

50 Years of Wildlife Disease Research

By Dr. John Fisher

July 1, 2007, will mark the 50th anniversary of the Southeastern Cooperative Wildlife Disease Study (SCWDS) based at The University of Georgia's College of Veterinary Medicine. Why should this interest people in West Virginia? Because the DNR Wildlife Resources Section supports SCWDS as a member of this unique regional cooperative and receives its assistance with wildlife mortality investigations, diagnostic testing, research, consultation and training.

The SCWDS story began after World War II when game management agencies throughout the Southeast were pouring resources into restoration of white-tailed deer populations that were depleted during the pre-conservation era. The immediate results were limited but spectacular, and agencies were proud of the progress that had been made. However, a formidable disease threat to deer restoration emerged in 1949, when anglers in several states found large numbers of bloated deer carcasses along

streams in the late summer and early fall. In some areas, more than 90 percent of the deer population fell victim to this mysterious disease, known only as "Killer X." Fortunately, Killer X vanished as quickly as it had appeared, and regional deer restoration programs flourished in the early 1950s.

But Killer X returned at the same time of year in 1954. It hit even harder in 1955, when heavy deer mortality occurred from the Appalachians into the Ozarks and grave concern arose for the well-being of newly restored deer populations. Facilities were not available to investigate widespread deer deaths, and once again Killer X disappeared with colder weather and without identification of its cause. Sportsmen, conservationists, and the general public found this situation untenable and wanted action! It would be too costly, however, for any single state to establish and maintain an organization with the expertise and capabilities to cope with future deer mortality crises.

After careful deliberation, on July 1, 1957, the Southeastern Association of Game and Fish Commissioners founded the Southeastern Cooperative Deer Disease Study. Headquartered at The University of Georgia's College of Veterinary Medicine in Athens and directed by Dr. Frank A. Hayes, the organization's mission was to investigate



Healthy deer, above, and a sick deer, inset, suffering from hemorrhagic disease alongside a pond.

Photo courtesy SCWDS
Jeff Craig

the mysterious deer mortality. The initial annual budget of \$18,000 was provided in equal amounts from each of the 11 southeastern state wildlife agencies, who were the original members of the cooperative. The number of member states later grew to 17.

Shortly after the organization's inception, those involved with it became increasingly aware of the dearth of information on white-tailed deer diseases. In addition to requests to develop data on deer diseases, there was increasing pressure on the small staff to procure vital information on potential disease

SCWDS Primary Objectives

- Detect causes of sickness and death in wildlife
- Define the impact of diseases and parasites on wildlife populations
- Delineate disease relationships between wildlife and domestic animals
- Determine the role of wildlife in the epidemiology of human diseases



Photo courtesy SCWDS

SCWDS is currently researching avian vacuolar myelinopathy (AVM), a fatal brain disease that is affecting bald eagles. Here a biologist prepares to test three eagles.

interrelationships between wild animals and humans or domestic animals. Recognizing the increasing demands, in 1960 the Southeast wildlife agency commissioners expanded its mission to encompass all wildlife species and changed its name to the Southeastern Cooperative Wildlife Disease Study.

Additionally, through the interest and efforts of the commissioners, in 1963 the United States Congress enacted an annual appropriation, administered through the U.S. Department of the Interior, to support basic wildlife disease research conducted by SCWDS. Through these means, efforts began to close information gaps about diseases in wild animals and determine disease interactions between wildlife and domestic animals and humans.

One of the first research projects designed to establish needed base-

line health data was a deer parasite survey throughout the Southeast from 1961 to 1963. Continued research into deer parasites yielded a management tool in 1980 that often is used to correlate deer parasite numbers with local deer nutritional status and population health. This technique, known as the abomasal parasite count (APC), involves determining the average number of stomach worms in a representative sample of deer from a particular population. The APC value, combined with other indicators of deer health, such as lung worm numbers and body fat abundance, can indicate whether the local deer population already has, or is likely to develop, health problems because the deer density is high and may exceed the carrying capacity of the habitat. With this and other biologic information, wildlife

managers can determine whether the local deer population has health risks and can adjust harvest regulations accordingly. Over the years, SCWDS has performed nearly 700 deer herd health checks throughout the Southeast.

Since the 1960s, SCWDS has conducted regional parasite surveys of numerous wild game bird species, including turkeys, quail, doves and grouse, as well as small game animals, such as cottontails and squirrels. Many projects have been conducted to better understand the role of wildlife, particularly deer, in the spread of diseases and parasites in livestock. An early project to evaluate tropical cattle fever tick eradication showed it would not be necessary to exterminate deer in an area to accomplish this. Additional projects showed that deer were not

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Nanci Bross-Fregonara

DNR biologists and wildlife managers use information and training provided by SCWDS to monitor wildlife health.

protective antibodies, as well as to innate genetic resistance of the deer. This phenomenon has not only been demonstrated experimentally, but has been observed when captive deer from northern areas have been moved to southern facilities.

Foreign animal diseases were recognized early on as a dangerous threat to valuable wildlife resources as well as livestock and poultry. Wildlife could be directly affected by the accidental or intentional introduction of exotic diseases such as rinderpest and foot-and-mouth disease, or indirectly affected if it became necessary to destroy

important in the epidemiology of cattle diseases such as brucellosis. All of these studies added significantly to the knowledge of diseases and parasites in wildlife, as well as of potential health implications for domestic animals.

As knowledge expanded, it became apparent that native diseases and parasites were unlikely to devastate deer or other wildlife populations in the Southeast. Even Killer X, now known to be hemorrhagic disease, which is caused by infection with hemorrhagic disease viruses transmitted by insects, did not significantly impact the Southeast's restoration programs, as today's deer numbers readily attest. Hemorrhagic disease remains a significant disease of white-tailed deer throughout much of the United States today and SCWDS continues to conduct research to better understand it.

For example, recent hemorrhagic disease research by SCWDS has shown that the likelihood of deer suffering severe clinical disease or dying, versus developing a mild or unapparent infection, depends on

the geographic origin of the deer. In general, deer in the deeper portions of the South, such as Florida and Texas, are less likely to develop severe disease than deer to the North, particularly in the Midwest. This resistance in southern deer appears to be due to frequent exposure to the virus with maintenance of

large numbers of wild animals to prevent transmission to domestic and wild animals, and to stamp out the introduced disease from the country. Recognizing this threat, a vital alliance between wildlife and domestic animal interests was officially established in 1967 when the United States Department of Agri-

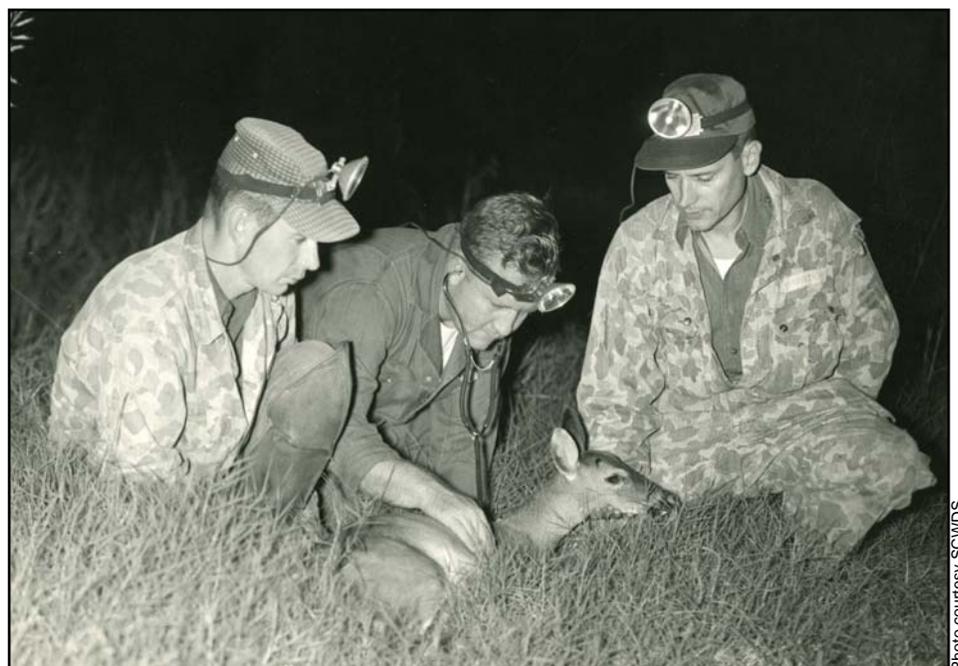


Photo courtesy SCWDS

Frank Hayes, center, the first SCWDS director, checks a doe after it was tranquilized with the CapChur™ gun, a tool he developed in the 1950s.

culture sponsored a three-day training program. SCWDS conducted the program with assistance from internationally recognized disease experts. The third day was a test exercise in which wildlife biologists from 15 states and USDA officials reacted to a hypothetical introduction of foot-and-mouth disease into a southeastern deer population. The USDA continues to sponsor this highly successful program each year.

Unfortunately, exotic disease introductions have not always been hypothetical. The USDA enlisted SCWDS in the early 1970s to respond to Newcastle disease outbreaks among domestic poultry in California, Florida and Texas. In 1983-84 SCWDS personnel again were active members of the task force to eradicate highly pathogenic avian influenza virus from poultry in Maryland, New Jersey, Pennsylvania and Virginia. In all of these cases, SCWDS worked to capture and test wild birds in the outbreak area to determine if they were carrying or spreading the viruses; fortunately in all cases they were not. SCWDS and USDA have signed annual cooperative agreements since 1979.

An interesting phenomenon recognized during the Newcastle disease episode in California in 1972 is of key interest today. Testing of wild birds for Newcastle disease virus yielded the first information showing that wild birds, especially aquatic species, are major natural reservoirs for the avian influenza viruses that do not cause disease. This finding has been essential in developing science-based surveillance strategies for highly pathogenic avian influenza viruses that have killed poultry, wild birds and humans in Asia, Africa and Europe.

Since its inception, SCWDS has conducted diagnostic testing and research on animal diseases that are



Jim Crum

A DNR biologist extracts a lymph node from a deer in Hampshire County. The tissue was sent to SCWDS for CWD testing.

transmissible to humans. While examining wild animals that had been confiscated because they were being moved to another location illegally, SCWDS detected rabid raccoons as well as foxes carrying a tapeworm that can be fatal to humans, but which does not naturally occur in the Southeast.

Illegal stocking of raccoons in the 1970s is responsible for the

expanding raccoon rabies outbreak that began in the Mid-Atlantic States, now affects the entire eastern United States, and threatens the Midwest. SCWDS also was heavily involved in research to develop and field test the methods to successfully deliver oral rabies vaccines to free-ranging wild animals.

Currently, SCWDS is conduct-

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Most SCWDS achievements, although less publicized, have been of great value to wildlife managers, researchers, educators and policy makers, as well as domestic animal and public health officials. These include:

- Thousands of diagnostic investigations to determine causes of sickness or death in more than 200 wildlife species
- Publication of two books, *Diseases and Parasites of White-tailed Deer* and the *Field Manual of Wildlife Diseases in the Southeastern United States*, now in its 3rd edition
- Publication of more than 450 scientific articles and book chapters comprising a significant amount of the wildlife health knowledge in North America
- Distribution of a quarterly newsletter and brochures
- Development of a wildlife health educational program for graduate and veterinary students with 40 MS and 25 PhD degrees awarded
- Service in leadership positions and as editors to organizations such as the Wildlife Disease Association, American Association of Wildlife Veterinarians, United States Animal Health Association, and World Organisation for Animal Health



Photo courtesy SCWDS

A SCWDS biologist checks a fox for tapeworms which can be fatal to humans. The animal had been confiscated after being moved illegally.

ing extensive research into the ecology of avian influenza viruses in wild birds and the environment with the support and collaboration of the USDA, the National Institutes of Health, the Centers for Disease Control and Prevention, and other organizations. Human-health oriented SCWDS projects have included Lyme disease and West Nile virus research, as well as surveys and experimental inoculations of deer with *E. coli* O157:H7, the bacterial organism first associated with undercooked ground beef that more recently sickened people who had consumed contaminated spinach. The frequent emergence of new diseases involving wildlife continues to provide opportunities for SCWDS to apply its unique expertise to better understand new diseases in order to develop preven-

tion and control programs.

The Southeastern Cooperative Wildlife Disease Study has assembled an enviable list of accomplishments in its first 50 years. Many were attained without much public notice, while other SCWDS achievements have become well known. One of these is the CapChur™ gun that is used by wildlife biologists, veterinarians, and others around the world to tranquilize wild animals. Frank A. Hayes, the first SCWDS

Director, was a key member of

the Georgia team that developed, tested, and refined this essential management tool in the 1950s.

Today, SCWDS employs approximately 30 faculty, staff and graduate students at its headquarters in Athens, Georgia. A satellite office operates in Florida where

SCWDS has an ongoing year-round surveillance project for exotic ticks and other external parasites that can serve as carriers of foreign animal diseases. A small sample of ongoing SCWDS projects includes researching the cause and epidemiology of avian vacuolar myelinopathy (AVM), a fatal brain disease that has affected bald eagles, coots, ducks, geese, and other birds at several southeastern reservoirs since the early 1990s; and evaluating the efficiency of surveillance techniques for West Nile Virus.

Since its establishment, SCWDS has provided untold benefits to natural resources, wildlife managers, domestic animal and public health officials, and citizens and visitors throughout the Southeast. With its unique cooperative approach and pooling of resources, SCWDS has grown and evolved by leveraging funds provided by an individual supporter with those of the other states, federal agencies and granting organizations in order to develop and distribute wildlife health information and services of value to everyone. In this proven manner, SCWDS supporters, like the DNR Wildlife Resources Section and the people of West Virginia, receive much more bang for their bucks and everyone gets a bargain.

Dr. Fisher has been Director of SCWDS since December, 2000.

The Southeastern Cooperative Wildlife Diseases Study has laboratories located on the campus of The University of Georgia's College of Veterinary Medicine in Athens. Samples taken from wildlife in West Virginia are sent here for examination and testing.



Photo courtesy SCWDS