U.S. Fish & Wildlife Service

Endangered Red Wolves

The U.S. Fish and Wildlife Service is reintroducing red wolves (Canis rufus) to prevent extinction of the species and to restore the ecosystems in which red wolves once occurred, as mandated by the Endangered Species Act of 1973 (Act). According to the Act, endangered and threatened species are of esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people.

On the Edge of Extinction

The red wolf is one of the most endangered animals in the world. It is a shy species that once roamed throughout the Southeast as a top predator. Aggressive predator control programs and clearing of forested habitat combined to cause impacts that brought the red wolf to the brink of extinction. By 1970, the entire population of red wolves was believed to be less than 100 animals confined to a small area of coastal Texas and Louisiana.

photo: National Geographic Society

To save the species from extinction, the Service captured as many as possible of the few remaining animals from 1974 through 1980. Only 14 captured animals met the criteria established to define the species and stood between its existence and extinction. These animals formed the nucleus of a captive-breeding program established at the Point Defiance Zoo and Aquarium in Tacoma, Washington, with the final goal of reestablishing the species in portions of its original southeastern range. Thirty-three zoos and nature centers in 21 states and the District of Columbia now cooperate in a national breeding program and are valuable partners in efforts to restore red wolves.

Back in the Wild

The red wolf is now back in the wild, hunting, rearing young, and communicating by its characteristic howl, in several locations in its original southeastern habitats. Since 1987, red wolves have been released into northeastern North Carolina and now roam over more than 560,000 acres that includes three national wildlife refuges, a U.S. Air Force bombing range, and approximately 200,000 acres of private land. Beginning in 1991, red wolves were also released into the 520,000-acre Great Smoky Mountains National Park in eastern Tennessee.

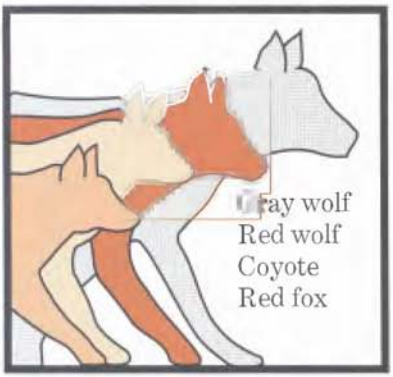
Other red wolves have been released on coastal islands in Florida, Mississippi, and South Carolina as a steppingstone between captivity and the wild. Although these islands are not large enough to provide for the needs of more than a few red wolves at a time, they provide the opportunity for them to breed and exist in the wild in order to produce animals for future mainland reintroductions.

Why reintroduce red wolves?

The essential reasons are to prevent extinction of the species and to restore the ecosystems in which red wolves once occurred. It is important to save all members of an ecosystem, including predators, if we intend to preserve the environment and be good stewards of the land. Predators maintain the balance and health of ecosystems by controlling over-populations of prey species and

photo: Melissa McGaw ©

removing unhealthy animals. The Act requires recovery plans for endangered species. The recovery population goal in the Red Wolf Recovery Plan is 550 (at least three wild populations totaling 220 and 330 in captivity at 30 or more facilities). Lessons learned in the Red Wolf Recovery Program have served, and will continue to serve, as a template for recovery of other species whose only hope for survival is reintroduction.



Gray wolf ..... *80-120 lbs.*
Red wolf ..... *45-80 lbs.*
Coyote ..... *20-45 lbs.*
Red fox ..... *10-15 lbs.*

What do red wolves look like?

Red wolves are mostly brown and buff colored with some black along their backs; there is sometimes a reddish color behind their ears, on their muzzle, and toward the backs of their legs. Red wolves are intermediate in size between gray wolves and coyotes.

The average adult female red wolf weighs 52 pounds and

the average adult male weighs 61 pounds. Red wolves have tall, pointed ears, long legs, and large feet, similar to the domestic German shepherd. Adult red wolves stand about 26 inches at the shoulder and are about 4 feet long from the tip of the nose to the end of the tail.

Since coyotes exist in both red wolf reintroduction areas (northeastern North Carolina and eastern Tennessee), it is important for people to know the physical differences between the two species. Adult coyotes weigh about one-half to two-thirds as much as red wolves and stand approximately 4 inches shorter; coyotes are much less massive through the head, chest, legs, and feet.

Former range of the Red Wolf

Did red wolves ever exist in North Carolina and Tennessee?

Based on fossil and archaeological evidence, the original red wolf range extended throughout the Southeast, from the Atlantic and Gulf Coasts, north to the Ohio River valley and central Pennsylvania, and west to central Texas and southeastern Missouri. At least one archaeological specimen has been found in North Carolina. In addition, court records from eastern North Carolina document that wolf bounties were paid from 1768 to 1789.

Do red wolves hybridize with coyotes?

Red wolves, gray wolves, domestic dogs, and coyotes are capable of interbreeding and producing fertile offspring. Social structures and territoriality usually prevent such interbreeding. Due to the widespread persecution of predators and the destruction of suitable habitat, by the 1960s the number of red wolves was dwindling, and coyotes had migrated into the Southeast.

When the few remaining red wolves

photo: Curtis Casteel

photo: Jack Winfield Ross ©

were unable to find mates of their own species hybridization with more abundant coyotes did occur. This hybridization is generally accepted as the final factor that resulted in the near extinction of the red wolf.

In reintroductions, instances of red wolves breeding with coyotes have occurred that involved lone red wolves that did not have access to potential red wolf mates. Similar breedings between gray wolves and coyotes also occur. It is believed that limited interbreeding between wolves and coyotes on the fringes of wolf populations is a natural occurrence that does not affect the integrity of either species.

However, where wolf populations are small and isolated, as in restorations, intensive management may be needed to ensure that availability of mates of their own species. We conclude that, given a choice, red wolves prefer red wolves as mates.

How many red wolves are there?

Red wolf numbers continually change due to births and deaths. At the end of August 1997, the total population was 240 to 317. Wild populations numbered 54 to 129, with 45 to 92 of these animals occurring in eastern North Carolina and the other 9 to 37 occurring in the Great Smoky Mountains National Park in eastern Tennessee. Another 11 to 13 red wolves existed on three island propagation sites off the Atlantic and Gulf Coasts. The remaining 175 red wolves were located at 35 captive-breeding facilities involving 33 cooperators.

photo, Barron Crawford

How does the Service keep track of the wolves?
Each red wolf that is captured or released is outfitted with a radio transmitter that emits pulse signals or "beeps" that biologists can read with a radio receiver. These signals enable the biologists to locate the wolves. The frequency of locations varies from once or twice daily to once a week, depending on specific circumstances.

Are red wolves a threat to humans?
There have been no documented cases of healthy wild red wolves attacking humans in North America, despite 500 years of historical coexistence. Wild red wolves are shy and usually stay away from humans and human activities.

However, wolves are capable of attacking and injuring humans, and such encounters with Native Americans may have occurred before the use of modern weapons and the resulting fear of man by wolves. Although unlikely to be a threat to humans, red wolves, and all wildlife, should not be approached in order to avoid possible injury to the animal or the people involved.

photo, Barron Crawford

What do red wolves eat?
Although the exact diet of red wolves is difficult to determine and varies depending on available prey, a study of approximately 2,200 scats (feces) of wild red wolves from northeastern North Carolina estimated that their diet consisted of about 50 percent white-tailed deer, 30 percent raccoons, and 20 percent small mammals, such as rabbits, rodents,

and nutria. Nonmammalian prey, domestic pets, and livestock were uncommon as prey items, but they did occur in very low numbers (less than 2 percent). A red wolf consumes about two to five pounds of food per day.

photo: Brokaw

Do red wolves live and/or hunt in packs?

A "pack" is simply defined as an extended family unit, which is the primary social structure of both red and gray wolves. A typical red wolf pack consists of five to eight animals—an "alpha" or breeding adult pair and offspring of different years. The alpha wolves are the only breeders in the pack; wolves breed once a year.

Wolf packs have specific home ranges that they actively defend against other canids, including wolves. The pack is a very closely knit group; in fact, older offspring assist the alpha pair with den attendance and pup-rearing. Almost all offspring between 1 and 3 years of age will leave the pack or "disperse."

Since the red wolf's diet does not consist of large ungulates, such as elk, bison, or moose, group or pack hunting is probably not necessary. Most hunting by red wolves is believed to be done individually or in pairs.

What does a red wolf on private land mean to the landowner?
All wild red wolves are classified as experimental nonessential under the Act. This designation is intended to minimize effects on individual landowner rights or lawful activities, such as farming, logging, hunting, trapping, or livestock operations. In fact, critical habitat cannot be legally established for experimental nonessential species. In the case of livestock or domestic pet depredation, relaxed regulations were passed in April of 1995 allowing landowners to take (kill) red wolves while depredation is occurring, provided that freshly wounded livestock or pets are evident.

There are also mechanisms for landowners to be paid if they choose to become involved with red wolf recovery or if they suffer depredations on their livestock or pets. Red wolves generate benefits for landowners by preying on species such as deer, raccoons, and nutria that can be pests on farms. Additionally, the presence of a pack of red wolves is likely to limit the distribution of coyotes in that area.

Private lands are an integral component of the Red Wolf Recovery Program. In eastern North Carolina, private lands provide only about 35 percent of the available habitat but support over 65 percent of the red wolf population. While it is clear that private lands are crucial to this and other endangered species programs, the challenge is to find ways to make it work in a manner that is expedient and fair to all.

Historic Time Line for the Endangered Red Wolf

1791	Red wolf first described by Bartram.
1851	First publication of valid scientific name for red wolf by Audubon and Bachman.
1905	First recognition of red wolf as a distinct species by Bailey.
1937	First recognition of three subspecies of red wolf by Goldman.
1962	Scientific community informed by McCarley that red wolf is in danger of extinction.
1967	Red wolf listed as an endangered species under provisions of the Endangered Species Preservation Act of 1966.
1968	Service begins a study of the red wolf in southeast Texas and southwest Louisiana.
1969	First red wolf placed into captivity initiating the red wolf captive-breeding center at PDZA.
1971	Study on the brains of canids by Atkins and Dillon confirms distinctiveness and primitive characteristics of red wolf.
1973	Endangered Species Act becomes Federal law. First red wolf recovery plan completed and implementation begins. In a race against extinction, an all-out effort to capture wild red wolves for captive-breeding program begins.
1977	First litter of red wolf pups born in captivity at PDZA.
1978	First successful experimental release, tracking, and recapture of red wolves on Bulls Island, South Carolina, solidifies reintroduction techniques.

1979	Nowak's definitive work on taxonomy of North American *Canis* entitled "North American Quaternary *Canis*" is published. This work retains Goldman's classification in regard to the red wolf. Evaluation of Land Between The Lakes in Tennessee and Kentucky for first red wolf reintroduction project begins.

photo: Barrom Crawford

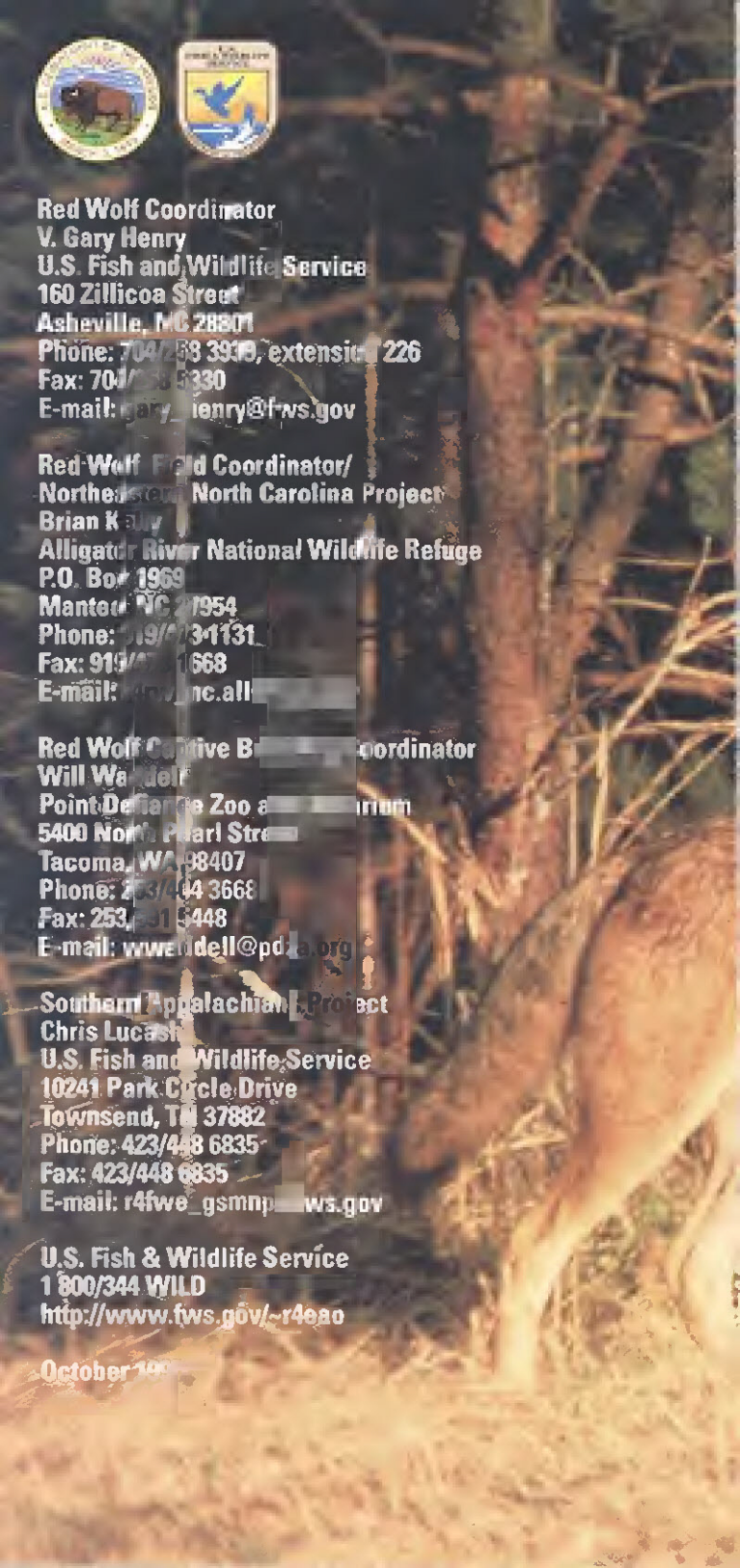
1980	Last red wolves removed from the wild and red wolf declared extinct in the wild. Unique allele found by Ferrell *et al.* in *Canis* specimens from within red wolf range supports conclusion that red wolf is a distinct species.
1984	Red wolf recovery plan revised, updated, and approved. Red wolf incorporated into AZA's SSP. Land Between The Lakes red wolf reintroduction project abandoned due to lack of public and state support. ARNWR established on land in northeastern North Carolina donated to the Service by Prudential Insurance Company.
1987	First reintroduction begins with the release of red wolves into ARNWR. First island propagation project begins on Bulls Island in attempt to

	give red wolves some wild experience before release into mainland reintroductions.
1988	First litter of red wolf pups born in the wild at ARNWR.
1989	Second island propagation project initiated by the release of red wolves on Horn Island off the coast of Mississippi.
1990	Third island propagation project begins by releasing red wolves on St. Vincent Island off the Gulf Coast of Florida. PLNWR established on land within red wolf experimental population boundaries in eastern North Carolina.
1991	Second reintroduction project started by the release of red wolves into GSMNP. Wayne and colleagues publish mtDNA results suggesting that the red wolf may be of hybrid origin. American Sheep Industry Association files petition to delist red wolf based on mtDNA results.
1992	Second-generation red wolf pups born in the wild at ARNWR. 1991 petition request to delist the red wolf found unwarranted by Service.
1993	Red wolves released into PLNWR. First red wolves born in the wild in GSMNP.
1994	Wayne and colleagues publish first nuclear DNA results suggesting, once again, that the red wolf may be of hybrid origin.
1995	Attitude survey by North Carolina State University shows majority of residents in eastern North Carolina support red wolf reintroduction. Amendment to Interior Appropriation Bill introduced in Senate to suspend all funding for Red Wolf Recovery Program. Amendment narrowly defeated. North Carolina law to allow taking of

	red wolves on private property in two counties goes into effect. Revised relaxed Federal regulations published addressing private landowner concerns about reintroduced red wolves. National Wilderness Institute files petition to delist red wolf based on nuclear DNA results.
1996	Economic study by Cornell University shows strong regional support for red wolf recovery, substantial potential tourism benefits, and a significant willingness of the public to pay for red wolf recovery that far exceeds the cost of the program. Wild- born red wolves comprise approximately 90 percent of the free-ranging northeastern North Carolina red wolf population. Study by East Carolina University shows strong local support for red wolf recovery in northeastern North Carolina and a willingness to contribute financially to support the program.
1997	1995 petition request to delist the red wolf found unwarranted by Service. Two North Carolina counties and two individuals file suit to invalidate federal regulations regarding the red wolf. Fourth island propagation project initiated on Cape St. George Island off the Gulf Coast of Florida.

Key to Acronyms

ARNWR	Alligator River National Wildlife Refuge, North Carolina
AZA	American Zoo and Aquarium Association
GSMNP	Great Smoky Mountains National Park, Tennessee
mtDNA	Mitochondrial DNA
PDZA	Point Defiance Zoo and Aquarium, Tacoma, Washington
PLNWR	Pocosin Lakes National Wildlife Refuge, North Carolina
SSP	Species Survival Plan



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