

## Rabies

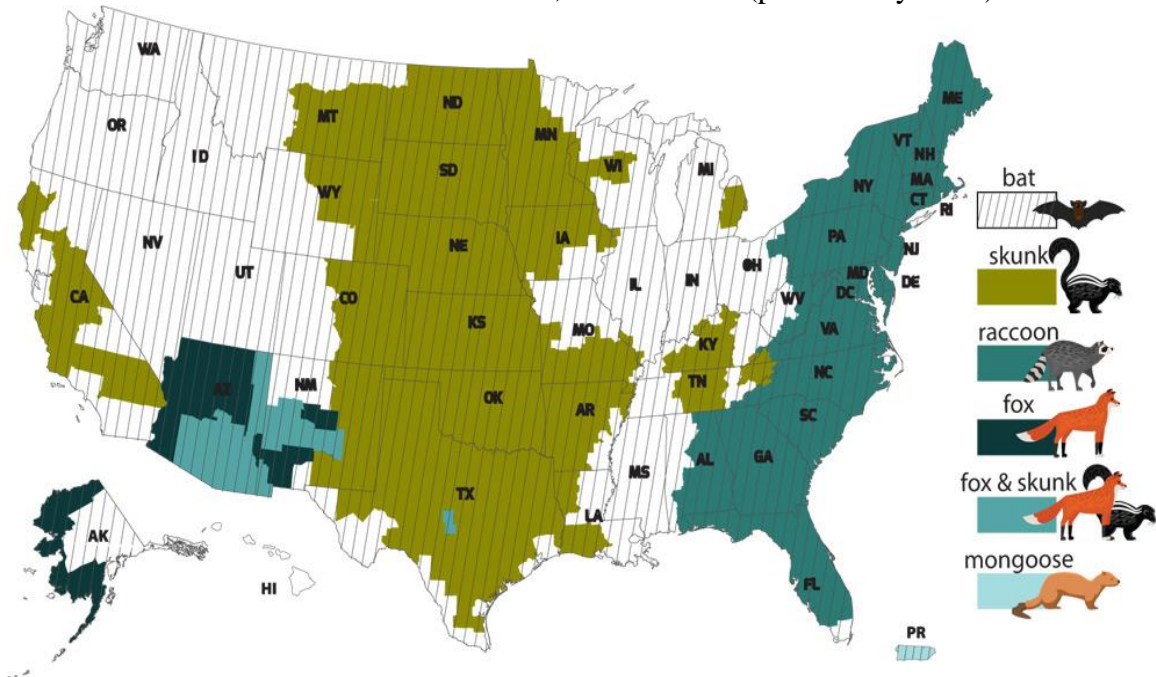
*Rabies is a Class A Disease and must be reported to the state within 24 hours by calling the phone number listed on the web page.*

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, and the primary reservoir species are bats. 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.

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. The vaccine is considered to be 100% effective against rabies when received in an appropriate amount of time and the entire protocol is completed.

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 rabies variants throughout the U.S. and Puerto Rico.

Figure 1: Distribution of major rabies virus variants among mesocarnivores United States and Puerto Rico, 2008 to 2018 (provided by CDC)



Southern skunk variant and several bat variants of rabies 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.

Examples of the erroneous picture often presented by passive surveillance is exemplified by reports of two positive skunks from De Soto Parish in 2013, and 13 positive skunks from De Soto in 2016. In 2013, De Soto Parish animal control officials documented the observation, recovery and euthanasia of 14 additional oddly behaving skunks that were not tested. In the same manner in 2016, De Soto officials documented at least 28 additional oddly behaving skunks. Many of these animals could have been infected with the rabies virus.

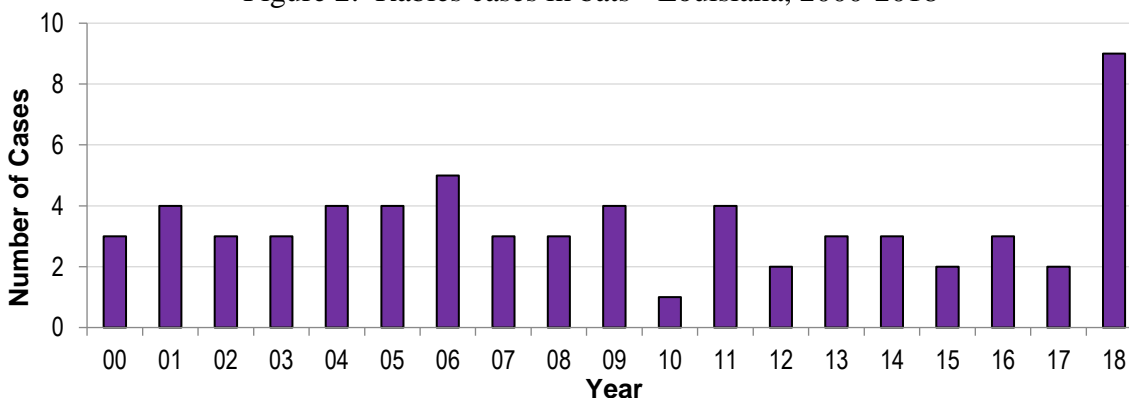
From 2000 until 2006, a period of seven years, there were no cases of rabies reported in pet species. Since 2007, four dogs and three cats have been reported to be positive for rabies. These recent cases in pet species serve as a reminder of the importance of vaccinating pet dogs, cats and ferrets for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

Table 1: Distribution by species and year - Louisiana, 2000-2018

Species	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	Total
Skunk	11	5	2	1		3	2	1	3		7	2	2	4		3	1	13	1	61
Bat	3	4	3	3	4	4	5	3	3	4	1	4	2	3	3	2	3	2	9	65
Dog								1			1			1	1					4
Cat										1					1				1	3
Horse		1	1					1												3
Squirrel											1									1
<b>Total</b>	<b>14</b>	<b>10</b>	<b>6</b>	<b>4</b>	<b>4</b>	<b>7</b>	<b>7</b>	<b>6</b>	<b>6</b>	<b>5</b>	<b>10</b>	<b>6</b>	<b>4</b>	<b>8</b>	<b>5</b>	<b>5</b>	<b>4</b>	<b>15</b>	<b>11</b>	<b>138</b>

Eleven different species of bats have been identified within the state of Louisiana. Each species is characterized by at least one distinct variant of rabies. Numbers of rabid bats reported in the state from 2000 to 2017 remained fairly constant. The consistency likely reflects stringent enforcement of testing policies by public health authorities, which generally restrict testing to animals involved in incidents with people. The results may also reflect a consistent level of rabies prevalence in bat species (Figure 2). In 2018 there was an increase in the number of rabid bats reported, a total of 9. Additionally, the map on page 1 shows that bat rabies is prevalent in every state and the U.S. Centers for Disease Control and Prevention (CDC) states that bats are the most prevalent reservoir of rabies in the country.

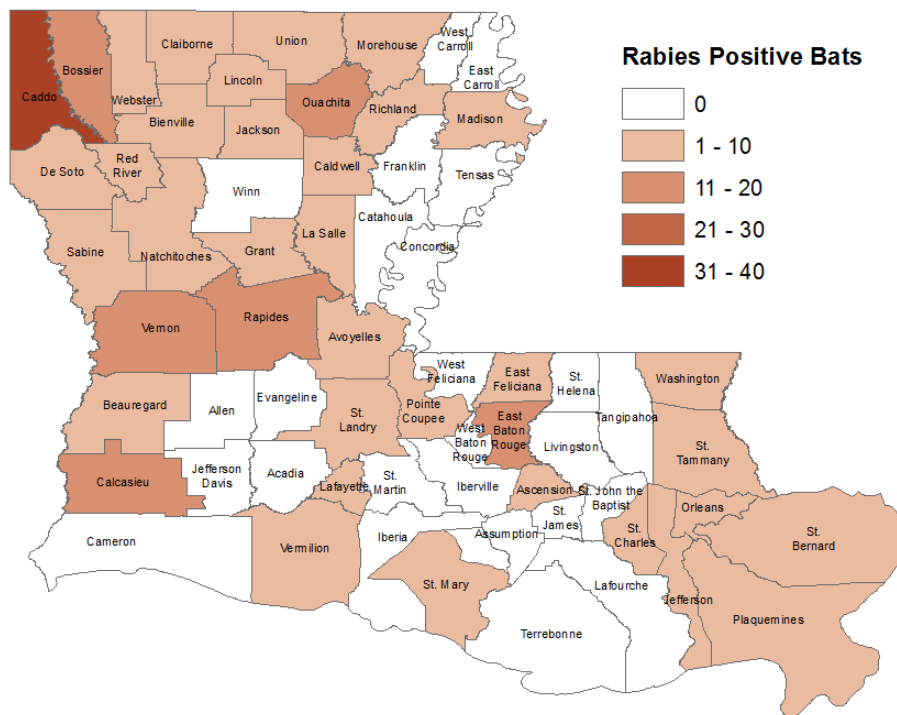
Figure 2: Rabies cases in bats - Louisiana, 2000-2018



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, as well as the positive cat identified in St. Helena Parish in 2018, were infected with bat variant rabies. These 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.

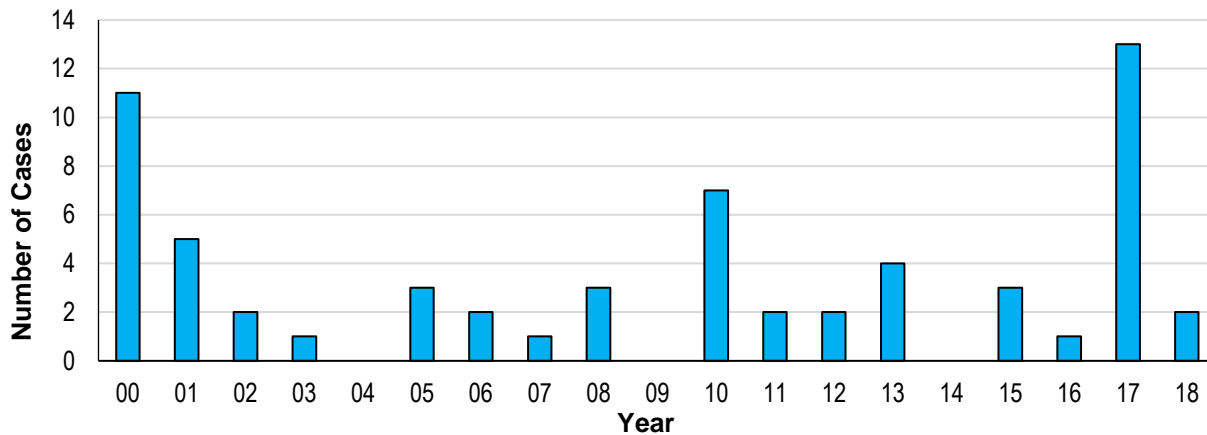
Rabid bats have been discovered in all regions of the state, with 5 positives reported in Ascension and East Baton Rouge Parishes in 2018. Higher numbers of bats are often submitted for testing from heavily populated areas of the state, reflecting the increased likelihood of human/bat interactions in densely populated areas. There also appears to be a higher density of bat rabies in the western parishes extending to Rapides parish in central Louisiana (Figure 3).

Figure 3: Bat rabies - Louisiana, 1970-2018



The only terrestrial variant of rabies known to circulate in Louisiana is the southern skunk variant. In 2017, thirteen (13) positive skunks were identified in the state, all in De Soto Parish (Figure 4). The dearth of reports of rabies in wild terrestrial animals, as stated previously, is likely due to stringent enforcement of testing guidelines and the absence of active surveillance.

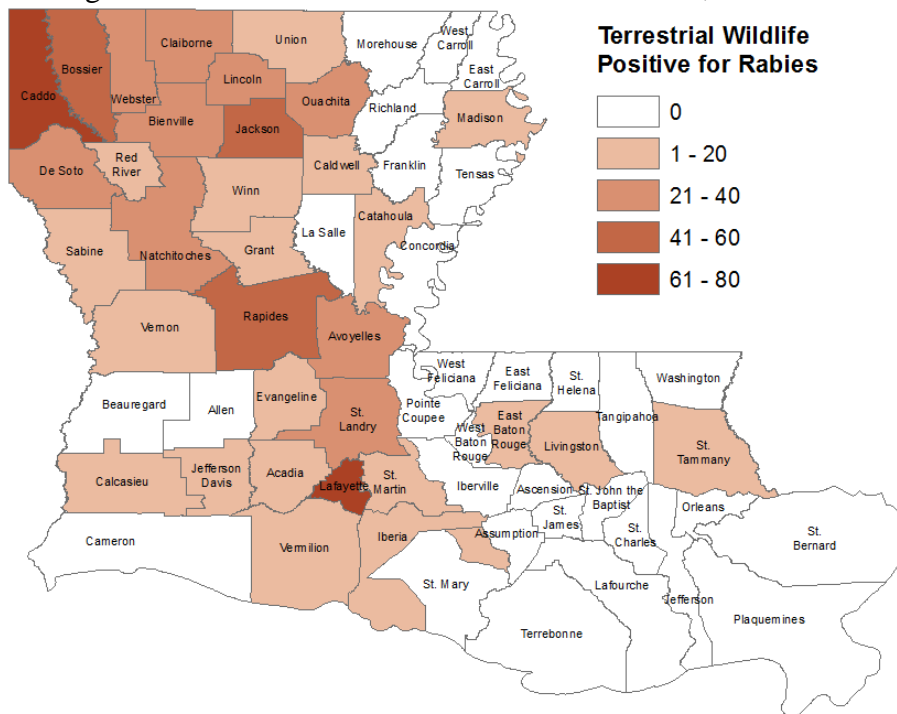
Figure 4: Rabies cases in wild terrestrial species - Louisiana, 2000-2018



The relatively high number of reported rabid skunks identified in De Soto Parish indicates the possibility of an epizootic within the area, but also reflects the proactive methods of De Soto Parish Animal Control in the identification and submission of these animals for testing.

The map of rabies in terrestrial wildlife illustrates the distribution of terrestrial rabies in Louisiana since 1970 (Figure 5).

Figure 5: Rabies in terrestrial wildlife - Louisiana, 1970-2018

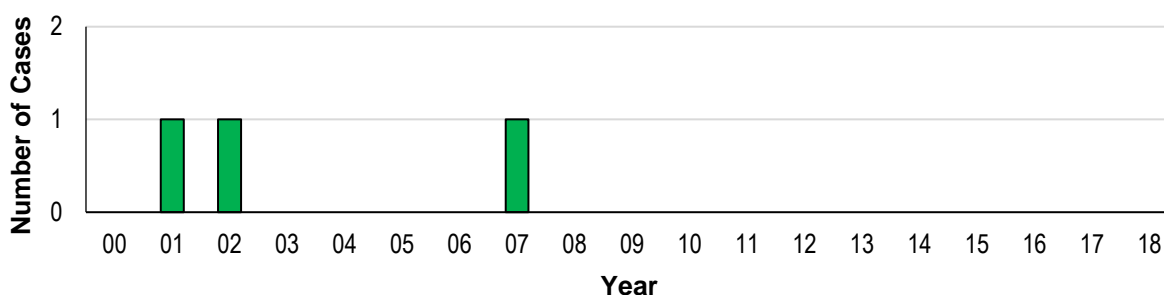


Prior to 2010, skunk variant rabies was thought to be present in all of north Louisiana, particularly northwest Louisiana, and areas of south Louisiana west of the Atchafalaya river basin. In 2010, a rabid squirrel infected with the southern skunk variant was identified in Livingston Parish immediately 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, or were terrestrial animals

infected with bat variant rabies. Since no evidence of transport of the rabid squirrel existed, state health officials were faced with the apparent reality that the skunk variant may have migrated east, thus the greater Baton Rouge area and all of southeast Louisiana was considered a zone of surveillance for skunk variant rabies. Since 2010, no further occurrences of skunk variant rabies have been identified in the area where the squirrel was discovered, but surveillance continues.

In the past 20 years, most cases of terrestrial rabies have been observed in two foci, one in northwest Louisiana, and a second 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 6: Rabies cases in agricultural animals (cattle, goats, sheep), and horses - Louisiana, 2000-2018



Rabies in horses and domestic ruminants is almost always geographically and epidemiologically related to the prevalence of skunk variant rabies (Figures 7 and 8). Rabies cases in agricultural animals and horses have been reported sporadically and infrequently.

Figure 7: Agricultural animals, equine species, dog and cat rabies - Louisiana, 1970-2018

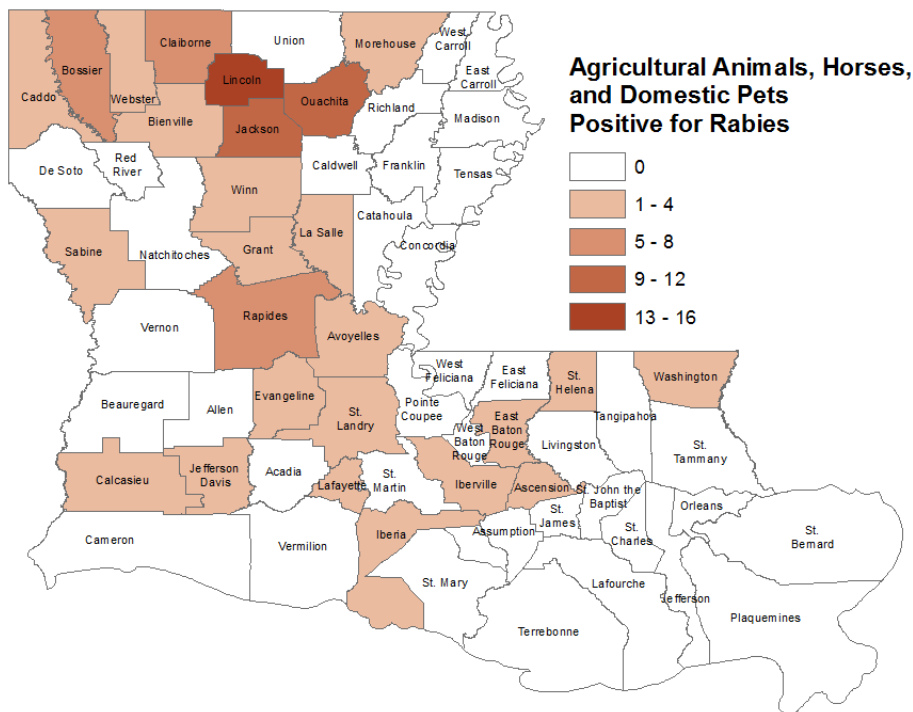
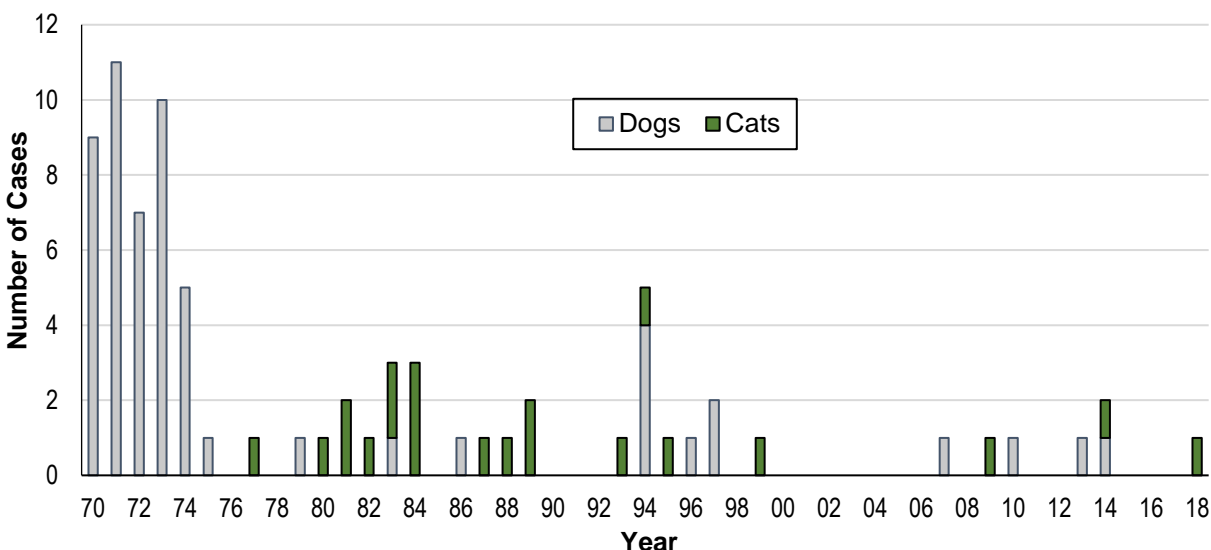


Figure 8: Rabies cases dogs and cats- Louisiana, 1970-2018



The predominant variant identified in dogs and cats has historically been the skunk variant, so the regions from where pet cases of rabies have been reported correspond for the most part with the distribution of reported cases in skunks. Nevertheless, cases of bat variant rabies in pets have become somewhat more common in recent years.

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, CDC 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.