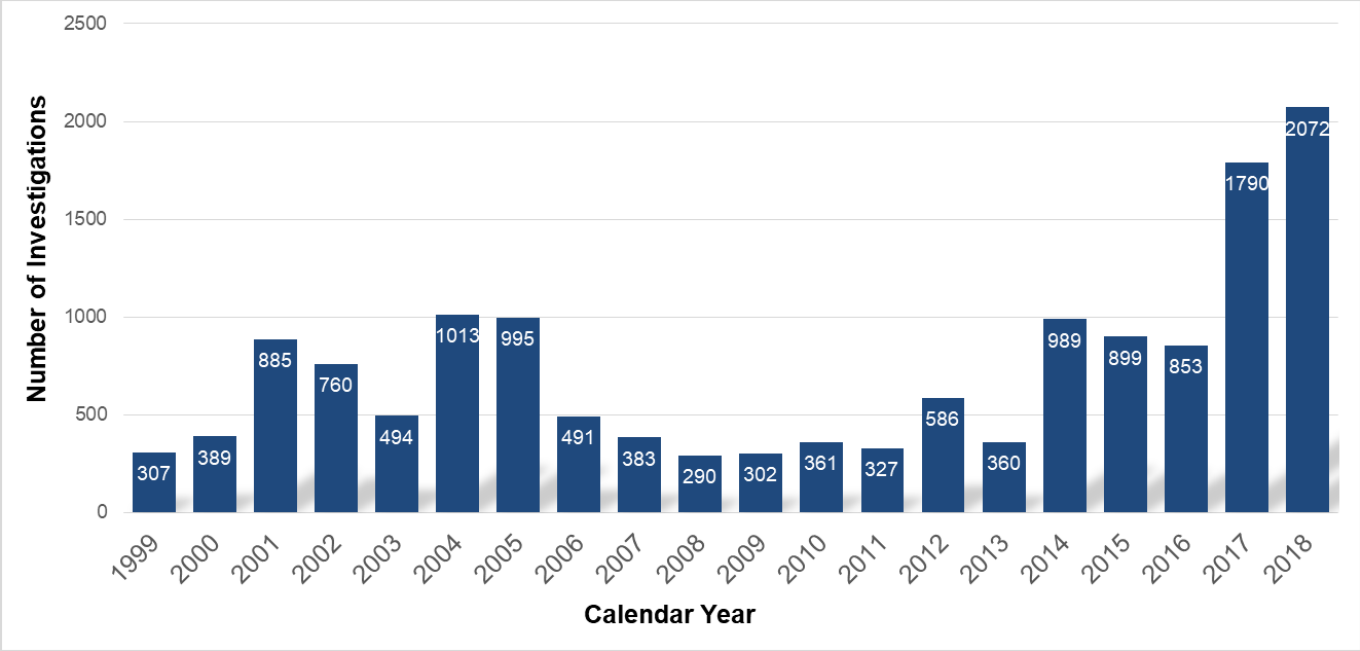
United States Department of Agriculture

Calendar Year 2018 Update: FAD Investigation Report

SUMMARY OF RECENT FAD INVESTIGATIONS

In the past 20 years, there have been over 14,500 investigations conducted for possible foreign animal disease (FAD) or emerging disease incidents throughout the United States, ranging from a yearly low of 290 investigations in calendar year 2008 to a high of 2,072 investigations in calendar year 2018 (Figure 1).

Figure 1: FAD Investigations from 1999 to 2018.

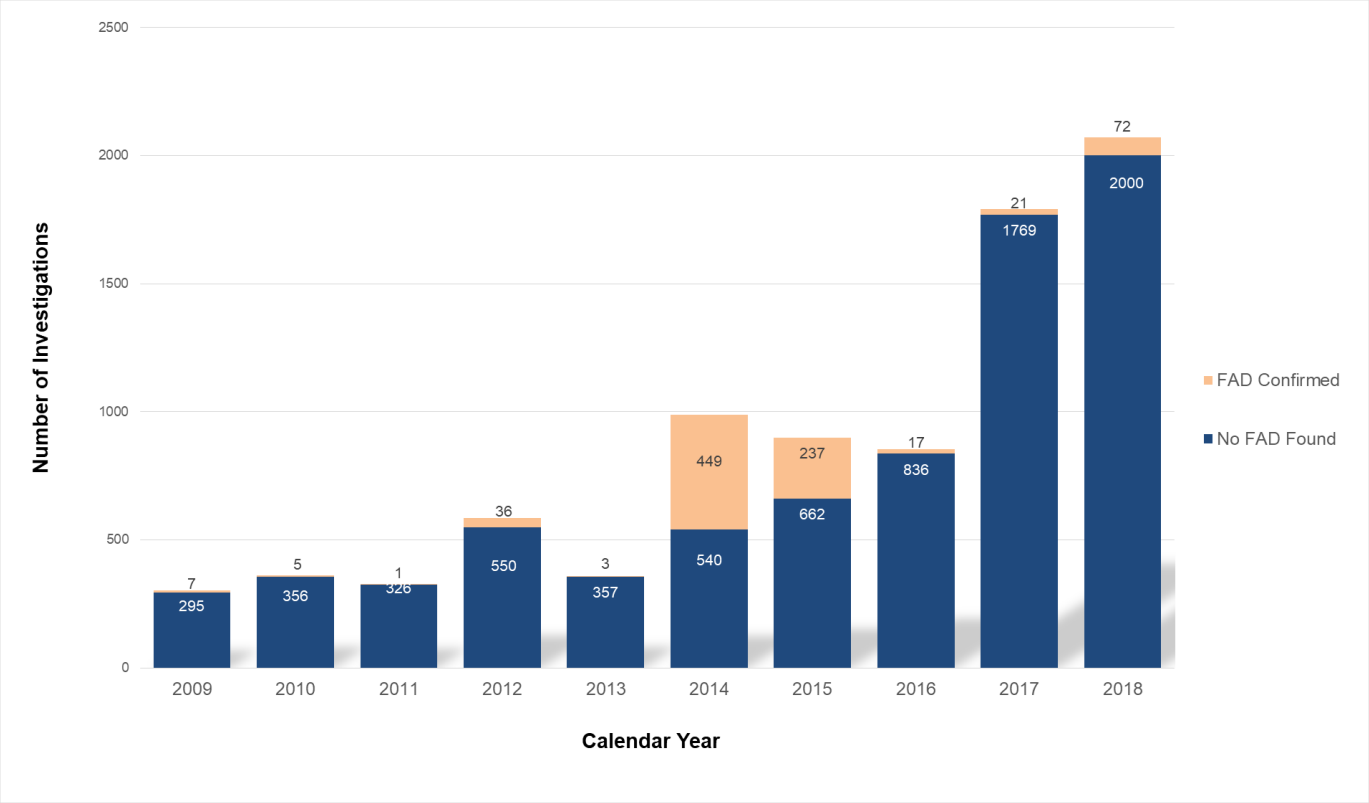


This summary of FAD investigations was compiled from annual animal health reports in the United States published by Veterinary Services (VS) of the USDA Animal and Plant Health Inspection Service (APHIS) (available here), data from the World Organization for Animal Health (OIE) World Animal Health Information Database (available here), and the Emergency Management Response System (EMRS) of APHIS VS. All data in this report from 2014 to present are from EMRS 2.0 (EMRS2), which is the VS system of record for FAD incidents.

2009 – 2018

From 2009 through 2018, 8,539 possible FAD or emerging disease incidents were investigated by VS and State collaborators. In most years, only a small percentage of those were confirmed by the investigation to be an emerging disease or FAD. The exceptions during this period included the following: a widespread vesicular stomatitis outbreak in 2014, the largest ever highly pathogenic avian influenza (HPAI) outbreak in the United States in 2015, and an outbreak of virulent Newcastle disease (vND) in 2018 (Figure 2). Please note that in and after CY2015, vesicular stomatitis has not been considered an FAD in the United States.

Figure 2: FAD Investigations by Result, 2009 to 2018.



In Figure 2, it is important to note these are not annual “animal” or “case” counts of FADs in the United States. Figure 2 only illustrates the number of investigations that resulted in an FAD confirmation. In the case of equine piroplasmosis (EP) caused by *Theileria equi* or *Babesia caballi*, investigations entered into EMRS2 may be associated with an EP detection, but EMRS2 does not provide a complete picture on EP prevalence or incidence in the United States.

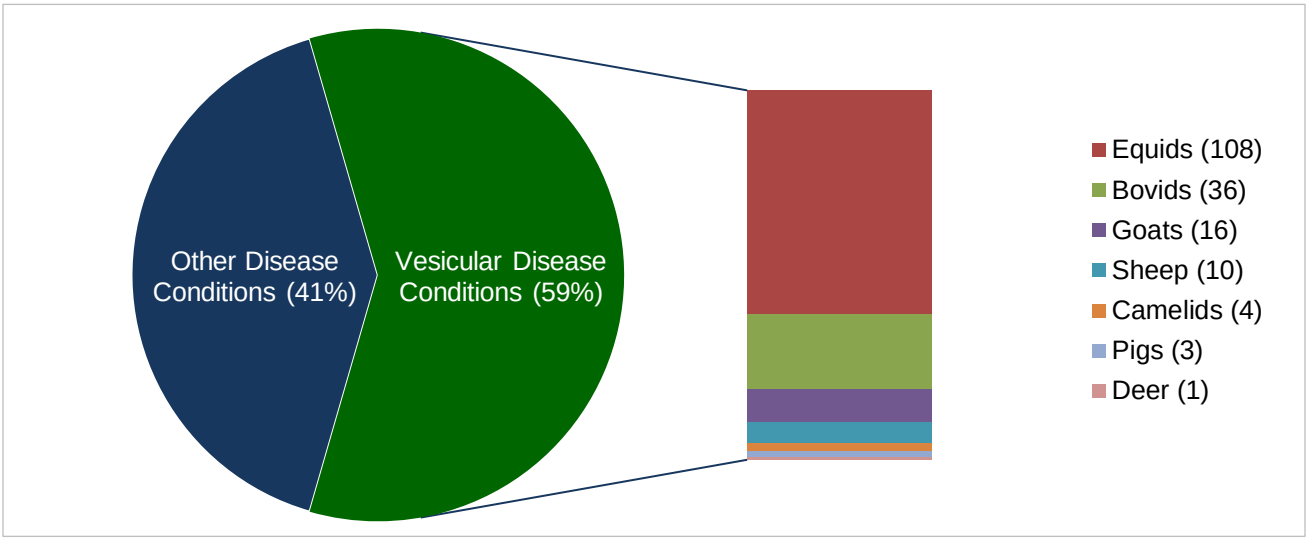
The sections below detail FAD investigations for the last 10 years (2009–2018). In Figures 3–10 below, the bar color is based on relative number, not on species. The species with the most vesicular investigations is red. Red does not refer to pigs (or bovids, equids), etc. Figures 11–12 are in a new format; the color is still based on relative number, not species.

2009

Of the 302 investigations conducted in 2009, 7 resulted in confirmed FAD findings. Two of the investigations found EP and five confirmed vesicular stomatitis.

In 2009, vesicular conditions of the muzzle and feet were once again the most common complaint investigated. Of the 302 investigations in 2009 there were 178 vesicular complaints; of these, 108 were in equids, 36 in bovids, 16 in goats, 10 in sheep, 4 in camelids, 3 in pigs, and 1 in a pudu, a South American deer species (Figure 3).

Figure 3: Proportion of Investigations due to Vesicular Conditions, by Species in 2009.

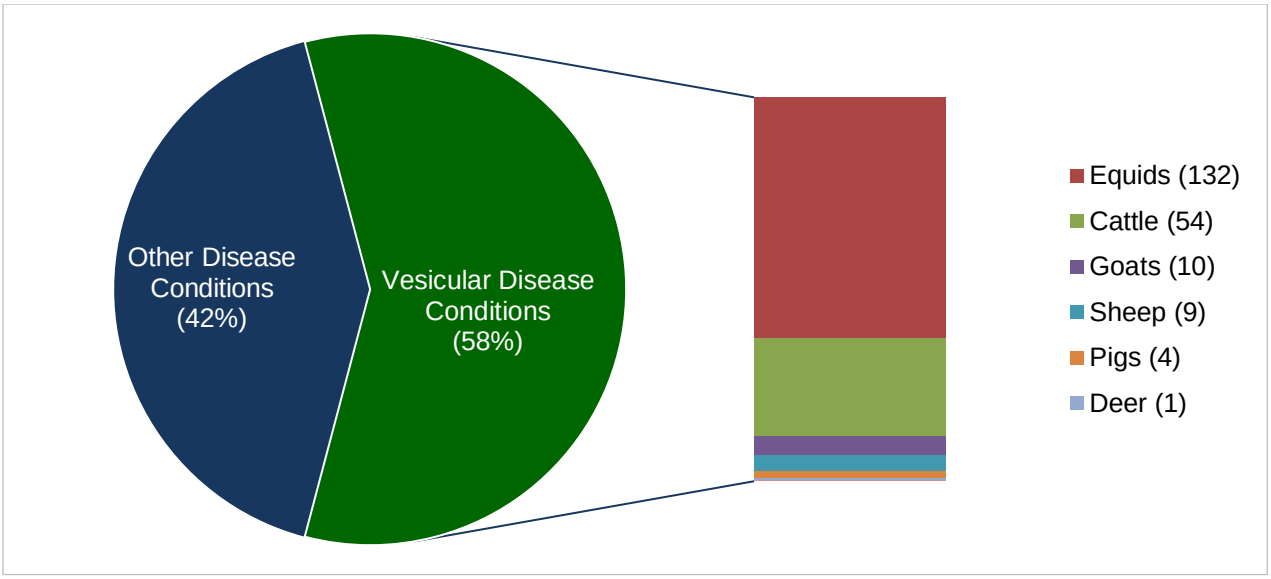


2010

There were 361 FAD investigations in 2010. Investigations were conducted in 44 States, Puerto Rico, and the U.S. Virgin Islands. States with the largest number of investigations were Texas (49) and Arizona (39). Five investigations confirmed the presence of an FAD. Two found vesicular stomatitis, one found rabbit hemorrhagic disease, and one confirmed New World screwworm in a dog originating in Venezuela. The fifth finding was a case of CEM in an imported stallion in California; all in-contact horses were tested and confirmed negative.

Of the 361 investigations, 210 were for possible vesicular disease conditions: 132 in equids, 54 in cattle, 10 in goats, 9 in sheep, 4 in pigs, and 1 in a deer (Figure 4).

Figure 4: Proportion of FAD Investigations due to Vesicular Conditions, by Species in 2010.

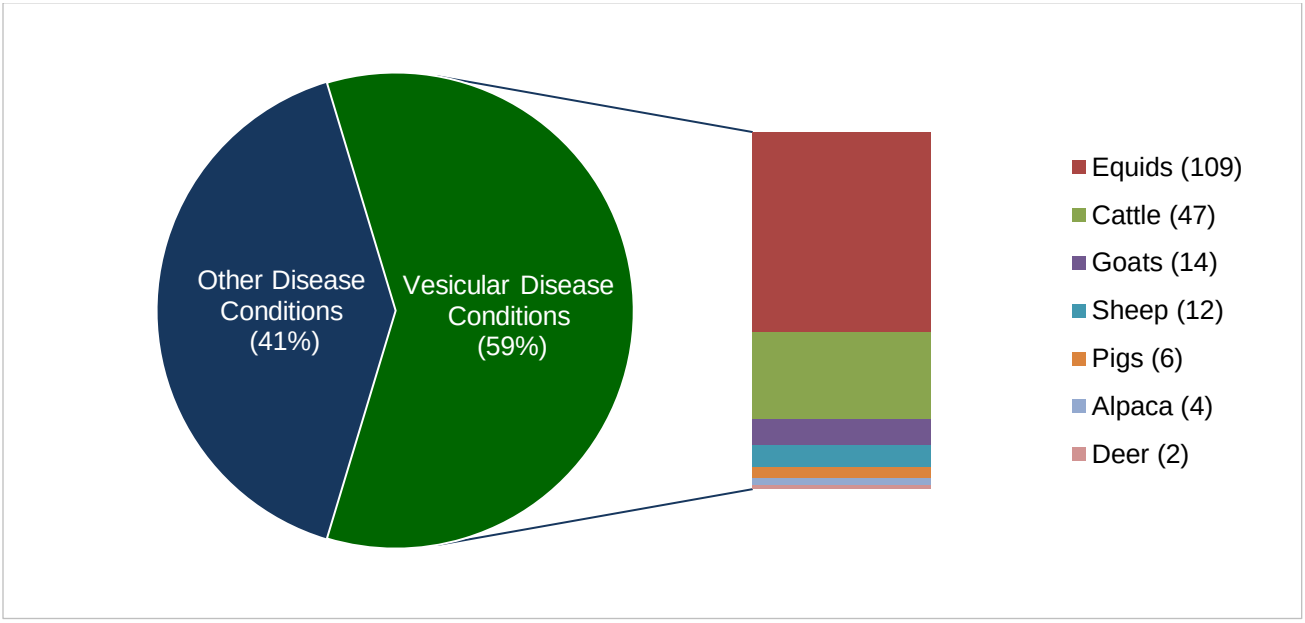


2011

There were 327 FAD investigations in 2011. Investigations were conducted in 45 States and Puerto Rico. States with the largest number of investigations were Texas (41), Arizona (26), and California (26). Only one FAD was found, a case of CEM in an Arabian stallion born in Arizona, not epidemiologically linked to cases in previous years; an in-contact stallion and mares were tested, none had positive results.

Of the 327 investigations, 194 were for possible vesicular disease conditions. Of the 194 vesicular complaints, 109 were in equids, 47 in cattle, 14 in goats, 12 in sheep, 6 in pigs, 4 in alpaca, and 2 in deer (Figure 5).

Figure 5: Proportion of FAD Investigations due to Vesicular Conditions, by Species in 2011.

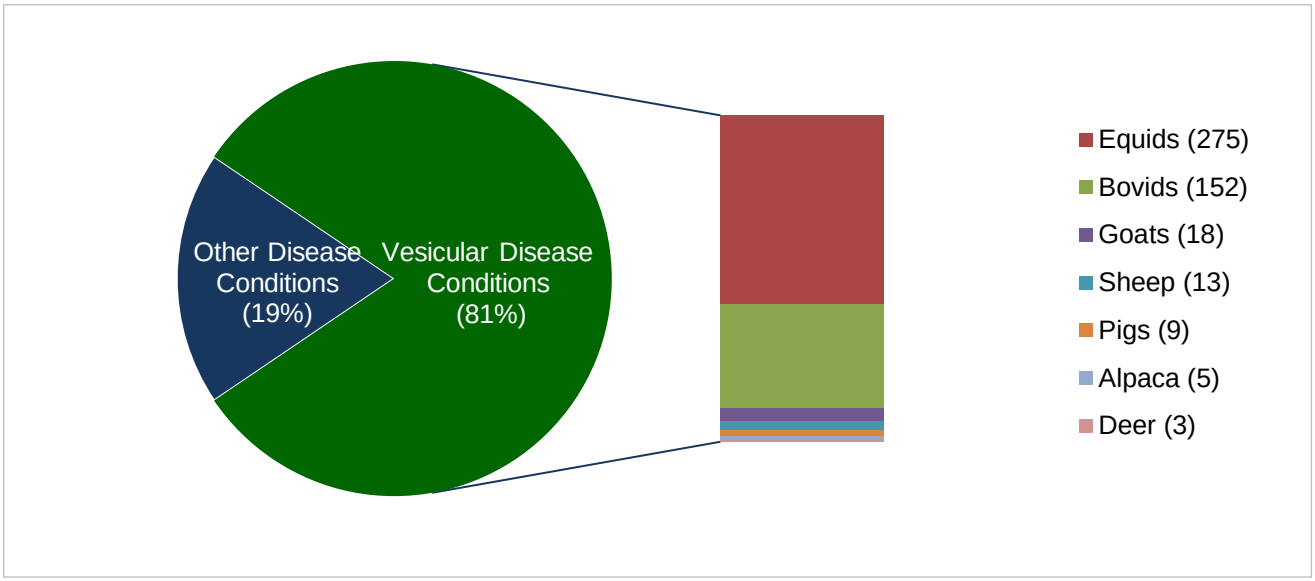


2012

In 2012 there were 586 investigations of suspected FADs in 47 States and Puerto Rico. New Mexico (113), Nebraska (54), and Texas (52) reported the most investigations. Of the 586 investigations, 36 resulted in a confirmed FAD finding. All 36 were diagnosed as vesicular stomatitis.

There were 475 vesicular complaints for the year, with 275 in equids, 152 in bovids (cattle, bison, yaks), 18 in goats, 13 in sheep, 9 in pigs, 5 in alpaca, and 3 in deer (Figure 6).

Figure 6: Proportion of FAD Investigations due to Vesicular Conditions, by Species in 2012.

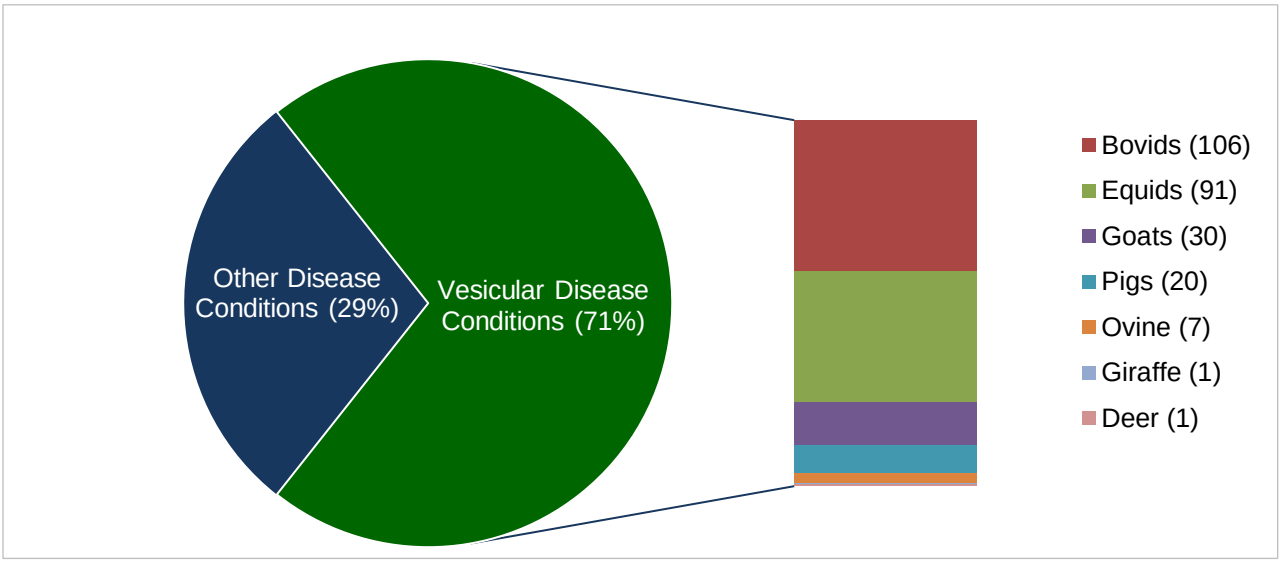


2013

In 2013, VS and State collaborators conducted 360 investigations of suspected FADs in 45 States, Puerto Rico, and the U.S. Virgin Islands. Iowa (41), California (24), and Colorado (23) reported the most investigations. Of the 360 investigations, 3 resulted in a confirmed FAD finding—two were CEM and one was tropical bont tick (*Amblyomma variegatum*).

There were 256 vesicular complaints for the year, with 106 in bovids (cattle, bison), 91 in equids, 30 in goats, 20 in pigs, 7 in ovine (sheep, mouflon), 1 in a deer, and 1 in a giraffe (Figure 7).

Figure 7: Proportion of FAD Investigations due to Vesicular Conditions, by Species in 2013.

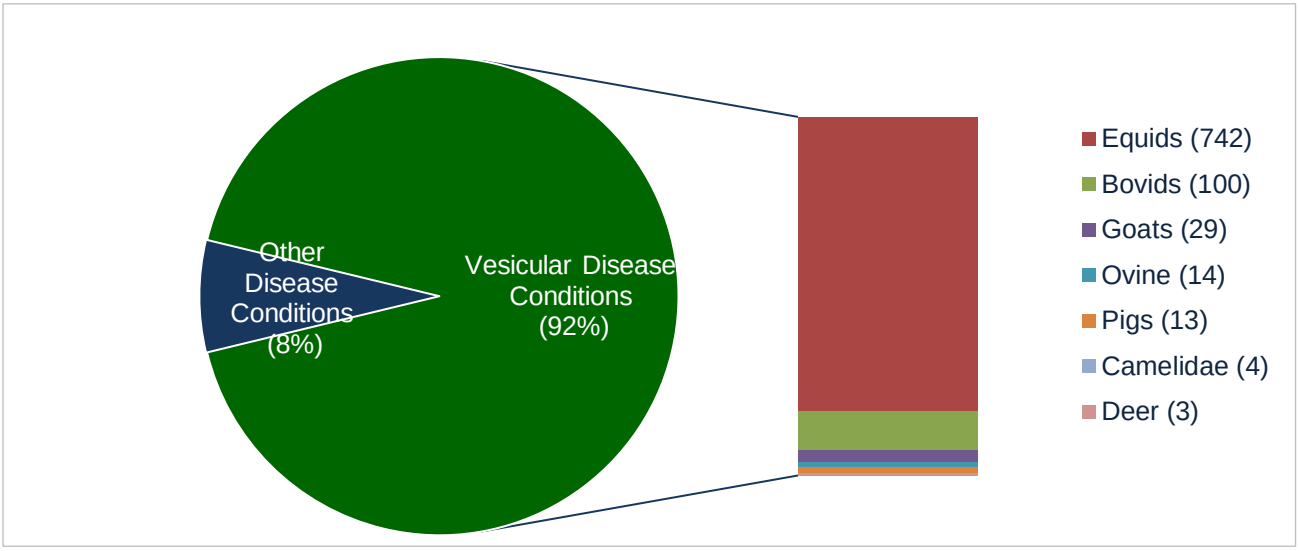


2014

There were 989 FAD investigations conducted in 2014. VS and State collaborators conducted investigations in 46 States and Puerto Rico. Colorado (556), Texas (153), and Georgia (18) reported the most investigations. As in 2005, the reason for the high number of investigations was largely due to a widespread outbreak of vesicular stomatitis virus. Of the 989 investigations, approximately half resulted in a confirmed positive FAD detection—the majority of these findings were vesicular stomatitis-positive diagnoses (433 positive premises in 2014). Additionally, 2 investigations resulted in the detection of HPAI, 13 investigations resulted in the identification of EP, and 1 investigation resulted in the identification of a foreign reptile tick species (*Amblyomma nuttalli Donitz*).

Of these 989 investigations, 905 were vesicular complaints with 742 in equids, 100 in bovids (cattle, bison), 29 in goats, 14 in sheep, 13 in pigs, 4 in camelidae (alpaca, llama) and 3 in deer (Figure 8).

Figure 8: Proportion of FAD Investigations due to Vesicular Conditions, by Species in 2014.



2015

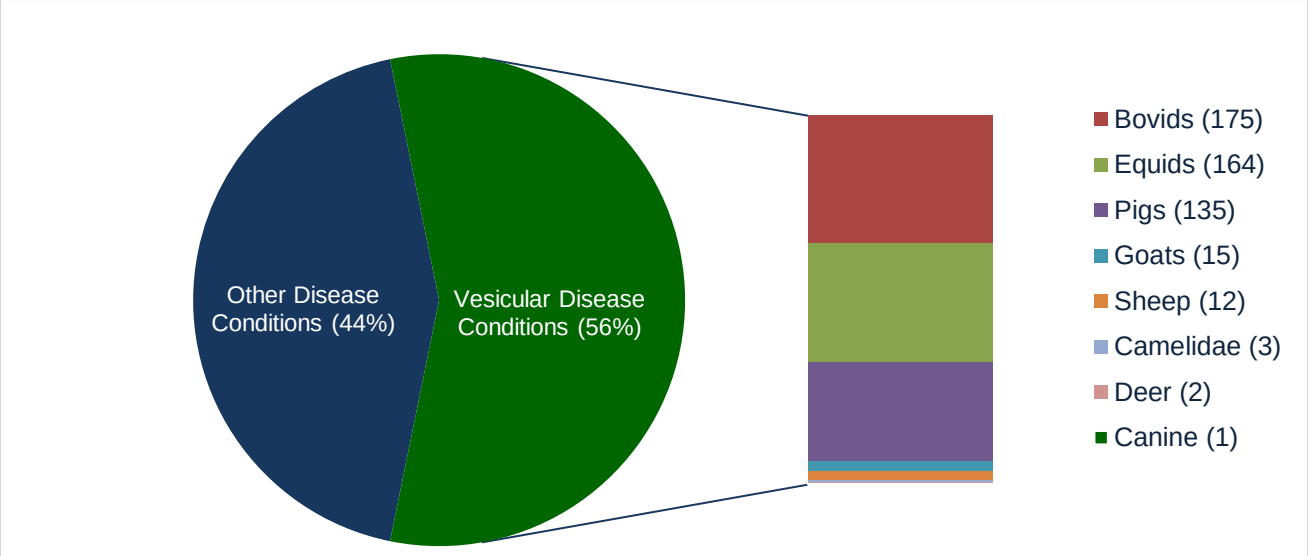
There were 899 FAD investigations conducted in 2015. Iowa (110), Minnesota (61), and Colorado (56) reported the most investigations. This year, the high number of investigations was primarily due to the largest outbreak of HPAI in U.S. history, focused in the Midwest. During the HPAI outbreak, in CY2015, there were 211 positive commercial premises, 20 positive backyard premises, and 4 positive captive wild birds (please note, the outbreak started in late December 2014). There were also 2 detections of EP.

Please note that for CY2015, most vesicular stomatitis investigations are not reported as in prior years, as vesicular stomatitis is no longer considered an FAD. However, any vesicular stomatitis investigations in caprine, ovine, cervid, and bovine species are reported in the total FAD investigation number. In these species groups, other FADs, including foot-and-mouth disease (FMD), must be

ruled out through an investigation. In addition, there were FAD investigations conducted in equids that included vesicular stomatitis as a differential; these were counted in the totals.

Of these 899 investigations, 507 were vesicular complaints with 175 in bovids (cattle, bison), 164 in equids, 135 in pigs, 15 in goats, 12 in sheep, 3 in camelidae (alpaca, llama), 2 in deer, and 1 in a canine (Figure 9).

Figure 9: Proportion of FAD Investigations due to Vesicular Conditions, by Species in 2015.



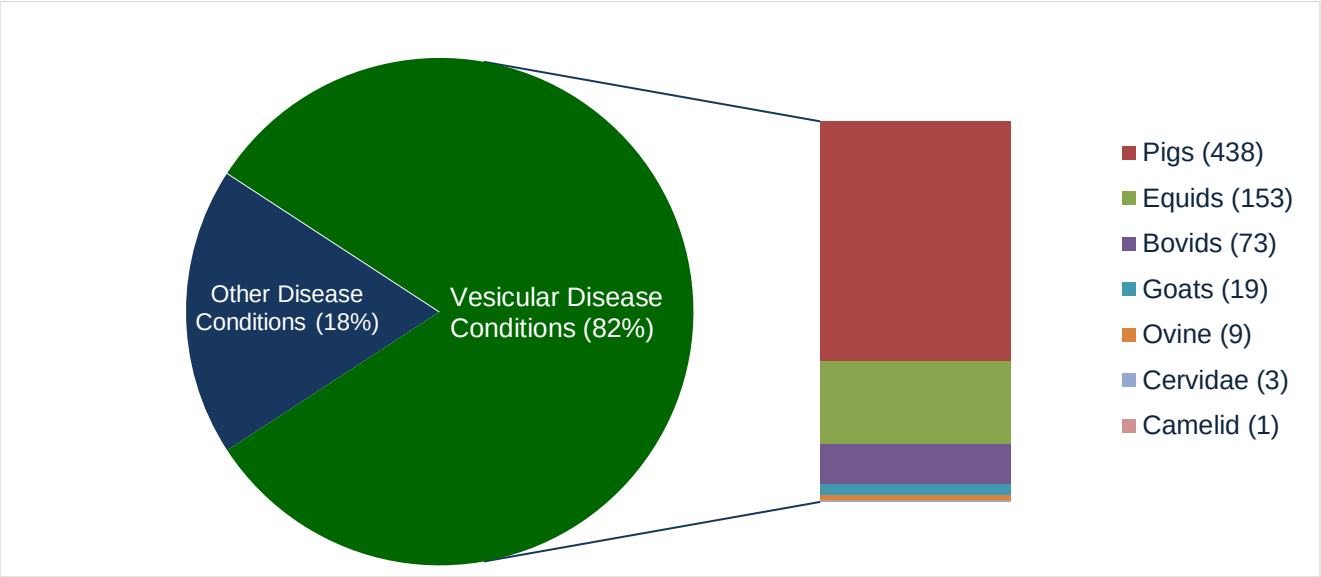
2016

There were 853 FAD investigations conducted in 2016. Wisconsin (124), Minnesota (114), and Iowa (66) reported the most investigations. This year, the high number of FAD investigations was primarily due to Senecavirus A, a vesicular disease of swine that has clinical signs that may appear similar to FMD vesicles and lesions. Senecavirus A is not an FAD; however, USDA APHIS, States, and industry take any report of vesicular lesions very seriously due to the potential consequences of an FMD outbreak. Of these 853 investigations, 696 were vesicular complaints with 438 in pigs, 153 in equids, 73 in bovids (cattle, bison), 19 in goats, 9 in sheep, 3 in cervids, and 1 in a camelid (Bactrian camel) (Figure 10).

In CY2016, there was a single case of HPAI in Indiana on a commercial premises. There was also a single investigation that resulted in an EP detection. Additionally, there were 3 detections of ectoparasites during FAD investigations—species of ticks which were considered to be foreign animal pests.

Importantly, a New World Screwworm (NWS) outbreak was detected in Florida in CY2016, resulting in 12 investigations that yielded one or more presumptive or confirmed positive NWS results. This Florida NWS outbreak was the first infestation documented in the United States in approximately 50 years.

Figure 10: Proportion of FAD Investigations due to Vesicular Conditions, by Species in 2016.



2017

In CY2017, there were 1,790 FAD investigations. Wisconsin (541), California (367), Michigan (159), Ohio (142), and Minnesota (109) all reported 100 or more FAD investigations. The number of FAD investigations was markedly higher in 2017 due to Senecavirus A. Due to the clinical similarities between FMD and Senecavirus A, as well as the enormous consequences of an FMD outbreak in the United States, USDA APHIS, States, and industry continue to vigilantly investigate swine vesicular lesions. CY2017 is only the second time in the past 20 years that the number of FAD investigations conducted in the United States has surpassed 1,000 (the last time was in 2004 with 1,013 FAD investigations), and the first time FAD investigations have ever exceeded 1,500.

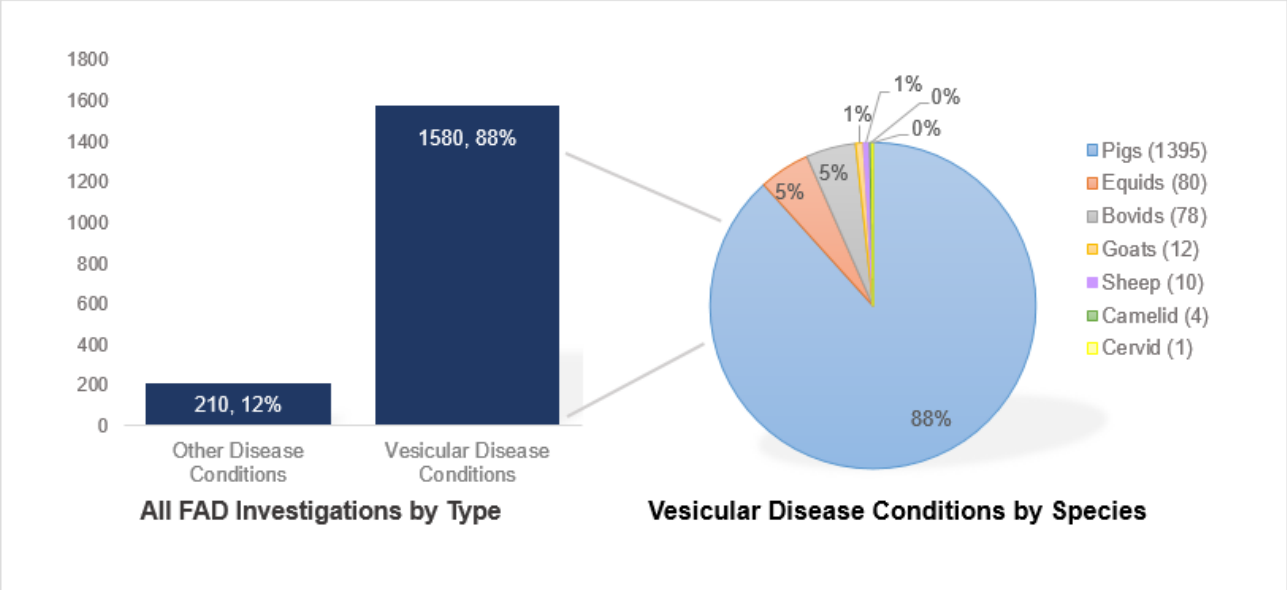
Of these 1,790 investigations, 1,580 were vesicular complaints with 1,395 in pigs, 80 in equids, 78 in bovids, 12 in goats, 10 in sheep, 4 in camelids (alpaca, llama, unknown type of camel), and 1 in a cervid (reindeer) (Figure 11).

In terms of FADs detected, response to the NWS outbreak continued from CY2016 into CY2017: there was one new FAD investigation, initiated in CY2017, which resulted in an additional confirmed positive NWS detection. This was the single detection on the Florida mainland during the NWS incident. Importantly, utilizing the sterile insect technique, NWS was declared to be successfully eradicated from the United States in March 2017.

Additionally in CY2017, there were two cases of HPAI in Tennessee, both on commercial premises. There were also two identifications of ectoparasites—both species of ticks which were considered to be foreign animal pests. Fourteen FAD investigations resulted in a positive EP finding (again, please note that this does not reflect EP incidence or prevalence in the United States). In addition to these

terrestrial FAD identifications, two aquatic FADs were also detected in CY2017: acute hepatopancreatic necrosis disease (caused by *Vibrio parahemolyticus,* which affected shrimp) and infectious salmon anemia. However, 98.8 percent of all FAD investigations in CY2017 did not detect the presence of a FAD or pest.

Figure 11: Proportion of FAD Investigations due to Vesicular Conditions, by Species in 2017.



2018

For the first time ever, over 2,000 FAD investigations were conducted in 2018. The 2,072 FAD investigations were conducted in 44 States and Puerto Rico. California (925), Wisconsin (312), Ohio (148), Michigan (136), and Oregon (134) all reported more than 100 FAD investigations. As in 2016 and 2017, the number of FAD investigations was again higher due to Senecavirus A. Due to clinical similarities in swine between this virus and FMD, APHIS, States, and industry continue to investigate all reports of swine vesicular lesions to rule-out this highly contagious foreign animal disease.

Of these 2,072 investigations, 1,729 were vesicular complaints with 1,592 in pigs, 58 in equids, 57 in bovids (primarily cattle; bison, bongo), 9 in sheep, 7 in goats, and 6 in cervids (Figure 12).

There were a number of FADs detected in CY2018 from FAD investigations. The vND outbreak in southern California resulted in 181 FAD investigations that identified 55 infected premises. This is not the total number of vND cases in CY2018—only the number of FAD investigations (sick calls/complaints) that resulted in the detection of vND.

Twelve FAD investigations resulted in a pest detection: 10 were ticks considered to be foreign to the United States, 1 was NWS from an imported dog, and 1 was the identification of a parasitic fly not known to exist in the United States. FAD investigations resulting in tick detections found

primarily *Haemaphysalis Longicornis* (the Asian longhorned tick*)* which was first detected in the United States in 2017. In addition, 3 FAD investigations resulted in EP detections in 2018.

Two FAD investigations resulted in the detection of rabbit hemorrhagic disease (RHD). One of the investigations detected RHD virus-1 (RHDV1); the other detected RHD virus-2 (RHDV2). While both FADs, RHDV2 had never been previously identified in the United States. Finally, though there was no associated FAD investigation, it should be noted that there was also a detection of bonamia exitiosa (in an oyster) in CY2018. An FAD in the United States, this disease was detected as part of routine surveillance and prompted no official action.

Figure 12: Proportion of FAD Investigations due to Vesicular Conditions, by Species in 2018.