



National Scrapie Eradication Program

Fiscal Year 2020 Report

October 1, 2019 to September 30, 2020

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Veterinary Services

Strategy and Policy Unit
Sheep and Goat Health Center

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A Note on Navigation

This presentation has hyperlinks for navigation. Text in **blue** is a hyperlink to the slide or website being discussed. Additionally, there are action buttons on each page:



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Return to 1st page of the Introduction

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Introduction

The National Scrapie Eradication Program focuses on seven primary areas:

- Education and prevention
- Animal identification and compliance
- Surveillance [Regulatory Scrapie Slaughter Surveillance (RSSS) and on-farm]
- Tracing positive and exposed animals and testing exposed animals
- Cleanup of infected and source flocks through genetic susceptibility testing and indemnification of susceptible exposed animals
- Monitoring previously infected and exposed flocks
- The Scrapie Free Flock Certification Program (SFCP)

Program Summary

Performance Measures - The percent of cull black-faced sheep found positive at slaughter, and the percent of cull sheep found positive at slaughter adjusted for face color¹ have been 0 percent since FY 2017 ([Chart 1](#) and [Chart 2](#)).

Positive Animals – No animals tested positive for classical scrapie in FY 2020. The most recent case of classical scrapie was in an Indiana goat sampled at slaughter in June of FY 2019. In FY 2020, 2 sheep tested positive at slaughter for non-classical scrapie (Nor98-like). One lamb sampled at slaughter in October 2019 was reported as “inconclusive” for classical scrapie. Lymph node tissue had suspect IHC staining. Genotype of the lamb was AA at codon 136 and RR at codon 171, which is considered to be resistant to classical scrapie. Additional testing, using three alternative antibodies to scrapie, produced mixed results. Further testing was conducted on the flock which was depopulated for diagnostic purposes and all samples were not detected by IHC. This case has similar staining to an RR lamb tested in April 2018.

¹*White, black and mottled-faced color sheep are weighted based on population; white-faced sheep have the greatest weight. If a white-faced positive sheep is found, this statistic will markedly increase. See notes below for details.*

Program Summary

Infected and Source Flocks - There have been no infected herds identified in FY 2020. One flock in Texas has an open infected status since April 2016, but there are no exposed animals on the premises. Animals designated for test must be sampled and valid test results obtained before the status can be closed.

The number of newly designated infected and source flocks by year since 1997 is shown in [Chart 3](#). The peak was in 2005 with 180 flocks.

Program Summary

Scrapie in Goats –The total number of NVSL confirmed positive cases in goats is 44 since FY 2002. Samples from three of these positive animals were collected through RSSS, one in November 2014, the second in July 2018, and the most recent in June 2019. The remainder of the positive cases have been found through testing of clinical suspects, testing of exposed animals, and trace-out investigations. [Figure 1](#) shows the number of positive cases by State and by fiscal year of last reported case.

Scrapie Free Flock Certification Program (SFCP) – At the end of the FY 2020, there were 226 flocks participating in the Scrapie Free Flock Certification Program (SFCP). Statuses of these flocks were 43 export monitored, 38 export certified, and 145 select monitored flocks ([Figure 2](#)). SFCP open statuses by fiscal year of Status date² from FY 2007 to FY 2020 are depicted in [Chart 4](#).

²Chart 4 represents the cumulative change in SFCP enrollment over time, and includes open and closed statuses/programs, and active and inactive flocks/herds. Previous charts of SFCP participation by year were manually updated and used the enrollment date to determine the year of participation in SFCP. With the change to Tableau charts, the start/status date is used. Many participating flocks were grandfathered into the Export category in 2013 with an earlier status date.

Surveillance

Surveillance activities are reported by Field Operations Districts shown in [Figure 3](#). Surveillance minimums are based on estimated breeding sheep and goat populations in each State. The distribution of sheep and goat populations by District is depicted in [Chart 5](#).

Components of Scrapie Surveillance

- **Regulatory Scrapie Slaughter Surveillance (RSSS)** started April 1, 2003. It is a targeted slaughter surveillance program which is designed to identify infected flocks. As of the end of FY 2020, samples have been collected from 667,035 animals since April 1, 2003. 32,253 samples were collected in FY 2020, 25,682 from sheep and 6,571 from goats.³ There have been 489 NVSL confirmed positive animals (473 classical cases – 470 sheep and 3 goats) and 16 Nor98-like cases since the beginning of RSSS. No animals tested positive for classical scrapie in FY 2020.

³Total sampling is decreased primarily due to the negative impacts of COVID-19 on the ability to collect samples.

Surveillance

Components of Scrapie Surveillance

- **RSSS Genotyping** – In November 2018, APHIS started a pilot project designed to decrease the costs of scrapie IHC testing by reducing the number of sheep that are tested for scrapie. Using a swab, a specimen for DNA analysis is collected at slaughter from each sheep, along with the obex and retropharyngeal lymph node. DNA is analyzed to determine the genotype at codon 171; tissue samples from genetically susceptible sheep are then tested for scrapie; samples from sheep that are not genetically susceptible are not tested. In FY 2019, 2,103 sheep⁴ were genotyped through this pilot, and in FY 2020, 3,088 were genotyped. To date, no samples from genetically susceptible sheep referred for scrapie testing have tested positive.

The number of RSSS sheep and goats collected in each District is shown in [Chart 6](#). Collection sites by state are shown in [Figure 4](#). [Figure 5](#) is a hex map, representing the number of animals collected in each State. [Chart 7](#) compares RSSS sampling by month for the current year with the monthly average of the previous 4 years.

⁴Sheep tested through RSSS Genotyping Pilot are included in the total number of sheep tested through RSSS.

Surveillance

Components of Scrapie Surveillance (continued)

- **On-farm Surveillance** includes both regulatory testing of scrapie exposed and potentially exposed sheep and goats and testing sheep and goats on farm for routine surveillance. 828 sheep and 848 goats were tested on-farm in FY 2020. No animals tested positive.

Surveillance Goals

The annual target is to test at least 40,000 animals for scrapie. Negative impacts of COVID-19 on the ability to collect samples contributed to not meeting this target. 33,929 animals were sampled for scrapie testing in FY 2020.

- 32,253 RSSS samples and 1,676 on-farm samples
- Of which 26,510 were sheep and 7,419 were goats.

Progress towards meeting the national surveillance target is depicted in [Chart 8](#). Distribution of sampling by type (RSSS or on-farm) and by species is shown in [Chart 9](#). [Chart 10](#) and [Table 1](#) is a breakdown by face-color (sheep) and type (goats) by age.

Surveillance

State Sampling Minimums

The National Scrapie Eradication Program establishes annual sheep sampling minimums for each State and tracks the States’ level of compliance with meeting these minimums. These State minimums were implemented in FY 2010 to ensure adequate geographical representation, so that APHIS can find the last remaining cases and document freedom from scrapie. State sampling minimums are established based on the population demographics of mature sheep and goats in each State. To account for the impacts of COVID on the ability of personnel to collect samples, the State sampling minimums were reduced to 81% of the State sampling minimum projected at the beginning of the year. The calculations used to derive the sampling minimums are described in the [National Scrapie Surveillance Plan](#). The COVID-adjusted State sampling minimums for sheep and goats, and the total number of animals sampled by State of Animal ID, are listed in in the following slides:

District 1	Table 2	District 3	Table 4
District 2	Table 3	District 4	Table 5

The percent sampling minimum for sheep and goats achieved by each State in FY 2019 are depicted in [Figure 6](#) and [Figure 7](#).

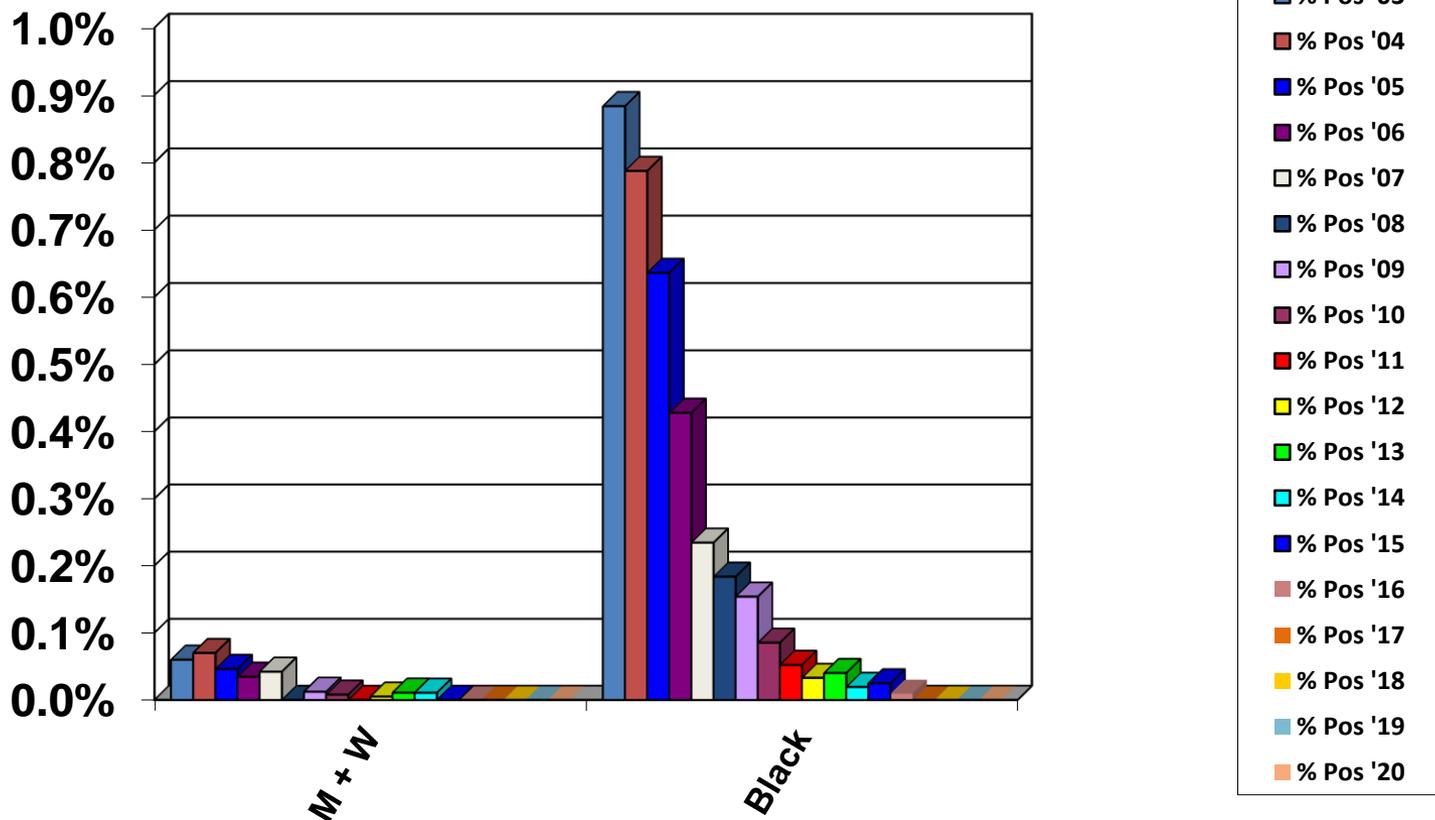
Surveillance

State Sampling Minimums (Cont.)

Surveillance option for meeting state minimums— Historically, several States have had difficulty meeting their annual sampling requirement. Starting in FY 2018, these States were able to increase and, in most cases, meet the sampling minimum by identifying sheep producers or dealers for genotyping of codon 171 prior to live-animal testing (rectal biopsy) of the genetically susceptible (primarily QQ, also KK, QH, QK) animals. Genotyping is done to reduce the costs associated with live-animal testing. The susceptible sheep that were live-animal tested and the genetically less susceptible (QR, RK, or RH) and genetically resistant (RR) sheep were credited to the State. Under this option, 647 sheep were genotyped during FY 2020; 152 of these had genotypes considered susceptible (23.5%). None of the susceptible animals that were live-animal tested were positive. In all, 495 sheep with genotypes considered resistant were credited to States. Sheep sampled on producer premises that had tags originating in a different State were credited to both the State of origin and the State where sampling occurred; if sampling occurred on a dealer premises they were credited only to the State of origin. These additional samples are included in the Total Number of Sheep Sampled column of Districts Tables (Tables 2 through 7), and in the calculations for the hex maps showing the percent of sampling minimum achieved (Figures 6 and 7). These genotyped animals are not included in any other charts in this report.

Percent of RSSS Sheep Samples that Tested Positive for Classical Scrapie - By Face Color

FY 2003 – FY 2020

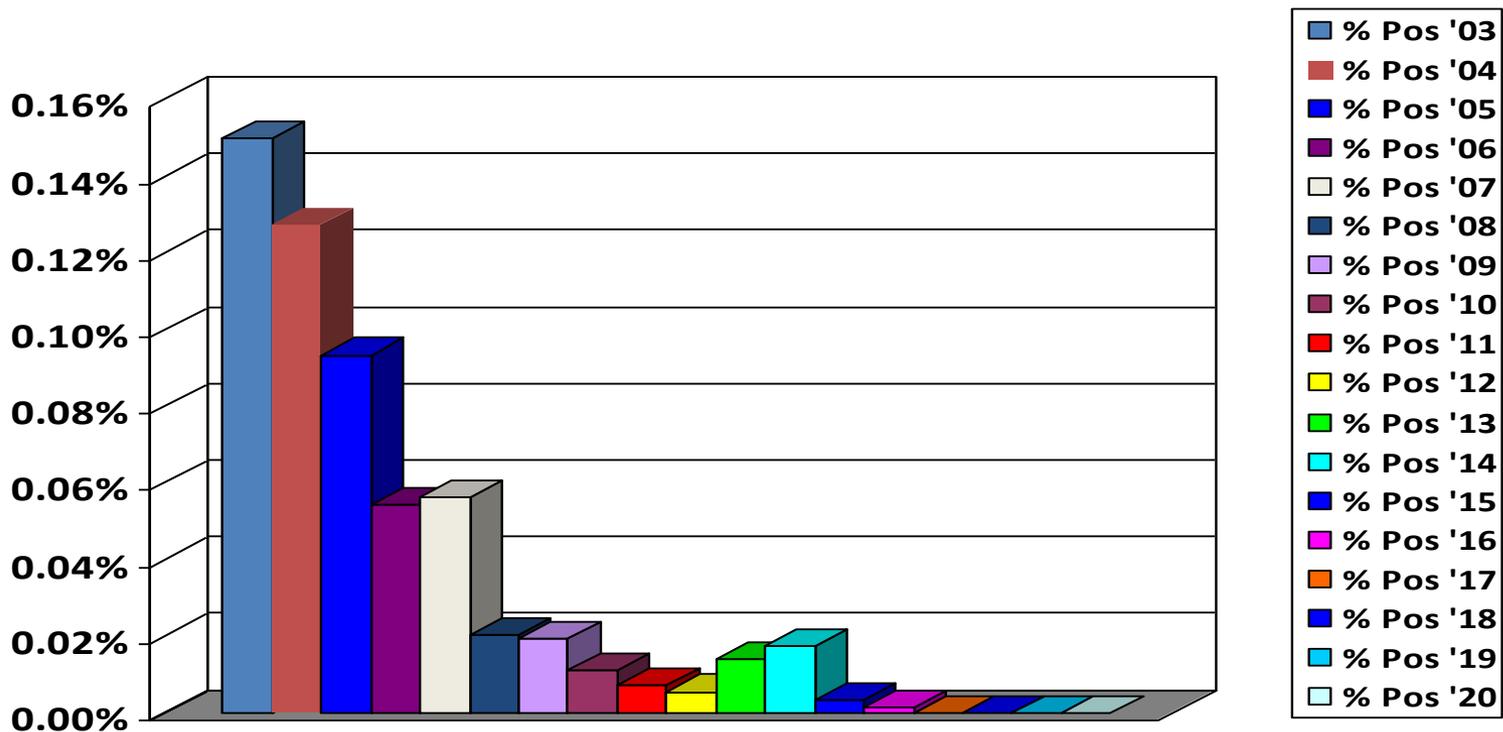


(Chart 1)

Adjusted to exclude multiple positive animals from same flock. Mottled- and white-faced combined. Does not include Nor98-like scrapie cases found through RSSS.

Percent of RSSS Sheep Samples that Tested Positive for Classical Scrapie - Weighted by Face Color

FY 2003 – FY 2020

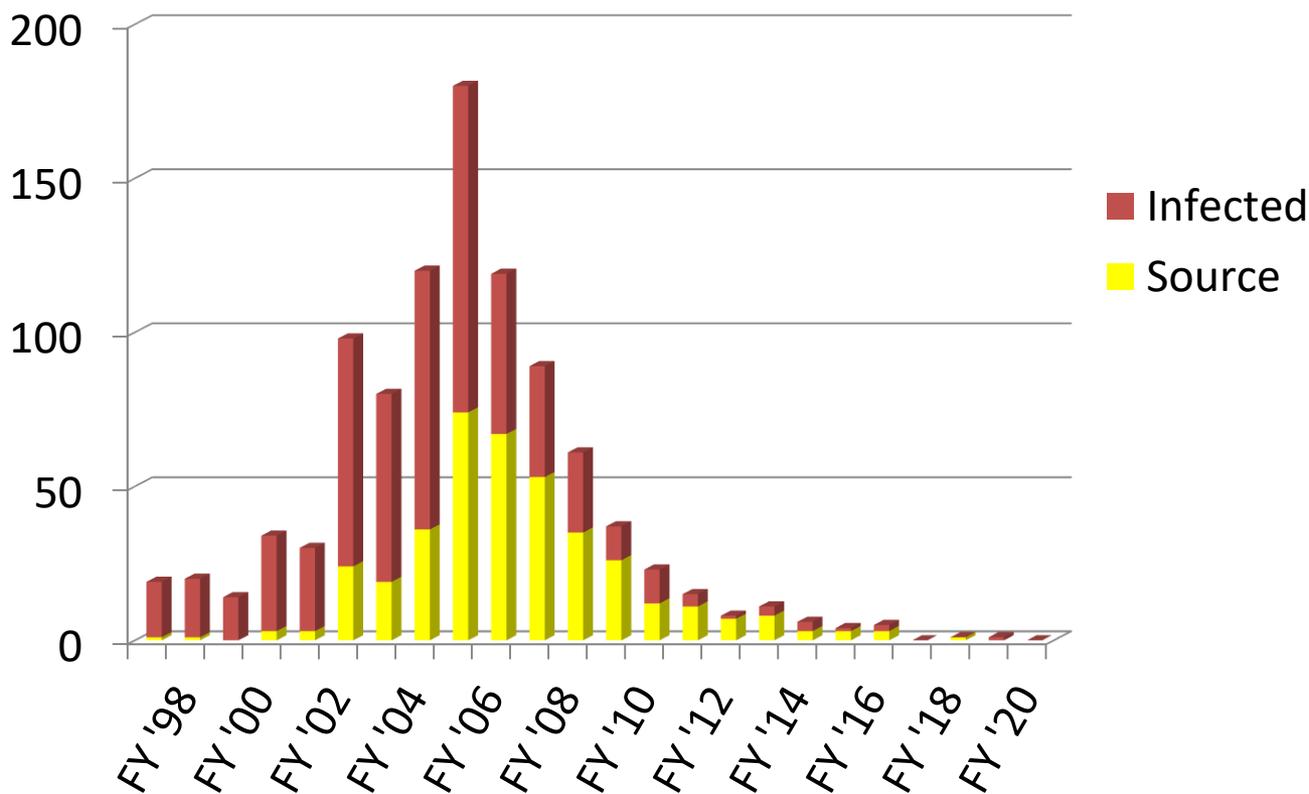


(Chart 2)

Adjusted to exclude multiple positive animals from the same flock. Does not include Nor98-like scrapie cases found through RSSS.

Infected and Source Flocks

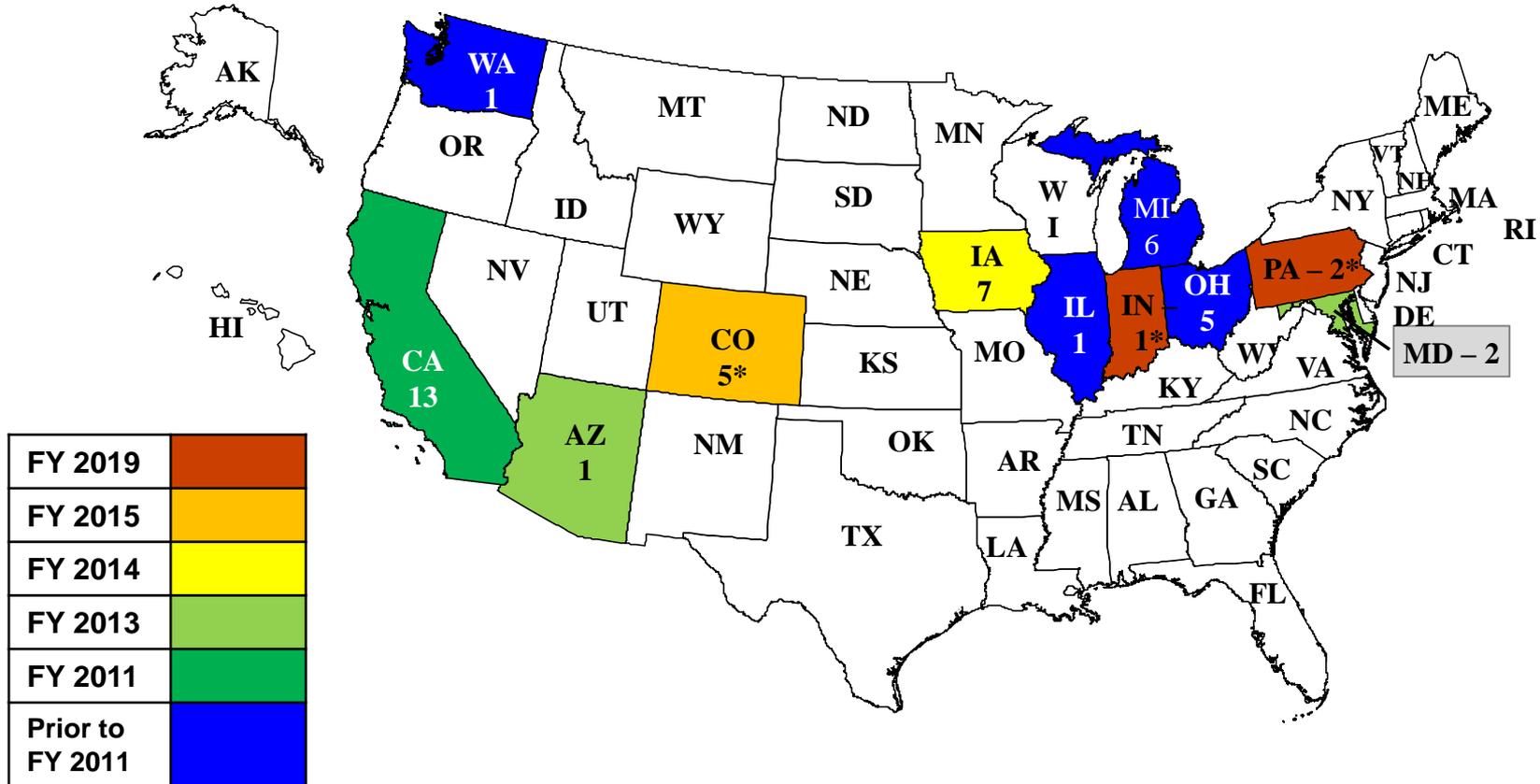
New Statuses by Year – *Fiscal Years 1997 to 2020*



(Chart 3)

Scrapie Cases in Goats

FY 2002 – FY 2020



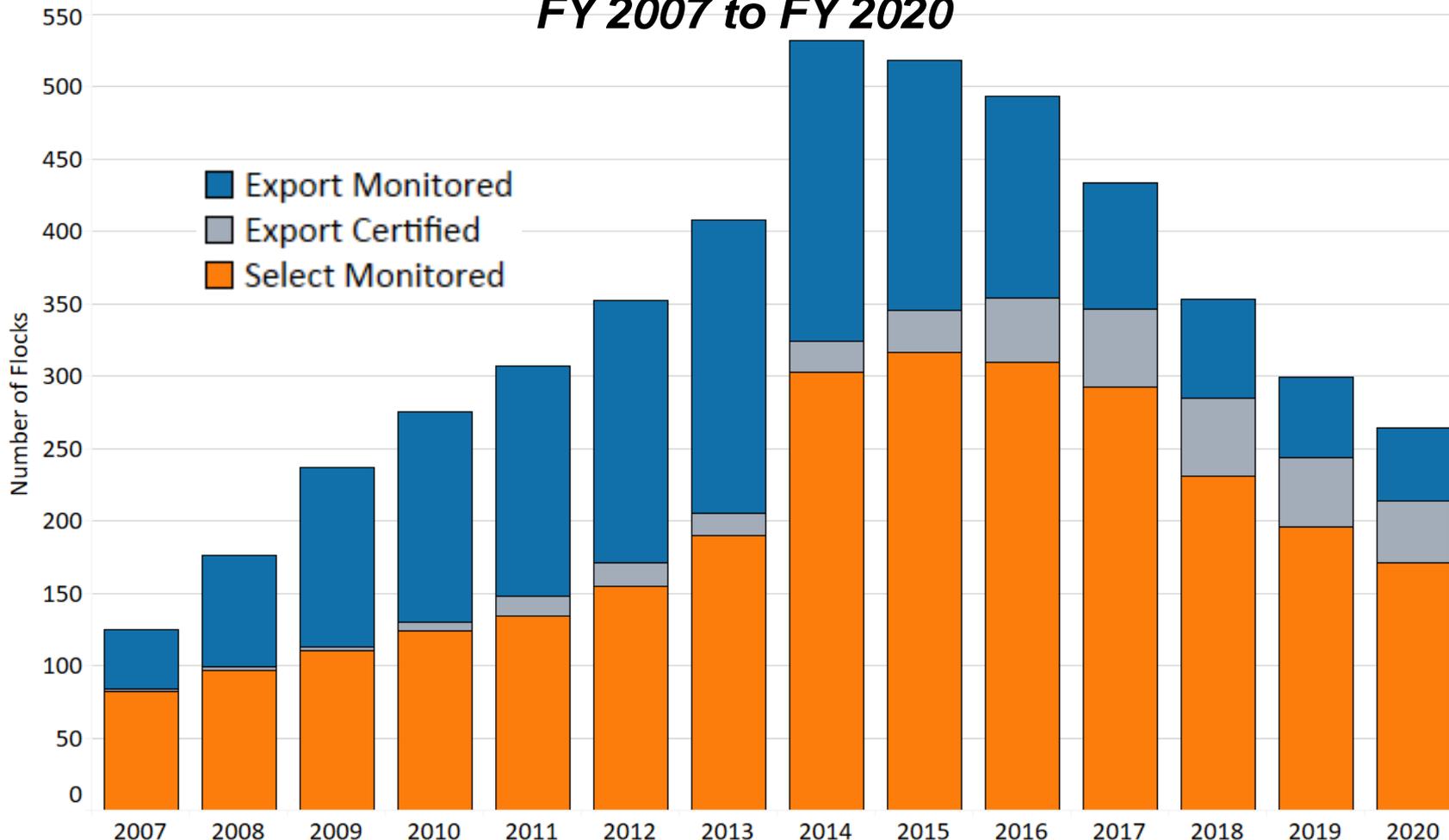
(Figure 1)

Color code indicates fiscal year of last case by State. 44 NVSL confirmed cases.

* States with 1 RSSS positive goat; samples collected November 2014, July 2018, and June 2019

SFCP Participating Flocks Based on Status Date

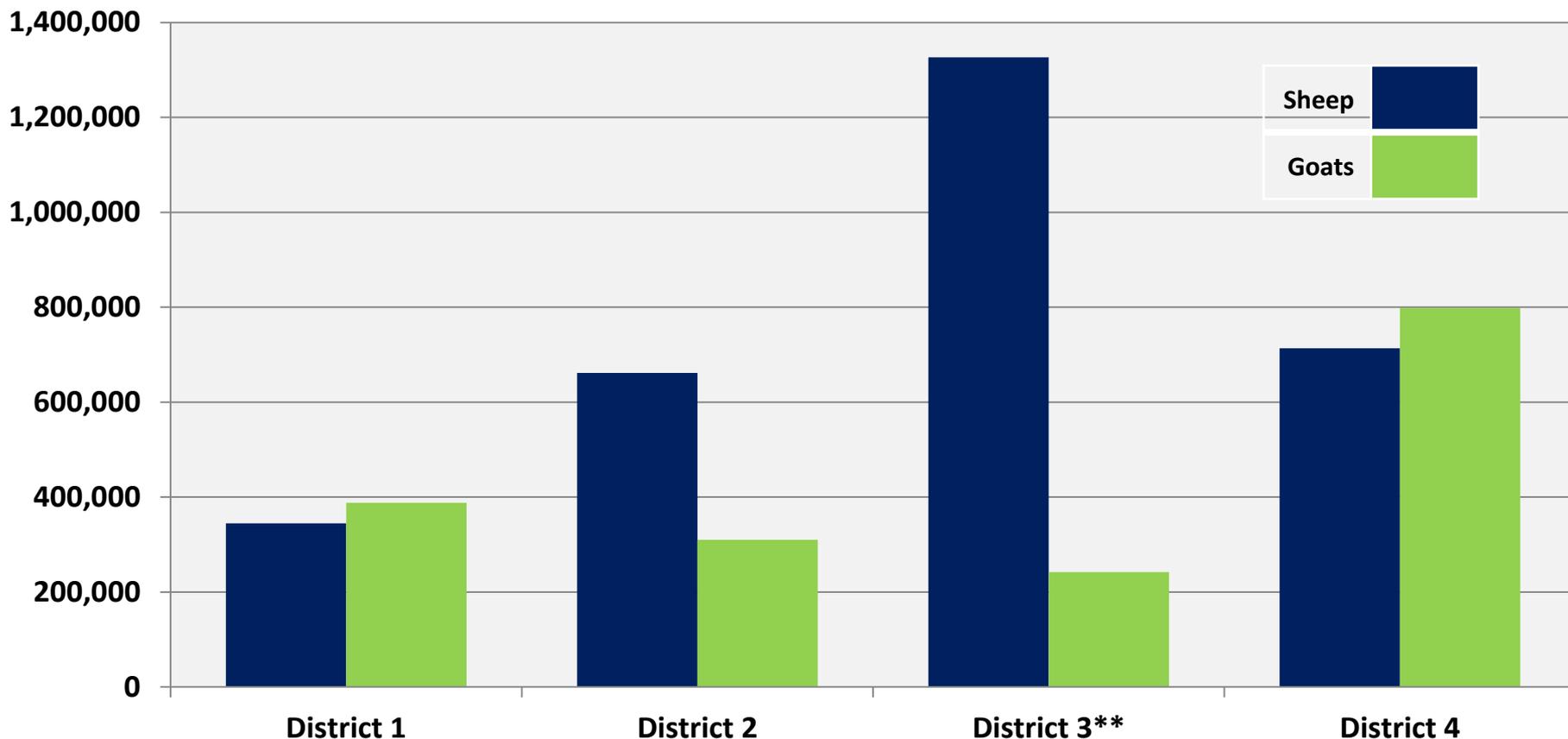
FY 2007 to FY 2020



(Chart 4)

Represents the cumulative change in SFCP enrollment over time, and includes open and closed statuses/programs, and active and inactive flocks/herds. Chart is based on current or last status date; many participating flocks were grandfathered into Export program in 2013 with earlier status date.

Total Sheep and Goat Populations by District*



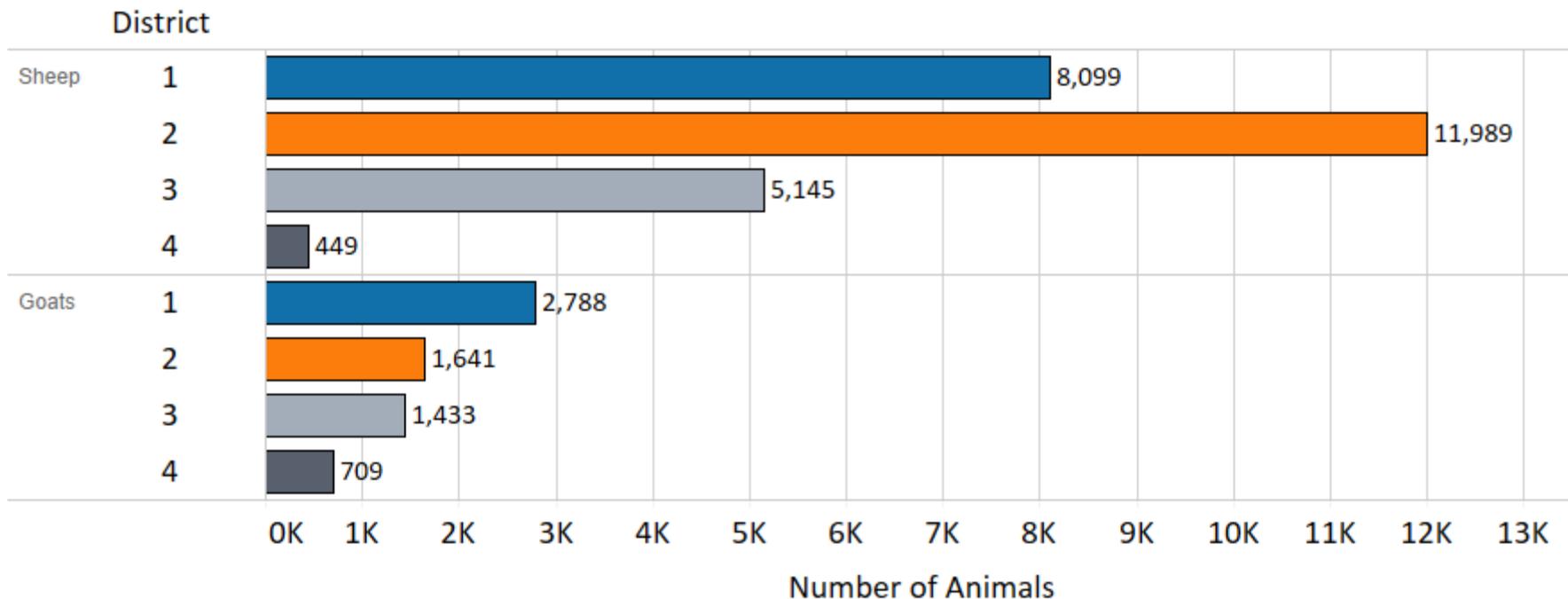
(Chart 5)

* Source: NASS Sheep and Goat, January 31, 2020.

** Does not include sheep and goats residing on the Navajo Nation.

Total RSSS Samples Collected by District

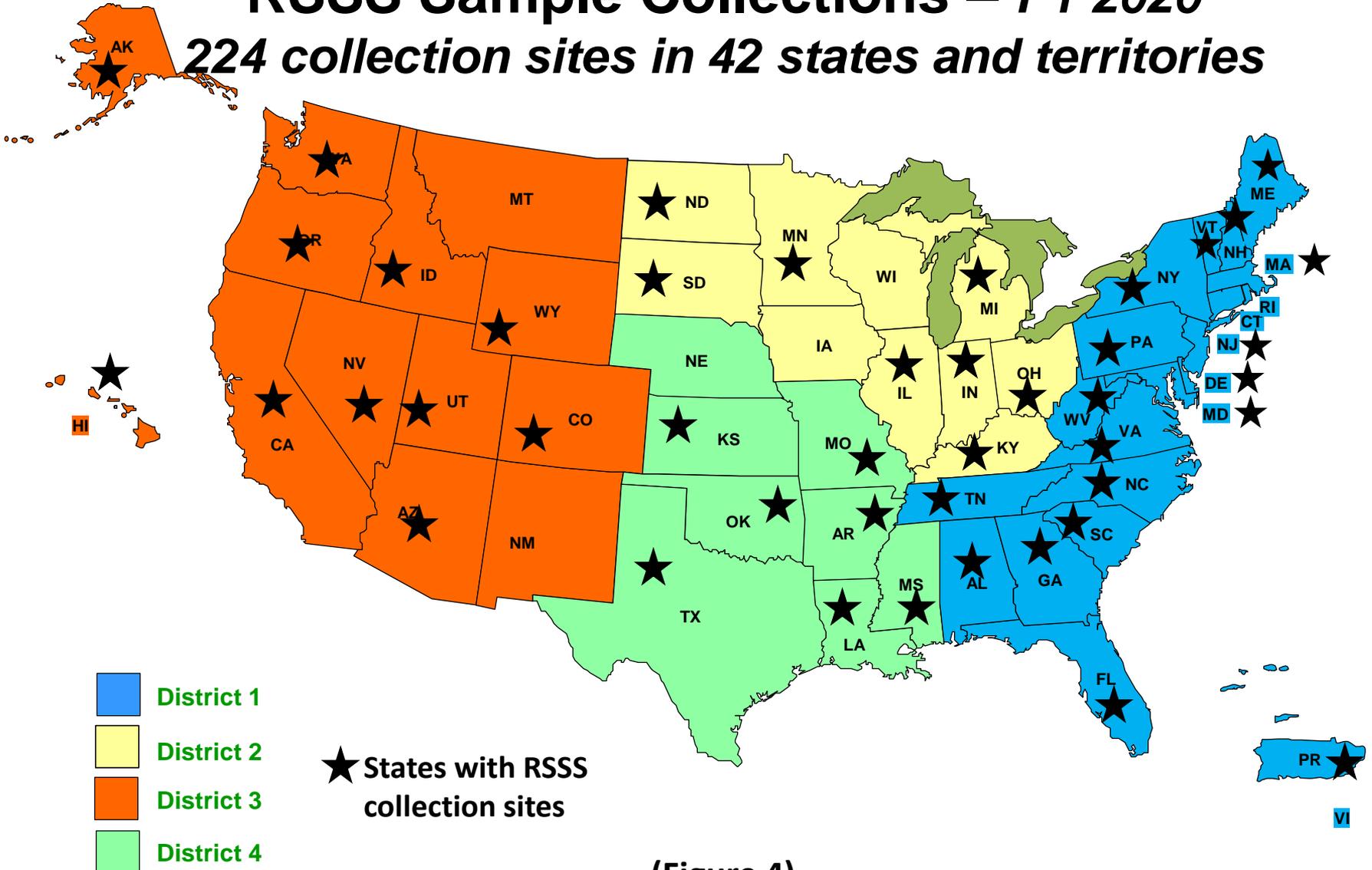
FY 2020



(Chart 6)

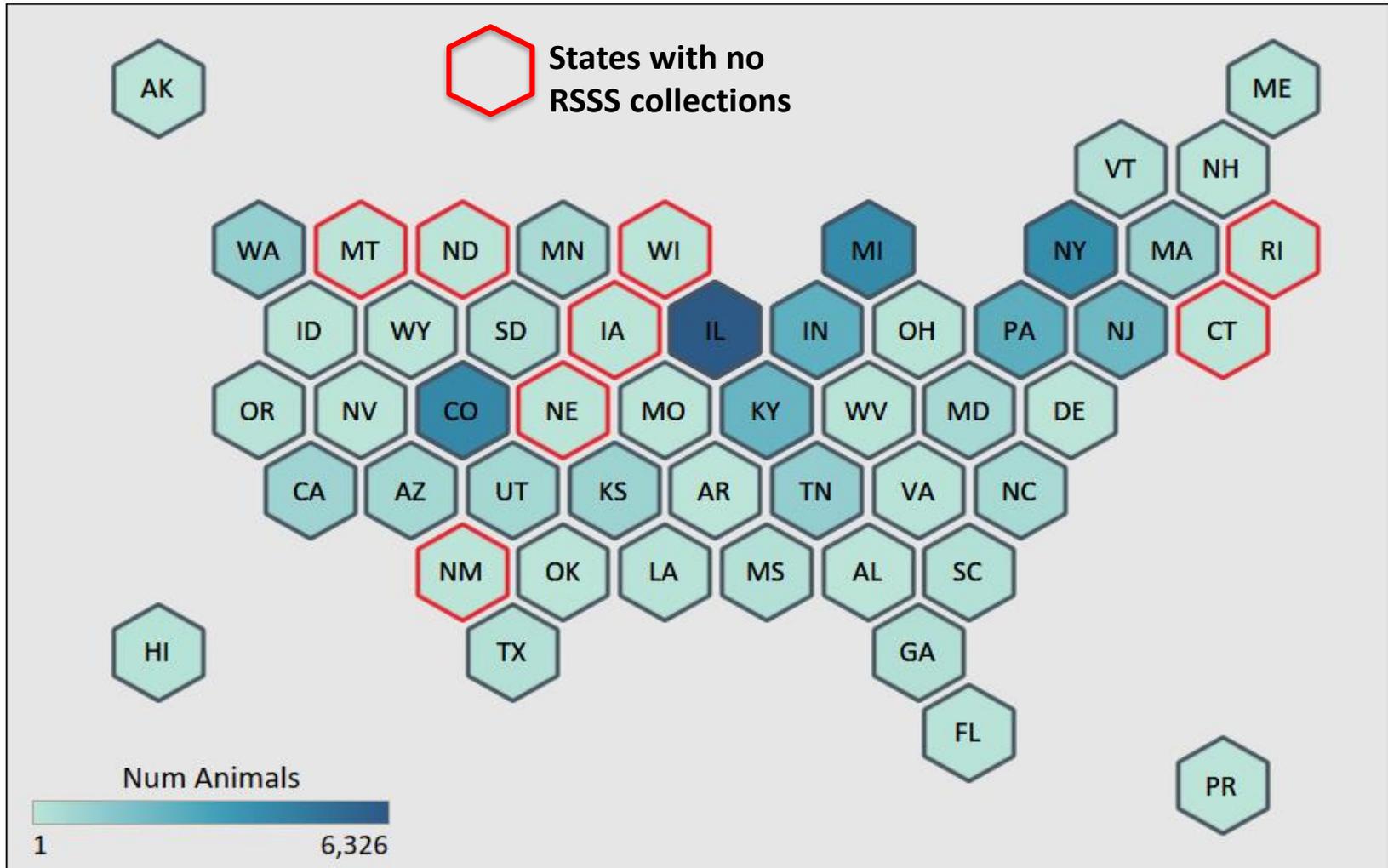
RSSS Sample Collections – FY 2020

224 collection sites in 42 states and territories



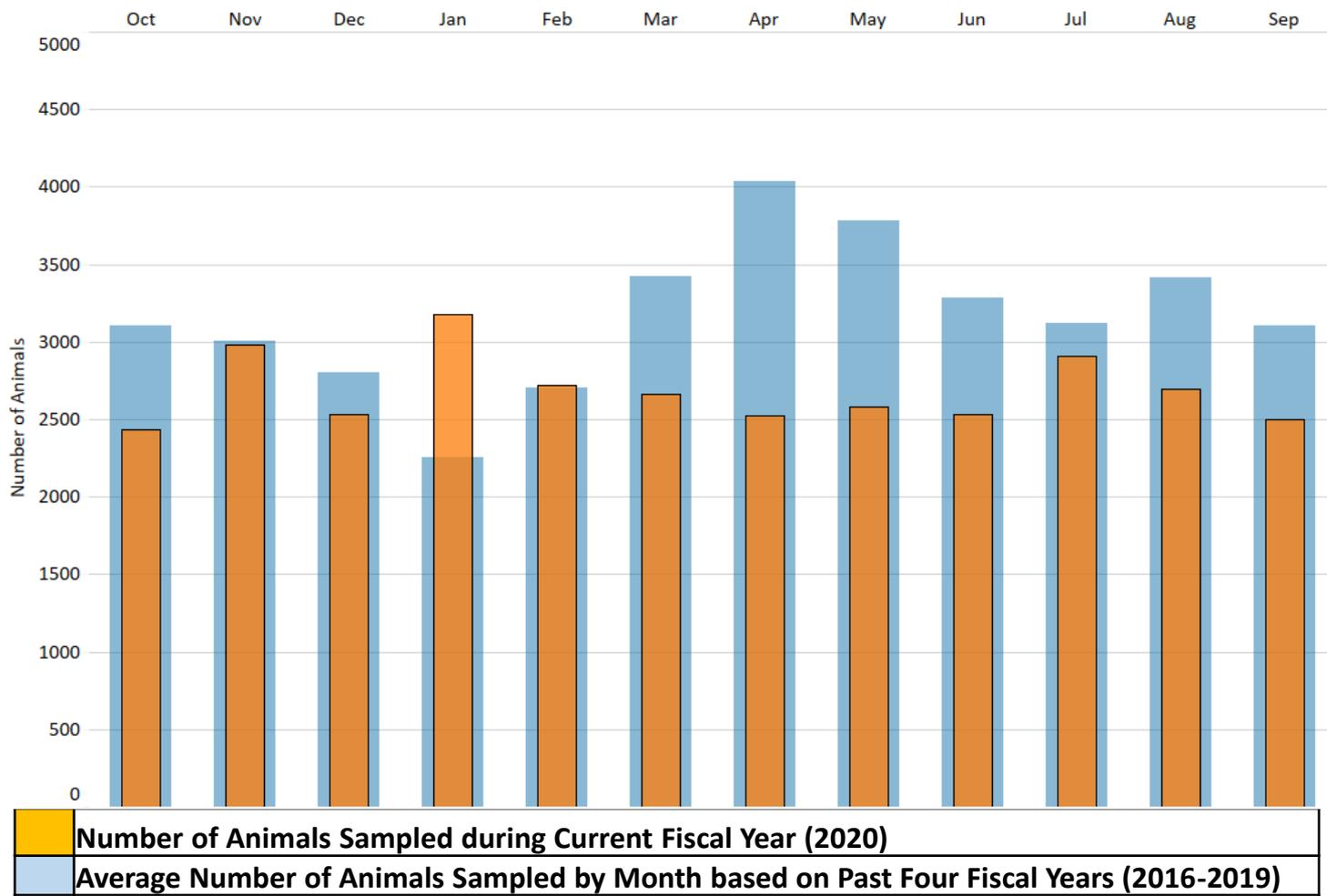
(Figure 4)

Total RSSS Samples Collected by State FY 2020



(Figure 5)

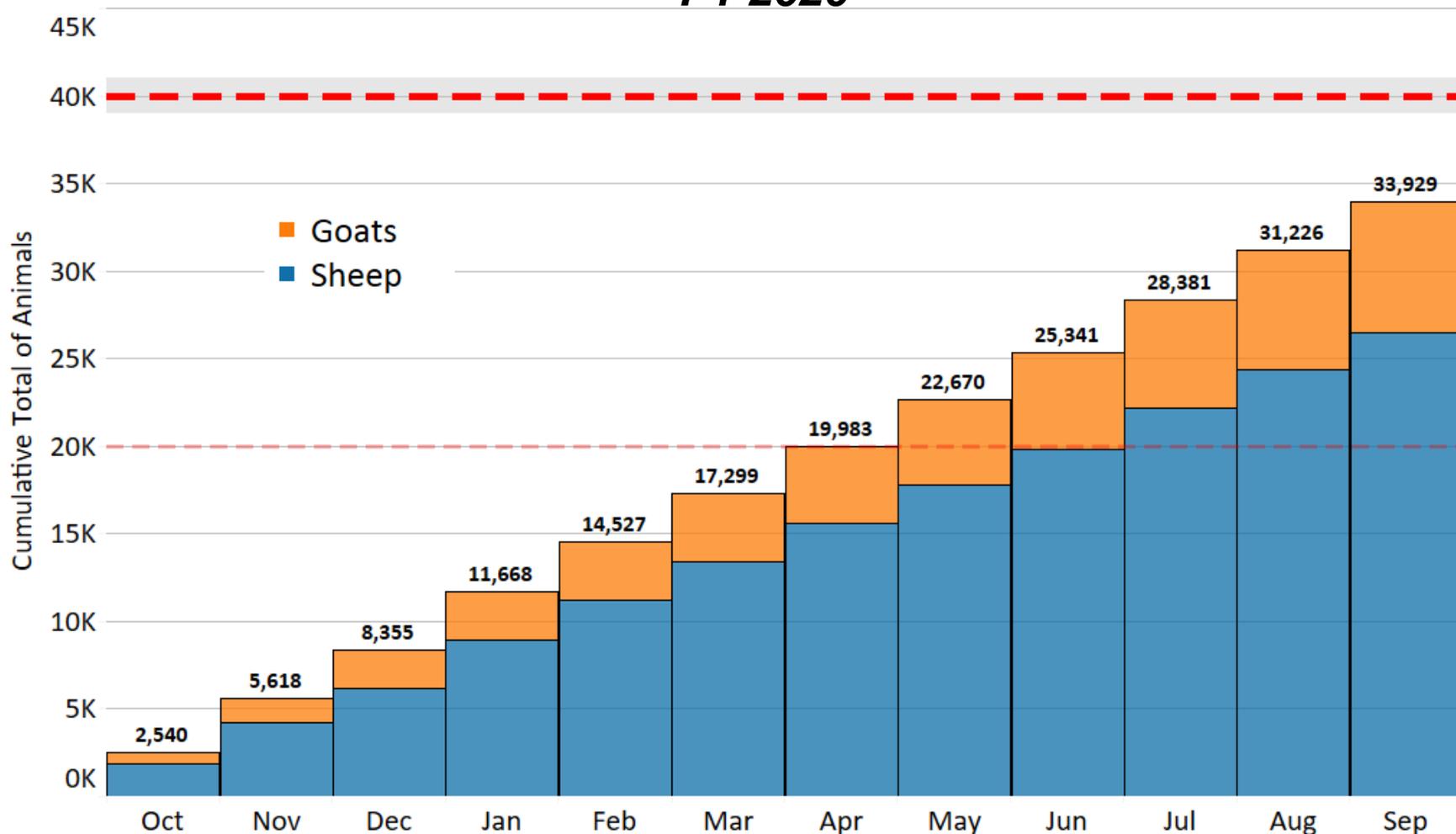
Comparison by Month of RSSS Samples Collected in FY 2020 to Average of FY 2016 – FY 2019



(Chart 7)

Cumulative Number of Animals Sampled by Month

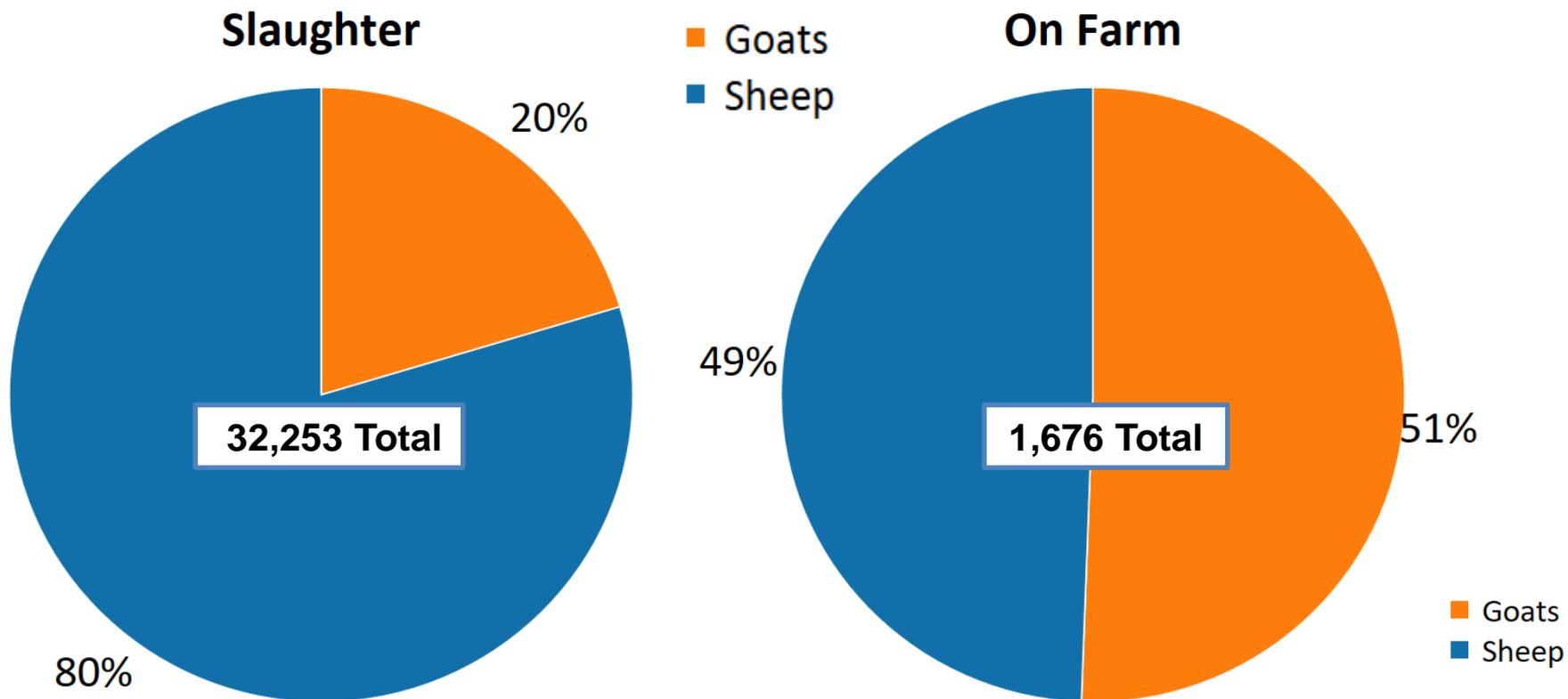
FY 2020



(Chart 8)

RSSS and On-Farm Surveillance Sampling by Species

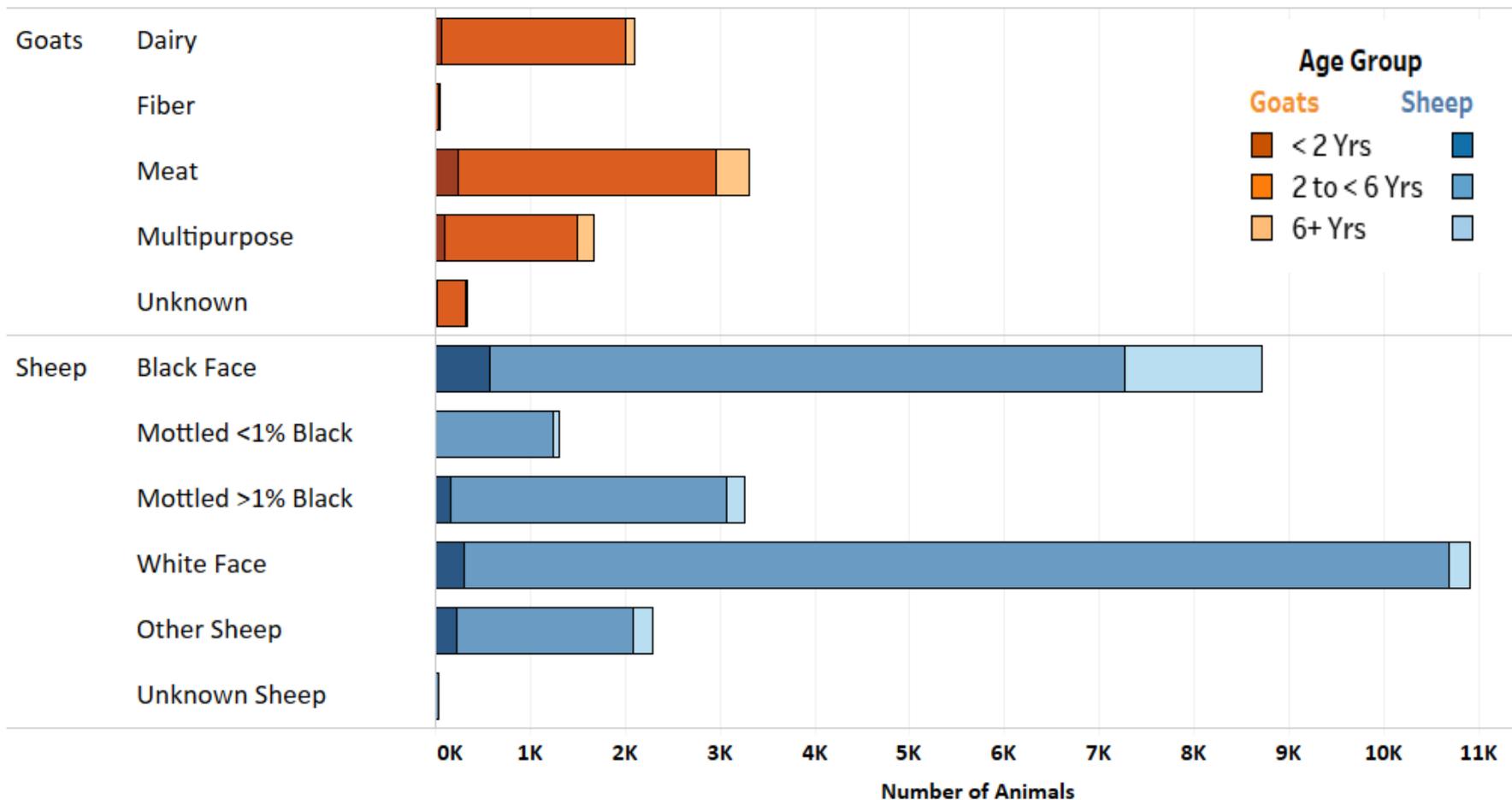
FY 2020



(Chart 9)

RSSS and On-Farm Surveillance Testing by Species

FY 2020



(Chart 10)

RSSS and On-Farm Surveillance Testing by Species

FY 2020

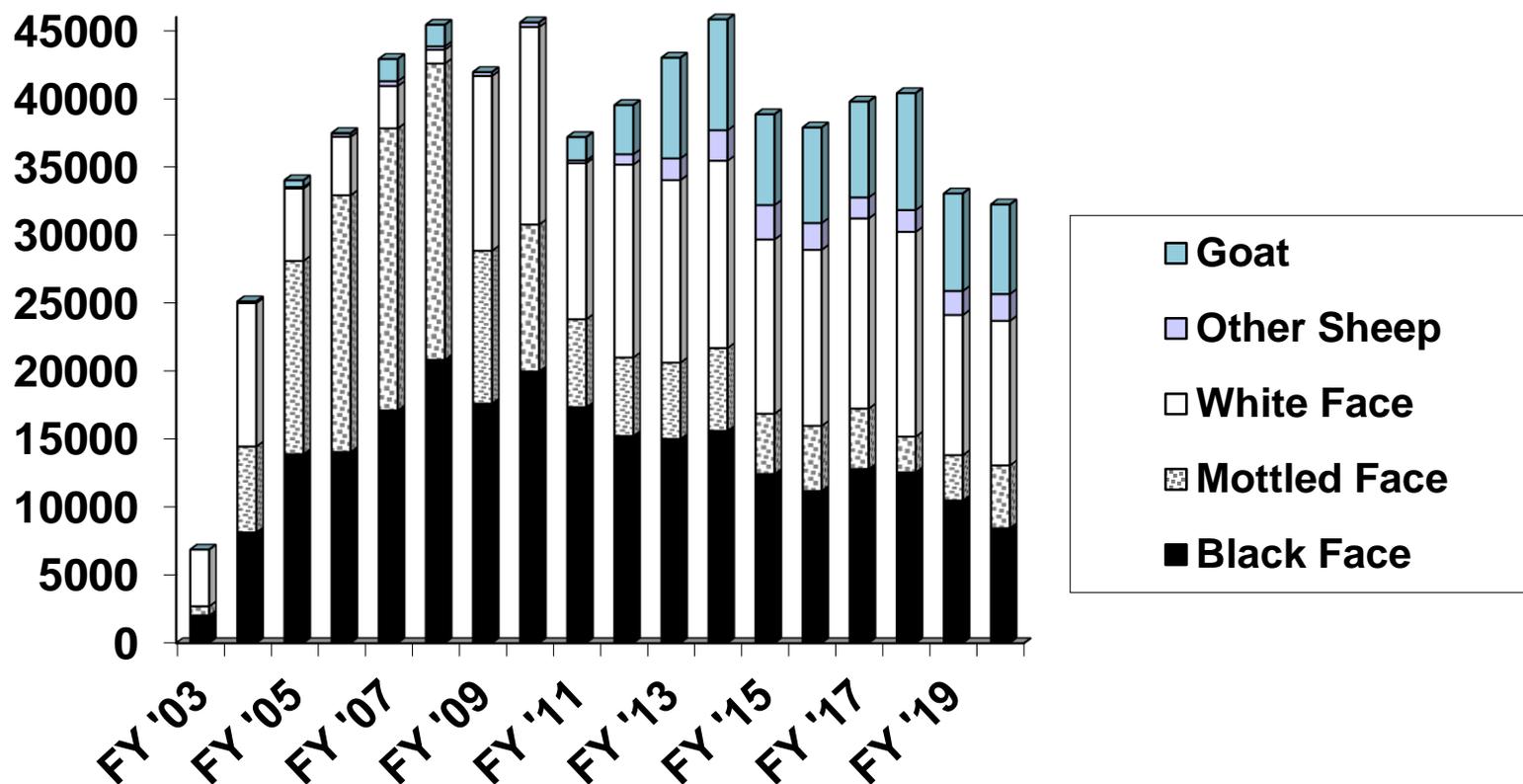
Species.. Type		Age Group			Grand Total
		< 2 Yrs	2 to < 6 Yrs	6+ Yrs	
Goats	Dairy	56	1,945	93	2,094
	Fiber	1	32	3	36
	Meat	238	2,724	344	3,306
	Multipurpose	100	1,392	170	1,662
	Unknown	10	307	4	321
	Total	405	6,400	614	7,419
Sheep	Black Face	568	6,705	1,438	8,711
	Mottled <1% Black	4	1,241	67	1,312
	Mottled >1% Black	165	2,906	192	3,263
	White Face	310	10,374	221	10,905
	Other Sheep	216	1,867	209	2,292
	Unknown Sheep	7	20		27
	Total	1,270	23,113	2,127	26,510
Grand Total		1,675	29,513	2,741	33,929

(Table 1)

Number of Records
 1 10,374

Darker shading represents greater number of animals tested that met targeting criteria.

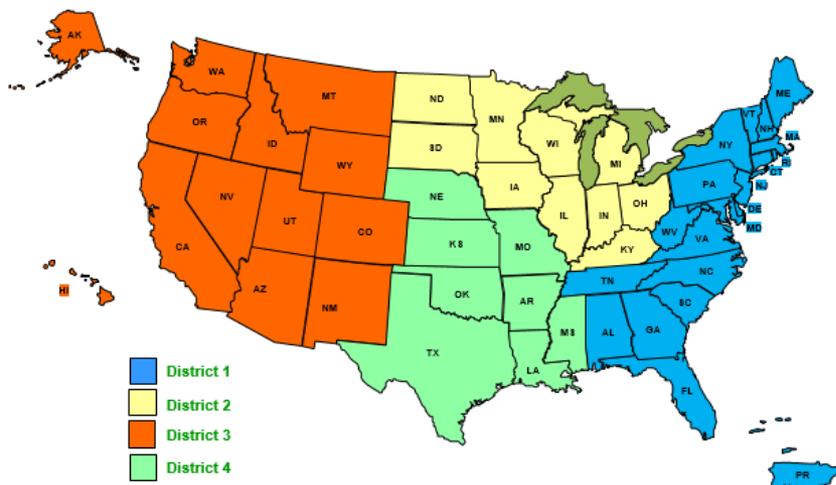
Surveillance Samples Collected at Slaughter FY 2003 – 2020



(Chart 11)

Other sheep includes hair sheep, and sheep with gray, red, or unknown face color. Chart includes animals collected for RSSS & CSPS.

FY 2020 Sheep and Goat State Sampling Minimums¹ and State Collections - District 1



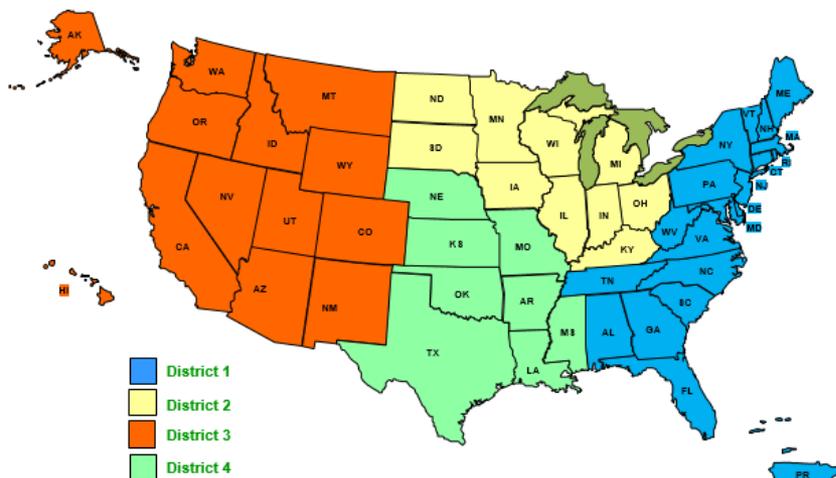
State	Sheep		Goats	
	Total Sampled FY 2020	Sampling Minimum FY 2020	Total Sampled FY 2020	Sampling Minimum FY 2020
Alabama	102	99	69	70
Connecticut	43	18	26	6
Delaware	9	3	6	3
Florida	96	61	124	83
Georgia	98	59	137	96
Maine	134	33	26	9
Maryland	171	74	76	15
Massachusetts	424	32	49	13
New Hampshire	100	23	11	7
New Jersey	84	51	8	12
New York	502	265	159	42
North Carolina	243	93	152	79
Pennsylvania	778	368	201	77
Rhode Island	42	6	8	2
South Carolina	60	36	133	49
Tennessee	864	151	193	134
Vermont	126	46	19	15
Virginia	418	294	97	67
West Virginia	293	109	65	29

(Table 2)

¹State minimums are adjusted for COVID impacts

FY 2020 Sheep and Goat State Sampling Minimums¹ and State Collections - District 2

State	Sheep		Goats	
	Total Sampled FY 2020	Sampling Minimum FY 2020	Total Sampled FY 2020	Sampling Minimum FY 2020
Illinois	711	378	202	62
Indiana	993	432	175	83
Iowa	961	810	186	126
Kentucky	465	192	106	104
Michigan	1,337	392	186	53
Minnesota	1,500	384	168	70
North Dakota	821	187	21	9
Ohio	1,290	810	158	103
South Dakota	2,611	816	41	31
Wisconsin	1,479	418	259	169

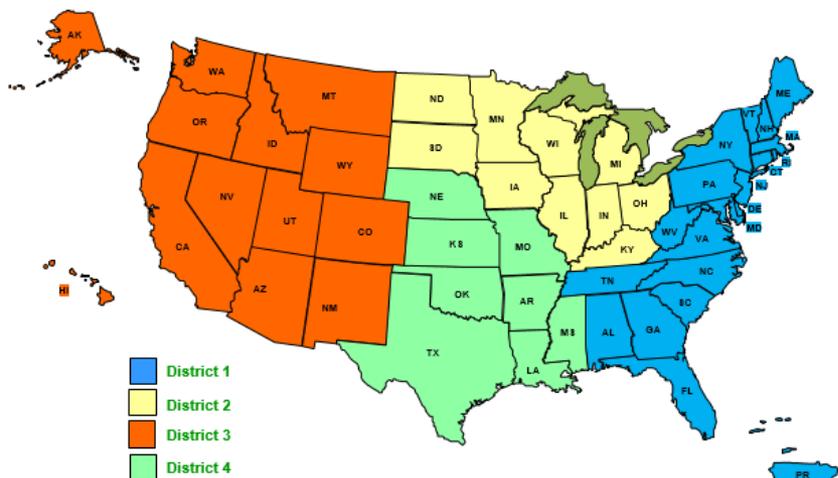


(Table 3)

¹State minimums are adjusted for COVID impacts

FY 2020 Sheep and Goat State Sampling Minimums¹ and State Collections - District 3

State	Sheep		Goats	
	Total Sampled FY 2020	Sampling Minimum FY 2020	Total Sampled FY 2020	Sampling Minimum FY 2020
Alaska	3	2	6	1
Arizona	146	136	321	37
California	533	643	147	305
Colorado	1,269	810	471	79
Hawaii	114	84	40	32
Idaho	398	468	133	50
Montana	1,637	363	41	23
Nevada	65	380	35	44
New Mexico	146	211	69	30
Oregon	490	342	108	92
Utah	390	486	71	30
Washington	368	72	103	66
Wyoming	1,707	553	70	22

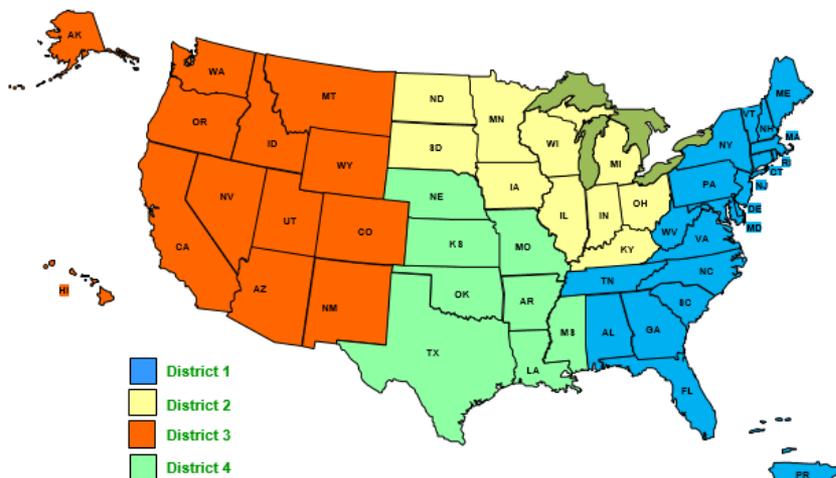


(Table 4)

¹State minimums are adjusted for COVID impacts

FY 2020 Sheep and Goat State Sampling Minimums¹ and State Collections - District 4

State	Sheep		Goats	
	Total Sampled FY 2020	Sampling Minimum FY 2020	Total Sampled FY 2020	Sampling Minimum FY 2020
Arkansas	97	84	55	90
Kansas	406	281	276	120
Louisiana	55	13	61	41
Mississippi	80	58	113	57
Missouri	437	162	409	211
Nebraska	458	136	69	72
Oklahoma	247	228	313	219
Texas	1,308	810	1,482	810



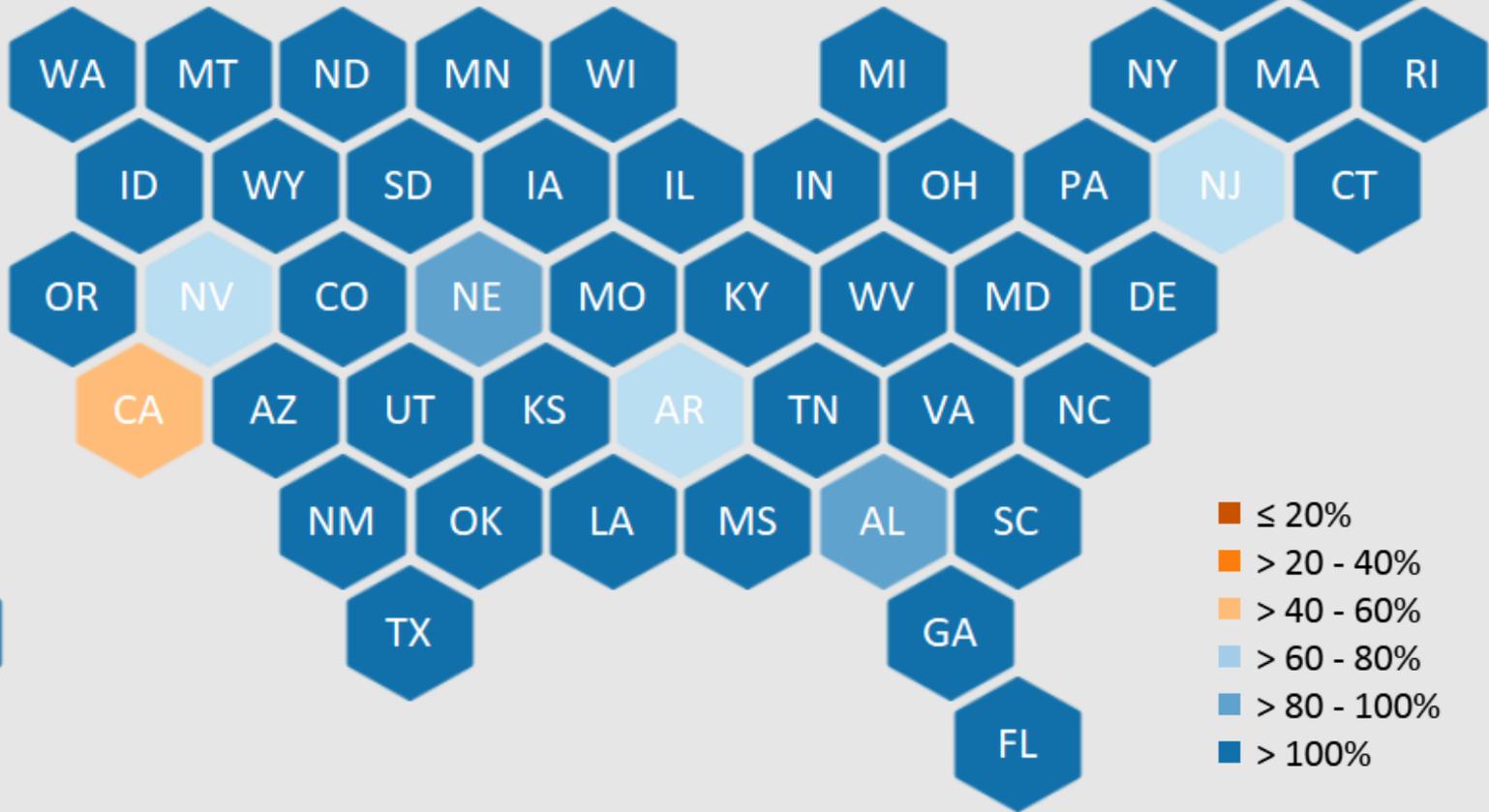
(Table 5)

¹State minimums are adjusted for COVID impacts

Percent of Sampling Minimum Achieved in FY 2019 - RSSS and On-farm Surveillance Goats

AK

ME



(Figure 7)

AK and RI have a sampling minimum of 1, and DE has a sampling minimum of 2.