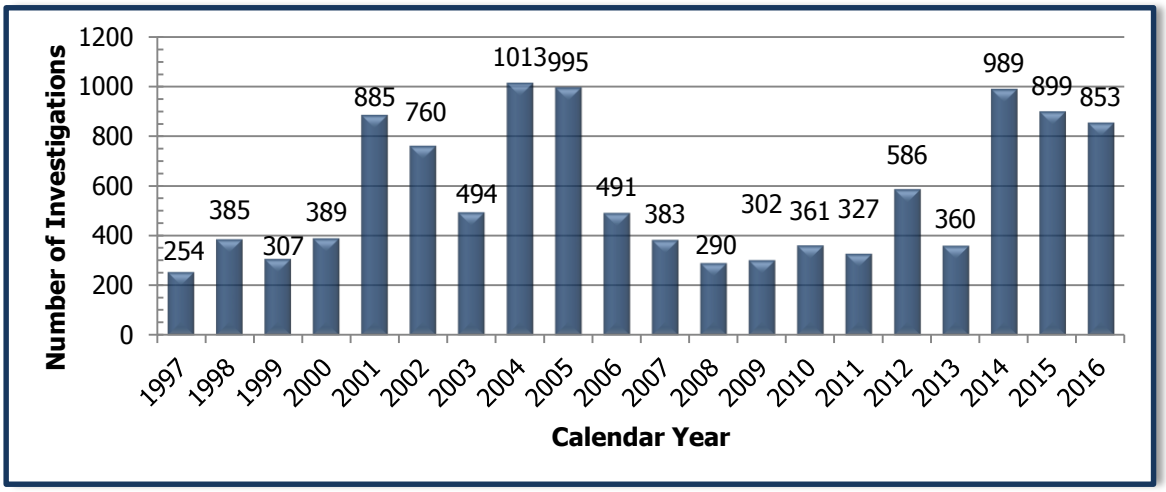
United States Department of Agriculture

Calendar Year 2016 Update: FAD Investigation Report

Summary of Recent FAD Investigations

In the past 20 years, there have been over 11,300 investigations conducted on possible foreign animal disease (FAD) or emerging disease incidents throughout the United States, ranging from a yearly low of 254 investigations in calendar year 1997 to a high of 1,013 investigations in 2004 (Figure 1).

Figure 1: FAD Investigations from 1997 to 2016

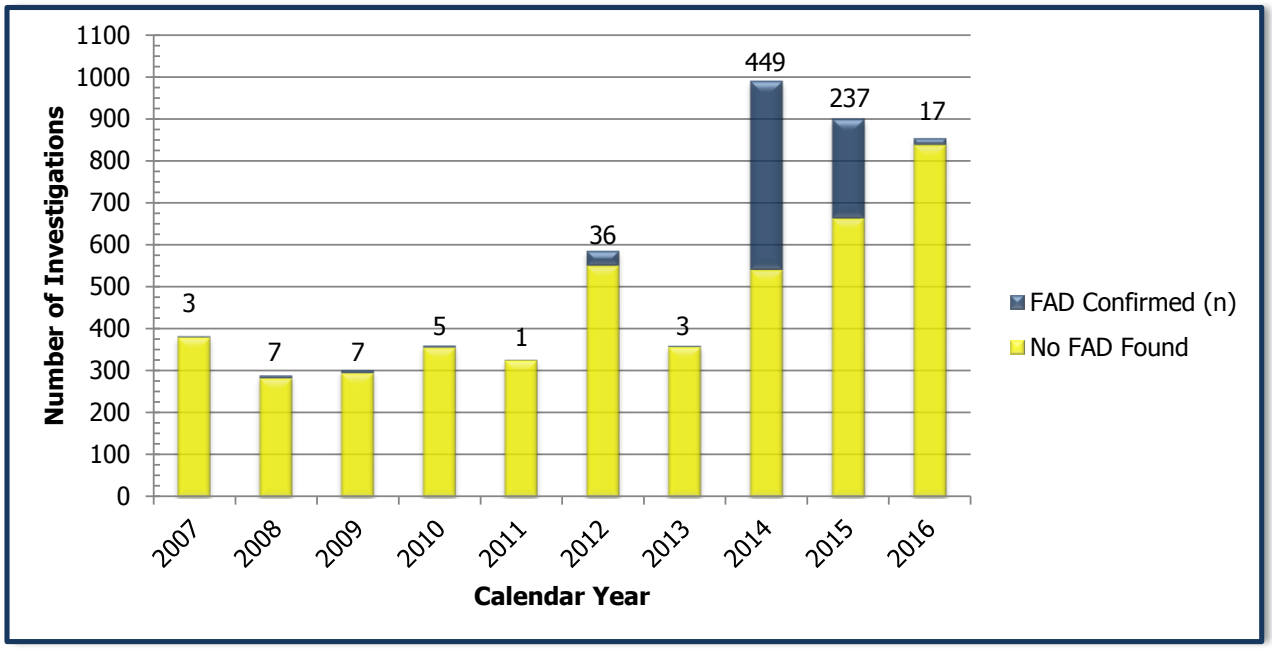


This summary of FAD investigations was compiled from annual reports on animal health in the United States published by Veterinary Services (VS) of USDA Animal and Plant Health Inspection Service (APHIS) (available here), data from the World Organization for Animal Health (OIE) World Animal Health Information Database (http://web.oie.int/wahis/public.php?page=home), and data in the Emergency Management Response System 2.0 (EMRS2) of APHIS VS.

2007 – 2016

From 2007 through 2016, 5,350 possible FAD or emerging disease incidents were investigated by VS and State collaborators. However, only a small percentage of those were confirmed to be actual emerging or foreign animal disease. The exceptions during this period were the occurrences of a widespread vesicular stomatitis outbreak that contributed to the 449 confirmed FAD findings in 2014 and the largest ever U.S. highly pathogenic avian influenza outbreak in 2015 (Figure 2). Please note that vesicular stomatitis is no longer considered to be an FAD.

Figure 2: FAD Investigations by Result, 2007 to 2016.



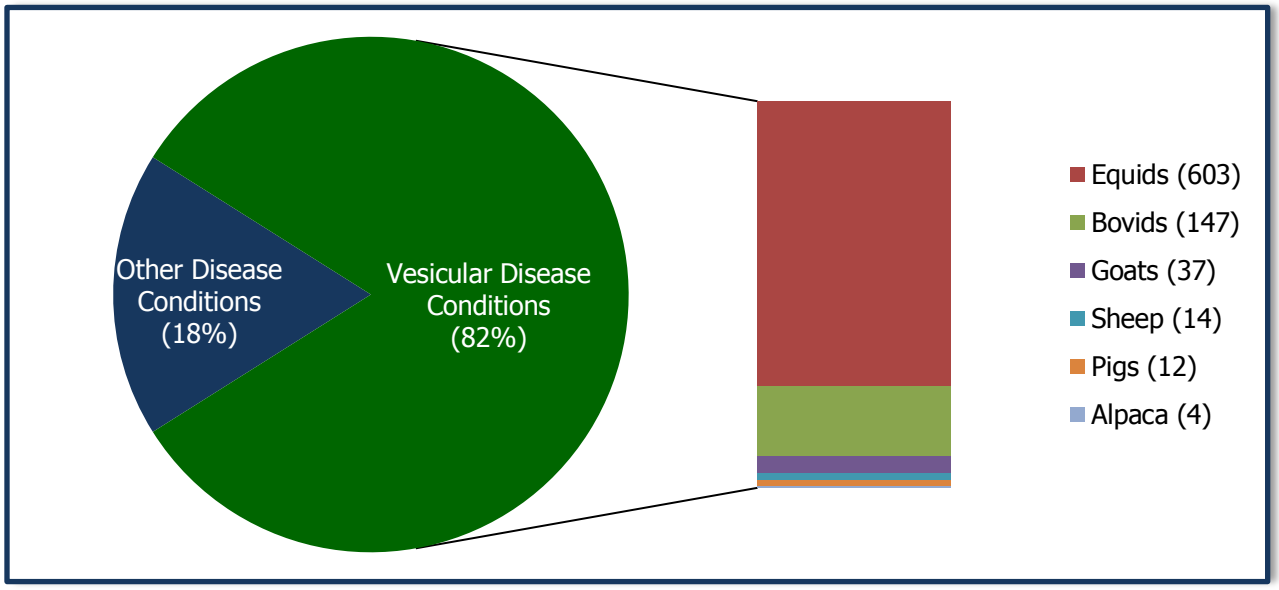
Please note that in Figures 3–14 below, the color of the bar is based on relative number, not on species. So, for example, the species with the most vesicular investigations is in red. Red does not always refer to pigs (or bovids, or equids), etc.

2005

In 2005, VS and State collaborators conducted 995 investigations of suspected FADs in 47 States and Puerto Rico. Colorado, Utah, and Wyoming reported the most investigations (146, 144, and 130, respectively), the majority of which were in response to a vesicular stomatitis outbreak that ultimately was reported in 6 additional States: Arizona, Idaho, Montana, Nebraska, New Mexico, and Texas. Of the 995 investigations, 446 resulted in a confirmed FAD finding, with 445 diagnosed as vesicular stomatitis. The other confirmed finding was a rabbit hemorrhagic disease outbreak.

In 2005, vesicular conditions (painful, blister-like lesions) of the muzzle and feet were the most common complaint investigated. There were 817 vesicular complaints: 603 in equids (horses, donkeys, and mules), 147 in bovids (cattle and bison), 37 in goats, 14 in sheep, 12 in pigs, and 4 in alpaca (Figure 3). Differential FAD diagnoses for vesicular conditions in equids include vesicular stomatitis. In ruminants, camelids, cervids, and swine, vesicular diseases of concern include not only vesicular stomatitis but also foot-and-mouth disease (FMD), which is a highly contagious viral infection that primarily affects cloven-hoofed animals. FMD would have a severe economic impact if it entered the United States.

Figure 3: Proportion of FAD Investigations due to Vesicular Conditions, by Species in 2005.

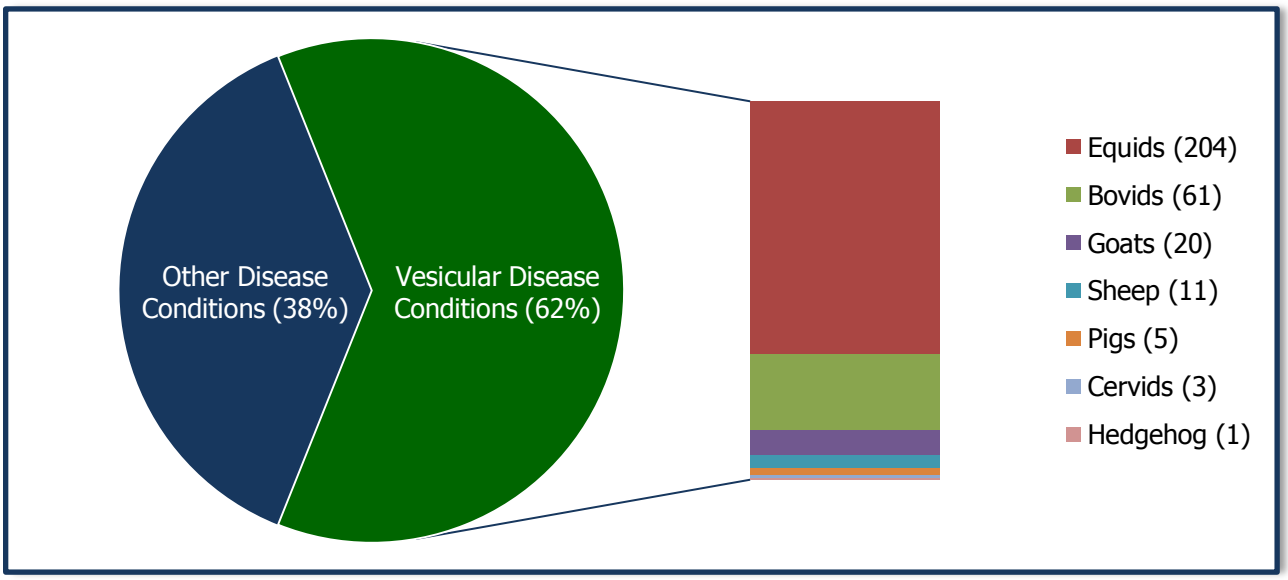


2006

In 2006, VS and State collaborators conducted 491 investigations of suspected FADs in 45 States, Puerto Rico, and the U.S. Virgin Islands. Tennessee and Texas reported the most investigations (46 and 47, respectively). Of the 491 investigations, 14 resulted in a confirmed FAD finding, with 13 diagnosed as vesicular stomatitis and one as contagious equine metritis (CEM), a transmissible, exotic, venereal disease of horses caused by the bacterium *Taylorella equigenitalis*.

There were 305 vesicular complaints for the year, with 204 in equids, 61 in bovids, 20 in goats, 11 in sheep, 5 in pigs, 3 in cervids, and 1 in a hedgehog (Figure 4).

Figure 4: Proportion of FAD Investigations due to Vesicular Conditions, by Species in 2006.

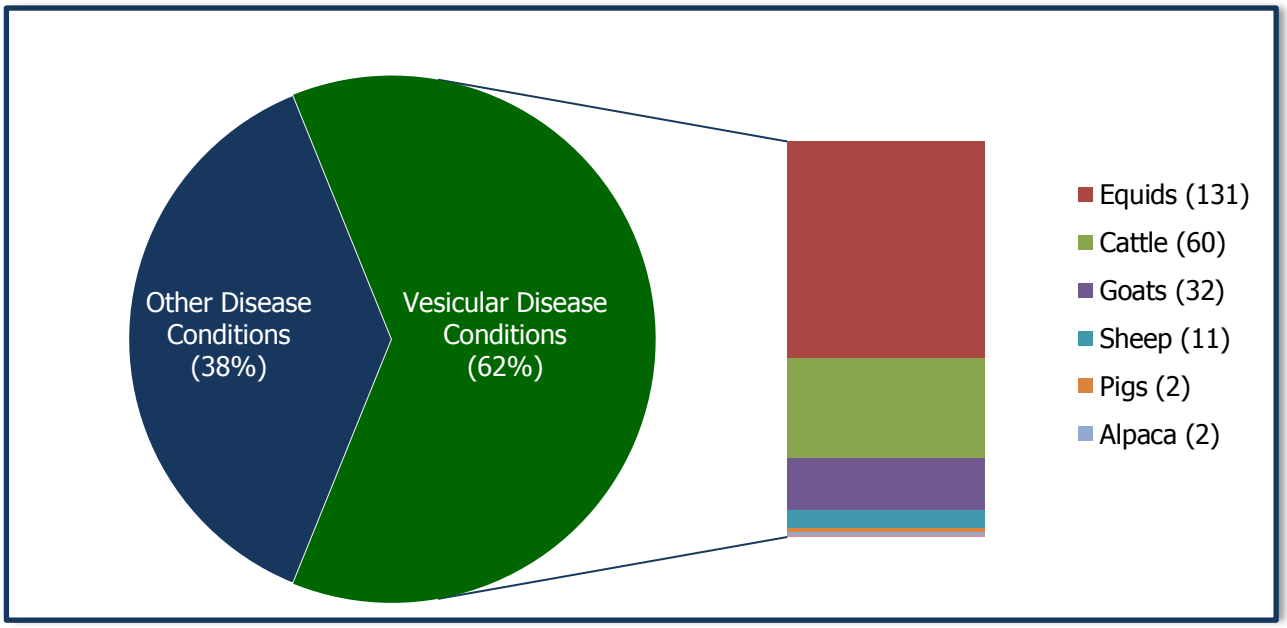


2007

In 2007, there were 383 investigations in 45 States and Puerto Rico. California and Texas reported the greatest number of investigations (31 and 30, respectively). Of the 383 investigations conducted, 3 resulted in a confirmed FAD finding. One FAD investigation of shrimp in Hawaii found white spot syndrome virus (WSSV), another confirmed Old World screwworm in a dog originating in Singapore, and the third found New World screwworm in a dog originating in Trinidad.

As in years past, vesicular conditions of the muzzle and feet were the most common complaint investigated. There were 238 vesicular complaints: 131 in equids, 60 in cattle, 32 in goats, 11 in sheep, 2 in pigs, and 2 in alpaca (Figure 5). In contrast to 2005 and 2006, none of the vesicular disease investigations confirmed the presence of vesicular stomatitis.

Figure 5: Proportion of FAD Investigations due to Vesicular Conditions, by Species in 2007.

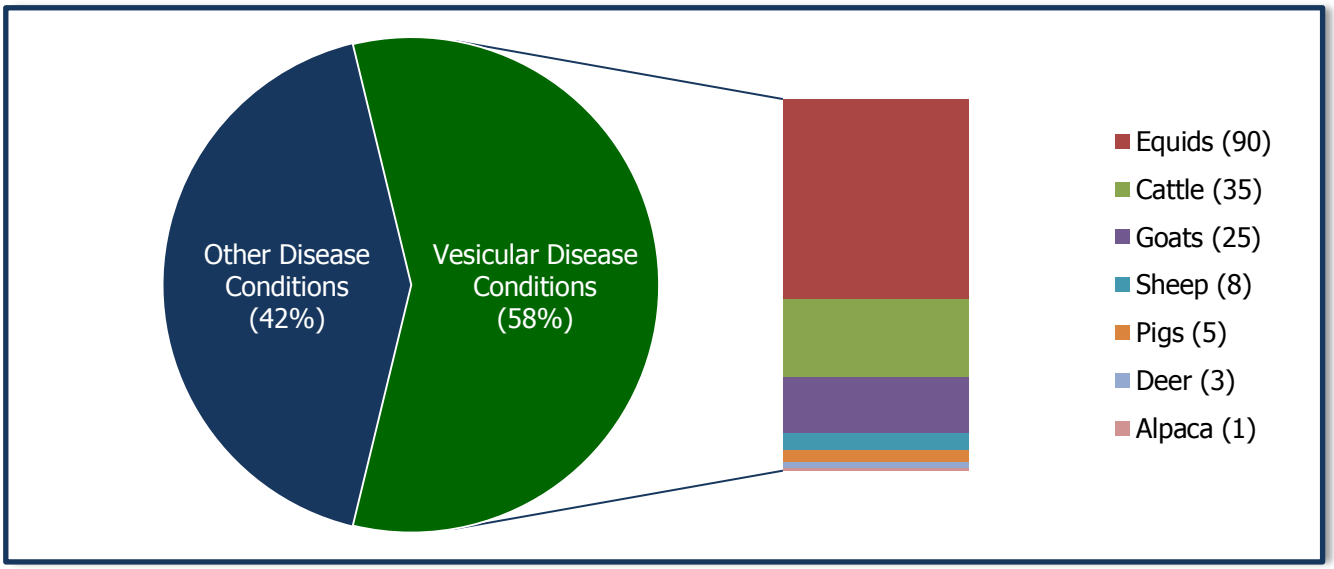


2008

VS and State collaborators conducted 290 investigations in 2008; 7 resulted in confirmed FAD findings. One FAD investigation confirmed equine piroplasmosis (*Theileria equi,* EP), three found wildebeest-associated malignant catarrhal fever (alcelaphine herpesvirus type 1), one confirmed rabbit hemorrhagic disease, one found WSSV, and another confirmed an outbreak of CEM unrelated to the 2006 finding.

In 2008, vesicular conditions of the muzzle and feet were again the most common complaint investigated. There were 167 vesicular complaints: 90 in equids, 35 in cattle, 25 in goats, 8 in sheep, 5 in pigs, 3 in deer, and 1 in an alpaca (Figure 6).

Figure 6: Proportion of Investigations due to Vesicular Conditions, by Species in 2008.

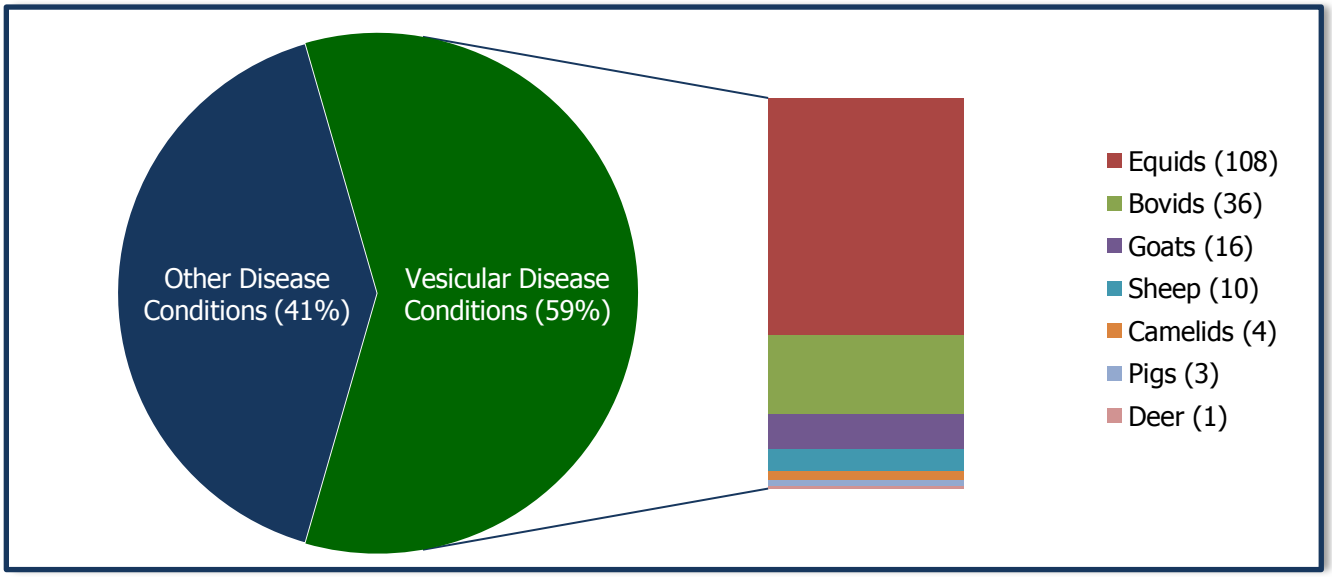


2009

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 7).

Figure 7: Proportion of Investigations due to Vesicular Conditions, by Species in 2009.

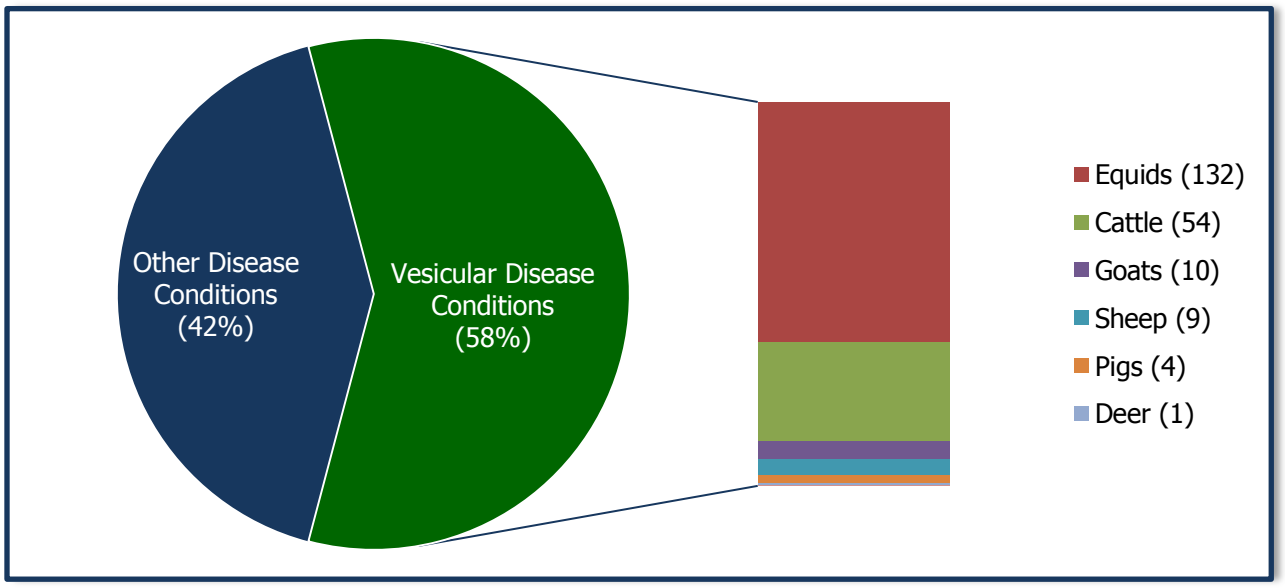


2010

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 8).

Figure 8: Proportion of FAD Investigations due to Vesicular Conditions, by Species in 2010.

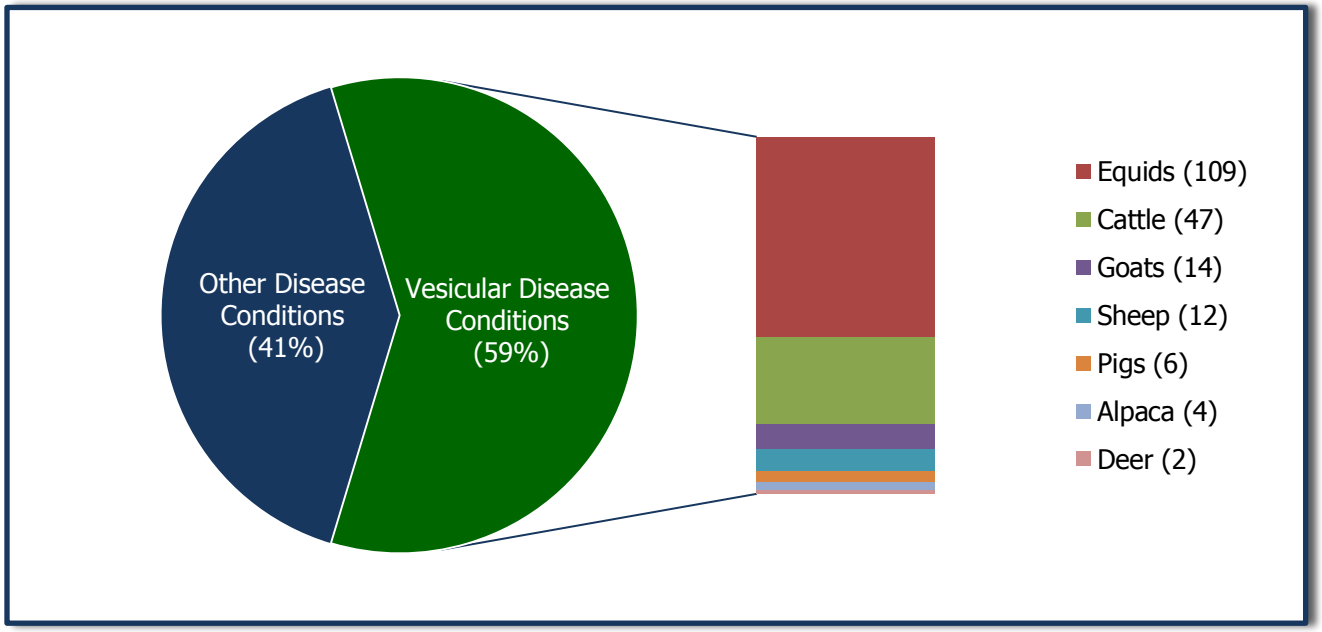


2011

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 9).

Figure 9: Proportion of FAD Investigations due to Vesicular Conditions, by Species in 2011.

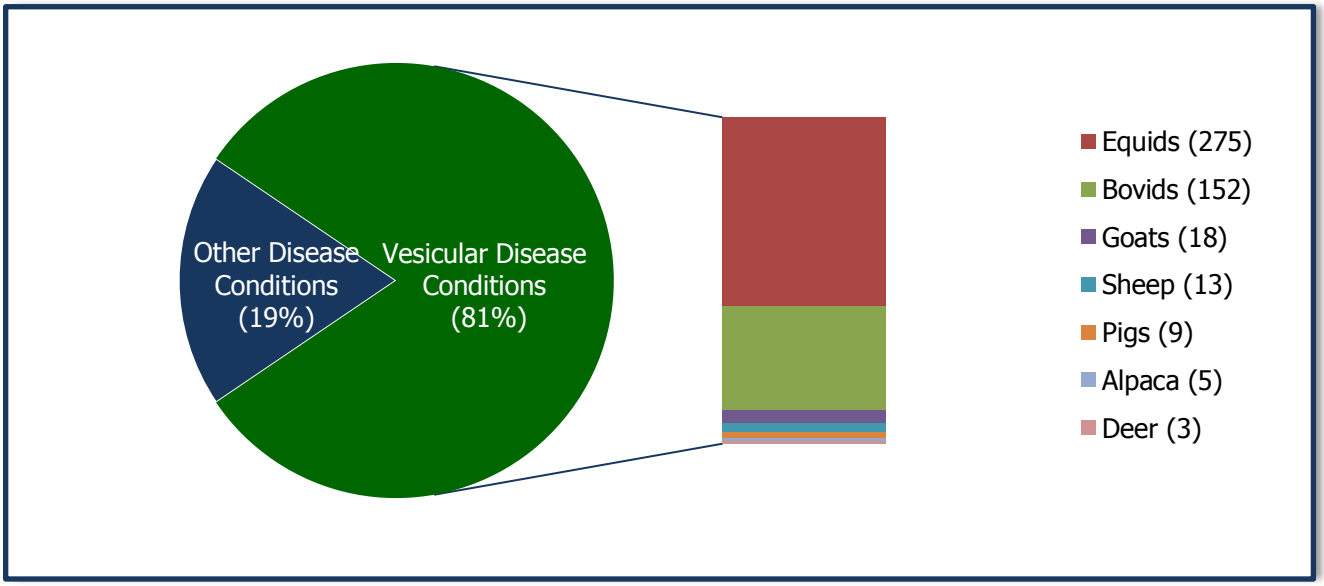


2012

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 10).

Figure 10: Proportion of FAD Investigations due to Vesicular Conditions, by Species in 2012.

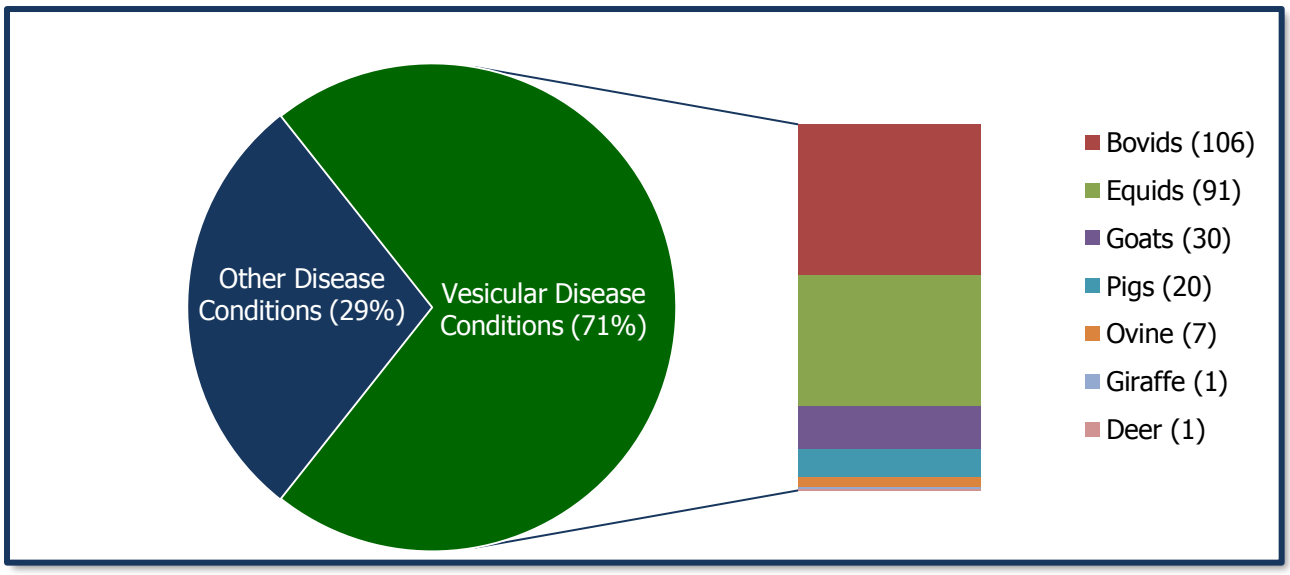


2013

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 11).

Figure 11: Proportion of FAD Investigations due to Vesicular Conditions, by Species in 2013.

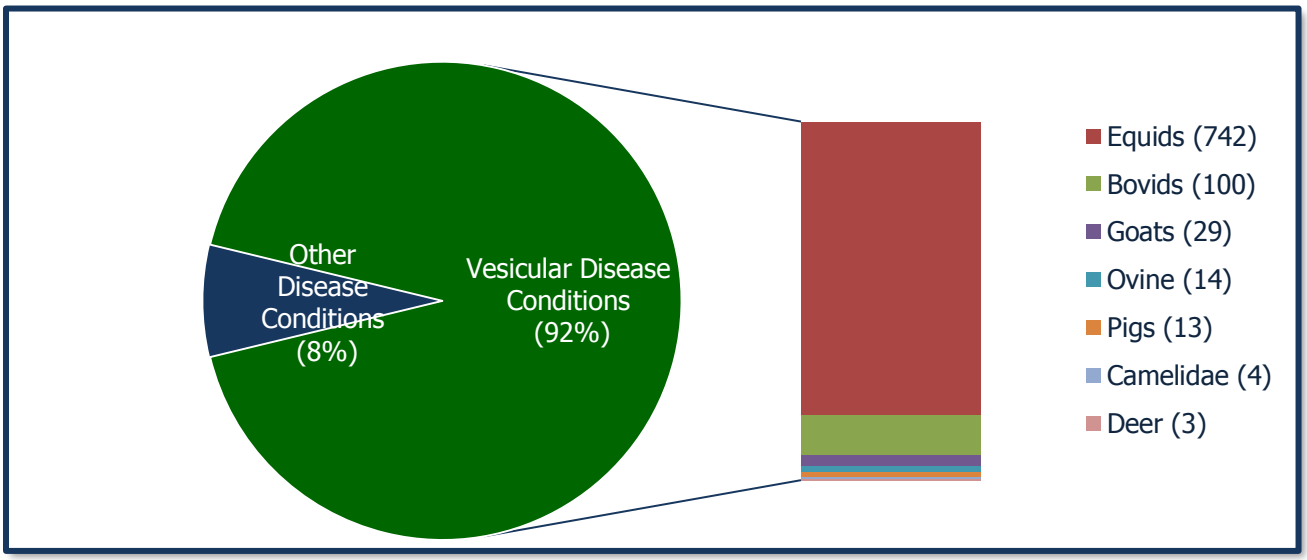


2014

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; situation reports here). Additionally, 2 investigations resulted in the detection of highly pathogenic avian influenza, 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 12).

Figure 12: Proportion of FAD Investigations due to Vesicular Conditions, by Species in 2014.

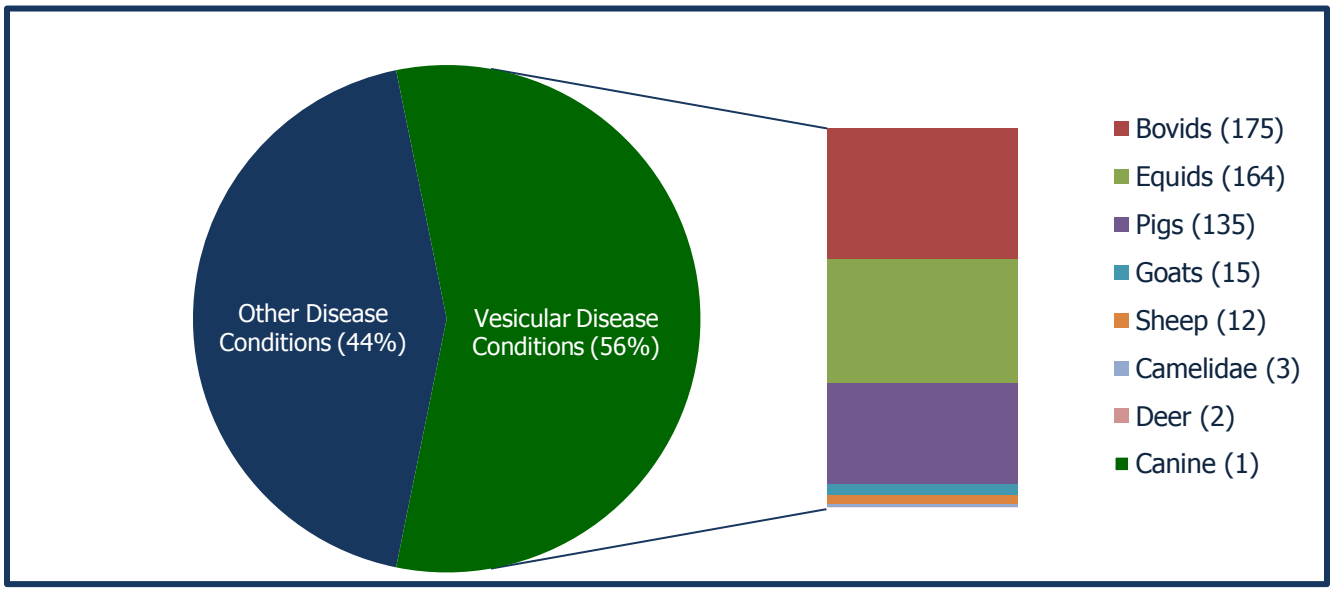


2015

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 highly pathogenic avian influenza (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 addition, there were FAD investigations conducted in equids that included vesicular stomatitis as a differential; these were counted in the totals. For future years, these specific equid investigations will no longer be considered FAD investigations if there is not an FAD differential diagnosis. In these species groups, other FADs, including FMD, must be ruled out through an investigation. 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 13).

Figure 13: 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 14).

In CY2016, there was a single case of HPAI in Indiana on a commercial premises. There was also a single 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 14: Proportion of FAD Investigations due to Vesicular Conditions, by Species in 2016.