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ANNUAL SUMMARY  
RABIES 1973  
Issued July 1974

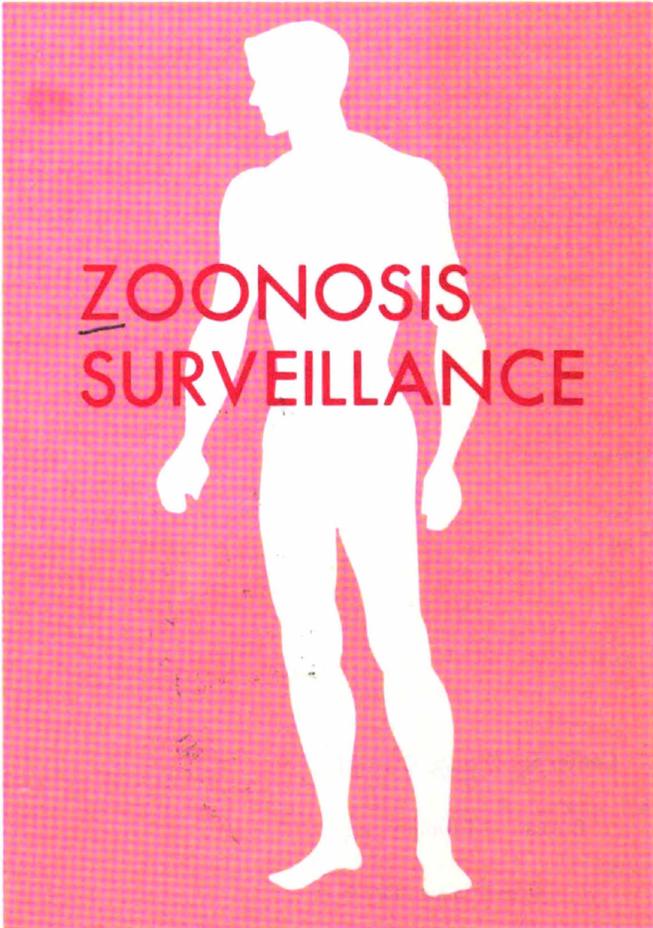
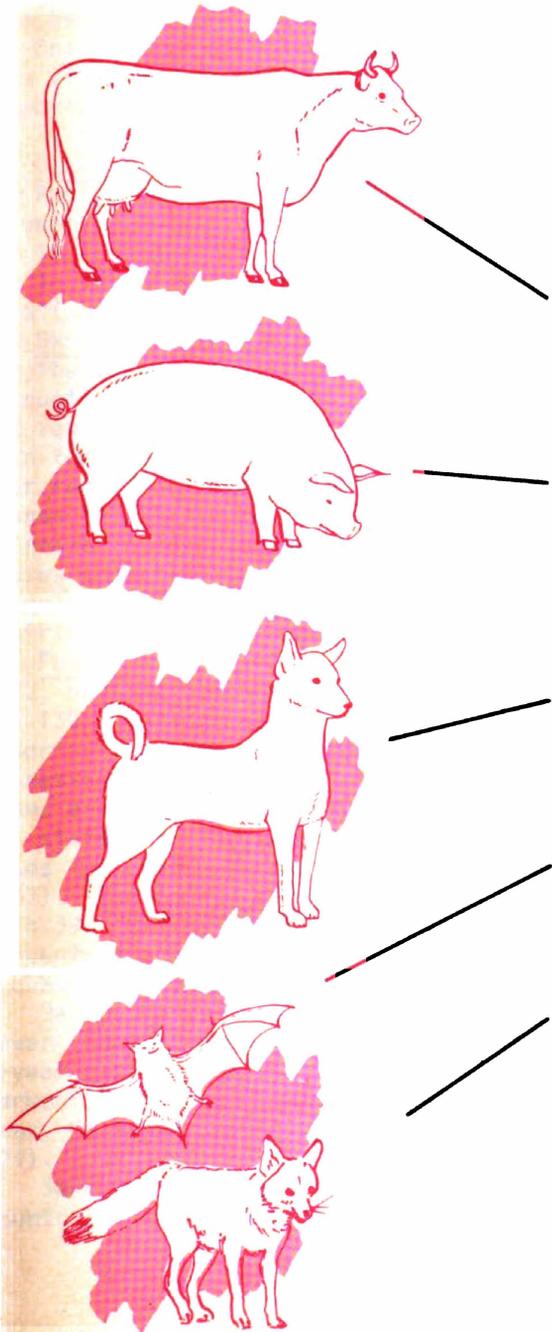
CENTER FOR DISEASE CONTROL

# RABIES

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U. S. DEPARTMENT OF  
HEALTH, EDUCATION, AND WELFARE  
PUBLIC HEALTH SERVICE

# PREFACE

Summarized in this report is information received from Health, Agriculture and Wildlife Officials from the various States and their counterparts in the Federal government. Much of the information is preliminary. It is intended primarily for the use of those with the responsibility of disease control activities. Anyone desiring to quote this report should verify the data at its original source for accuracy and interpretation.

Contributions to the Surveillance Report are most welcome. Please address to:

Center for Disease Control  
Attn: Chief, Rabies Control Unit  
Bureau of Epidemiology  
Lawrenceville, Georgia 30245

## SUGGESTED CITATION

Center for Disease Control: Rabies Surveillance, Annual Summary 1973  
issued July 1974

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## I. REPORTS OF CASES IN THE UNITED STATES

### A. Summary

In 1973, 3,698 laboratory confirmed cases of rabies were reported for the United States, 729 fewer cases than for 1972, and 4% below the average for the preceding 5 years. Rabies cases were reported from all the contiguous states, except Wyoming, and from Alaska and Puerto Rico. Hawaii, the District of Columbia, Guam, and the Virgin Islands reported no cases. California (401) and Minnesota (373) reported the most cases. The animals most frequently reported infected by percentage of the total cases were skunks - 50%, foxes - 13%, bats - 12%, cattle - 10%, dogs - 5%, cats - 4%, and raccoons - 3%. The 180 cases in dogs is the lowest recorded for the United States since records have been kept.

Only 1 case of rabies in a human occurred in 1973. A 26-year-old man had onset 22 days after he was bitten by a bat; he died 14 days later despite intensive medical support.

### B. Case Reports

Rabies was reported in 2,930 wild animals (79%), in 767 domestic animals, and in 1 human.

I. Rabies in Wildlife. Rabies was recorded in 13 species of terrestrial wildlife and in insectivorous bats. Cases in the major wildlife hosts, skunks (63%), foxes (15%), bats (15%), and raccoons (4%), accounted for over 98% of all wildlife cases.

Skunks. Thirty states reported 1,851 cases for 1973, 244 cases fewer than for 1972. For the 13th consecutive year, skunks were the animals most frequently reported infected, accounting for 50% of all cases. A total of 628 counties reported cases in skunks (24 fewer counties than for 1972). Although the total number of reports was lower than for the preceding year, the percentage of cases in skunks (50%) was the highest ever recorded. The states reporting the most cases in skunks were California (243) and Minnesota (258). California and Minnesota were also the states reporting the greatest increase in cases above the preceding year (+74 and +65 cases respectively). The states reporting the greatest decrease were Oklahoma (-103) and Texas (-60). San Joaquin County, California, reported 34 cases, the highest for any county. The general distribution of skunk cases remains similar to that for the past decade.

Foxes. Twenty-seven states reported 477 cases for 1973, 168 fewer cases than for 1972, and 37% below the average for the preceding 5-year period. Twenty-seven states and 139 counties reported cases for 1973. Foxes were the animals most frequently reported infected in 7 states: Alaska, Kentucky, Louisiana, Maine, New Hampshire, Tennessee, and Virginia. The states reporting the most cases were Kentucky with 125 cases and Virginia with 70. New Hampshire, which reported no fox cases for 1972, was the state with the greatest increase in cases; Coos County, New Hampshire, reported 25 cases for 1973. Tennessee was the state reporting the greatest decrease in cases (-47). The county reporting the most cases for 1973 was Augusta County, Virginia, with 39. Rabies in foxes remains relatively localized in the United States with concentrations in the Appalachian area, upper New England region, and endemic areas in Alabama, Louisiana, and Texas.

Bats. Forty-five states reported a total of 432 cases of rabies for 1973, 72 cases fewer than for the previous year, but 15% higher than the average for the preceding 5-year period. States that reported no cases in bats were Alaska, Hawaii, Missouri, Vermont, Wyoming. Ten states recorded cases in bats only. For the fourth consecutive year, California (141) reported by far the largest number of cases followed by Texas (21).

Santa Clara County, California, reported 37 cases in bats, more than any other county in the United States. As in the past, rabies in bats was widely distributed

with 217 counties reporting 432 cases, in contrast to the situation in foxes where 139 counties reported 477 cases. The geographic distribution of cases in bats is largely independent of the apparent distribution of cases in terrestrial animals.

Raccoons. A total of 114 cases of rabies were reported from 13 states for 1973, 48 fewer cases than for the preceding year. Florida and Georgia continued to report most (85%) of the cases. These states include the area where a cycle of transmission has been established, and rabies in raccoons is enzootic. The remaining 16 cases were scattered throughout 11 states.

Other Wildlife. Fifty-six cases of rabies were recorded in wildlife species other than those included above. Most of the cases occurred in mongooses in Puerto Rico (42), where rabies is enzootic in this species. The other cases were 6 in bobcats, 4 in coyotes, 1 in a coatí mundi, 1 in a fisher, 1 in a ringtail cat, and 1 in a flying squirrel. These cases were not associated with any particular geographic area. Although the diagnosis of rabies in the flying squirrel was confirmed by fluorescent antibody tests, it was not confirmed on subsequent animal inoculation.

2. Rabies in Domestic Animals. Thirty-three states and Puerto Rico reported 767 cases in domestic animals for 1973, 196 fewer cases than for 1972. Cases were reported in 381 cattle, 180 dogs, 139 cats, 52 horses and mules, 8 sheep and goats, and 7 swine. Half of the cases in domestic animals were in cattle. Cattle cases were reported from 226 counties in 25 states and from Puerto Rico. In general, cattle cases were reported from areas of high endemicity in skunks and foxes.

Dog cases declined markedly both in total number (180 vs. 232) and as a percentage of total cases (4.6 vs 5.2). Cases were reported from a total of 137 counties in 27 states and from Puerto Rico. Wisconsin (35) and Kentucky (19) were the states reporting the most cases in dogs. West Virginia was the only state where dogs were the animals most frequently reported infected. Quachita Parrish, Louisiana (6 cases), was the only county reporting 5 or more cases for 1973. The 180 cases reported in dogs is the lowest annual total ever recorded for the United States. The decrease in cases is associated with not only the general absence of dog-to-dog transmission, but also the absence of outbreaks along the U.S.-Mexico border such as the one occurring in 1972. More information about the ownership and vaccination status, and other characteristics of infected dogs is found in the survey of canine rabies for 1973 (elsewhere in this report).

A total of 139 cases in cats were reported from 24 states and Puerto Rico. Fewer cases have been reported for only 1 other year (135 cases from 1970) since U.S. records have been kept.

### 3. Rabies in Humans

Summary. The 1 human rabies case occurred in a Kentucky man who had onset 22 days after being bitten by a bat and died 14 days later despite intensive medical support. The clinical course was complicated by respiratory arrest, hypothermia, hypoxia, hypotension, and diffuse interstitial pneumonitis. This was the ninth human case of bat-associated rabies in the United States since 1951.

History. On September 7, 1973, a 26-year-old male developed paresthesias and pain in his ears, headache, sore throat, and anorexia. These symptoms persisted and were accompanied by fever, difficulty in swallowing, intermittent confusion, and behavioral changes. He was admitted to Clark County Hospital in Winchester, Kentucky. Upon admission he demonstrated nuchal rigidity, a temperature of 105°F, a positive straight leg raising test, drooling of oral secretions, pharyngeal spasms, and spontaneous flexion and extension of all extremities. His lungs were clear to auscultation and chest x-ray was normal. His past medical history was unremarkable except that he was unemployed because of low back pain and possible lumbar disc disease which had been diagnosed 2 years earlier.

Because of intermittent episodes of confusion and the peculiar muscle contractions, neurologic consultation was requested. The patient was transferred to St. Joseph's Mercy Hospital in Lexington. On September 13, 1973, examination revealed blood pressure of 140/104, pulse of 160, respiratory rate of 30, and temperature of 105°F. He appeared to be a toxic, acutely ill man, who was initially alert and awake. When stimulated he would flex and extend all his extremities. The deep tendon reflexes were equal, and cranial nerve examination revealed paralysis of the palate. Results of admission studies

included sinus tachycardia on the EKG, and hematocrit of 44%, with a blood count of 8,600. The patient was treated with diazepam, aspirin suppositories, and tetanus immune globulin. On September 14, 1973, he developed pharyngeal spasms and cyanosis while being turned in bed. Respiratory arrest occurred, and immediate cardio-pulmonary resuscitation was performed. The patient was intubated and ventilated with a volume cycled respirator. Cephalothin, diphenylhydantoin, and chlorpromazine therapy was begun. A subsequent chest x-ray revealed a left lower lobe infiltrate.

On September 15, 1973, the patient's family reported that he had been bitten a month earlier on the right ear by a bat. The attic door in their house was left open sometime during the second week in August, and, while asleep, he was bitten on the ear. Attempts to catch the bat were unsuccessful, and no medical care was sought. With the additional history of the bat bite a diagnosis of clinical rabies was entertained. Over the next 2 days the patient became more obtunded, and an elective tracheostomy was performed. On September 17, examination revealed pupils that were equal, round, and slowly reactive to light, a poor gag reflex, and intermittent facial paralysis, hyporeflexic deep tendon reflexes, flacid extremities, response only to deep pain, but no pathological reflexes. Sputum, blood, cerebrospinal fluid, and corneal impressions were collected for rabies studies, and the patient was given 20 IU/KG of human immune rabies globulin intramuscularly.

The patient's clinical situation stabilized over the next 24 hours. Intracerebral pressure was monitored by an epidural pressure transducer, and when it increased, it was controlled with mannitol administration. On September 19, an episode of hypotension and tachycardia secondary to upper GI bleeding occurred. Red blood cells were given to increase the hematocrit. On September 20, an intraventricular catheter attached to a Rickham reservoir was inserted into the left cerebral ventricular and 690 units of immune rabies globulin were instilled. No change in the patient's intraventricular pressure was noted after the instillation of the human immune rabies globulin.

During the patient's subsequent clinical course many interrelated complications occurred. Hypoxia was present earlier in the course and subsequently represented the most formidable complication. Measurement of blood gases following the patient's cardiorespiratory arrest and during administration of 40% respirator oxygen gave  $PO_2$  61 and  $PCO_2$  44. With a diagnosis of aspiration pneumonia, ventilation was controlled via a tracheostomy tube. By September 18, diffuse pulmonary infiltrates and severe hypoxia compatible with the "Adult Respiratory Disease Syndrome" occurred. Despite various adjustments in respiratory control and intensive pulmonary care, both the chest x-ray and arterial blood gases revealed a worsening pulmonary picture. At 5 AM, on September 22, an abrupt episode of hypotension occurred followed by cardiac arrest. Auscultation of the lungs suggested tension pneumothorax. Although the collapsed lung was re-expanded, hypoxia continued and a repeat cardiac arrest occurred. At 8:20 AM September 22, the patient died.

The results of viral studies from both ante- and post-mortem specimens are summarized in the table below. The presence of rabies antigen was confirmed from specimens collected on days 11, 12, and 14 and the final day of illness.

#### SPECIMENS POSITIVE FOR RABIES ANTIGEN FROM HUMAN CASE, KENTUCKY 1973

| <u>Date Specimen</u> | <u>Day of Illness</u> | <u>Type of Specimen</u> | <u>Diagnostic Technique</u> |
|----------------------|-----------------------|-------------------------|-----------------------------|
| 9/17                 | 11                    | Corneal Impressions     | FA+                         |
| 9/18                 | 12                    | Saliva                  | Mice Inoculation            |
| 9/18                 | 12                    | Tracheal Aspirate       | Mice Inoculation            |
| 9/20                 | 14                    | CSF                     | Mice Inoculation            |
| 9/22                 | Post-mortem           | Cerebellum              | Mice Inoculation            |
| 9/22                 | Post-mortem           | Ammon's Horn            | Mice Inoculation            |
| 9/22                 | Post-mortem           | Brain Stem              | Mice Inoculation            |

(Reported by Vincent Taormino, M.D., Raymond Otero, Ph.D., Hospital Microbiologists, Karen Riley, R.N., Nurse Epidemiologist, St. Joseph's Hospital, Lexington; Philip Weller, M.D., Administrator, Fayette County Health Department; Joseph Skaggs, D.V.M., State Epidemiologist, Bureau of Health Services, Calixto Hernandez, M.D., Kentucky Department of Human Resources; and the Viral Diseases Branch, Bureau of Epidemiology, CDC.)

## COMMENT

This was the ninth human case of bat-associated rabies in the United States since 1951. Although bat rabies accounts for only 15% of reported wildlife rabies, bat-associated rabies has been the most frequent source of human infection in the United States since 1970. This case re-emphasizes the importance of educating the public to the danger of bites from bats. If the patient had received rabies prophylaxis after the biting incident, there is every chance that he would have remained healthy.

## II. SPECIAL REPORTS

### A. Survey of Cases in Dogs for 1973

The 180 cases of rabies in dogs for 1973 is the lowest annual total on record for the United States. As a result of effective vaccination, rabies in dogs declined sharply from over 5,000 cases representing over 50% of the total cases reported annually in the early 1950's to less than 5% of the total for 1973. However, dog bites continue to be the major cause of rabies prophylaxis in humans, and rabid dogs remain the animals presenting the greatest individual threat of human exposure.

The Rabies Control Section, Viral Diseases Branch, Bureau of Epidemiology, CDC, requested information about the ownership, vaccination status, and exposures associated with dog cases for 1973. A typical case of canine rabies during 1973 involved a owned, unvaccinated animal that developed dumb rabies and exposed 1 or more persons.

In 157 cases, information on the vaccination status of the dog was obtained. Of these, 91% (143) were in unvaccinated pet dogs or in strays. In 14 cases a history of vaccination was indicated. In 5 of these there was apparent vaccine failure, in 6 cases the vaccination was outdated or administered after exposure, and in 3 cases there was not enough information to evaluate the vaccination status of the dog. In the 5 cases where there was apparent vaccine failure, 3 cases involved modified live vaccines and the other 2 involved inactivated vaccine.

In 118 cases where information on the owner of the dog was supplied, only 9 cases (8%) involved strays. In 128 of the cases, information regarding human exposure was available; 89 (70%) involved human exposure but it should be noted that in many of these cases the "exposed" persons had a history of contact but not of having been bitten. In 74 of the 86 cases where behavioral information was supplied, the symptomatology was typical of dumb or paralytic rabies.

The continuation of a low incidence of rabies in the U.S. dog population will depend on maintaining and increasing the percentage of vaccination. Monitoring of future cases of rabies in dogs will be continued to detect possible failures of vaccines under normal usage and to observe any changes in the pattern of cases.

### B. Evaluation of Rabies Diagnosis in State Laboratories

In the fall of 1973, all the state diagnostic reference laboratories and 14 selected regional and veterinary college laboratories accepted an invitation by the Licensure and Proficiency Testing Branch, Bureau of Laboratories, and the Rabies Control Section, Bureau of Epidemiology, CDC, to participate in evaluating their rabies diagnostic performance. In October, 5 blind coded samples of mouse brain tissue, including 2 positive and 3 negative for rabies antigen, and a questionnaire were sent to these laboratories.

Results of the examination of the specimens by fluorescent antibody testing (FA) were sent to the CDC from all the participating labs, and when a result was not in agreement with the correct identification, the remaining tissue from the original source of the specimen was reexamined by FA at the CDC. Because 1 of the specimens in the

series did not produce sufficiently consistent results, it was not considered in the grading of the results. All but 5 of the laboratories correctly identified each of the 4 remaining test specimens. The 5 laboratories that did not correctly identify all specimens missed 1 specimen each; 3 reported a negative specimen as positive, and 2 reported the positive specimen as negative. The erroneous results were not attributable to the use of any specific technique or reagent.

The 5 laboratories that identified specimens incorrectly were asked to examine further specimens to determine if there might be a continuing problem with their diagnostic technique. Ten specimens sent to the laboratories as a follow-up included 4 positive and 6 negative for rabies antigen. Three of the 5 laboratories demonstrated their diagnostic competence by correctly identifying all the specimens. The remaining 2 laboratories reported unsatisfactory results by FA examination of the specimens, and they were notified that a continuing problem was evident with their rabies diagnoses. The directors of both laboratories expressed concern and interest in correcting the diagnostic difficulties. Both accepted the offer of the Virology Training Branch, Bureau of Laboratories, CDC, for special personnel training and bench work. Several problems were corrected, and the laboratories have subsequently demonstrated satisfactory technique.

The results of the initial testing indicated a high level of diagnostic competence with 59 of the 64 (92%) laboratories correctly identifying all the specimens initially examined. A follow-up of the 5 labs that reported incorrect diagnoses led to the correction of the existing diagnostic problems in their laboratories. Through the coordinated efforts of several units at the CDC, for the first time an evaluation of the competence of all the state reference laboratories in performing FA diagnosis of rabies has been combined with effective remedial action. Because of the importance of accurate, dependable FA diagnosis to public health, testing of rabies diagnostic competency in public health laboratories will be continued on a regular basis.

**Table 1 INCIDENCE OF RABIES IN THE UNITED STATES BY TYPE OF ANIMAL  
1953-1973**

| YEAR | DOGS  | CATS | FARM ANIMALS | FOXES | SKUNKS | BATS | OTHER ANIMALS | MAN | TOTAL |
|------|-------|------|--------------|-------|--------|------|---------------|-----|-------|
| 1953 | 5,688 | 538  | 1,118        | 1,033 | 319    | 8    | 119           | 14  | 8,837 |
| 1954 | 4,083 | 462  | 1,032        | 1,028 | 547    | 4    | 118           | 8   | 7,282 |
| 1955 | 2,657 | 343  | 924          | 1,223 | 580    | 14   | 98            | 5   | 5,844 |
| 1956 | 2,592 | 371  | 794          | 1,281 | 631    | 41   | 126           | 10  | 5,846 |
| 1957 | 1,758 | 382  | 714          | 1,021 | 775    | 31   | 115           | 6   | 4,802 |
| 1958 | 1,643 | 353  | 737          | 845   | 1,005  | 68   | 157           | 6   | 4,814 |
| 1959 | 1,119 | 292  | 751          | 920   | 789    | 80   | 126           | 6   | 4,083 |
| 1960 | 697   | 277  | 645          | 915   | 725    | 88   | 108           | 2   | 3,457 |
| 1961 | 594   | 217  | 482          | 614   | 1,254  | 186  | 120           | 3   | 3,470 |
| 1962 | 565   | 232  | 614          | 594   | 1,449  | 157  | 114           | 2   | 3,727 |
| 1963 | 573   | 217  | 531          | 622   | 1,462  | 303  | 224           | 1   | 3,933 |
| 1964 | 409   | 220  | 594          | 1,061 | 1,909  | 352  | 238           | 1   | 4,784 |
| 1965 | 412   | 289  | 625          | 1,038 | 1,582  | 484  | 153           | 1   | 4,584 |
| 1966 | 412   | 252  | 587          | 864   | 1,522  | 377  | 183           | 1   | 4,198 |
| 1967 | 412   | 293  | 691          | 979   | 1,568  | 414  | 250           | 2   | 4,609 |
| 1968 | 296   | 157  | 457          | 801   | 1,400  | 291  | 210           | 1   | 3,613 |
| 1969 | 256   | 165  | 428          | 888   | 1,156  | 321  | 307           | 1   | 3,522 |
| 1970 | 185   | 135  | 399          | 771   | 1,235  | 296  | 252           | 3** | 3,276 |
| 1971 | 235   | 222  | 484          | 677   | 2,018  | 465  | 289           | 2   | 4,392 |
| 1972 | 232   | 184  | 547          | 645   | 2,095  | 504  | 218           | 2   | 4,427 |
| 1973 | 180   | 139  | 448          | 477   | 1,851  | 432  | 170           | 1   | 3,698 |

\*Data prior to 1960 from USDA, ARS. Subsequent data from PHS, CDC.

\*\*1 patient recovered.

**Table 2 HUMAN RABIES DEATHS, UNITED STATES 1973**

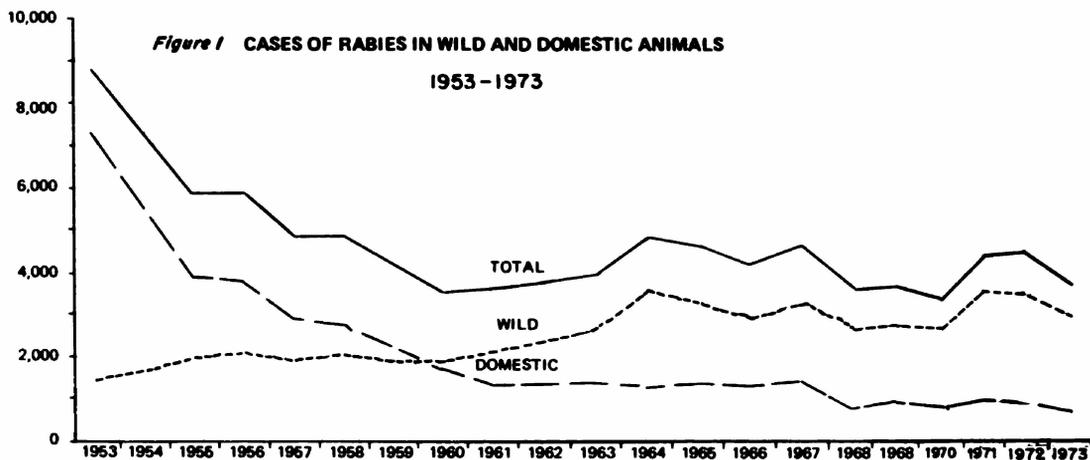
| Locality            | Age | Sex | Nature of Exposure   | Post Exposure Treatment | Incubation Period | Duration of Illness | Date of Death | Locality of Death   |
|---------------------|-----|-----|----------------------|-------------------------|-------------------|---------------------|---------------|---------------------|
| Lexington, Kentucky | 26  | M   | Bitten on ear by bat | None                    | About 30 Days     | 16 Days             | 9/22/73       | Lexington, Kentucky |

**Table 3 INCIDENCE OF RABIES IN THE UNITED STATES BY STATE  
1961-1973**

| STATE                   | 1961  | 1962  | 1963  | 1964  | 1965  | 1966  | 1967  | 1968  | 1969  | 1970  | 1971  | 1972  | 1973  |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                         | 3,470 | 3,727 | 3,933 | 4,764 | 4,584 | 4,198 | 4,608 | 3,813 | 3,522 | 3,276 | 4,392 | 4,427 | 3,698 |
| 1. Alabama              | 64    | 31    | 35    | 36    | 18    | 22    | 52    | 29    | 60    | 49    | 61    | 82    | 52    |
| 2. Alaska               | 9     | 15    | 7     | 11    | 10    | 2     | 2     | 33    | 7     | 21    | 43    | 11    | 7     |
| 3. Arizona              | 25    | 26    | 75    | 71    | 60    | 53    | 66    | 65    | 39    | 48    | 40    | 61    | 39    |
| 4. Arkansas             | 92    | 51    | 75    | 124   | 84    | 78    | 93    | 57    | 37    | 53    | 108   | 112   | 108   |
| 5. California           | 254   | 294   | 307   | 328   | 222   | 308   | 324   | 372   | 313   | 322   | 322   | 275   | 401   |
| 6. Colorado             | 11    | 4     | 15    | 11    | 11    | 18    | 15    | 9     | 40    | 66    | 33    | 23    | 19    |
| 7. Connecticut          | 0     | 0     | 0     | 2     | 4     | 1     | 0     | 1     | 12    | 4     | 17    | 7     | 5     |
| 8. Delaware             | 0     | 0     | 2     | 0     | 0     | 0     | 0     | 1     | 0     | 0     | 4     | 7     | 6     |
| 9. District of Columbia | 0     | 0     | 0     | 0     | 0     | 0     | 6     | 3     | 0     | 0     | 0     | 0     | 0     |
| 10. Florida             | 68    | 72    | 85    | 106   | 78    | 78    | 82    | 111   | 178   | 97    | 76    | 87    | 43    |
| 11. Georgia             | 8     | 12    | 85    | 123   | 74    | 110   | 121   | 83    | 118   | 116   | 146   | 109   | 94    |
| 12. Hawaii              | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 13. Idaho               | 0     | 2     | 3     | 2     | 15    | 7     | 5     | 4     | 3     | 4     | 4     | 1     | 1     |
| 14. Illinois            | 163   | 133   | 157   | 229   | 313   | 192   | 195   | 135   | 88    | 158   | 318   | 277   | 202   |
| 15. Indiana             | 109   | 196   | 54    | 37    | 77    | 116   | 89    | 90    | 58    | 31    | 82    | 84    | 57    |
| 16. Iowa                | 349   | 349   | 343   | 460   | 232   | 168   | 136   | 126   | 103   | 136   | 240   | 350   | 214   |
| 17. Kansas              | 7     | 5     | 23    | 38    | 148   | 65    | 109   | 52    | 72    | 107   | 112   | 129   | 101   |
| 18. Kentucky            | 128   | 143   | 122   | 64    | 104   | 125   | 227   | 413   | 212   | 141   | 187   | 271   | 238   |
| 19. Louisiana           | 65    | 26    | 54    | 87    | 90    | 58    | 70    | 42    | 42    | 69    | 62    | 49    | 52    |
| 20. Maine               | 0     | 1     | 2     | 30    | 4     | 26    | 27    | 55    | 7     | 49    | 198   | 100   | 69    |
| 21. Maryland            | 5     | 3     | 2     | 3     | 27    | 6     | 5     | 5     | 3     | 3     | 3     | 19    | 16    |
| 22. Massachusetts       | 1     | 3     | 6     | 1     | 3     | 4     | 5     | 6     | 3     | 4     | 6     | 6     | 7     |
| 23. Michigan            | 80    | 48    | 50    | 59    | 68    | 43    | 25    | 17    | 13    | 28    | 48    | 9     | 12    |
| 24. Minnesota           | 144   | 237   | 273   | 416   | 177   | 218   | 178   | 259   | 179   | 126   | 265   | 295   | 373   |
| 25. Mississippi         | 1     | 0     | 0     | 67    | 42    | 22    | 11    | 7     | 6     | 3     | 5     | 4     | 1     |
| 26. Missouri            | 219   | 163   | 178   | 192   | 131   | 262   | 178   | 123   | 155   | 125   | 148   | 110   | 92    |
| 27. Montana             | 1     | 1     | 1     | 12    | 8     | 8     | 10    | 15    | 9     | 3     | 6     | 7     | 41    |
| 28. Nebraska            | 46    | 26    | 33    | 41    | 39    | 34    | 72    | 30    | 16    | 17    | 12    | 18    | 7     |
| 29. Nevada              | 0     | 1     | 11    | 15    | 0     | 10    | 10    | 2     | 13    | 11    | 5     | 2     | 4     |
| 30. New Hampshire       | 0     | 0     | 17    | 1     | 6     | 28    | 48    | 3     | 5     | 2     | 4     | 4     | 38    |
| 31. New Jersey          | 7     | 10    | 16    | 18    | 21    | 23    | 21    | 14    | 16    | 11    | 20    | 21    | 18    |
| 32. New Mexico          | 23    | 13    | 43    | 50    | 21    | 19    | 30    | 42    | 20    | 16    | 9     | 16    | 7     |
| 33. New York            | 92    | 107   | 89    | 121   | 259   | 215   | 90    | 45    | 244   | 260   | 136   | 45    | 30    |
| 34. North Carolina      | 14    | 1     | 15    | 6     | 3     | 4     | 3     | 13    | 4     | 3     | 5     | 4     | 14    |
| 35. North Dakota        | 37    | 52    | 72    | 83    | 50    | 88    | 171   | 137   | 79    | 57    | 193   | 147   | 159   |
| 36. Ohio                | 77    | 386   | 308   | 288   | 349   | 200   | 138   | 90    | 75    | 60    | 123   | 101   | 38    |
| 37. Oklahoma            | 20    | 33    | 69    | 102   | 143   | 190   | 377   | 126   | 74    | 103   | 283   | 299   | 174   |
| 38. Oregon              | 16    | 17    | 17    | 12    | 9     | 5     | 5     | 6     | 4     | 4     | 9     | 4     | 8     |
| 39. Pennsylvania        | 14    | 58    | 29    | 11    | 14    | 16    | 16    | 11    | 14    | 4     | 23    | 63    | 29    |
| 40. Rhode Island        | 0     | 0     | 0     | 0     | 1     | 0     | 2     | 0     | 0     | 3     | 1     | 2     | 1     |
| 41. South Carolina      | 0     | 0     | 10    | 2     | 3     | 1     | 2     | 0     | 0     | 0     | 20    | 13    | 6     |
| 42. South Dakota        | 105   | 116   | 12    | 90    | 69    | 118   | 142   | 132   | 53    | 119   | 167   | 132   | 151   |
| 43. Tennessee           | 186   | 213   | 138   | 571   | 681   | 353   | 559   | 282   | 132   | 65    | 108   | 316   | 149   |
| 44. Texas               | 658   | 531   | 525   | 358   | 399   | 448   | 401   | 264   | 330   | 227   | 323   | 344   | 264   |
| 45. Utah                | 8     | 1     | 4     | 3     | 2     | 3     | 3     | 4     | 5     | 2     | 9     | 9     | 3     |
| 46. Vermont             | 0     | 0     | 14    | 7     | 32    | 27    | 19    | 11    | 38    | 57    | 16    | 10    | 3     |
| 47. Virginia            | 190   | 136   | 238   | 333   | 338   | 259   | 210   | 148   | 386   | 216   | 79    | 109   | 99    |
| 48. Washington          | 5     | 0     | 20    | 6     | 22    | 15    | 2     | 2     | 5     | 8     | 5     | 9     | 10    |
| 49. West Virginia       | 115   | 147   | 113   | 40    | 28    | 60    | 63    | 55    | 120   | 153   | 121   | 60    | 25    |
| 50. Wisconsin           | 25    | 43    | 65    | 84    | 71    | 64    | 62    | 53    | 45    | 60    | 93    | 156   | 154   |
| 51. Wyoming             | 0     | 0     | 0     | 0     | 6     | 9     | 6     | 9     | 56    | 6     | 14    | 2     | 0     |
| 52. Guam                | 0     | 0     | 0     | 0     | 0     | 0     | 89    | 0     | 0     | 0     | 0     | 0     | 0     |
| 53. Puerto Rico         | 29    | 21    | 21    | 33    | 18    | 19    | 37    | 21    | 31    | 49    | 80    | 56    | 57    |
| 54. Virgin Island       | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |

**Table 4 CONFIRMED RABIES CASES IN THE UNITED STATES BY STATE AND ANIMAL, 1973**

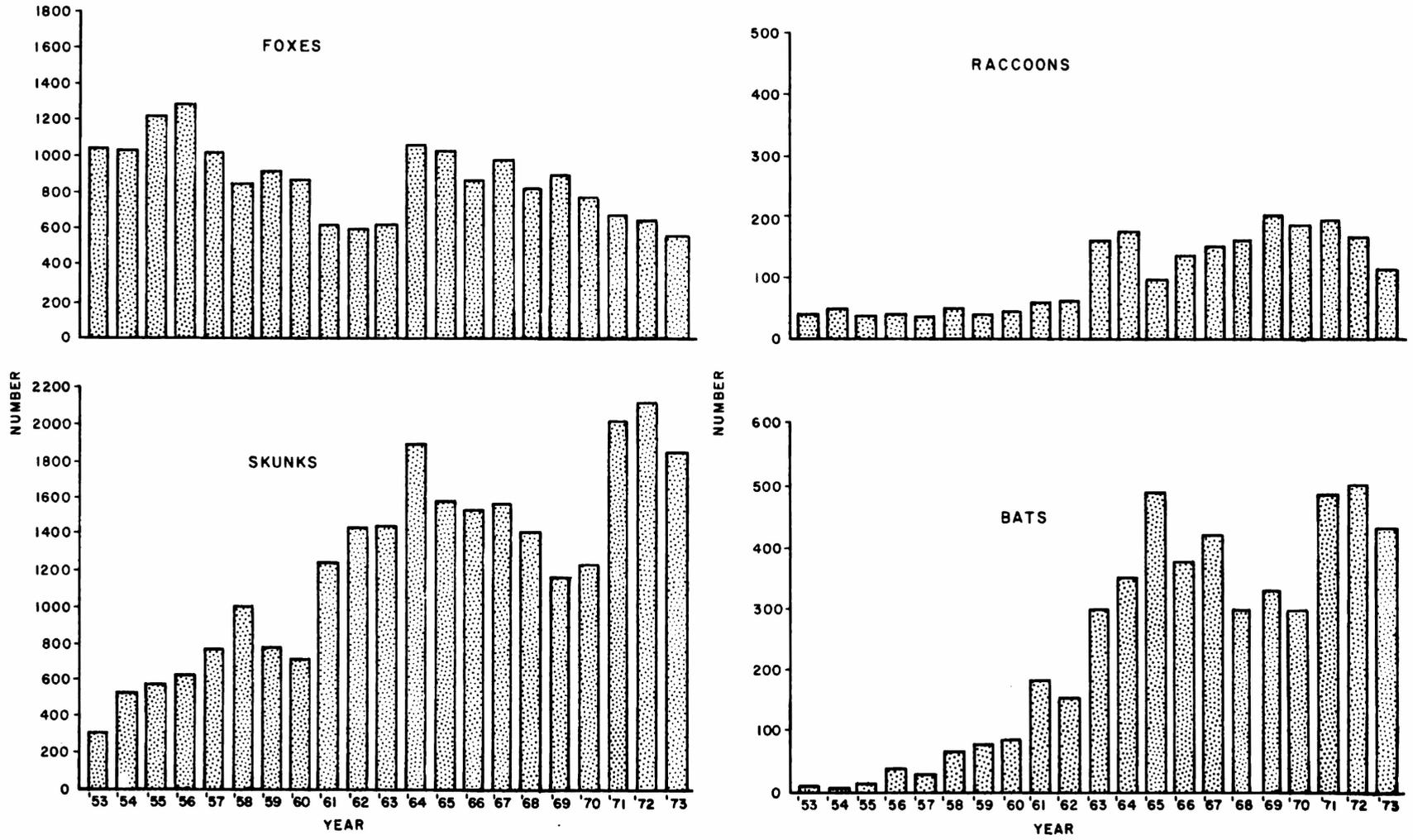
|                | Dogs | Cats | Cattle | Horses and Mules | Sheep and Goats | Swine | Domestic Animal Totals | Skunks  |         |               | Bobcats | Coyotes | Foxes |     |               | Raccons | Bats | Other Animals     | Wild Animal Totals | Humans | Total |                |
|----------------|------|------|--------|------------------|-----------------|-------|------------------------|---------|---------|---------------|---------|---------|-------|-----|---------------|---------|------|-------------------|--------------------|--------|-------|----------------|
|                |      |      |        |                  |                 |       |                        | Striped | Spotted | Not Specified |         |         | Gray  | Red | Not Specified |         |      |                   |                    |        |       |                |
| <b>TOTAL</b>   | 180  | 139  | 381    | 52               | 8               | 7     | 767                    | 1,550   | 5       | 296           | 6       | 4       | 234   | 53  | 186           | 114     | 432  | 50                | 2,930              | 1      | 3,698 |                |
| <b>STATE</b>   |      |      |        |                  |                 |       |                        |         |         |               |         |         |       |     |               |         |      |                   |                    |        |       |                |
| Alabama        | 4    | 2    | 5      |                  |                 |       | 11                     |         |         |               |         |         |       |     | 28            | 1       | 2    |                   | 41                 |        | 52    | Alabama        |
| Alaska         | 1    |      |        |                  |                 |       | 1                      |         |         |               |         |         | 2     |     |               |         |      | 4 Arctic Fox      | 6                  |        | 7     | Alaska         |
| Arizona        | 3    | 1    |        |                  |                 |       | 4                      | 3       |         |               |         |         |       |     | 3             |         | 11   | 1 Coati Mundi     | 35                 |        | 39    | Arizona        |
| Arkansas       | 3    | 1    | 3      | 1                | 1               |       | 9                      | 90      |         |               |         |         | 1     |     |               | 1       |      |                   | 99                 |        | 108   | Arkansas       |
| California     | 1    |      | 7      | 3                | 1               |       | 12                     | 243     |         |               |         |         |       |     | 3             | 2       | 141  |                   | 389                |        | 401   | California     |
| Colorado       |      | 1    | 1      |                  |                 |       | 2                      |         |         |               |         |         |       |     |               |         |      |                   | 17                 |        | 19    | Colorado       |
| Connecticut    |      |      |        |                  |                 |       | 0                      | 11      |         |               |         |         |       |     |               |         |      |                   | 5                  |        | 5     | Connecticut    |
| Delaware       |      |      |        |                  |                 |       | 0                      |         |         |               |         |         |       |     |               |         |      |                   | 6                  |        | 6     | Delaware       |
| Dist. of Col.  |      |      |        |                  |                 |       | 0                      |         |         |               |         |         |       |     |               |         |      |                   | 0                  |        | 0     | Dist. of Col.  |
| Florida        | 3    | 1    |        |                  |                 |       | 4                      | 1       |         | 2             |         |         |       |     | 3             | 23      | 10   |                   | 39                 |        | 43    | Florida        |
| Georgia        | 1    | 1    | 1      | 1                |                 |       | 4                      |         | 2       | 2             |         | 2       | 3     |     |               | 75      | 6    |                   | 90                 |        | 94    | Georgia        |
| Hawaii         |      |      |        |                  |                 |       | 0                      |         |         |               |         |         |       |     |               |         |      |                   | 0                  |        | 0     | Hawaii         |
| Idaho          |      |      |        |                  |                 |       | 0                      |         |         |               |         |         |       |     |               |         |      |                   | 1                  |        | 1     | Idaho          |
| Illinois       | 12   | 15   | 13     | 1                |                 |       | 41                     | 143     |         |               |         | 7       | 4     |     |               |         |      |                   | 161                |        | 202   | Illinois       |
| Indiana        | 3    |      | 1      | 1                |                 |       | 5                      | 45      |         |               |         | 2       | 1     |     |               |         |      |                   | 52                 |        | 57    | Indiana        |
| Iowa           | 3    | 18   | 60     | 6                | 1               | 1     | 89                     | 121     |         |               |         |         |       |     | 1             |         | 3    |                   | 125                |        | 214   | Iowa           |
| Kansas         | 2    | 7    | 5      |                  |                 |       | 14                     | 83      |         |               |         |         |       |     |               | 1       | 3    |                   | 87                 |        | 101   | Kansas         |
| Kentucky       | 19   | 10   | 40     | 3                |                 | 1     | 73                     |         |         |               |         | 93      | 9     | 23  |               |         | 4    |                   | 164                | 1      | 238   | Kentucky       |
| Louisiana      | 10   |      | 1      |                  |                 |       | 11                     |         |         |               |         |         | 2     | 18  |               | 1       | 3    |                   | 41                 |        | 52    | Louisiana      |
| Maine          | 1    |      | 6      | 2                |                 | 2     | 11                     |         |         |               |         |         |       | 56  |               |         | 1    |                   | 58                 |        | 69    | Maine          |
| Maryland       |      |      |        |                  |                 |       | 0                      |         |         |               |         |         |       |     | 1             |         | 14   | 1 Flying Squirrel | 16                 |        | 16    | Maryland       |
| Massachusetts  |      |      |        |                  |                 |       | 0                      |         |         |               |         |         |       |     |               | 1       |      |                   | 7                  |        | 7     | Massachusetts  |
| Michigan       | 1    |      |        | 1                |                 |       | 2                      |         |         |               |         |         |       |     |               |         | 9    |                   | 10                 |        | 12    | Michigan       |
| Minnesota      | 15   | 12   | 74     | 4                | 2               |       | 107                    | 257     | 1       |               |         |         | 1     |     | 3             | 1       |      |                   | 266                |        | 373   | Minnesota      |
| Mississippi    |      |      |        |                  |                 |       | 0                      |         |         |               |         |         |       |     |               |         | 1    |                   | 1                  |        | 1     | Mississippi    |
| Missouri       | 14   | 7    | 8      |                  |                 |       | 29                     |         |         |               |         |         |       |     | 1             |         |      |                   | 63                 |        | 92    | Missouri       |
| Montana        |      |      | 1      |                  |                 |       | 1                      | 36      |         |               |         |         |       |     |               |         | 4    |                   | 40                 |        | 41    | Montana        |
| Nebraska       |      | 1    |        |                  |                 |       | 1                      |         |         |               |         |         |       |     |               |         | 3    |                   | 6                  |        | 7     | Nebraska       |
| Nevada         |      |      |        |                  |                 |       | 0                      |         |         |               |         |         |       |     |               |         | 4    |                   | 4                  |        | 4     | Nevada         |
| New Hampshire  |      | 1    |        |                  |                 |       | 1                      | 3       |         |               |         |         | 25    |     |               |         | 7    |                   | 37                 |        | 38    | New Hampshire  |
| New Jersey     |      |      |        |                  |                 |       | 0                      |         |         |               |         |         |       |     |               |         | 18   |                   | 18                 |        | 18    | New Jersey     |
| New Mexico     |      | 1    |        |                  |                 |       | 1                      |         |         |               |         |         |       |     |               |         | 5    |                   | 6                  |        | 7     | New Mexico     |
| New York       |      |      |        |                  |                 |       | 0                      | 11      |         |               |         |         |       |     | 1             |         |      |                   | 30                 |        | 30    | New York       |
| North Carolina |      |      |        |                  |                 |       | 0                      |         |         |               |         |         |       |     |               |         | 14   |                   | 14                 |        | 14    | North Carolina |
| North Dakota   | 4    | 8    | 22     | 1                | 1               | 2     | 38                     | 117     |         | 1             |         |         |       |     |               | 2       |      |                   | 121                |        | 159   | North Dakota   |
| Ohio           | 1    | 1    |        |                  |                 |       | 2                      | 27      |         |               |         |         | 3     |     | 3             |         | 3    |                   | 36                 |        | 38    | Ohio           |
| Oklahoma       | 6    | 4    | 24     | 1                | 1               |       | 36                     |         |         |               |         |         |       |     | 1             |         | 4    |                   | 138                |        | 174   | Oklahoma       |
| Oregon         |      |      |        |                  |                 |       | 0                      |         |         |               |         |         |       |     |               |         | 8    |                   | 8                  |        | 8     | Oregon         |
| Pennsylvania   | 3    | 2    | 1      |                  |                 |       | 6                      |         |         |               |         |         |       |     |               |         | 18   | 1                 | 23                 |        | 29    | Pennsylvania   |
| Rhode Island   |      |      |        |                  |                 |       | 0                      |         |         |               |         |         |       |     |               |         | 1    |                   | 1                  |        | 1     | Rhode Island   |
| South Carolina |      |      |        |                  |                 |       | 0                      |         |         |               |         |         |       |     |               | 1       | 5    |                   | 6                  |        | 6     | South Carolina |
| South Dakota   | 7    | 14   | 25     | 3                |                 |       | 49                     | 99      | 2       |               |         |         |       |     |               |         | 1    |                   | 102                |        | 151   | South Dakota   |
| Tennessee      | 6    |      | 25     | 2                |                 |       | 33                     | 52      |         |               |         |         | 26    | 2   | 31            |         | 5    |                   | 116                |        | 149   | Tennessee      |
| Texas          | 7    | 17   | 23     | 16               | 1               |       | 64                     | 131     | 2       | 6             | 2       | 2       | 22    | 1   | 8             |         | 4    | 21                | 200                |        | 264   | Texas          |
| Utah           |      |      |        |                  |                 |       | 0                      |         |         |               |         |         |       |     |               |         | 3    |                   | 3                  |        | 3     | Utah           |
| Vermont        |      |      | 2      |                  |                 |       | 2                      |         |         |               |         |         |       |     | 1             |         |      |                   | 1                  |        | 3     | Vermont        |
| Virginia       | 2    | 1    | 8      | 1                |                 |       | 12                     |         |         | 3             |         |         | 70    |     |               |         | 14   |                   | 87                 |        | 99    | Virginia       |
| Washington     |      |      |        |                  |                 |       | 0                      |         |         |               |         |         |       |     |               |         | 10   |                   | 10                 |        | 10    | Washington     |
| West Virginia  | 9    | 2    | 1      |                  |                 |       | 12                     | 1       |         | 1             |         |         | 7     |     | 1             |         | 3    |                   | 13                 |        | 25    | West Virginia  |
| Wisconsin      | 35   | 7    | 19     | 4                |                 |       | 65                     | 76      |         |               | 1       |         | 1     | 2   |               |         | 9    |                   | 89                 |        | 154   | Wisconsin      |
| Wyoming        |      |      |        |                  |                 |       | 0                      |         |         |               |         |         |       |     |               |         |      |                   | 0                  |        | 0     | Wyoming        |
| Guam           |      |      |        |                  |                 |       | 0                      |         |         |               |         |         |       |     |               |         |      |                   | 0                  |        | 0     | Guam           |
| Puerto Rico    | 4    | 4    | 5      | 1                |                 | 1     | 15                     |         |         |               |         |         |       |     |               |         |      |                   | 42                 |        | 57    | Puerto Rico    |
| Virgin Islands |      |      |        |                  |                 |       | 0                      |         |         |               |         |         |       |     |               |         |      |                   | 0                  |        | 0     | Virgin Islands |



**Fig. 2 CONFIRMED RABIES CASES IN THE UNITED STATES BY STATE, 1973**



**Figure 3 CASES OF RABIES IN WILDLIFE HOSTS**



**Figure 4** RABIES REPORTED HUMAN CASES, 1950-1973

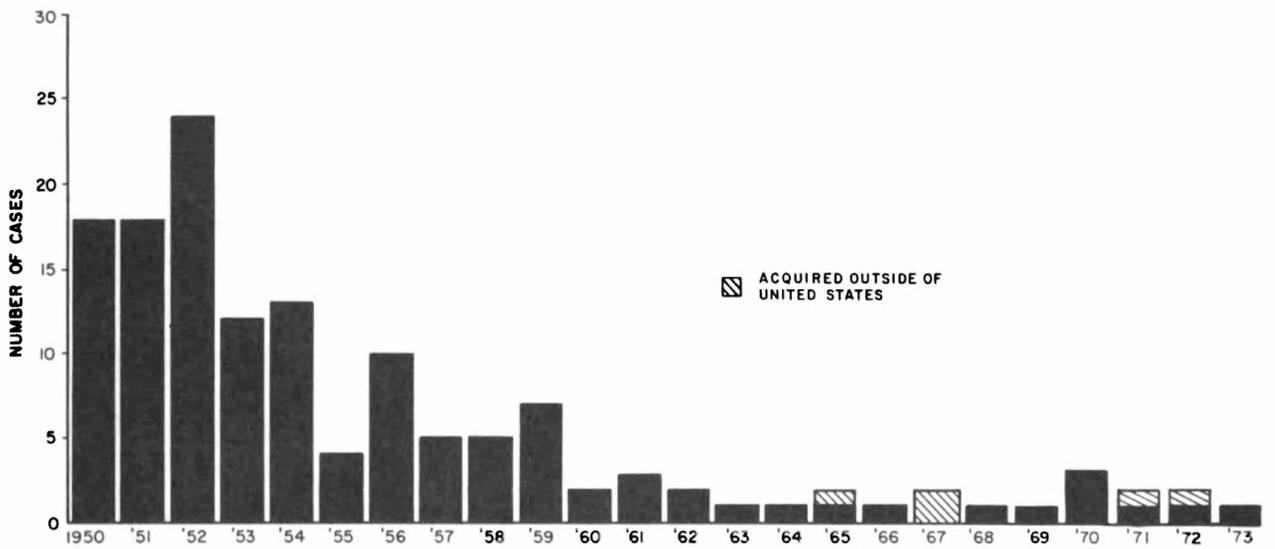
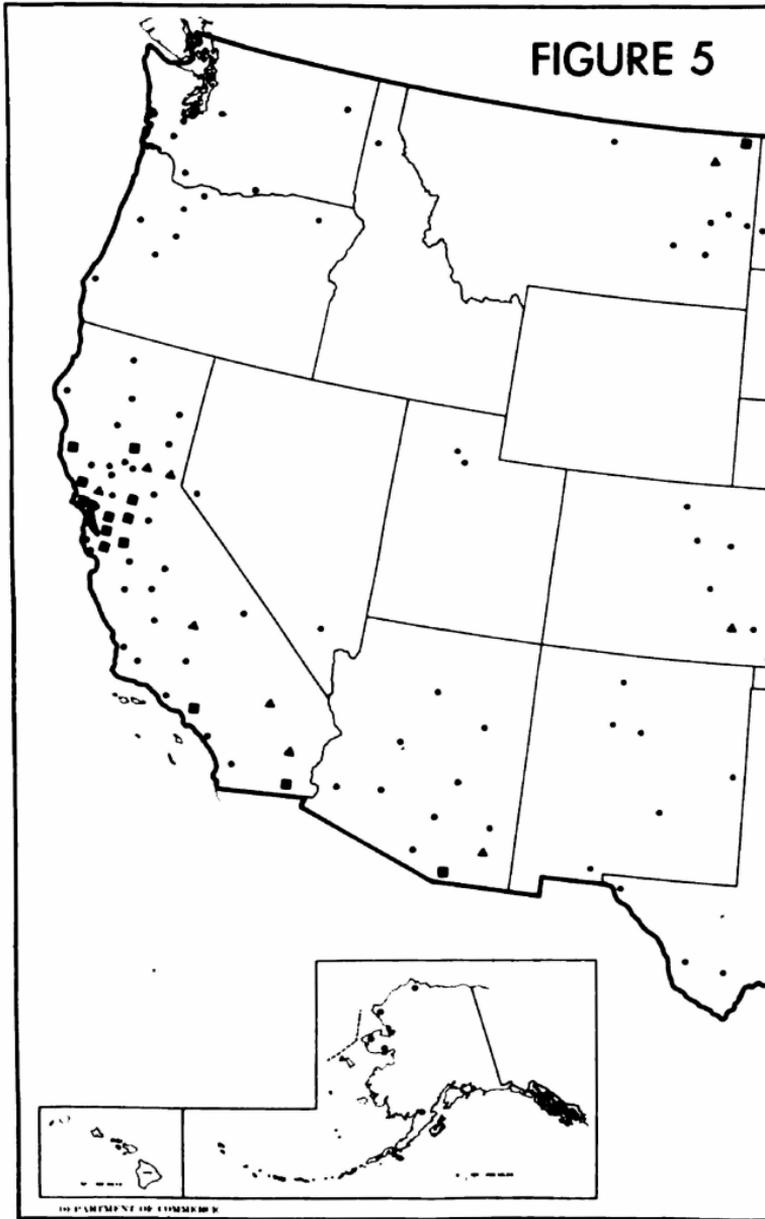


FIGURE 5



DEPARTMENT OF COMMERCE

# COUNTIES REPORTING ANIMAL RABIES - 1973

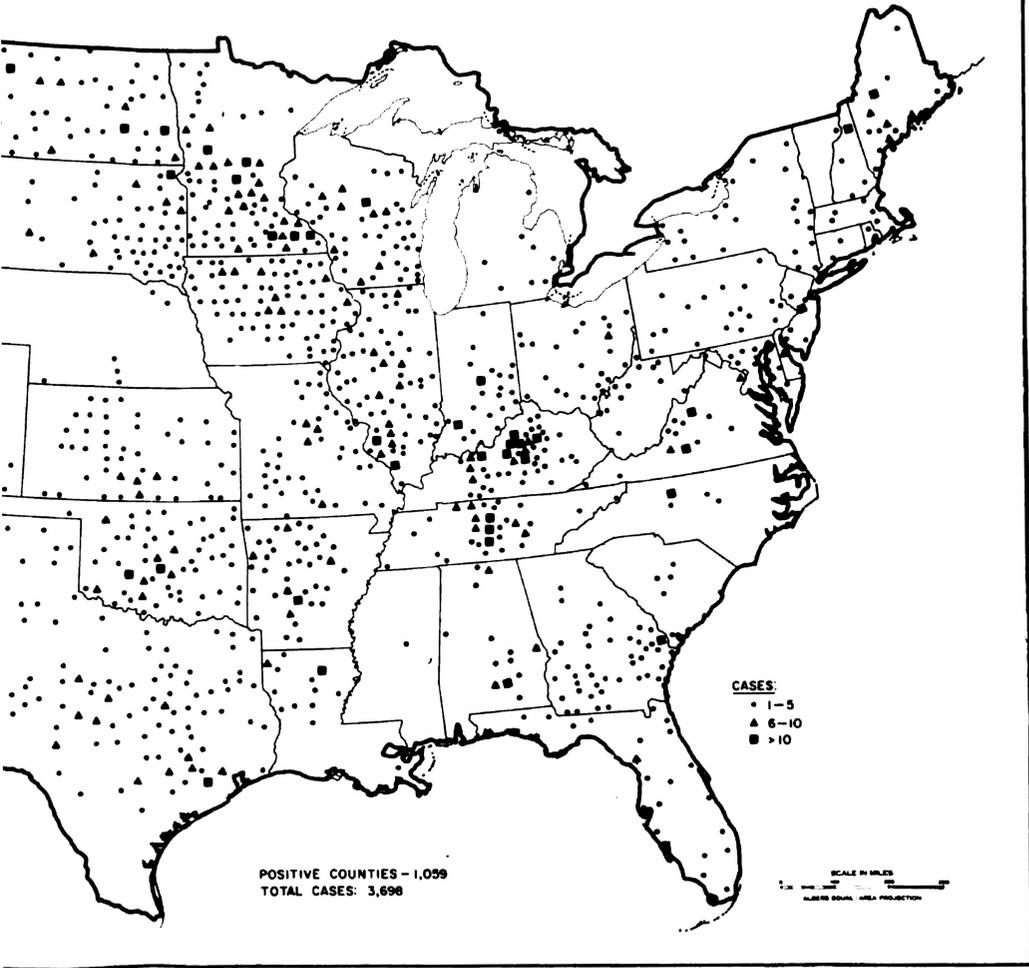


FIGURE 6



# COUNTIES REPORTING DOG RABIES - 1973

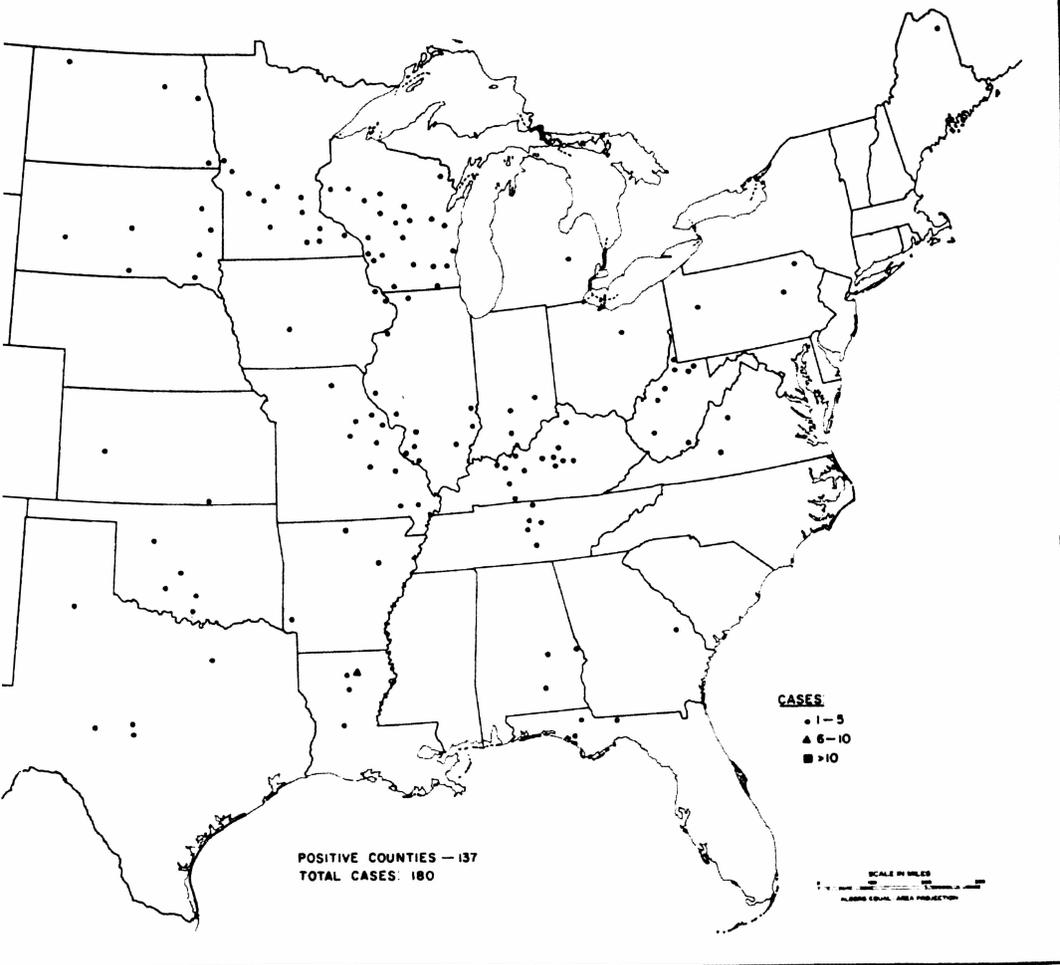


FIGURE 7 COUNTIES REPORTING FOX RABIES - 1973

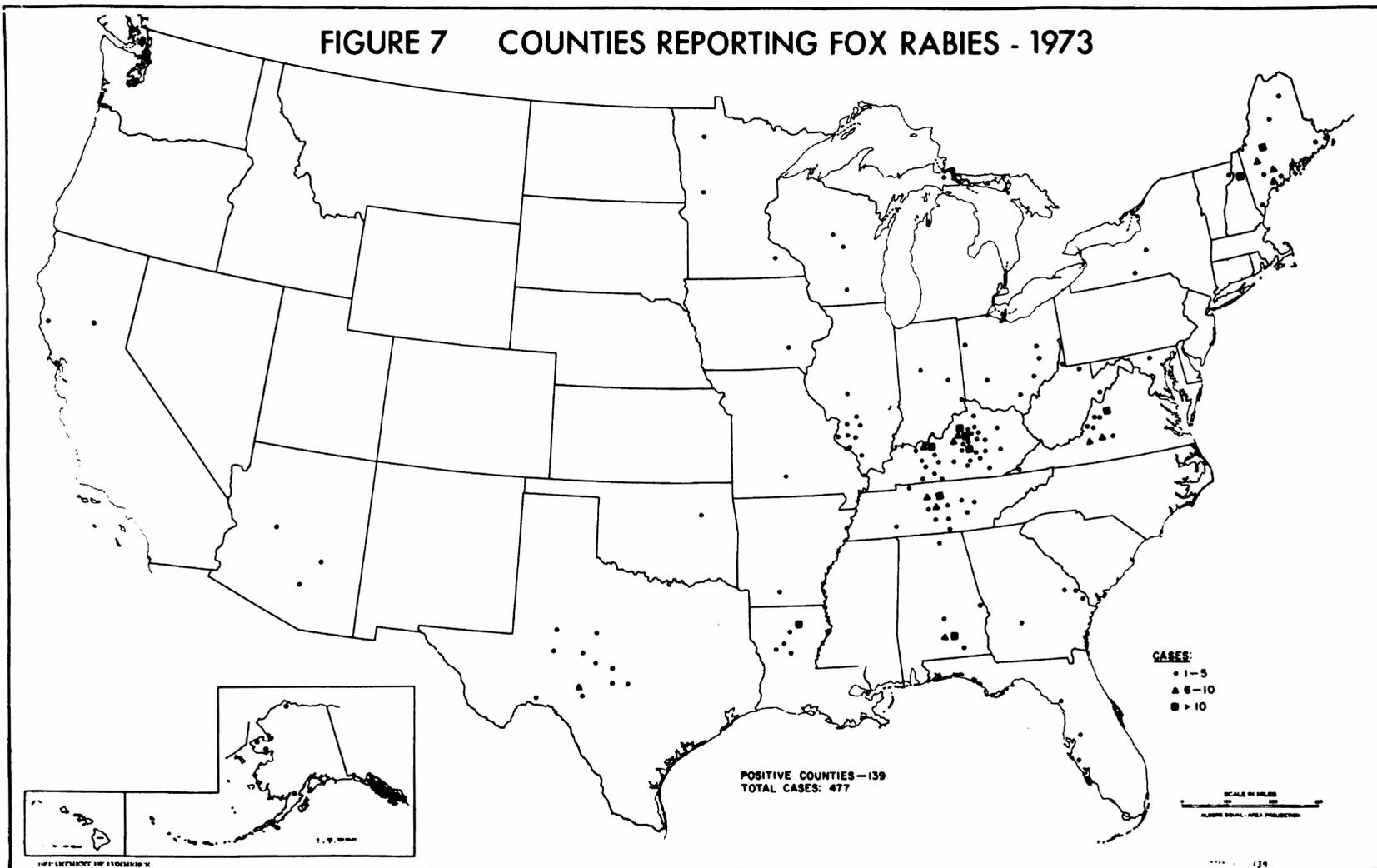
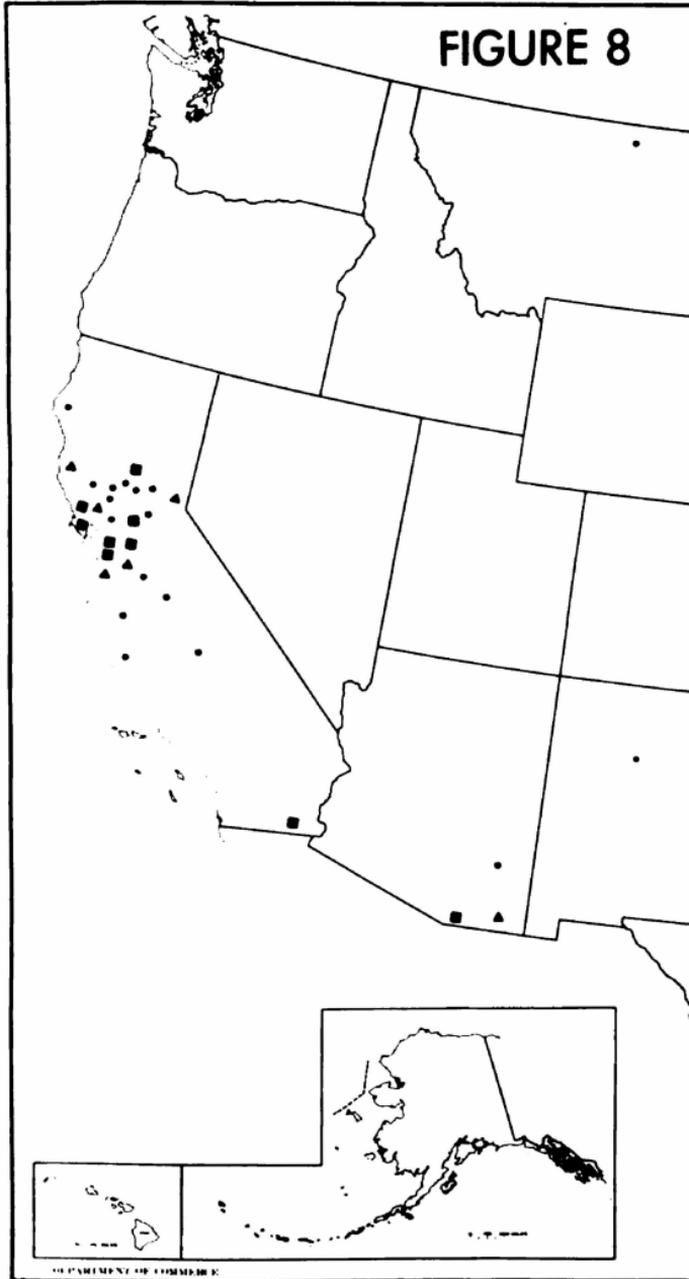
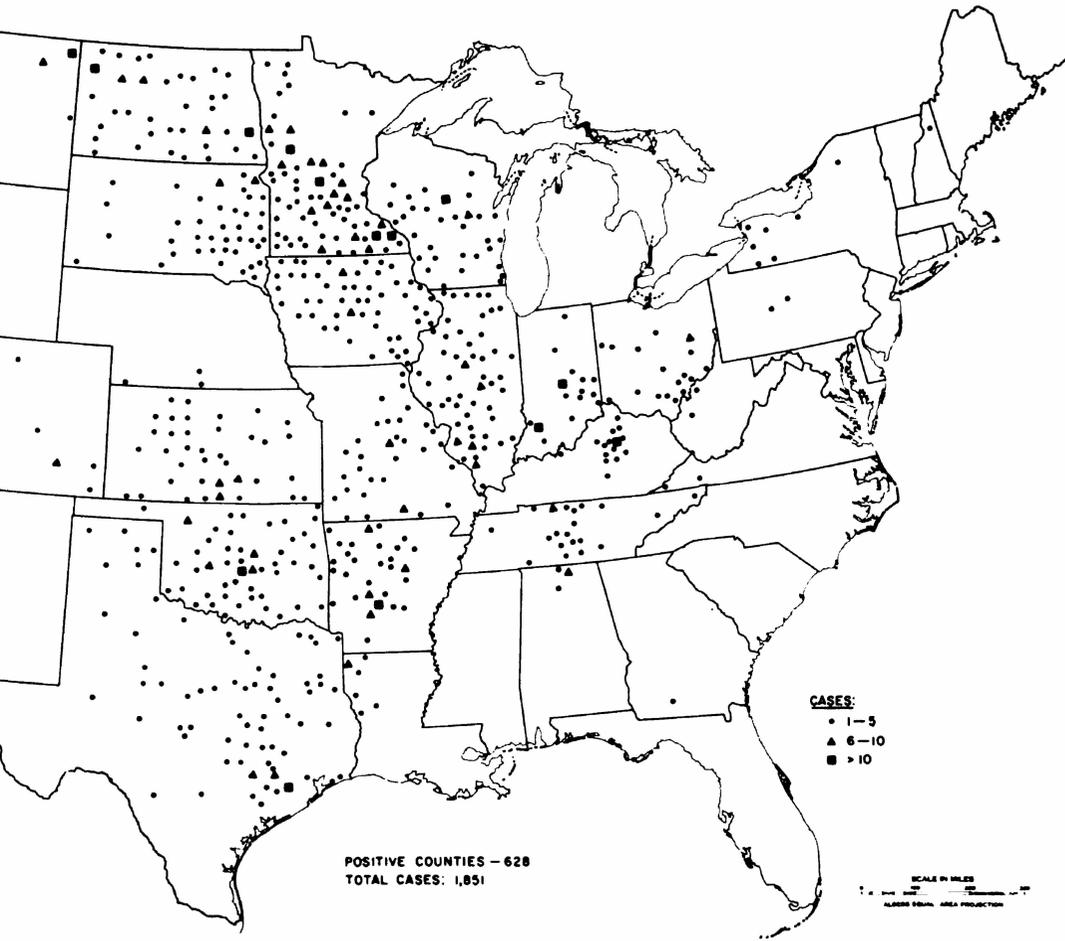


FIGURE 8



# COUNTIES REPORTING SKUNK RABIES - 1973



**FIGURE 9**



# COUNTIES REPORTING RACCOON RABIES - 1973



FIGURE 10



# COUNTIES REPORTING BAT RABIES - 1973

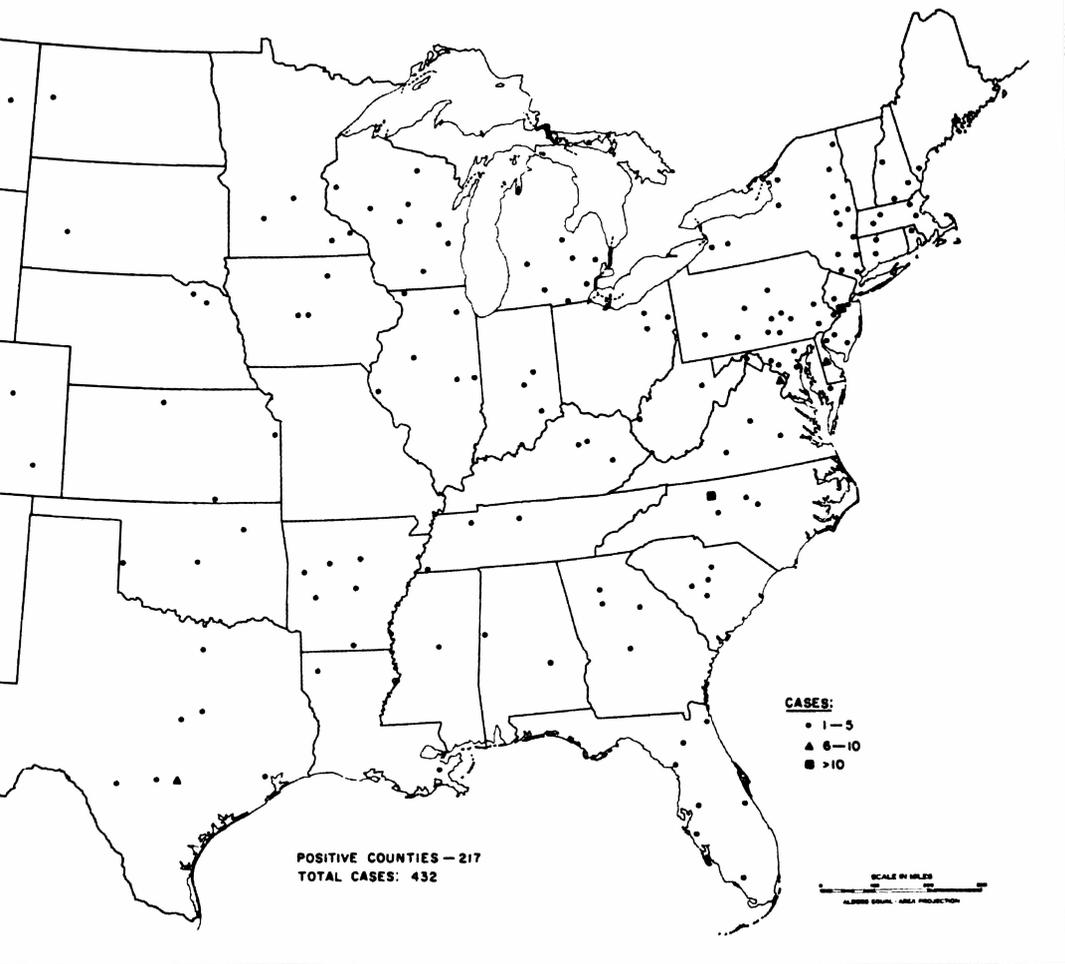
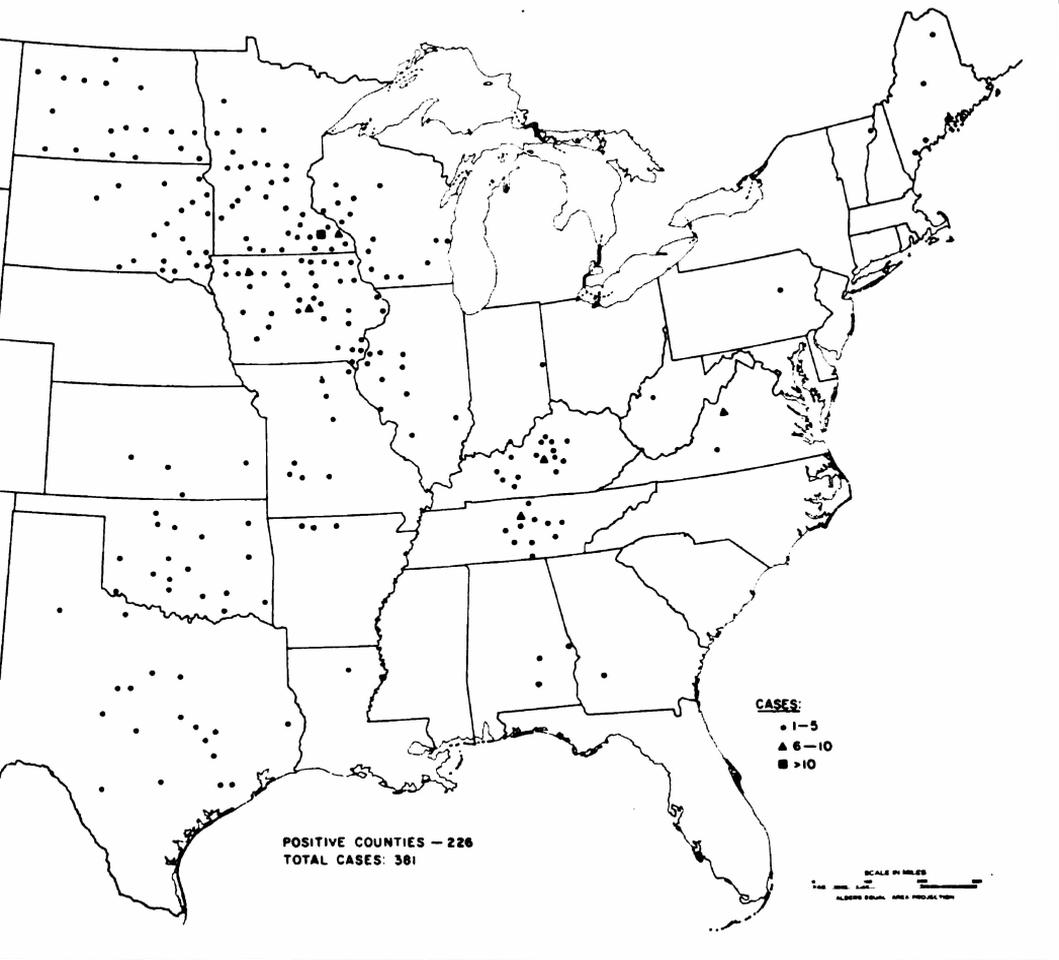


FIGURE 11



# COUNTIES REPORTING CATTLE RABIES - 1973



## REVISED NATIONAL RECOMMENDATIONS FOR ANIMAL RABIES VACCINATION

This is the first revision of the Compendium of Animal Rabies Vaccines developed in 1971-1972 by the Rabies Subcommittee, Animal Health Committee, National Research Council-National Academy of Sciences (NRC-NAS)\* and initially published in 1972. The revised compendium represents the Center for Disease Control's recommendations on animal rabies vaccinations. At the request of the Compendium Review Committee,\*\* the revised recommendations have been reviewed by the Rabies Committee of the U.S. Animal Health Association, and the Association of State and Territorial Public Health Veterinarians.

The purpose of the compendium is to provide information on rabies vaccines to practicing veterinarians, public health officials, and others concerned with rabies control. Ultimately this compendium should serve as a basis for standardization of animal rabies vaccination throughout the United States.

Revisions in the compendium include 2 new areas frequently of concern to persons charged with the responsibility for rabies control: the selection of vaccine for use in vaccinating wildlife, and evaluation of hazards following human exposure to animal rabies vaccines.

No vaccine is currently licensed for the vaccination of wildlife in the United States, and data on efficacy and duration of immunity are generally lacking. In the event it is necessary to vaccinate wild animals, only INACTIVATED vaccines should be used (some MLV vaccines may actually induce rabies in wild animals). In the absence of specific data, dosage and duration of immunity should be based on the recommendations for vaccination of dogs.

Accidental inoculation or other forms of exposure may occur to individuals administering animal rabies vaccines. Such exposures to inactivated vaccines constitute no known rabies hazard. Based on years of empirical observations, the LEP- and HEP-type live virus vaccines also appear to constitute no rabies hazard. However, available data on human exposure to ERA vaccine are inadequate. Preliminary results obtained from animal studies suggest that this virus may be no more pathogenic for man than the LEP virus, but further study is needed. In the event of exposure to ERA virus, public health officials should be contacted for specific recommendations.

\*(Members of the NRC-NAS Rabies Subcommittee include Peter Kennedy, D.V.M., Chairman, Victor Cabasso, Ph.D., David Davis, Ph.D., R. Keith Sikes, D.V.M., and Charles York, D.V.M.)

\*\* (Members of the Compendium Review Committee include W. G. Winkler, D.V.M., Chairman, Melvin K. Abelseth, D.V.M., R. Keith Sikes, D.V.M., R. C. Stewart, Ph.D., and A. L. Strating, D.V.M.)

**COMPENDIUM OF ANIMAL RABIES VACCINE IN THE U.S.**

| VACCINE   | COMPANIES<br>MARKETING  | FOR<br>USE<br>IN      | REGIMEN RECOMMENDED FOR<br>PRIMARY IMMUNIZATION |  |       | REVACCINATION<br>RECOMMENDED |
|---|---|-----------------------|---|--|-------|------------------------------|
|   |   |                       | DOSE(S)   | ANIMAL'S<br>AGE  | ROUTE |                              |
| <b>A) Modified Live Virus Vaccines (MLV)</b><br>Chick Embryo Origin<br>Low Egg Passage (LEP),<br>Flury (FL) | FROMM<br>(Raboid)   | Dogs                  | 1 dose<br>of 1 ml.                              | 3-4 mos.*<br>& 1 yr.                                     | IM    | 3 yrs.                       |
|   | AMERLAB<br>(Rabies<br>Vaccine)                                | Dogs                  | 1 dose<br>of 2 ml.                              | 3-4 mos.*<br>& 1 yr.                                     | IM    | 3 yrs.                       |
| Tissue Culture Origin<br>Canine Kidney,<br>High Egg Passage   | NORDEN<br>(Endurall-R)  | Dogs                  | 1 dose<br>of 1 ml.                              | 3-4 mos.*<br>& 1 yr.                                     | IM    | 3 yrs.                       |
|   |   | Cats                  | 1 dose<br>of 1 ml.                              | 3-4 mos.   | IM    | 1 yr.                        |
|   |   | Cattle                | 2 doses<br>of 1 ml.<br>each 6<br>wks. apart     | as<br>required   | IM    | 1 yr.                        |
| Porcine Kidney (ERA)  | JEN-SAL<br>(ERA)<br><br>CONNAUGHT<br>(ERA)                    | Dogs                  | 1 dose<br>of 2 ml.                              | 3-4 mos.*<br>& 1 yr.                                     | IM    | 3 yrs.                       |
|   |   | Cats                  | 1 dose<br>of 2 ml.                              | 3-4 mos.   | IM    | 2 yrs.                       |
|   |   | Cattle                | 1 dose<br>of 2 ml.                              | 4 mos.   | IM    | 4 yrs.                       |
|   |   | Horses                | 1 dose<br>of 2 ml.                              | 4 mos.   | IM    | 2 yrs.                       |
|   |   | Sheep<br>and<br>Goats | 1 dose<br>of 2 ml.                              | 4 mos.   | IM    | 1 yr.                        |
| <b>B) Inactivated Vaccines</b><br>Tissue Culture Origin<br>Primary Hamster Kidney<br>(Fixed Virus)          | JEN-SAL<br>(Rabies<br>Vaccine)                                | Dogs                  | 2 doses<br>of 2 ml.<br>ea.                      | 1st dose<br>at 3-4 mos.<br>2nd dose<br>3-4 wks.<br>later | IM    | 1 yr.                        |
|   | BURNS-<br>BIOTEC<br>(BioRab<br>or Anagen-R)                   | Cats                  | 2 doses<br>of 1 ml.<br>ea.                      | Same as<br>for dogs                                      | IM    | 1 yr.                        |
| Tissue Origin<br>Caprine, Nervous Tissue<br>(Fixed Virus)   | BANDY<br>(Rabies<br>Vaccine)                                  | Dogs                  | 1 dose<br>of 2 ml.                              | 3-4 mos.   | IM    | 1 yr.                        |
|   |   | Cats                  | 1 dose<br>of 2 ml.                              | 3-4 mos.   | IM    | 1 yr.                        |
| Suckling Mouse Brain<br>(Fixed Virus)   | DOUGLAS<br>(SMBV)   | Dogs                  | 1 dose<br>of 1 ml.                              | 3-4 mos.   | IM    | 1 yr.                        |
|   | FT. DODGE<br>(Trimune)<br><br>HAVER-<br>LOCKHART<br>(Murigen) | Cats                  | 1 dose<br>of 1 ml.                              | 3-4 mos.   | IM    | 1 yr.                        |

\*In mass vaccination programs the schedule of primary immunization may consist of only 1 inoculation given each year to all dogs between 3 months and 1 year of age.



**STATE EPIDEMIOLOGISTS AND  
STATE PUBLIC HEALTH VETERINARIANS**

Key to all disease surveillance activities are the State Epidemiologists who are responsible for collecting, interpreting, and transmitting data and epidemiologic information from their individual States. Their contributions to this report are gratefully acknowledged. In addition, valuable contributions to zoonoses surveillance reports are made by State Public Health Veterinarians.

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| Oregon               | John A. Googins, M.D.              | Monroe Holmes, D.V.M.                       |
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| Rhode Island         | James R. Allen, M.D. (Acting)      | Thomas J. Grennan, Jr., D.V.M.              |
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