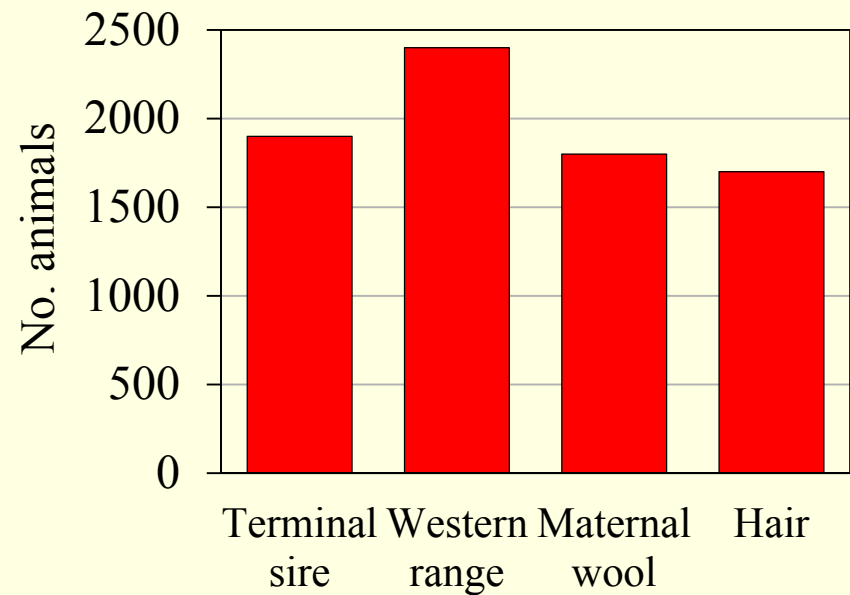
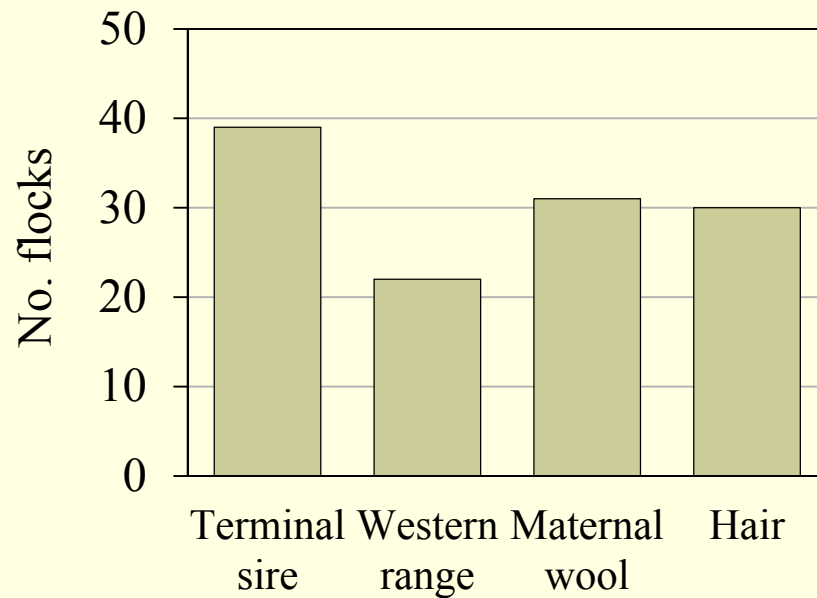
- Maternal birth weight
- Maternal weaning weight
- Litter size
- Scrotal circumference

## ■ Wool

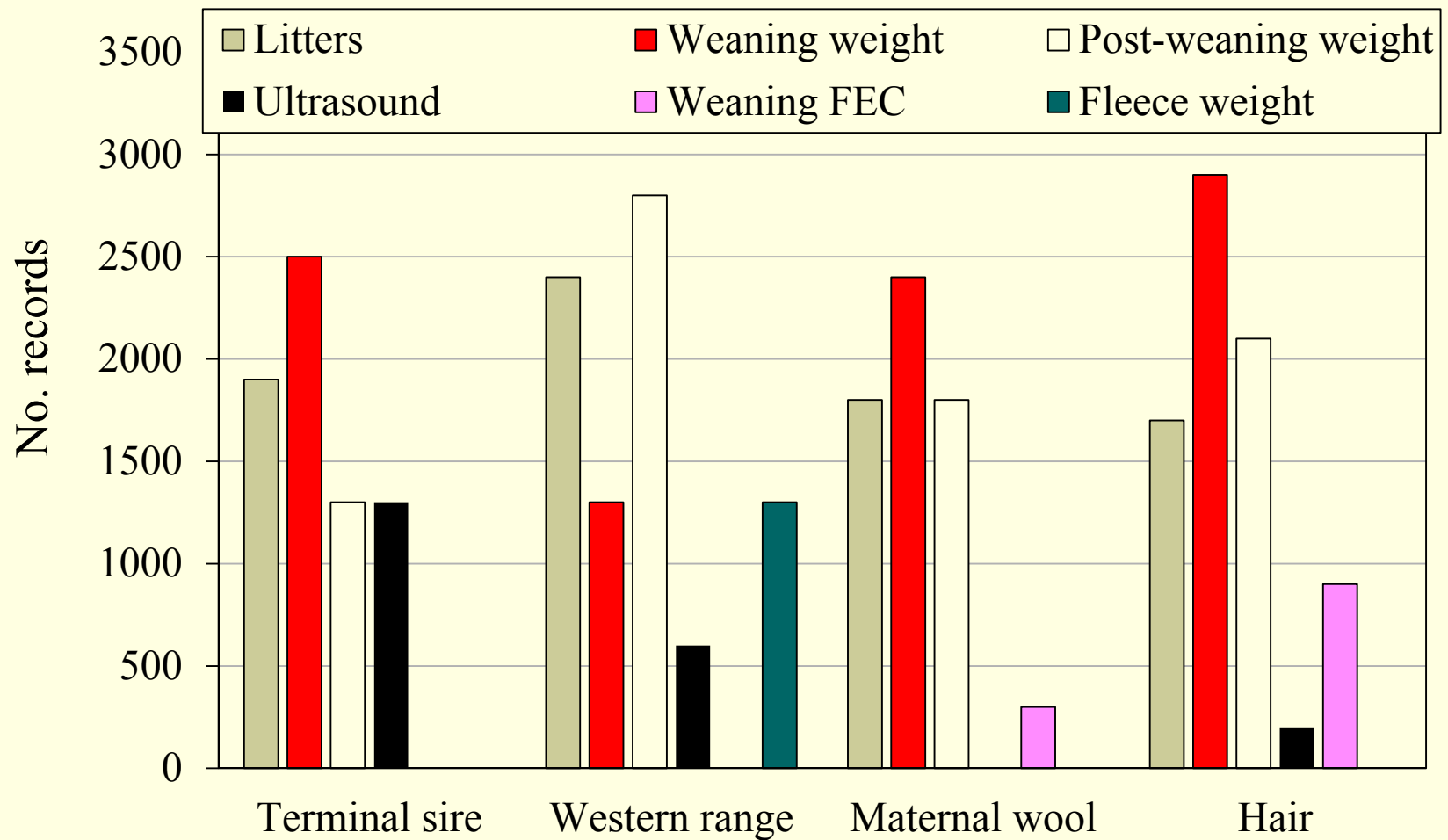
- Greasy fleece weight
- Fiber diameter
- OFDA fiber profile
- Staple length

# NSIP breed-types (2013)

- Terminal sire (Suffolk)
- Western range (Targhee)
- Maternal wool (Polypay)
- Hair (Katahdin)

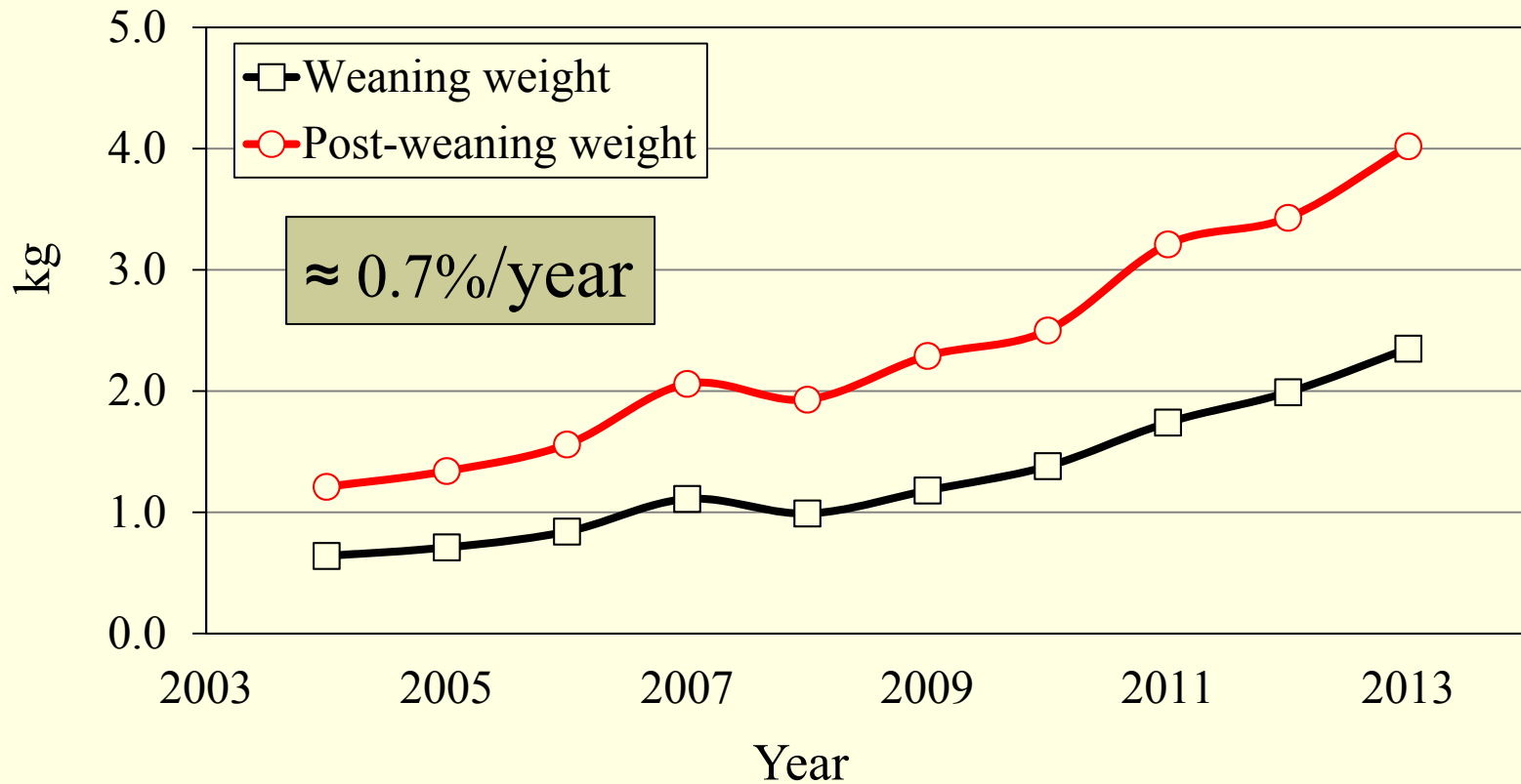


# NSIP recording (2013)



# Trends in terminal sire EBV

Trend in weaning & post-weaning weight EBV in Suffolk



# LAMBPLAN lean meat index

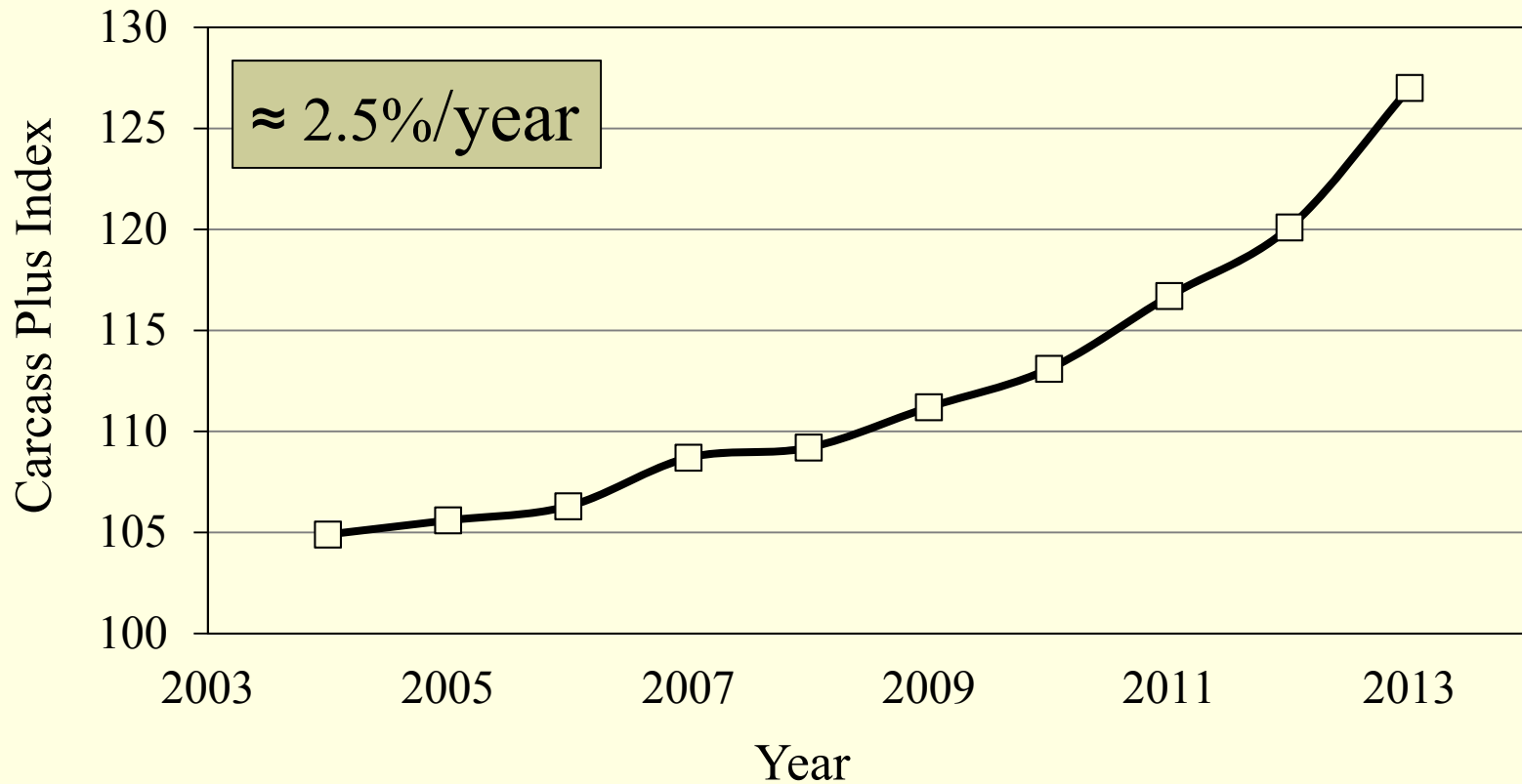
## ■ Carcass Plus Index

- Developed to improve carcass value in Australian sheep industry
- Seen as providing a reasonable assessment of carcass value in U.S. terminal sires

Criteria (EBV)	Index Weight	Relative emphasis
Post-weaning weight (kg)	5.06	60%
UMD (mm)	7.83	20%
UFD (mm)	-13.36	20%


# Trends in lean meat index

Trend in Carcass Plus index in Suffolk  
(relative to reference value of 100)

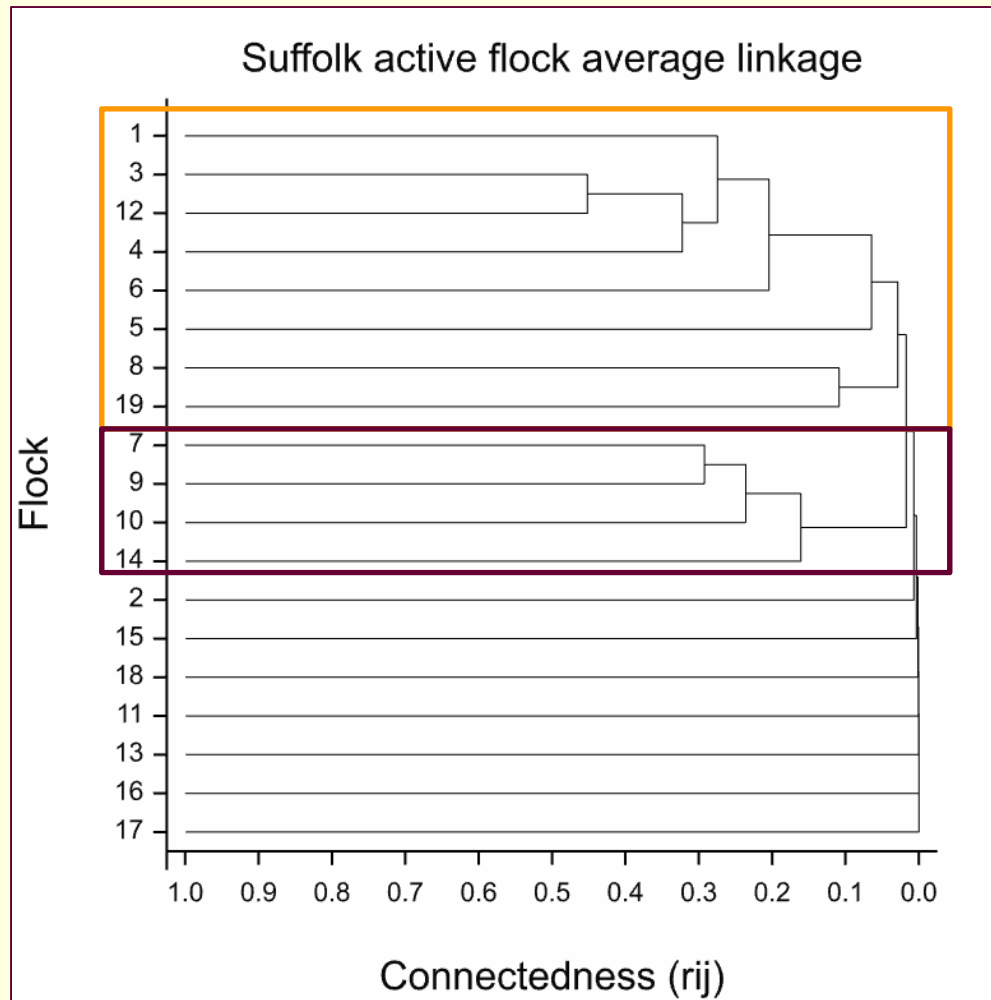


# Elite sires report

- Top Suffolk sires ranked on Carcass Plus index score

 <b>Elite Report - Suffolk</b>		<b>- Sires with 2014 - 2015 Offspring</b>										<b>August 2015</b>	
		<b>Carcass+</b>											
ID Flock	Prg:Flks Inbrd.Coeff	BWt kg	WWt kg	MWWt kg	PWWt kg	PFat mm	PEMD mm	NLW %	NLB %	PSC cm	SRC\$	Carc.+	Sire Dam
690024-2009-009170 <i>Michigan State Univer</i>	208 : 2 1%	0.70 95%	5.90 94%	0.63 81.0	9.23 95%	-3.71 94%	1.16 95%	-6.3 71%	-0.2 63%	0.0 0%	115.4 76%	174.3 95%	69002520055BR155 6900242005000503
690035-2014-004111 <i>Mint Gold Ranch</i>	21 : 1 4%	0.54 76%	4.88 74%	0.61 49.0	6.72 76%	-2.86 75%	1.77 79%	-3.3 42%	-1.3 37%	0.0 0%	115.0 53%	166.7 74%	6900242009009170 6900352011001062
690007-2011-002553 <i>Bunker Hill Farms</i>	154 : 2 3%	0.36 93%	5.16 91%	-0.49 74.0	8.73 93%	-2.54 93%	1.12 94%	0.4 60%	7.9 52%	0.0 0%	117.1 70%	165.6 93%	6900242009009170 6900072009BH2360
690007-2014-002890 <i>Bunker Hill Farms</i>	15 : 1 3%	0.39 78%	4.58 78%	0.94 44.0	8.07 80%	-3.02 78%	1.14 83%	0.8 34%	1.6 29%	0.0 0%	118.9 52%	164.2 79%	6900072013002793 6900072008BH2191
690007-2013-002793 <i>Bunker Hill Farms</i>	17 : 1 1%	0.31 80%	3.89 79%	0.39 56.0	6.64 81%	-2.96 80%	1.63 83%	-0.5 45%	3.0 39%	0.0 0%	115.7 57%	163.0 80%	6900242009009170 6900072008BH2271
690007-2013-002868 <i>Bunker Hill Farms</i>	23 : 1 1%	0.35 79%	4.38 79%	-0.54 39.0	6.78 82%	-2.58 80%	1.60 84%	1.4 32%	2.3 27%	0.0 0%	115.9 52%	162.6 80%	6900352012002005 6900072012002660
690007-2014-002870 <i>Bunker Hill Farms</i>	30 : 1 2%	0.26 84%	4.31 84%	0.03 51.0	6.94 86%	-2.28 85%	1.62 88%	3.2 39%	7.0 33%	0.0 0%	118.4 57%	162.1 85%	6900072011002553 6900072008BH2271

# Connectedness





# NSIP's potential impact in terminal sires

≈ 2,000 recorded lambings of terminal sire ewes



Produce ≈ 1,300 ram lambs per year  
Cull 50% ⇒ 650 new breeding rams



⇔ Average ram life of 2.5 year

Annual breeding ram inventory ≈ 1,625 rams



⇔ 50 ewes / breeding ram / year

80,000 ewes bred



Need 50,000  
recorded lambings,  
a 25X increase

≈ 2,000,000 ewes bred  
to terminal sires

NSIP meeting  
only 4% of  
potential demand

# Funding resources

---

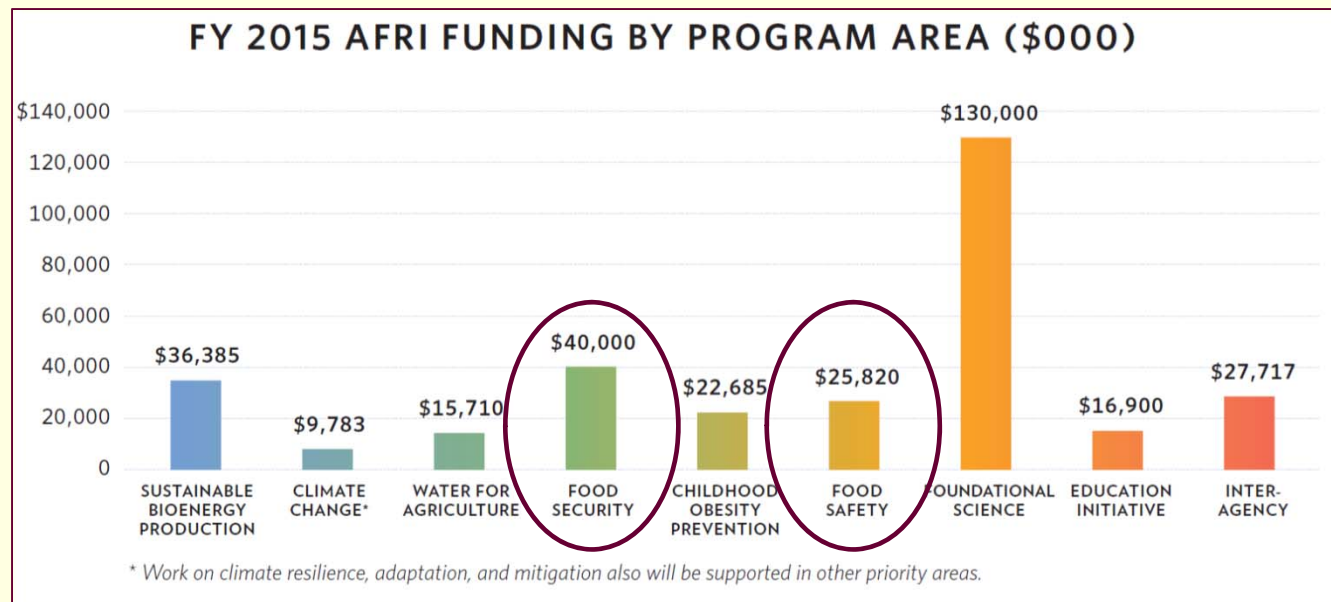
- Sheep industry extramural funds
  - Organizations
    - National Sheep Industry Improvement Center
    - American Lamb Board
    - American Sheep Industry
  - Discretionary spend: US\$ 2 million
    - Legislation, marketing, education & research



# Funding resources

## ■ USDA-NIFA

- FY 2015: US\$ 1,435 million
- Agriculture & Food Research Initiative: US\$ 325 million



# Opportunities with genomics?

---

- Genomic selection

- Limited opportunities currently given industry dynamic
- Still, need to begin to establish a reserve of DNA samples on well-chosen NSIP sheep

- Genetic tests for major genes

- Ovine progressive pneumonia virus susceptibility
- Scrapie susceptibility
- Spider lamb
- Myostatin

- Parentage determination

# The Good, the Bad, and the Ugly

---

## ■ The Bad

- Low profile of sheep in U.S. agriculture
  - Limits resources for R&D and education/training
- Little engagement in NSIP by some important breeds

## ■ The Ugly

- Impacts opportunities for innovation and recruitment

# The Good, the Bad, and the Ugly

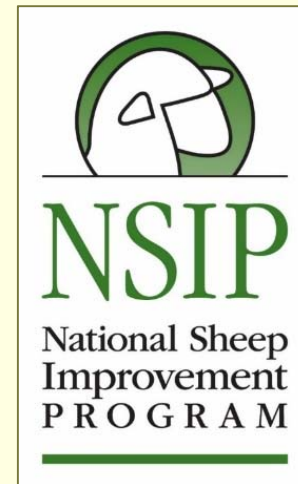
---

## ■ The Good

- Strong commitment among those engaged in NSIP
  - Opportunities for growth
- Robust genetic evaluation system in place (LambPlan)
  - Appreciable genetic gains being achieved

# Thank you

---



Questions?