

A Brief History of Wolf Research

PART II

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Wolf research has come a long way in a short time. By the middle of the 20th century, decades of ferocious persecution had radically reduced wolf numbers and shrunk wolf range to a fraction of its former size.

The wary survivors were ghostlike inhabitants of North America's densest wilderness. That situation plus the wolf's tendency to wander a broad range made it difficult to find and observe wolves. Much early science on wolves was based on indirect evidence of behavior such as tracks, scats and kill sites.

What was needed was a way of keeping track of an animal that was difficult to find and watch. What was needed was an electronic revolution that would give scientists a way of monitoring an intelligent and wary animal that had learned to avoid humans at all costs.

Radio Telemetry Collars

HISTORY: The radio collar is a rugged collar fitted with a device that emits a beeping radio signal for up to six years. Researchers waving what looks like a small television antenna can pinpoint the location of an animal wearing a radio collar. Ground-based researchers can detect these signals a mile away, whereas airborne researchers can pick up the signals from distances as great as 15 miles.

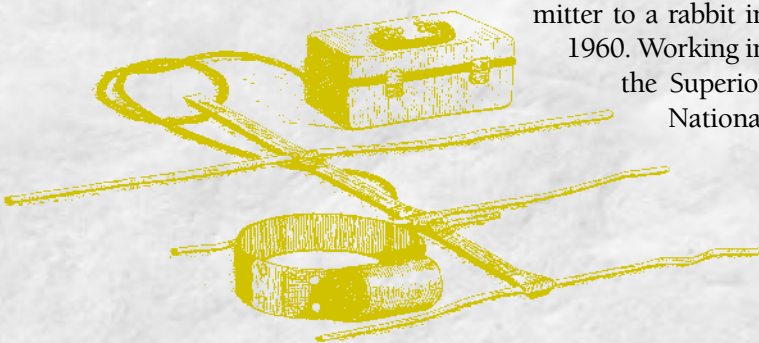
Illinois engineer William Cochran pioneered radio telemetry with wildlife when he attached a radio transmitter to a rabbit in 1960. Working in the Superior National

Forest in the late 1960s, L. David Mech was one of the earliest researchers to use radio collars to study wolves.

ADVANTAGES/DISADVANTAGES: Radio collars give researchers an effective way to locate individual wolves. Telemetry collars yield data on the movements of a particular wolf over time. Radio collars enable researchers to follow wolves at all times of year, not mainly in winter. Even when a collared wolf cannot be seen with the eye, researchers gain valuable data when they pinpoint the wolf's location. Modern radio collars can also indicate whether a wolf is moving, inactive or dead.

The main limitation of telemetry collars is the need for a human to collect the data. Wolves can travel out of the range of a receiver and become lost from a study. Because it is difficult to monitor radio collars at night on the ground (and impossible with an airplane), radio collars mainly disclose wolves'

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Satellite Collars

HISTORY: Satellite collars have been used for 30 years to track large mammals but only became light enough for wolves in the past decade. These collars are basically telemetry collars that transmit signals to Argos satellites. The satellites calculate the approximate location of the animal and send the data to the researcher's computer.

ADVANTAGES/DISADVANTAGES: Satellite-based locations are only accurate to about half a mile, so the main use of satellite collars is to track long-distance movements of wolves wherever they go. Besides the advantage of being able to automatically follow wolves wherever they go, day and night, regardless of weather, satellite collars also minimize the biologist's field time. Once a wolf is outfitted with a collar, field time is over; the data are analyzed as they come into a desktop computer. One disadvantage, however, is that satellite collars usually last only 6 to 18 months, depending on how frequently they locate the wolf.

RESEARCH ISSUES: Because of the above advantages and disadvantages, satellite collars are usually used for two main purposes: (1) to monitor seasonally migrating wolves such as those in Canada that may follow migrating caribou for hundreds of miles north and south, and (2) to follow long-distance dispersing wolves.

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daylight behavior. Before a wolf can be collared, it must usually be trapped, a step that requires expensive fieldwork and sometimes a bit of luck.

The telemetry collar revolutionized wolf research and still probably gives more "bang for the buck" than any other single research aid.

RESEARCH ISSUES: Telemetry collars show researchers where wolves go and how they spend time. That breaks down into many smaller issues. Radio collars gave the first solid information about the dramatic movements of dispersing wolves. Radio-collared wolves continue to show researchers a great deal about wolf territory: its size, its relation to the territories of other packs, the variables that affect it and so on. Using telemetry, researchers can locate packs from airplanes in winter and study pack size (and thus population size) and such complex behavior as hunting techniques.

GPS Collars

HISTORY: During the mid-1990s, Global Positioning Satellite (GPS) technology was incorporated into collars. GPS collars receive signals from a special set of 24 satellites, calculate the location of the wolf, the time and the date, and store the data in the collar.

Some GPS collars drop off after they acquire a full set of data so a researcher can retrieve the collar and access the stored information. Some models store data that can be accessed remotely by a researcher in the field. Other models send data directly to satellites, which pass the data back to the researcher's computer.

ADVANTAGES/DISADVANTAGES: GPS collars track wolf movements with great precision (within a few feet) and offer a great many more data points so that a wolf's movements can be analyzed virtually continuously. GPS collars make it possible to map the travels of wolves in difficult terrain (such as in nearly roadless Alaska) where researchers on the ground lack the mobility to follow wolf movements.

The two key disadvantages are high cost (\$3,000, 12 times the cost of a simple telemetry collar) and a short usable lifespan (3 to 12 months) due to the many data collections. Some of that initial cost is recaptured because it costs less to monitor these collars. Typical data capacity for a GPS collar is 2,000 locations.

RESEARCH ISSUES: The precision and frequency of data collection by GPS collars allow researchers to study how wolves use various portions of their range, such as the way they choose specific routes. Additionally, GPS collars tell researchers much about wolf activity patterns.



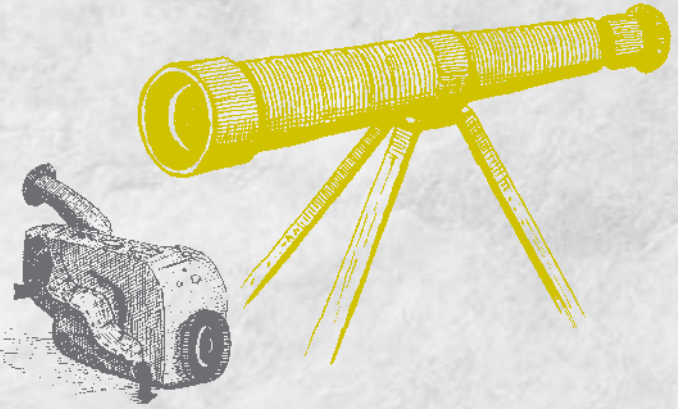
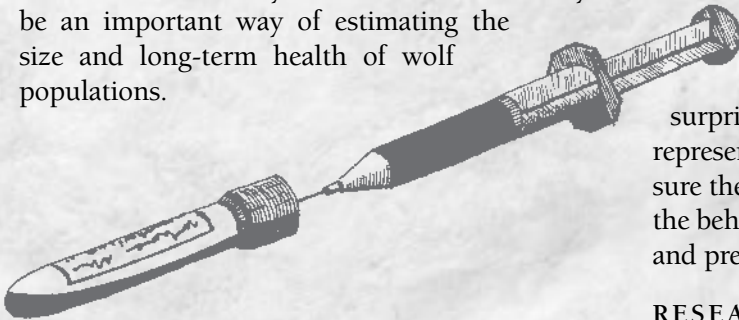


DNA Analysis

HISTORY: Basic science by Watson and Crick allowed scientists to create the new field of DNA sequence analysis. The analysis of wolf DNA began in the 1980s.

ADVANTAGES/DISADVANTAGES: The analysis of wolf DNA opens vast new areas of research, allowing researchers to find answers to questions that previously were unknowable. The work can be slow and painstaking, but it offers great potential.

RESEARCH ISSUES: Using DNA sequencing, researchers are answering critical questions about the uniqueness and developmental history of the red wolf. DNA analyses allow researchers to determine the genetic relatedness of members of a single pack or even genetic relatedness between members of different but nearby packs. DNA research offers insights into the past and likely future of isolated wolf populations, such as the one on Isle Royale. Genetic research may be an important way of estimating the size and long-term health of wolf populations.



Visual Observation: Yellowstone

HISTORY: When wolves were reintroduced into Yellowstone National Park in 1995, most biologists predicted wolves might be heard but rarely seen by park visitors. They were wrong. The open vistas of Yellowstone favor long-distance wildlife observation. For reasons not understood, many of the park's wolves quickly became comfortable with the presence of humans and made no special effort to keep out of sight. This has resulted in an unanticipated and exceptionally exciting opportunity for researchers to observe wolf behavior.

ADVANTAGES/DISADVANTAGES: The obvious advantage of the spectacular wolf observation opportunities in Yellowstone is that virtually the whole range of wolf behavior can now be monitored and filmed. In just a few years Yellowstone wolf observations have produced stunning discoveries and surprises. The single disadvantage is that it is difficult to know how representative this behavior might be. That is, researchers cannot be sure the behavior of reintroduced wolves in this one park is typical of the behavior of wolves in other settings, where humans are dangerous and prey are harder to locate.

RESEARCH ISSUES: Park observations have produced especially rich observations of wolf hunting and killing behavior, but the park has also made it possible for researchers to observe and film the whole range of wolf behavior except life underground in dens. Amazingly enough, the oldest wolf research technology—just watching wolves—is now producing some of the most exciting scientific results. ■

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