

Rabies

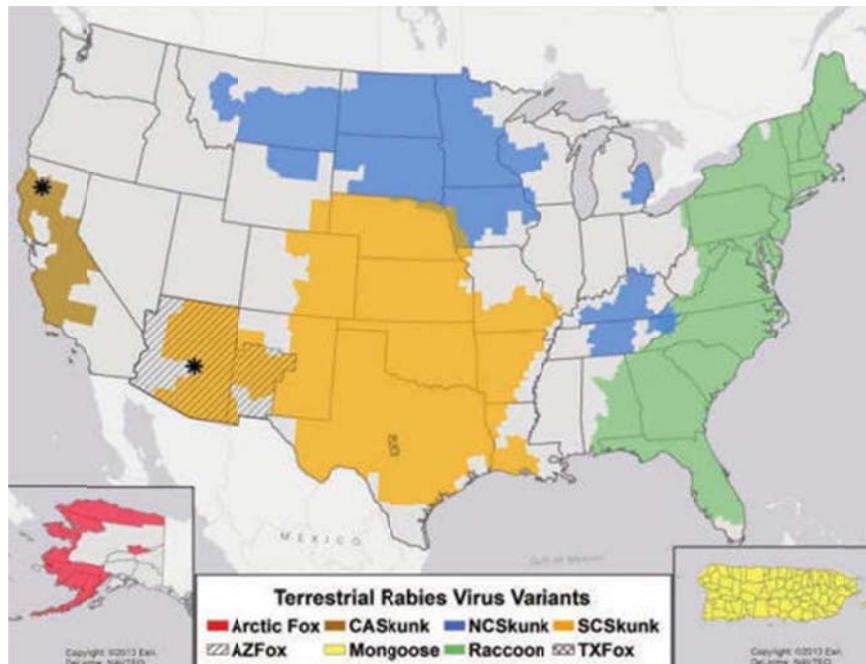
Rabies is a Class A Disease and must be reported to the state within 24 hours by calling the phone number listed on the web page.

Classical rabies virus, family *Rhabdoviridae*, genus *Lyssavirus*, causes acute encephalitis in all warm-blooded hosts, including humans. One or two cases of human rabies are reported annually in the United States. The case fatality rate is generally considered to approach 100%. In the U. S., less than 10% of reported cases occur in domestic animals or pets. Classical rabies virus consists of several subtypes, or variants, whose nomenclature reflects the primary reservoir in nature, e.g. skunk variant, raccoon variant, bat variant, etc.

There are also many related lyssaviruses. All known lyssaviruses are thought to cause a neurological disease identical to rabies in humans and other warm-blooded hosts. These related lyssaviruses have been discovered primarily in bats in Europe, Asia, Australia and Africa. Rabies and other lyssaviruses have been classified into three phylogroups. A vaccine exists that is protective against rabies virus, but this vaccine is thought to be protective only against related lyssaviruses in Phylogroup I.

All species of mammals are susceptible to classical rabies, but only a few species are considered important reservoirs, such as bats, skunks, raccoons, foxes and coyotes. Most of these reservoirs harbor specific variants of the virus in distinct geographic locations. Figure 1 illustrates the distribution of terrestrial rabies variants throughout the United States.

Figure 1: Animal reservoirs for rabies - United States, 2013



Skunk variant rabies and several bat variants of the virus are endemic in Louisiana. The cases reported in Louisiana reflect these predominant virus variants (skunk and bat). Active surveillance for wildlife rabies is not conducted in Louisiana; therefore, the number of cases reported does not reflect the actual ecology of the virus in the state. An example of the erroneous picture often presented by passive surveillance is exemplified

by the reports of two positive skunks from De Soto Parish in 2013. Although rabies testing confirmed the presence of two rabid skunks, De Soto Parish animal control officials documented the observation, recovery and euthanasia of fourteen additional oddly behaving skunks that were not tested. Some, if not all, of these animals certainly could have been infected with the rabies virus.

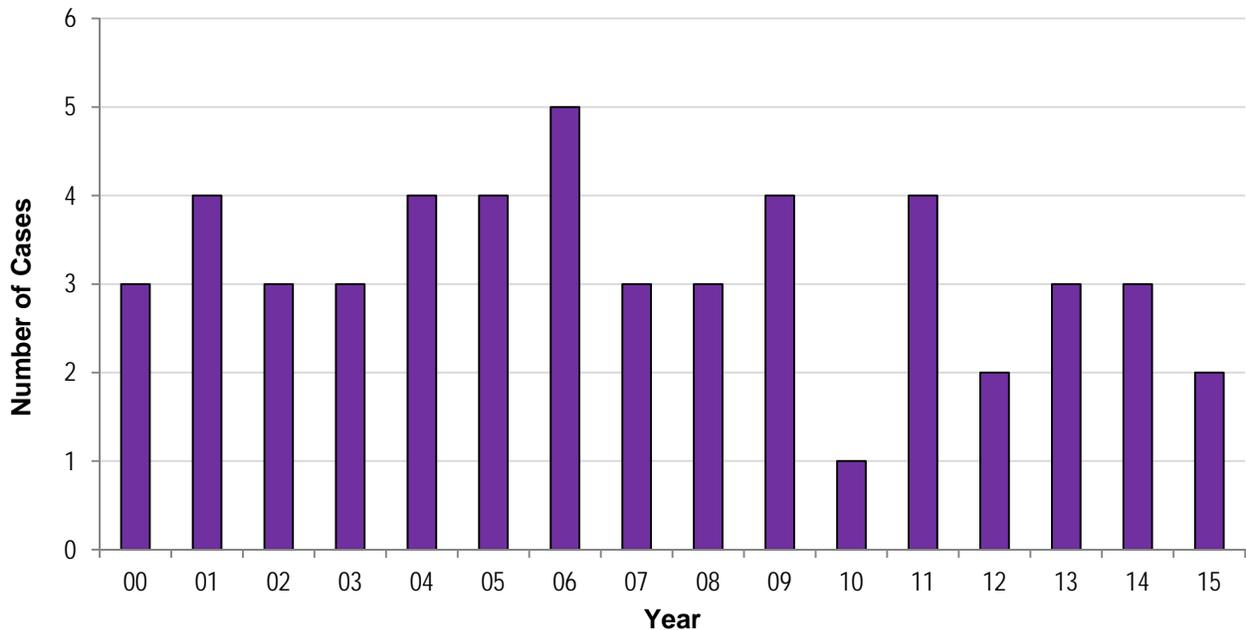
From 2000 until 2006, a period of seven years, there were no cases of rabies reported in pet species. Since 2007, four dogs and two cats were reported to be positive for rabies. These recent cases in pet species serve as a reminder of the importance of vaccinating pet dogs, cats and ferrets for rabies (Table 1).

Table 1: Distribution by species and year - Louisiana, 2000-2015

Species	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	Total
Skunk	11	5	2	1		3	2	1	3		7	2	2	4		3	46
Bat	3	4	3	3	4	4	5	3	3	4	1	4	2	3	3	2	51
Dog								1			1			1	1		4
Cat										1					1		2
Horse		1	1					1									3
Squirrel											1						1
Total	14	10	6	4	4	7	7	6	6	5	10	6	4	8	5	5	107

Eleven species of bats inhabit the state of Louisiana. Each species is characterized by at least one distinct variant of rabies. Numbers of rabid bats reported in the state since 2000 have remained fairly constant, one to five reported each year. This consistency likely reflects stringent enforcement of testing policies by public health authorities, and may also reflect a consistent level of rabies prevalence in bat species (Figure 2).

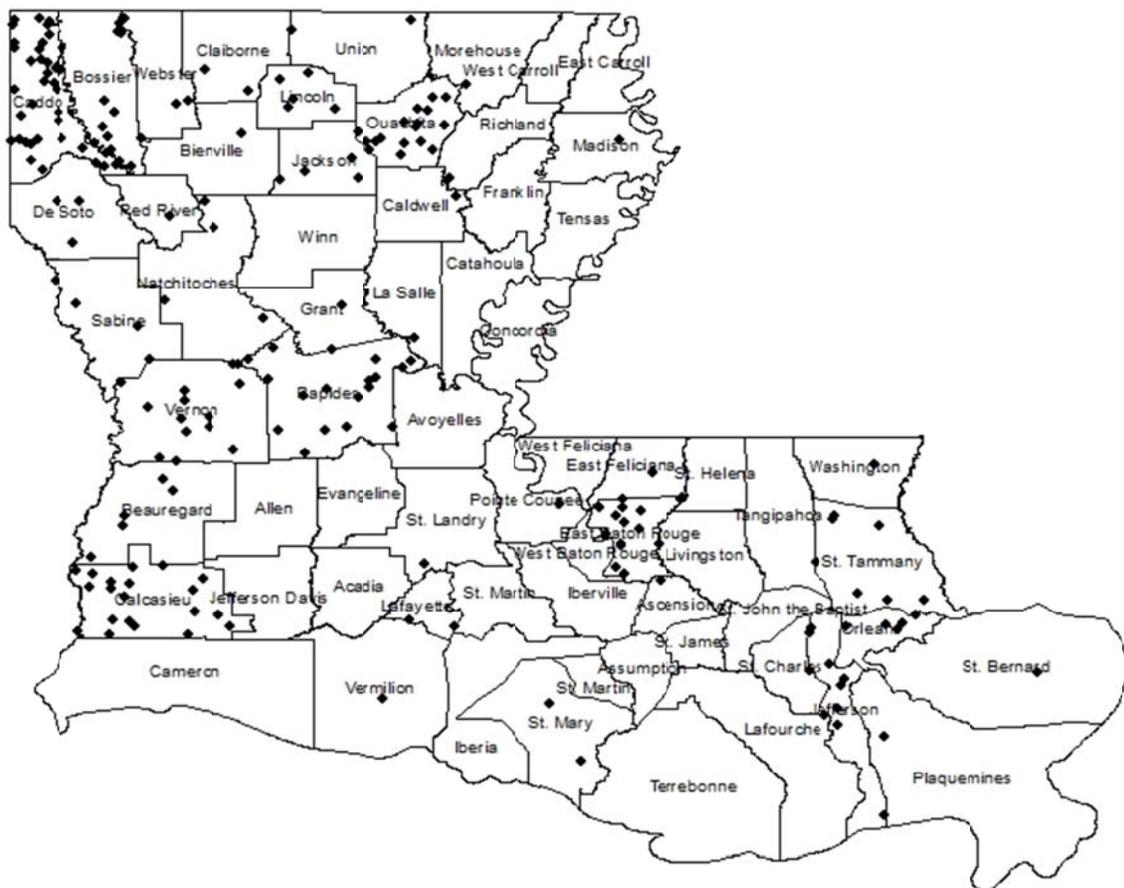
Figure 2: Rabies cases in bats - Louisiana, 2000-2015



Bat variant rabies can be transmitted to terrestrial animals. In fact, the positive dog and cat identified in 2014, the former discovered in Ouachita Parish and the latter discovered in Washington Parish, were both infected with bat variant rabies. These two cases illustrate the importance of rabies vaccination in pets, even those in urban and suburban areas, due to potential contact with bats that are often identified in such environments.

Figure 3 is a map showing the locations, geographically accurate to parish level only, of rabid bats discovered in the state since 1970. The map illustrates that rabid bats have been discovered in all regions of the state. Clusters appear to be centered in populated areas, apparently reflecting the increased likelihood of human/bat interaction in densely populated areas.

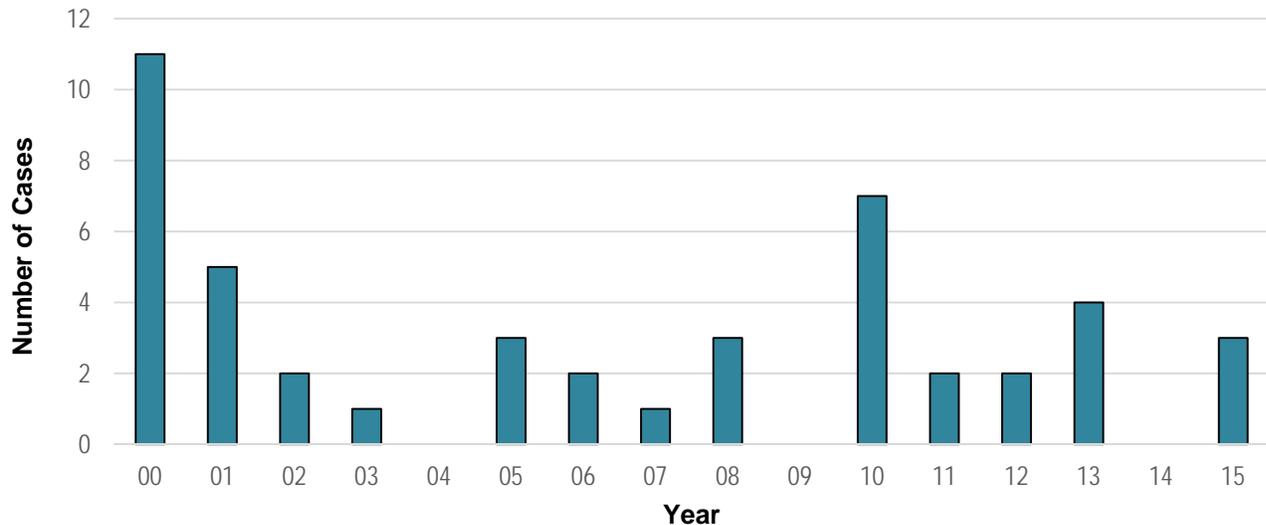
Figure 3: Bat rabies - Louisiana, 1970-2015



The only terrestrial variant of rabies known to circulate in Louisiana is the southern skunk variant. Figure 4 shows that a very small number of rabid terrestrial animals (less than 10) have been reported annually in Louisiana in the past decade. In 2015, three positive skunks were identified in the state. This dearth of reports of rabies in wild terrestrial animals is likely due to stringent enforcement of testing

guidelines, guidelines that limit testing to those animals involved in a potential exposure to humans, and does not accurately reflect the prevalence of the disease in wildlife.

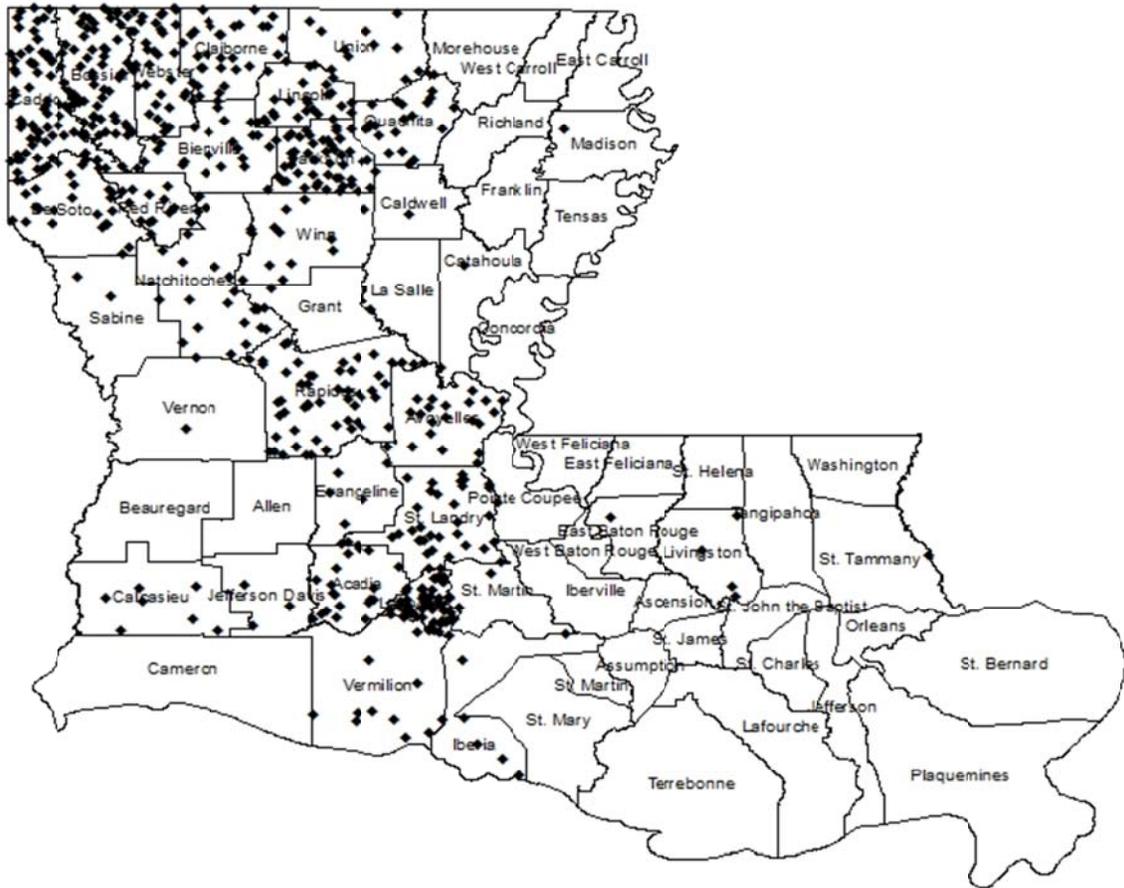
Figure 4: Rabies cases in wild terrestrial species - Louisiana, 2000-2015



The map of rabies in terrestrial wildlife (Figure 5, geographically accurate to parish level only) illustrates two characteristics of the disease in Louisiana. Prior to 2010, skunk variant rabies was thought to be present in all of north Louisiana, particularly northwest Louisiana, and areas of south Louisiana west of the Atchafalaya river basin. In 2010, a rabid squirrel infected with the southern skunk variant was identified in Livingston Parish immediately adjacent to the eastern boundary of East Baton Rouge Parish. Prior to the report of the rabid squirrel, the few reports of rabies in terrestrial wildlife east of the Atchafalaya basin involved animals that had been transported to southeast Louisiana after capture. The prevailing thought was that the animals had been exposed in areas of the state known to be endemic for the skunk variant, specifically those areas west of the Atchafalaya basin in south Louisiana, or areas of north Louisiana. Since no evidence of transport of the rabid squirrel existed, state health officials are faced with the apparent reality that the skunk variant may have migrated east, thus the greater Baton Rouge area and all of southeast Louisiana remain in a zone of surveillance for skunk variant rabies.

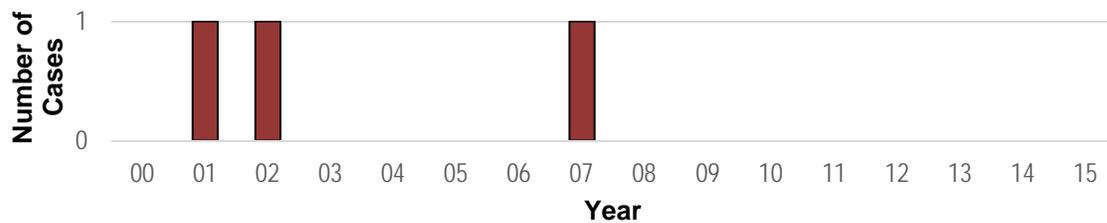
The second characteristic of rabies in Louisiana (illustrated in Figure 5) is the focal nature of rabies reports in terrestrial wildlife over the past 40 plus years. Two foci of reports are observed, one in northwest Louisiana, and a second observed in an area centered in south central Louisiana (Lafayette Parish). These foci may not only reflect areas of more intense rabies transmission in skunks, but may also reflect areas with plentiful skunk habitats, or more abundant skunk habitats in areas near human habitation.

Figure 5: Rabies in terrestrial wildlife - Louisiana, 1970-2015



Zero to two reports of rabies in agricultural animals (cattle, goats, sheep, etc.), and horses have been reported annually over the past 44 years (Figure 6).

Figure 6: Rabies cases in agricultural animals (cattle, goats, sheep), and horses - Louisiana, 2000-2015



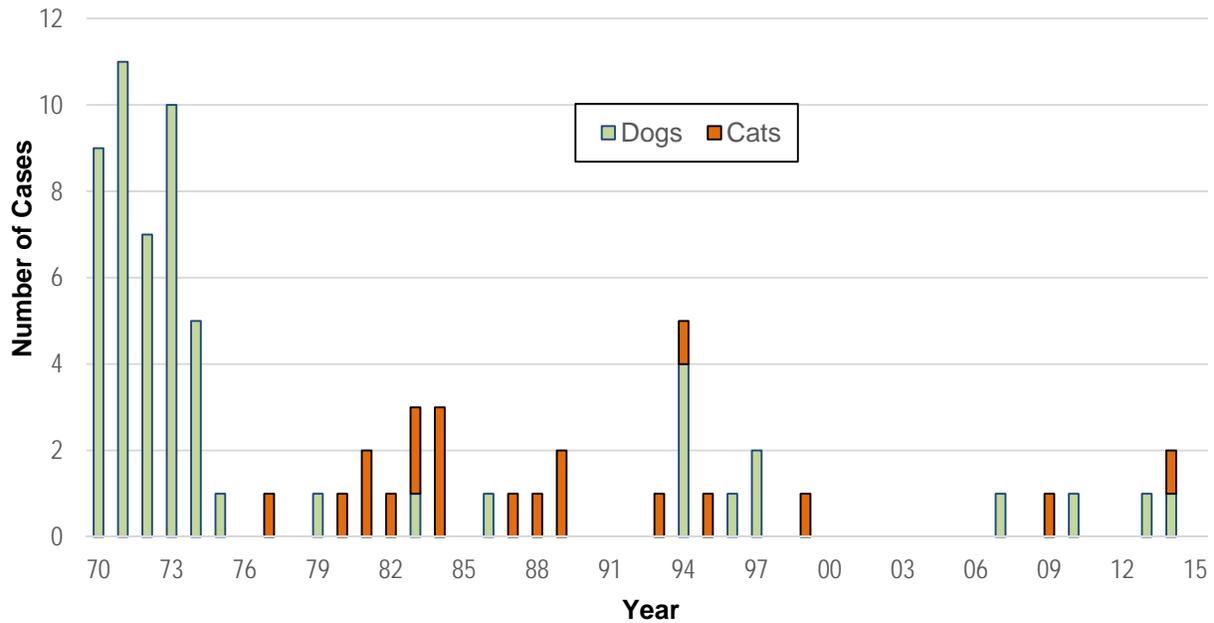
Rabies in agricultural animals and equine species is almost always geographically and epidemiologically related to the prevalence of skunk variant rabies. A map of both agricultural animal, equine, and pet rabies in Louisiana, seems to confirm this association (Figure 7). Cases in horses, cattle, goats and sheep have not been reported from areas not known to be endemic for skunk variant rabies.

Figure 7: Agricultural animals, equine species, dog and cat rabies - Louisiana, 1970-2015



Figure 8 illustrates reported cases of rabies in pet species in Louisiana. The predominant variant identified in dogs and cats is the skunk variant. Nevertheless, a few cases of bat variant rabies, as were observed in 2014, have been identified in pets.

Figure 8: Rabies cases dogs and cats- Louisiana, 1970-2015



There have been no domestically transmitted human cases of rabies reported in Louisiana since 1953. In August, 2010, Louisiana’s first human case of rabies in over 50 years was reported in a migrant worker from Michoacán, Mexico. The case investigation revealed that this 19 year-old male had been bitten on the heel by a bat approximately 2.5 weeks prior to symptom onset. At the time of the bite, the young man was employed on a ranch in Mexico, but in late July he entered the United States, eventually being employed as an agricultural worker in south Louisiana. Investigators established that the exposure had occurred in Mexico, not in Louisiana.

After the death of the young man, the U.S. Centers for Disease Control and Prevention confirmed the virus to be vampire bat variant rabies, the first human death from this particular variant reported in the United States. Due to a delay in recognition of symptoms of rabies, 95 close contacts, primarily agricultural workers and health care workers, were administered post-exposure prophylaxis to eliminate the possibility of secondary transmission.