

Future sheep genetics research at ARS

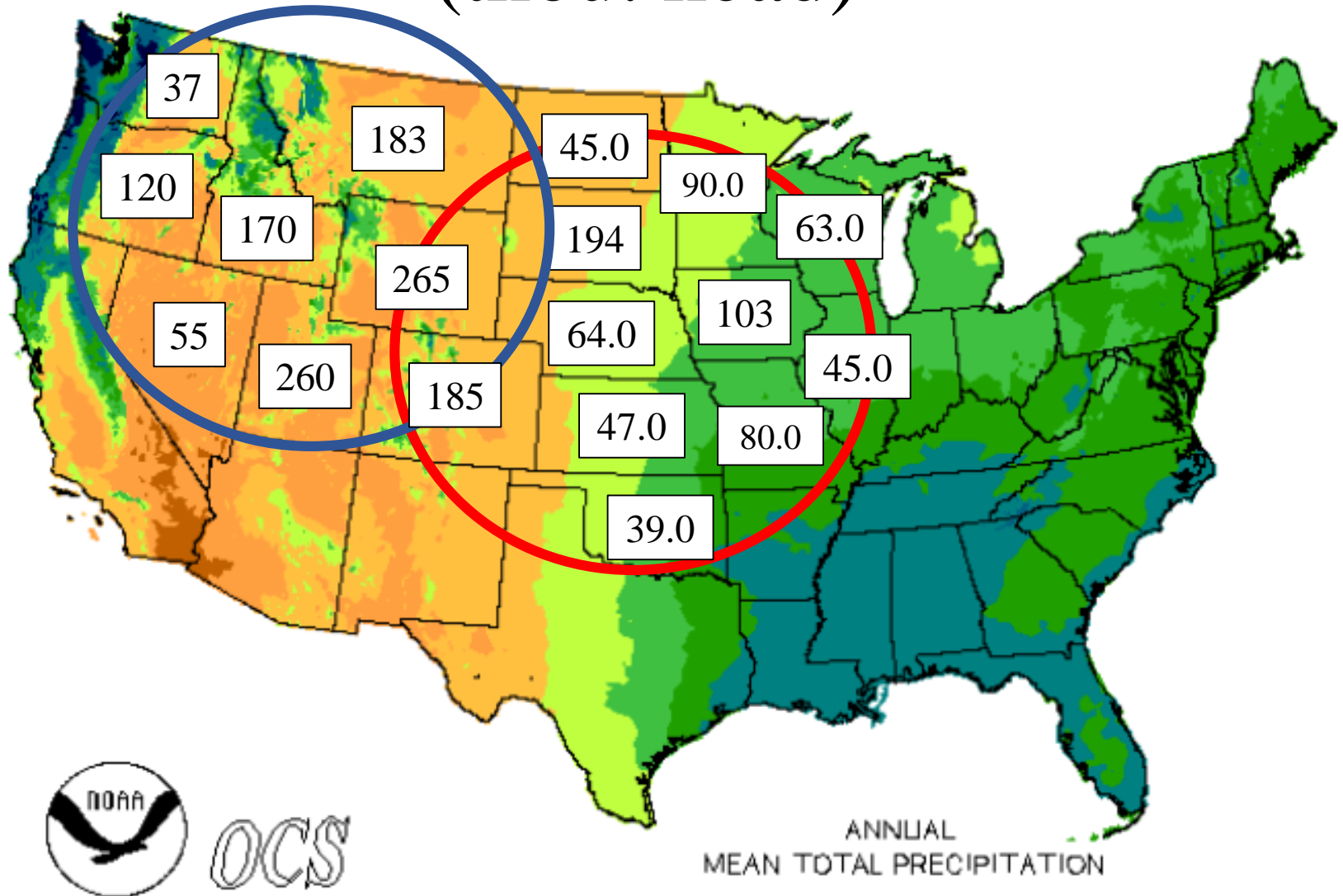
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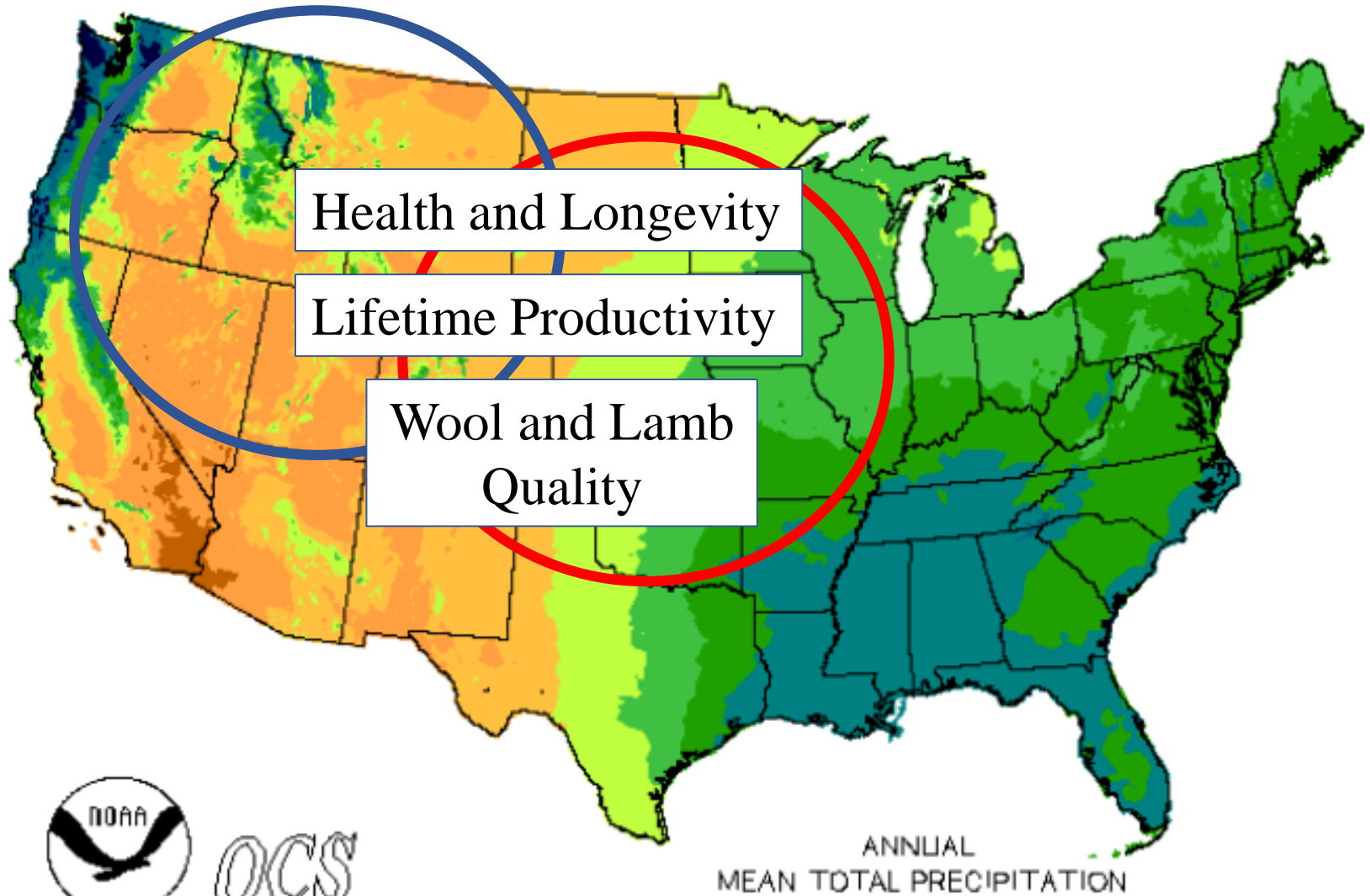
January 23, 2019

Breeding sheep inventory (thou. head)



OCS

Research Priorities



OCS

ARS genetic reference flocks

- Through sampling breeding stock from throughout the country and “deep phenotyping” our populations, we can work to identify genomic regions and expand NSIP EBV/indexes.

“Meat and potatoes” traits

Number of lambs born/weaned
Lamb pre- and post-weaning growth
Fleece and fiber traits

Difficult/expensive traits

Health traits

Mastitis
Immune function
Respiratory disease
Foot rot

Functional traits

Out-of-season/accelerated lambing
Milk/colostrum quality
Longevity
Udder confirmation

Performance traits

Feed efficiency
Lean growth
Primal cut weight
Eating quality

Five most common reasons for culling ewes in the U.S.

- Culling ewes prior to the end of their normal productive life (6 – 8 years) decreases a sheep enterprise's profitability through increased costs and lost revenue.

Primary reason	% of cull ewes
Age	55.6
Failure to lamb	7.7
Teeth problems	7.6
Hard bag	7.1
Mastitis	6.7

Reasons for culling ewes prematurely

Ewe Fertility

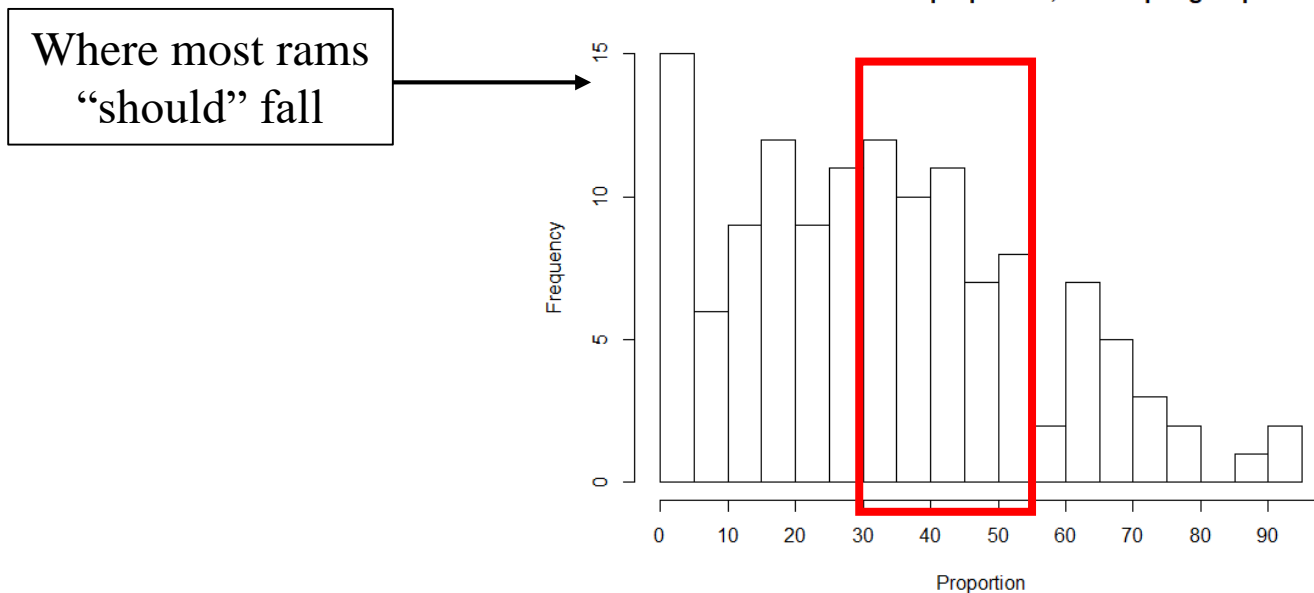
- In many MARC flocks, ewes that are repeatedly open are retained.
- Reproductive tracts between barren and fertile contemporary ewes are harvested and compared.
- **Objectives:** identify genomic regions and in-utero environmental effects associated with reduced fertility.



	Sub-Fertile	Fertile
Ewes	6	6
Ovary Length, mm	12.3 ± 1.2	18.7 ± 1.2
Ovary Height, mm	7.5 ± 0.7	12.9 ± 0.7
Follicle Count	1.5 ± 1.7	12.3 ± 1.7

What About the Buck?

- Genotyping platforms have allowed parentage to be determined from multiple-sire breeding groups.
- Results indicate a wide variation in the number of lambs sired per ram, which can limit ROI of breeding rams.
- **Objectives:** quantify genetic/behavioral factors contributing to ram breeding capacity.

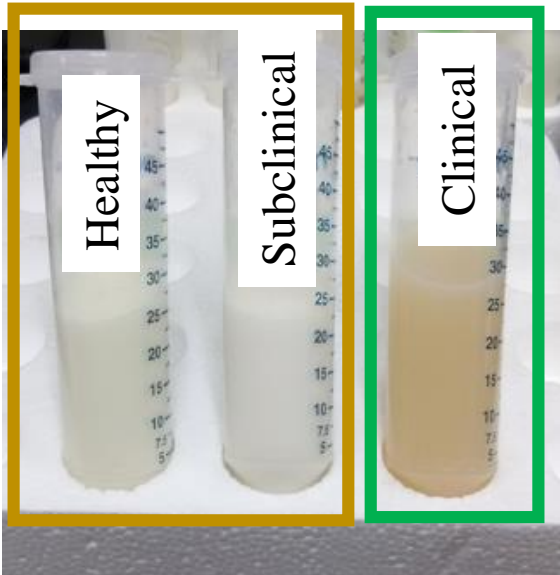
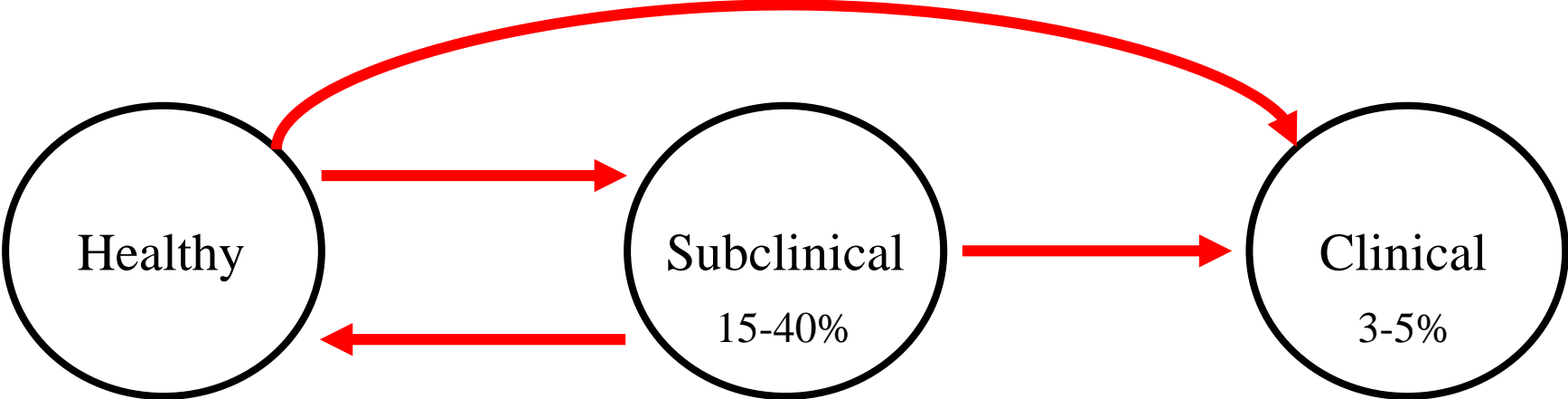


Mouth Soundness

- In many cases, incisor loss/wear is an unavoidable function of ewe aging.
 - Past work has estimated moderate heritability for number of incisors at any age (0.39 – 0.80) and incisor wear (0.46).
- **Objectives:** quantify mouth soundness in ewes to identify genetic and non-genetic factors contributing to variation.

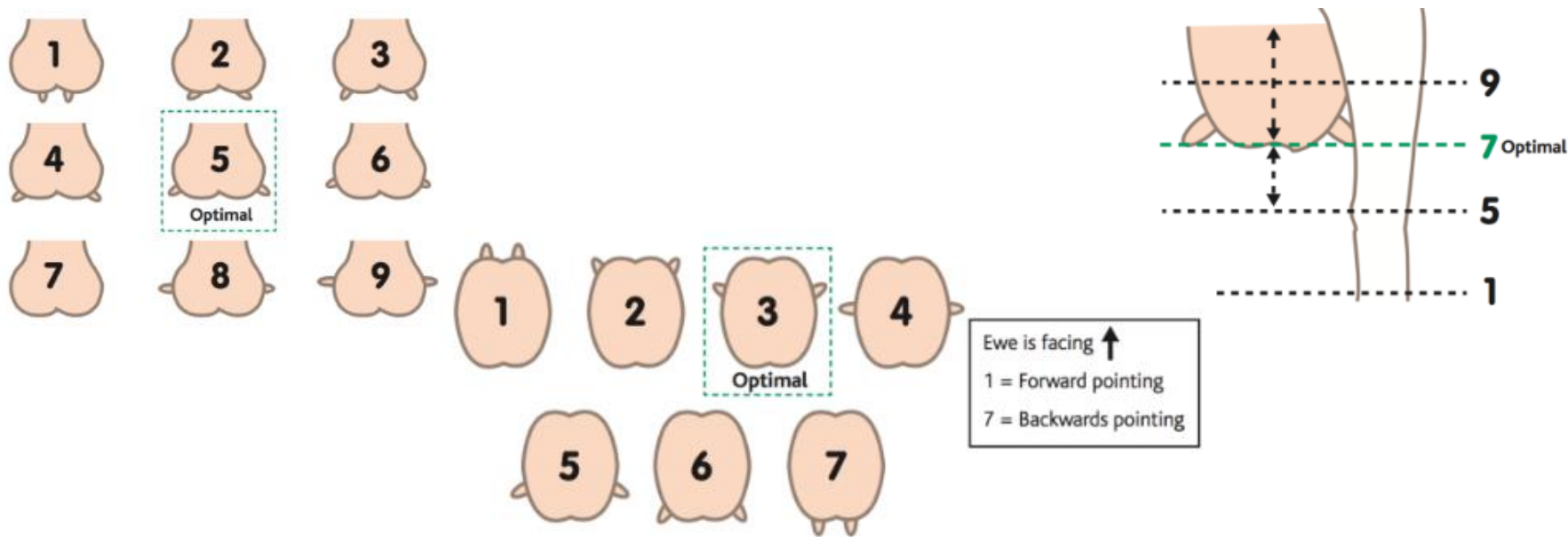


Prevalence of Mastitis



Cost of Subclinical Mastitis

- Our research: 45% of range ewes were culture positive ~5 d post-lambing and weaned, on average, **11.4 pounds lighter** litters.
- **Objectives**: Identify and evaluate traits that are easy to measure and can enhance ewe resistance to intramammary infection when selected on.



Other Projects

- Genetics of ewe reproductive performance in out-of-season and accelerated lambing programs.
- Terminal sire breed evaluation in high- and low-input lambing systems.
- Evaluation of the EasyCare in the Intermountain West.
- Genetic, nutritional, and biological factors associated with lamb eating and carcass quality.