

The Mysterious Wolf of the South

Little is known about the life history of the red wolf. Now it looks as if we may never have the chance to find out

When white settlers first entered southeastern North America, they encountered large, wolflike animals in the region from central Texas to Florida and north to the Ohio River Valley. These animals, mentioned in writings dating back more than 300 years, were still common in certain areas until the early twentieth century, but they remained little known to science. Now, after centuries of human persecution and environmental disruption, the native wolf population of the southeast has become nearly extinct. Possibly these animals will disappear entirely before their taxonomy and life history are known.

The term *red wolf* was originally used in reference to animals that lived in central and southern Texas. But taxonomic studies later showed a consistency of key cranial and dental features between these animals and the wolves that lived across the southeastern states to Florida. Thus the designation *red wolf* and the latinized name *Canis rufus* came to be applied to all wolf-like animals in this region.

Unfortunately, the red wolf was exterminated from most of its original range, particularly in the east, at an early date. Few specimens were preserved, and there were no really complete descriptions of the animal's appearance and life history. Therefore we do not know exactly what sort of animal the red wolf was under natural conditions, and whether it was more closely related in habits and physical features to the larger gray, or timber, wolf (*Canis lupus*), which existed to the north and west, or to the smaller coyote (*Canis latrans*) of western North America.

Even the common name red wolf is misleading although we continue to use it for convenience' sake. The reddish color referred to was not particularly common except in parts of south-central Texas. Available specimens, plus literary accounts, show that from eastern Texas to the Atlantic there once lived black, brown, grayish, yellowish, and red wolves. Thus, size and body structure are better guides than coloration for distinguishing the different species of wolves.

Some 213 adult red wolf skulls collected in the south-central part of the species' range show that almost every red wolf was considerably larger than the largest coyote, but that the majority were smaller than most gray wolves. In the region represented by these specimens various accounts indicate that female red wolves usually weighed from 40 to 60 pounds, males from 55 to 75 pounds. Some larger animals were reported, and one 92-pounder from Winn Parish, Louisiana, seems to be the record.

The accounts of early settlers and naturalists invariably refer to the wolflike animals from extreme eastern Texas to Florida as "wolves," showing that they considered these animals to most closely resemble the gray wolves of Europe and northeastern North America. Nevertheless, some reports from the coastal area of Texas use red wolf synonymously with big coyote.

Early and recent accounts from Texas agree that the red wolf was more slender and had relatively longer legs than the gray wolf. Such proportions are believed to have been an adaptation for long-distance running. It has also been sug-

gested that the species' long, slender legs enabled it to get along better in the coastal prairies and river bottom swamps where it was especially abundant.

The mystery of the red wolf's identity is emphasized by the fact that while some workers believe it to be very closely related to the coyote, one recent taxonomic study at Harvard University indicated that it was actually a subspecies of the gray wolf. This latter investigation attempted to draw up a mathematical definition of the red wolf based on skull measurements. Other studies, using brain anatomy and blood serum analysis, have tried to define the red wolf as a distinct species. An idea that now seems to be emerging is that the red wolf represents the surviving stock of a primitive line of wolves that occupied much of North America a million years ago, but was then forced back by more advanced animals and changing environments into a range centered in the great swamps and marshes of the southeast.

Specific details of the ecology, reproduction, and behavior of the red wolf are very poorly known. No significant studies were made when the species was still prevalent, and recent efforts have been limited by the problem of locating definite red wolf populations. Possibly we will never know how this animal lived under natural conditions in an undisturbed habitat. What is known has been derived by combining information from old accounts and from new studies in southeastern Texas.

Red wolves establish dens in hollow tree trunks, stream banks, old holes of other animals, and, in

by Ronald M. Nowak

coastal areas, on sand knolls. Although usually obscured by brush or vines, the dens' locations give the occupants a good view of surrounding terrain.

The young are born from late March to May, following a gestation period of 60 to 63 days. Both

parents actively guard and feed the pups. The young reportedly number from 3 to 12, with 6 or 7 being average, but most die before the age of six months. Hookworms are said to be a major factor in keeping the successful reproductive rate low in southeastern Texas. Full size and

mating capability are attained in the third year of life, but surviving young usually remain with the parents for a longer period.

Many observations attest to the highly social character of the red wolf, with at least two animals reported in most accounts of sight-



ings. The original parents and surviving pups for several successive years form most of the so-called packs, although occasionally, different family groups join together. A pack usually includes from 5 to 12 individuals, but as many as 23 have been seen together.

The red wolf is noted for its long-distance movements. An adult pair or pack is said to establish a roughly circular territory through which the animals move about once every seven days, often on definite runways. Many years ago, some packs reportedly had territories 40 miles in diameter, but most were certainly smaller. A number of accounts expressed the belief that red wolves in the Gulf Coast area concentrated on the coastal prairies in fall and winter, and moved to the inland forests in spring and summer.

Clearly the red wolf was not so much a predator of big game as was the larger gray wolf. There are stories of packs of red wolves pursuing deer, but the species was not always dependent on such activity, and usually smaller animals are referred to in accounts of the red wolf's prey. The only systematic analysis of stomachs of animals presumed to be red wolves showed that rabbits and hares made up the highest percentage of food taken, with small rodents ranking second. Other reported natural food of the red wolf includes squirrels, muskrats, nutria, prairie chickens, waterfowl, fish, crabs, crayfish, insects, and vegetable matter.

Records of predation on domestic animals are, of course, very common. Again, it appears that the red wolf did not share the destructive ability of the large western gray wolves, which were said to be capable of individually bringing down full-grown steers. There are a few tales of groups of red wolves attacking adult cattle, but such cases do not seem to have been usual. Reports of predation generally refer to calves, small hogs, sheep, and poultry.

In the early 1900s, wolves were said to have made sheep raising difficult in the Big Thicket of Hardin County, Texas, and in parts of northeastern Louisiana. There, and

in other lowland areas of the South, the practice of allowing hogs to wander freely in the forest led to many claims against the wolf. Surprisingly, the wolves of Texas and Louisiana also reportedly took a heavy toll of domestic dogs. When dogs were used to hunt the wolves, the latter often turned the tables as soon as the opportunity arose.

The red wolf was never a threat to human life: even the earliest accounts attest to this fact. Audubon did write of a slave killed by a pack of wolves in Kentucky in the early nineteenth century, but this is the only instance recorded in which red wolves may have been directly responsible for a human death. Following battles of the American Revolution and the 1835 Texas Rebellion, wolves were said to have fed upon the dead, but the animals reportedly fled at the approach of a

living man. From throughout the southeast come many tales of wolves following or pursuing humans, although an actual attack seldom occurred, and such cases were often attributable to freshly killed game being carried by the person involved.

The exact limits of the red wolf's original distribution, particularly in the north, will probably always remain a mystery. Wolves were exterminated at an early date in a broad swath from Pennsylvania through the Ohio Valley to northern Missouri, with very few specimens saved. Since none of the early accounts from this region attempts to distinguish between the red and gray wolf, we cannot be sure where the range of each species stopped.

The decline of the red wolf began with the arrival of white settlers along the Atlantic coast. The course



of events in South Carolina is typical. Here, in 1695, the colonial assembly ratified "An Act for Destroying Beasts of Prey." By this measure every Indian Bowman was required to yearly bring in one wolf, panther, or bear skin, or two bobcat skins. If the Indian produced more than one skin, a reward was provided, but if he failed to get his quota, he was to be "severely whipped." Regular monetary bounty payments began in 1700 and continued for most of the period through the end of the eighteenth century when wolves were noticeably on the decline.

The animals were often trapped by means of baited pits, dug about ten feet deep. Above the pit, fresh meat was suspended over a balanced board that dumped the wolf into the pit when it reached for the bait. Variations of such traps were

later used over much of the southeast.

By 1850 the wolf was said to be nearly extinct in South Carolina, and the last reliable records are from the lower Santee River bottoms between 1856 and 1860. A few twentieth-century reports of wolves in South Carolina are attributable to introduced animals.

The early extermination of wolves on the Atlantic seaboard was the result of an ancient attitude. Striking out of the river swamps, their howls piercing the night, these animals probably seemed like devils incarnate to the early settler with his European background. Certainly the actual depredations on livestock were inconsequential when compared to losses suffered through flooding and disease, but perhaps nothing infuriated the farmer more than the sight of a

sheep or hog torn apart by wild beasts. While the settler was helpless against the other forces of nature, the predator offered him a chance to strike back.

As "civilization" moved westward, the steel spring trap succeeded the pit as a primary method of catching wolves. Poison was also widely used beginning in the mid-nineteenth century. Another common means of destruction was locating and killing young wolves in the den.

In some parts of the southeast, the Civil War served as a respite for the wolf, but following the end of hostilities, the species was extirpated over wide areas. Wolves reportedly held out in the mountains of North Carolina and Virginia until the first decade of the twentieth century, but we cannot be sure that these animals were red wolves. The forests of southern Indiana and Illinois apparently sheltered a few surviving red wolves until the early 1900s.

The remote lowlands of Florida and southern Georgia were among the last refuges for the red wolf in the east. Severe depredations on calves and sheep were reported during the closing years of the nineteenth century, but strychnine poisoning made the species rare even here after 1900. A few wolves reportedly survived until about 1920 in the Everglades, along the Kissimmee River of Florida, and in the Okefenokee Swamp of Georgia. Except for an occasional wandering individual, by the 1920s the red wolf had been exterminated in the entire region east of the Mississippi River. The species had also vanished from southeastern Kansas and central Oklahoma, and from most of its former range in Texas.

There remained two large concentrations of red wolves: one centered in the Ozark-Ouachita uplands of Arkansas, eastern Oklahoma, and southern Missouri; the other in the river bottom forests and coastal prairies of Louisiana and southeastern Texas.

But there were too many pressures on these last wolves. Various state and county governments in the region offered bounties. Trap-

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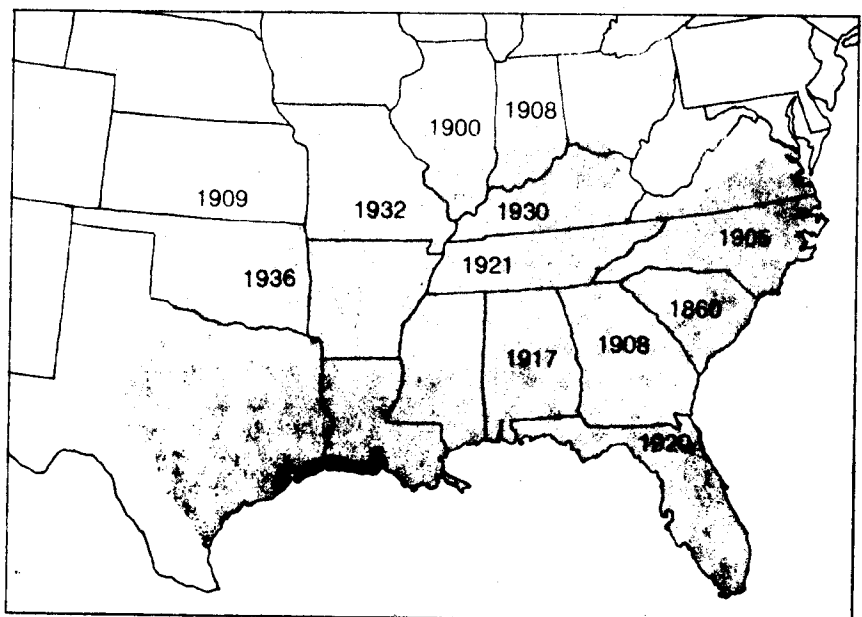
ping, poisoning, and even woods burning were widely practiced by farmers and private hunters. Furthermore, the 1920s saw the final destruction of the great forests that once covered the south-central United States. Loss of habitat, plus uncontrolled hunting, brought the numbers of many game species to an all-time low. Deprived of their natural prey, it is possible that wolves turned more to domestic stock and thus hastened their own destruction. As a final blow, the U.S. Bureau of Biological Survey began predator-control operations throughout the south-central states between 1915 and 1938. These elements combined to wipe out the

northern red wolf concentration in the 1930s. But remnant populations continued to survive along the Gulf Coast and in the large bottomland forests, particularly in northeastern Louisiana.

Although the red wolf was disappearing, wolflike animals continued to live and even increase in the south-central states. Many people thus believed that wolves were still present, but careful examination of specimens showed that only a few were as large as the true red wolf. Most were hardly bigger than the western coyote, while many others seemed to be intermediate in characters between the coyote and red wolf. After some years of observation it became apparent to biologists that these new wolflike animals in the south-central region represented an invasion by the coyote, plus the occurrence of some hybridization between individuals of that species and surviving red wolves.

It seems that the clearing of the forests and the elimination of the red wolf enabled the coyote to expand its range eastward. Habitat changes also resulted in a breakdown of behavioral patterns and ecological isolation, which led to the occurrence of interbreeding. Although the extent of hybridization is not certain, specimens from Missouri, Oklahoma, and most of Arkansas indicate that few hybrid animals occurred there. Apparently a relatively pure red wolf population maintained itself in these

The estimated original range of the red wolf is indicated by the light shading. Dates are the last years in which a red wolf was positively identified in each state. Darker shading indicates the probable current range; the evidence is not as strong in Louisiana as it is on the Texas coast.



areas until the 1930s when it was rapidly exterminated by man and replaced by invading coyotes.

To the south, hybridization was a more widespread and long-lasting phenomenon. Even before 1900, ranchers in the Edwards Plateau area of central Texas had noticed the existence of animals that seemed to be crosses between wolves and coyotes. A large series of skulls collected in this area from 1899 to 1918 confirms the presence of a population with characteristics intermediate between the red wolf and the coyote. Additional specimens show that by the 1930s and 1940s this hybrid swarm had spread over much of eastern Texas and southern Arkansas.

At that time, most of Louisiana still retained a pure red wolf population. Intensive government trapping, plus increased hunting pressure, decimated this population by the early 1950s and simultaneously came reports that the smaller coyote-like animals were moving into the state from the northwest.

Examination of hundreds of skulls collected since 1900 in eastern Texas, southern Arkansas, and Louisiana reveals that these areas are now occupied by hybrid animals. Most of these resemble the coyote in form, but are somewhat larger. As a pure species the red wolf has vanished from almost its entire natural range.

Although some biologists and trappers long ago realized that the true red wolf had all but disappeared, not until the early 1960s did government authorities become aware of the situation. As late as 1963 the U.S. Fish and Wildlife Service reported killing 2,700 "red wolves" in predator-control operations. But just the year before, Dr. Howard McCrley of Austin College had reported examining a large series of specimens and finding that nearly all of the supposed red wolves in Texas, Arkansas, and Oklahoma were being misidentified.

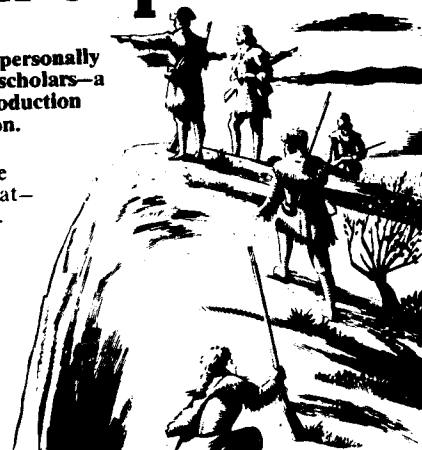
In 1964 and 1965, following recognition of the critical status of the species, Dr. Douglas H. Pinner and Paul W. Joslin of the University of Toronto undertook a red wolf study. In addition to other methods, they played recordings of howls, hoping to elicit responses that would reveal the presence of red wolves. Their investigation in-

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dedicated the survival of wolves in the Ozark National Forest of Arkansas, northeastern Louisiana and adjacent parts of Mississippi, southern Louisiana, and Chambers County in southeastern Texas.

In Louisiana, specimens have been collected and studied by the state Wildlife and Fisheries Commission and Louisiana Polytechnic Institute, but no animals definitely known to be red wolves have been killed in at least six years. It is possible that a few wolves survive in the bottomland forests along the Mississippi and Atchafalaya rivers, but even more likely that a small population now exists on the coastal marshes of southwestern Louisiana.

Continued survival of the red wolf seems most promising in the upper Gulf Coast area of Texas. Trappers and ranchers here have long reported the presence of large wolves that seem very distinct from coyotes. More than sixty skulls collected in Jefferson, Chambers, Liberty, and eastern Brazoria counties since 1963 (as part of predator-control operations) have been examined by zoologists and found to have the same size and features as skulls from the original red wolf population of the south-central United States. No skulls from this area show coyotelike or hybrid characters, but hybrid animals do exist immediately to the north and west. Although a more rigid analysis of all these specimens is planned for the near future, it is presently believed that a population of true red wolves survives in a narrow strip of coastal prairie from the Brazos River to Sabine Lake and probably on into Louisiana.

Recognition of the critical status of the red wolf led to its being placed on the rare and endangered species list of the U.S. Fish and Wildlife Service in January, 1965. Federal predator-control operations within the suspected range of the species, particularly southeastern Texas, were curtailed in 1966, and active investigation and protective efforts were begun in March, 1968. This project is currently being handled by Glynn Riley of the Bureau of Sport Fisheries and Wildlife's Division of Wildlife Services. The total area under investigation now includes Brazoria, Galveston, Harris, Liberty, Chambers, Jefferson, and Orange counties, Texas.



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Riley, a little more optimistic than some earlier workers regarding the present status of the red wolf, thinks that dense populations occur in some parts of the study area. Several hundred canids are believed to be present in the seven counties, but they are not all pure red wolves. Series of specimens from Brazoria County, west of the Brazos River, and from Liberty County indicate that the hybrid swarm is pressing in from the west and north. Riley does believe that a pure population of large red wolves still exists in southern Jefferson and Chambers counties, but he has not yet extensively investigated the current situation in eastern Brazoria County. The total pure red wolf population probably does not exceed 100 individuals, making this the rarest mammal species in North America.

The future survival of pure red wolves seems dependent on maintaining the numbers and habitat of existing populations. If this is not done, there will certainly be a continued expansion of the hybrid swarm and eventual elimination of the red wolf gene pool. Riley sees a serious threat to habitat from the increasing development of the chemical industry in the area. Other problems include drainage and burning of coastal marshes, chance killing by deer and waterfowl hunters, and, especially, persecution by the cattle ranchers who own most of the land involved.

Riley's research efforts have been limited by the need to devote much of his time to gaining the cooperation of ranchers. There is a prevailing belief that the red wolf constitutes a major threat to livestock, particularly young calves. In 1968 about 100 wolves were killed by local ranchers. While it is likely that many of the cattle believed killed by wolves actually died as a result of disease, poisonous plants, malnutrition, drowning, or other factors, and were perhaps then fed on as carrion, the attitude of the ranchers must be considered.

Riley has made arrangements with a number of ranchers who agreed to permit him to handle predator control on their land. He has received encouraging cooperation from stockmen in Chambers and Jefferson counties, and the killing of wolves there has declined since 1969. Riley attempts to capture any

individual animals that may be preying on livestock. Every effort is made to trap red wolves alive and unhurt, and they are then made available to zoos and research programs. In 1970, fifteen animals were taken alive and a smaller number were inadvertently killed. Remains of dead animals are saved for taxonomic studies.

Of the more than thirty animals captured in the red wolf study area since 1967, most are now in zoos. Their handling is being coordinated by the Wild Animal Propagation Trust for the purpose of maintaining a captive breeding pool that might one day be used to restore wild populations. Some of the captive specimens are being used in biochemical taxonomic research, and some are being sent to the Point Defiance Zoo in Tacoma for a genetics study.

The first full-time field investigation of the ecology and behavior of the red wolf was begun in July, 1971, by James Shaw, a student at Yale University. Radio transmitters enable researchers to determine the home range, food habits, and population structure of the species. At least thirty persons are presently conducting or planning research related to the red wolf.

Despite this widespread attention, actual protective measures have been rather slow in coming. But in 1969 the Arkansas Game and Fish Commission established a regulation to protect any red wolves left in that state. And at its 1970 session the Louisiana state legislature passed an act protecting the wolf (as well as the cougar and all birds of prey).

Probably the best way to preserve the red wolf would be through the establishment of guarded refuges within the species' range, each large enough to accommodate a viable population in its natural habitat. Some persons have suggested moving groups of red wolves to island sanctuaries off the Gulf Coast, particularly the Padre Island National Seashore. Such measures, and the final designation of any refuge, would best come after taxonomic studies have pinpointed pure red wolf populations, and field work has determined the ecological requirements of the species. Hopefully there is still enough time. ■



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