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A History of the Wildlife Services Program

Donald W. Hawthorne, Gary L. Nunley, and Vivian Prothro
USDA-APHIS-Wildlife Services, Oklahoma and Texas

Editor's Note: This is a continuation of an article begun in the January 1999 issue of THE PROBE *(#196). We thank Gary Nunley, State Director of the Texas Wildlife Damage Management Services Program, for permission to reprint this article.*

At the turn of the century, the livestock interests throughout the West felt and forcibly expressed the sentiment that it was unfair to collect grazing fees from any owner whose stock grazed a forest heavily infested with wolves and coyotes. The federal government had a large interest, since much of the vast areas of the West were forest lands and public domains. Between 1905 and 1907, the Forest Service and the Biological Survey investigated the predator-livestock problems, and each had publications that described approved and familiar methods of shooting, trapping, poisoning, the development of den hunting, and wire fencing to control wolf and coyote damage. As a result, Vernon Bailey reported in 1907 that more than 1,800 wolves and 23,000 coyotes were killed with an estimated $2 million savings in livestock.

In 1907-08, Piper carried out investigations and demonstrations relative to controlling the mouse plague in the Humboldt Valley, Nevada. In 1913, operational rodent control work began under a small administrative allotment of funds to control plague-bearing rodents on a few national forests in California. In the following year the first of what are now many hundreds of cooperative agreements was signed by the president of the New Mexico College of Agriculture and Mechanical Arts and the Secretary of Agriculture.

In 1914, Congress finally gave in to the pleading of stockman and sportsman clubs. As a result, Congress made a small appropriation for experiments and demonstrations to control predator animals, mainly to see what could be done. Also, USDA's Bureau of Biological Survey began to conduct prairie dog control demonstrations in Texas in December 1914.

In 1915, the first sizeable appropriation for predator control, $125,000, was made and the language of the act called for the direct participation by the Biological Survey. It also ordered the destruction of wolves, coyotes, and other animals injurious to agriculture and animal husbandry on National Forests and public domains. This action ended the Forest Serviceís predator control program and made it part of the regular work of the Biological Survey. Nine districts were formed in the western states and the following Predatory Animal Inspectors were appointed: C.R. Landon for Texas, Charles J. Bayer for Wyoming and South Dakota, George W. Holman for Utah, Luther J. Goldman for Idaho, E. F. Averill for Oregon, L. B. Crawford for Colorado, J. Stokley Ligon for Arizona and New Mexico, E. R. Sans for Nevada and California, and E. R. Bateman for Montana and North Dakota. Organized predator control efforts at the state level then followed.

In 1916, a rising epidemic of rabies in wild animals, particularly in coyotes, increased the appropriation by $75,000. This caused an increase in the number of Government hunters primarily in the hardest hit areas of northern California, Oregon, Nevada, and Idaho. Also, for the first time funding for rabies work and predator control exceeded that spent for "food studies." In 1920, all restrictions that work be done only on national forests and public domains were "officially" dropped.

Stanley P. Young wrote about his employment experience. "After a few preliminary contacts with J. Stokley Ligon, mainly through correspondence, I was asked to go to work as a Government hunter in Arizona with a grand salary of $75 per month. This magnificent salary meant that you had to board and take care of your other requisites, such as upkeep of saddle and pack horses, but I was able to do this, with cooperators aiding at times, because $75 was a lot of money in those days. By the time the employment date came around, October 1, 1917, I was sent a sack of wolf traps, formula for making wolf scent, and stake pins, together with a little packet of official stationery with instructions therein, one of which read: 'A man who does his duty well is the man who serves his country best, especially so when the world is being devastated by war (WWI). Be a clean hunter, keep a clean trapping kit, and leave a clean record. It will be honor to yourself and a credit to your country. To delay reports interferes with all accounts and delays your own pay.' " The instructions went on to instruct the hunter how to keep furs and scalps. (In

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CALENDAR OF UPCOMING EVENTS

March 17, 23, & 25, 1999: Vertebrate Pest Control Workshops, California (Salinas, Ontario, and Sacramento, respectively). Co-sponsored by Vertebrate Pest Council and Pesticide Applicators Professional Assoc. (PAPA). Three one-day workshops providing basic information and pesticide applicator certification credits, covering bird, rodent, and predator damage control techniques. For further information, contact Dr. Desley Whisson at (530) 754-8644, or visit web site <http://www.davis.com/~vpc/welcome.html> or web site <http://www.pestweb.com/papa/>.

April 11-14, 1999: 55th Annual Northeast Fish & Wildlife Conference, Holiday Inn, Manchester, NH. Contact: Judy Stokes, Conference Coordinator, phone (603) 271-3211 or email <info@wildlife.state.nh.us>.

May 9-13, 1999: Bird Strike Committee USA / Bird Strike Committee Canada, Delta Pacific Resort & Conference Center, Richmond, British Columbia. For information on call for papers, registration, and field trips contact: Bruce MacKinnon, Transport Canada, phone (613) 990-0515, or email <mackinb@tc.gc.ca>. Exhibitors wishing to display products should contact Jeff Marley at Margo Supplies Ltd., phone (403) 652-1932. Book hotel rooms by calling (800) 268-1133.

May 23-27, 1999: North American Aquatic Furbearer Symposium, Mississippi State University, Starkville, Miss. Presentations (papers and posters) will be given on ecology, economics, human dimensions, policy issues, population estimates, or techniques related to aquatic and semi-aquatic furbearers (beaver, mink, otter, nutria, muskrat, and raccoon). A variety of field trips to view local historical, ecological, and wildlife management areas are planned. Peer-edited symposium proceedings containing full papers and poster abstracts will be published. For conference information and registration forms, visit website at: http://www.cfr.msstate.edu/naafs/naafs.htm, or contact Richard B. Minnis, MS Coop. Fish & Wildlife Research Unit, phone (601)325-3158.

June 28-July 2, 1999: 2nd International Wildlife Management Congress, Hungary. To include a plenary session "Issues in Wildlife-Human Conflicts." Contact: Dr. E. Lee Fitzhugh, Extension Wildlife Specialist, UC Davis, phone (530) 752-1496, email <elfitzhugh@ucdavis.edu>.

Reminder: Have You Paid Your 1999 Dues???

Take a minute right now to check the date of your membership expiration—it's in the address block on this issue of THE PROBE, on the line above your name. If it says "DEC-98" or any other month in 1998, your membership in NADCA has expired and needs to be renewed! So, before you forget about it, fill out the "Membership Renewal and Application Form" on the back of this issue (or a photocopy of this form) and mail it, along with your check, to Treasurer Grant Huggins at the address indicated.

Keeping your dues current assures that you won't miss a single issue of THE PROBE... and it keeps Grant from having to send you a reminder! (While you're thinking about it, why not ask a friend or colleague to join NADCA too!)

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Editor: Robert M. Timm
UC Hopland Res. & Extens. Ctr., 4070 University Road, Hopland CA 95449. (707) 744-1424,
FAX (707) 744-1040, E-mail: rmtimm@ucdavis.edu

Editorial Assistant: Pamela J. Tinnin
P.O. Box 38, Partridge, KS 67566.
E-mail: PamT481@aol.com

Your contributions of articles to *The Probe* are welcome and encouraged. The deadline for submitting materials is the 15th of the month prior to publication. Opinions expressed in this publication are not necessarily those of NADCA.

Message from the President

NADCA members are scattered throughout the United States (and in some cases, outside the United States). This makes it difficult to have a membership meeting location and date convenient for all. In the past, NADCA meetings have been held in conjunction with the Vertebrate Pest Conference, the Great Plains Wildlife Damage Control Workshop, and the Eastern Wildlife Damage Control Conference, and smaller gatherings have met with the Wildlife Control Technology Seminar, Nuisance Wildlife Control Operators Shortcourses in Kentucky and South Carolina, and other venues. These meetings are important, because they provide the body to go along with the NADCA spirit.

In lieu of meetings, however, NADCA members depend on THE PROBE to disseminate information relevant to the wildlife damage management profession. NADCA members are well represented on WDAMAGE, the Internet discussion group sponsored by the Wildlife Damage Management Working Group of The Wildlife Society. In today's telecommunication-intensive world, you are only a phone call, or a keystoke, away from other NADCA members.

Look over the membership directory enclosed with this issue of THE PROBE. Find a name on the list and give that person a call. If you note a name of a colleague who is not listed in the directory, give that person a call or e-mail and invite him or her to join NADCA. I encourage you to contact your Regional Director if you have questions or concerns about NADCA. And please feel free to contact me at 435-797-2536, or a rschmidt@cc.usu.edu. You are the key to maintaining the NADCA connection!

Robert H. Schmidt
President, NADCA

Abstracts from the 5th Annual Conference of The Wildlife Society (continued from the January 1999 Issue, #196)

Diverse Applications of Sharpshooting to Manage Abundant Deer Populations

A.J. DeNicola, H.C. Frost, and K.E. Gustad.*
**White Buffalo, Inc., Hamden, CT*

Traditionally, regulated hunting has been the preferred approach for the management of deer populations. However, there are an increasing number of sites inaccessible to sportsmen where deer herds have become abundant. Sharpshooting has been used in several locations with considerable success and has been demonstrated to be an effective and efficient nontraditional management tool. We discuss 5 case studies where sharpshooting was used to significantly reduce localized deer populations. These programs were conducted within a National Park Service site, a Department of Energy facility, and three suburban communities. Removal sites varied in size from 250 to 9,200 ha. The number of deer removed ranged from 52 to 525 per year. Forty-four to 87% of target populations were removed in a given year. Projects required 1.25 to 5.2 person-hours per deer harvested. Biological data were collected from deer at each location to assess herd health. Results from these programs illustrate the versatility, efficiency, and effectiveness of sharpshooting for controlling deer populations. Wildlife problems in suburban communities or other sensitive management areas will become more common in the future, and sharpshooting will continue to play a valuable role in resolving deer-human conflicts.

Wildlife on Airports: A Fatal Attraction!

R.A. Dolbeer and S.E. Wright, USDA-APHIS-Wildlife Services, Sandusky, OH

Airports provide an attractive environment for many wildlife species. However, when departing and landing aircraft encounter these wildlife, the outcome is always fatal for the animal and occasionally harmful for the aircraft and occupants. As examples, bird and other wildlife strikes to civil and military aircraft cost the aviation industry in the U.S. over $300 million/year. From 1950-1997, over 240 military aircraft were lost to birds in Europe and North America. Over 300 people have been killed worldwide as a result of wildlife strikes. We analyzed all wildlife strike reports for 1991-1997 received by the Federal Aviation Administration after editing the reports and entering the information into a Wildlife Strike Database. Of the 17,000 unduplicated strike reports, over 97% involved birds of which about 50% identified the type of bird. Gulls were involved in 31% of identified bird strikes followed by waterfowl, blackbirds/starlings, pigeons/doves, and raptors (each 10-13%). Non-bird strikes involved 72% ungulates and 14% coyotes/dogs. Wildlife were not equally hazardous to aircraft. For example, <20% of gull strikes resulted in damage compared to >50% of goose strikes. Over 80% of deer strikes resulted in aircraft damage and substantial damage occurred >50% of the time. Although coyotes were frequently seen on airport and occasionally struck (about 50 reported strikes), there was only one incident of substantial damage ($100,000). Managers need to prioritize management actions to ensure that populations of the most hazardous species are minimized on airports. The wildlife strike database provides an objective means of developing a prioritized list of hazardous species.

An Empirical Model for Predicting Deer Population Trends in Suburban Chicago, Illinois

D.R. Etter, T.R. Van Deelen, R.E. Warner, and B.M. Hannon*
**Forest Preserve District of DuPage County, IL*

Wildlife managers face new challenges when attempting to model dynamic suburban white-tailed deer populations. Many suburban deer populations exist at high densities, yet most management programs to reduce deer numbers mimic catastrophic population crashes. Such drastic shifts in deer density can greatly alter deer population parameters, because both physical and biosocial factors influence reproductive rates, fetal sex ratios, recruitment, dispersal, survival, and spatial distributions in deer. Therefore, managers must include these factors and associated lag times when modeling suburban deer populations. During 1993-1998, >2,500 deer were culled from Forest Preserves in DuPage County, IL in an attempt to reduce and then maintain deer populations at goal density of 6 deer/km^2 (post-fawning). Additionally, 181 deer were live-captured and marked (129 were radio-marked) from these Forest Preserves and preserves in adjacent Cook County during 1994-1998 to determine population dynamics for suburban deer. These data provided the foundation for the development of an empirical suburban deer population model using Stella 5.0 software. The model treats male and female populations as discrete, because of their different survival, emigration, and reproduction potential. Density-dependent recruitment rates were incorporated to account for changes associated with fluctuating deer-densities. Sensitivity analysis was used to test the ability of different male and female removal strategies to achieve desired deer densities on annual and multi-year culling schedules. A separate model provided cost analysis to achieve desired deer densities and then maintain populations on an annual and semi-annual basis. We review these models and parameters and make recommendations for use by managers from other regions. A web site address for the model is also available.

Oral Vaccination Programs Against Canine Rabies in Texas

M.G. Fearneyhough
Zoonosis Control Division, Texas Dept. of Health, Austin TX

Two canine rabies epizootics began in Texas in 1988, one involving coyotes and dogs in south Texas and the other in gray foxes in central Texas. In south Texas since 1991, 2 people have died from canine rabies and over 3,000 people have taken post-exposure rabies vaccine injections. In February 1995, the Texas Dept. of Health initiated the Oral Rabies Vaccination Program as a multiyear effort with the goal of creating zones of vaccinated coyotes and gray foxes along the leading edges of the epizootics, thereby halting the spread of the virus. A total of 8,500,000 doses of Raboral V-RG oral rabies vaccine produced by Merial Ltd., Athens, GA have been distributed over 362,589 km^2 (140,000 mi^2) of Texas since 1995. Results from surveillance programs conducted in March 1997 have shown over 87% of the 337 coyotes tested from south Texas were positive for the biomarker included in the bait material. Many of those animals had taken baits in multiple years since 1995, and the average number of baits eat in 1997 was 5.3 per animal. Greater than 82% of coyotes tested from the primary surveillance area have shown evidence of an immune response to the vaccine. Canine rabies cases in south Texas have declined from 16

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those days, and until 1966, hunters had to have proof of their take by saving the scalp or the fur of each predator they caught.)

In the early days of predator control, a trapper would work out of a camp and have 2-5 good horses and would run 100 to 200 traps in two lines extending for 10 to 15 miles out from camp and looping back toward camp. This would total from 25 to 75 miles of trap line, depending on terrain. According to C. R. Landon, Henry Ford helped the trapper by providing him with better transportation (although he never had the predatory animal hunter in mind when he developed the early Model T car). Nevertheless, the Model T was wonderfully adapted to the trapper's use. The car could be driven practically anywhere one could go in a wagon. It could be driven slow enough for the hunter to see wolf tracks and other sign almost as good as he could on a horse. Yet with the use of a car, the hunter could cover two or three times as much country as he could on horseback.

In the late 1900s and the early 1920s, tremendous rabbit populations irrupted throughout the West, and the Biological Survey coordinated poisoning campaigns and drives. However, interest in rabbit control was stimulated by a commercial demand for rabbit skins for felt hats and other products. In Wyoming, farmers and ranchers sold 100,000 skins netting them $12-15,000. The Idaho program one year killed 600,000 rabbits and sold 61,000 pounds of skins.

The placing of poisons had become a fine art for both predators and rodents, and in 1920 a laboratory for experimentation with poisons was established in Albuquerque, New Mexico. It was called the "Eradication Methods Laboratory" and was under the direction of Stanley E. Piper. In 1921 it was moved to Denver, Colorado. Later (1928) it was renamed the "Control Methods Research Laboratory."

In 1922, predator and rodent control programs were started in Arkansas, Oklahoma, Iowa, Indiana, Louisiana, Minnesota, Wisconsin, and Washington.

For many years, stockmen had used strychnine as a means of controlling wolves and coyotes. The common practice was to salt any carcass they found on the range with raw strychnine. The coyotes and wolves soon learned that the distinctly bitter taste of the poison meant danger, and they would avoid the treated carcasses. Soon after the Government became involved in the program strychnine was put into tallow baits and inserted into a carcass. This was soon abandoned for the use of small baits known as "drop baits" placed around a carcass or a draw station. Later research developed a procedure of putting the poison into capsules and tablets that would hide the bitter taste of strychnine. Besides strychnine, work was done with thallium sulfate, primarily for pest birds such as ravens, and for predator control.

In 1925, the title "Predatory Animal Inspector" was changed to "State Leader." In 1928, the Office of Ornithology and Mammalogy with the Bureau of Biological Survey was upgraded to a division, and the name was changed to the "Division of Economic Investigations." But a year later, 1929, the name changed again, this time to the "Division of Predatory Animal and Rodent Control." In 1934, the Division was combined with law enforcement to form the "Division of Game Management" with a "Section of Predator and Rodent Control," and the title of "State Leader" was changed to "District Agent." However, only four years later, in 1938, it was again separated and re-named the "Division of Predator and Rodent Control." In 1939, the Bureau of Biological Survey of USDA and the Bureau of Fisheries in the Department of Commerce were transferred to the U.S. Department of the Interior to form the U.S. Fish and Wildlife Service (FWS).

In the act making the appropriations for the Dept. of Agriculture for Fiscal Year 1929, Congress called for "an investigation as to the feasibility of a definite predatory animal control program over a certain period, which would likewise assure a definite amount for expenditure for each succeeding year, and upon which to base more efficient control work." The investigation was made, and a report recommending a cooperative program to cover a 10-year period was submitted to the 70th Congress. A number of bills were introduced in both Houses of the 71st Congress to authorize the institution of the 10-year plan. However, after full Congressional hearings on the matter, the bill that was passed and signed by the President had no time limit and has become known as the "National Animal Damage Control Act of March 2, 1931" (Public Law 776). This is the legal authority in which the federal government is authorized to conduct animal damage control activities and to enter into cooperative agreements with state governments and local entities.

In the late 1920s and early 1930s, if an area had a rodent problem, one or more employees of the division would go into the community and organize rodent control "campaigns." These campaigns would involve the farmers and ranchers of the area, and also there would be a place set up for mixing bait. However, not all projects were large enough to justify setting up facilities to mix bait. Therefore, a number a bait mixing stations were established around the country such as the ones at Medford, Oregon and McCannon, Idaho. The McCannon station was move to Pocatello in 1932. In 1934, Congress approved funds to buy property at Pocatello, build a bait mixing plant, and operate it in cooperation with the Pocatello Chamber of Commerce. In 1936, the building was completed and the Pocatello Supply Depot was opened for business and remains an important part of the program today.

In the fall of 1941, the Humane Fur Getter, later renamed the Humane Coyote Getter, became operationally used in Wyoming, Colorado, New Mexico, and on a wildlife research project in Texas. In June 1942 it became operational Westwide. The "getter" was especially valuable in freezing weather

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that impedes traps. It was found to have less interference than did traps by rodents, other wildlife, and livestock, which made trap operation at times difficult. Because of concern within the agency about the possible hazard of the "getter" in which propulsion of sodium cyanide was powered by a .38 primer shell, an "agreement and release form" was developed. This required the signature of the landowner, the agent of the FWS, and had to be witnessed by a third party. One time a calf was killed with a "getter" on property where no agreement was signed, and the FWS employee had to pay for the calf.

In August 1945, the FWS announced the discovery and demonstration of a new rodenticide known as "Compound 1080." On October 24, 1945, a policy statement was issued on its use. Unlike strychnine, 1080 was found to be tasteless, soluble in water, it could be applied to a bait more easily, and it only took a small amount to be effective. In the 1940s, research was also being conducted on thallium sulfate and Compound 1080 in large meat baits for coyote control. On October 31, 1946, Acting Chief Clifford Presnall wrote"the new methods thallium, 1080, airplanes, and coyote getters all have great potential advantage to the program; however, I caution you to use them conservatively."

By 1948, Compound 1080 was registered and was being used on a limited basis for coyote control. A year later, Weldon B. Robinson published an article entitled "Thallium and 1080 Impregnated Stations in Coyote Control." He stated that the two poisons were equally effective, but 1080 was preferred because it was cheaper, more readily available, somewhat more selective, and easier to apply.

In 1946, Assistant District Agent J. R. Alcorn from Fallon, Nevada published an article in the May issue of the *Journal of Mammalogy* entitled "On the Decoying of Coyotes." Thus, predator calling became a tool in the program. Mr. Alcorn also described how to use a howl or a siren to locate coyotes before using the call.

The Service did not starting using aircraft in predator control operations until the late 1940s. First, they were used to distribute strychnine drop baits, but it became readily apparent that an airplane could be used effectively to shoot coyotes from the air.

In 1948, because of a worldwide shortage of food, particularly cereal grains, Congress passed a law setting up an emergency rat control program known as the Clean Grain Program. They appropriated $1 million to USDA to combine forces with USDI on rat control, and authorized them to publish educational materials such as posters, folders, and conservation bulletins. This program got the Division of Predator and Rodent Control deeply involved in commensal rodent control and helped further establish the program in the eastern U.S. Also in 1948, the Division was renamed the "Branch of Predator and Rodent Control." A badge depicting the organization's logo was assigned to each of the field personnel, and it was worn with pride. The program ran pretty well status quo, with no major changes from this time until the early 1960s.

In 1963, because of environmental pressure on the Department, the Secretary of the Interior, Stewart Udall, appointed an Advisory Group on Wildlife and Damage Management to review the Wildlife Services program. This Advisory Group was comprised of A. Starker Leopold, Professor at the University of California at Berkeley; Ira Gabrielson, Wildlife Management Institute; Clarence Cottam, Director of the Welder Wildlife Foundation; Thomas L. Kimball, Executive Director of the National Wildlife Federation; and Stanley A. Cain, Professor at the University of Michigan. The review was completed in 1964 and the group's report, entitled "Predator and Rodent Control in the United States" (better known as the "Leopold Report") was delivered to Secretary Udall. It contained six recommendations: 1) appoint an advisory board; 2) reassess the goals of the predator and rodent program, 3) revise the predator and rodent control guidelines, 4) amplify the research program; 5) establish legal control of the use of certain pesticides, and 6) change the name of the organization.

In June 1965, Secretary Udall adopted the report as a "guide post" for change and the name was changed to "Division of Wildlife Services." Two functions were added to the program, the Branch of Wildlife Enhancement and the Branch of Pesticide Monitoring and Surveillance. Jack Berryman, a professor from Utah State University, was named chief. The title "District Agent" was changed to "State Supervisor." Other staff titles were also changed appropriately: for example, "Mammal Control Agent" was changed to "District Field Assistant." The environmentalists were not satisfied with the changes, and in March 1971 the Defenders of Wildlife and the Sierra Club sued the Department of the Interior demanding, among other things, an end to the use of toxicants in predator control. A month later the Humane Society of the U.S. filed a similar lawsuit.

Secretary of the Interior Rogers C. B. Morton appointed an Advisory Committee on Predator Control, better known as the "Cain Committee." The committee conducted a very hurried review of the program and completed the report by the end of 1971. The report was critical of the program. There were two portions of the report, one on the recommendations of changing the program, and the other was the supporting data. When read closely, the report showed that there were numerous contradictions between the two portions. (It has come to light that a deal was made with the environmentalists that if the Government would ban predacides, the two lawsuits would

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The Editor thanks the following contributors to this issue: Donald W. Hawthorne, Gary L. Nunley, Vivian Prothro, and Robert H. Schmidt. Send your contributions to **The PROBE**, *4070 University Road, Hopland, CA 95449.*

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Wildlife Society Abstracts continued

reported in 1994 (before the first year of the program) to 75 in 1995, 15 in 1996, and only 3 to date in 1997. All three cases in 1997 were found within 3 miles of the southern limit of the 1997 vaccination zone and none showed laboratory evidence of having consumed a bait containing vaccine. The gray fox program continues to show similar success with 188 cases reported in 1995, 57 cases in 1996, and 16 cases to date in 1997.

Public Health and Safety Significance of Blackbird Roosts: Management Alternatives and Limitations

K.M. Garner and F.L. Boyd
USDA-APHIS-Wildlife Services, Nashville, TN and Auburn University, AL

Blackbird roosts have been implicated in numerous human health and safety conflicts. Histoplasmosis resulting from the fungus *Histoplasma capsulatum* is one of the most common concerns of local health agencies. Hazards to aircraft are also frequently a concern when roosts are located near airports and can involve costly aircraft damage as well as risks to human life. Roosts that occur near commercial and industrial facilities often result in safety hazards from the accumulation of blackbird droppings on walkways as well as disease concerns. While these conflicts have increased with human population growth and land development, new management techniques have not been developed and tested to address problems associated with blackbird roosts. In fact, available control techniques have decreased over time resulting in fewer options for wildlife managers. The current status of conflicts involving blackbird roosts and strategies to address these conflicts was presented. The adequacy of current management efforts to resolve conflicts associated with blackbirds was also discussed.

A Comprehensive Program for Managing While-tailed Deer in Montgomery County, Maryland

R.W. Gibbs, Jr., W.K. Hamilton, and J.E. Hench
Montgomery Co. Dept. of Parks and Planning, Silver Spring, MD

White-tailed deer populations in Montgomery Co., Maryland have increased dramatically over the past two decades. The result has been an increase in deer-related auto collisions and damage to agricultural crops, home landscapes, and natural vegetation. In an effort to reduce deer-related impacts, Montgomery Co. has developed a comprehensive management program for white-tailed deer. Based on recommendations from a citizen task force, a management plan was written and is being implemented by a multi-agency deer management work group composed of local, state, and federal professionals in the fields of wildlife, cooperative extension education, and law enforcement. The cornerstones of this program are 1) a centralized system of data collection to identify impact hotspots and increase our knowledge of local deer ecology and population dynamics, 2) an extensive public awareness and educational program to give citizens the information they need to address issues on their property; and 3) an adaptive approach to implementation that draws from a wide range of management options, including population management, applying each when and where it will be most effective. This program has created a system for dealing with deer on a county level that involves cooperative efforts between private landowners, government and non-government agencies and that should, over time, increase human tolerance of deer and manage deer numbers.

Habitat Use and Activity Patterns of Coyotes in Urban Tucson, Arizona

M.L. Grinder and P.R. Krausman
Dept. of Wildlife & Fisheries, University of Arizona

Coyotes are commonly observed in many urban centers in the western U.S. Our objectives were to determine the habitats that coyotes in urban Tucson use, and their patterns of use in those habitats. We trapped and radio-collared 17 coyotes between October 1996 and January 1998; we present the data from 13 coyotes here. Seven of these coyotes were in densely populated urban areas; 6 coyotes were in more rural area. We used point locations from coyotes to determine home ranges; we continually tracked coyotes for up to 12 hours to determine activity patterns. Home ranges (95% adaptive kernel) varied from 220 to 6499 ha in size. We quantified the availability of 7 habitat categories within Tucson using a pre-existing GIS database. We then determined habitat use at the scale of the study area versus the home range, and within the home range. At the study area scale, coyotes overall used most habitats in proportion to their availability. Within the home range, coyotes overall used parks, residential areas, and washes in greater proportion than their availability. At both scales, individual coyotes showed a wide range of differing preferences for certain habitats. Coyotes were most active at night, and some animals moved up to 10 km in a night through densely populated urban areas. Although coyotes appeared to reside permanently in Tucson, individuals showed great variation in the habitats that they used to do so.

Prevalence and Distribution of Toxoplasmosis in Urban White-tailed Deer

K.M. Hollis, L.L. Hungerford, J.P. Dubey, C. Anchor, and J. Chelsvig*
**College of Veterinary Medicine, University of Illinois*

White-tailed deer can serve as reservoirs for several zoonotic diseases, including toxoplasmosis, caused by a protozoan parasite. Data on deer health may serve as a useful biomonitoring tool to enhance food safety and public health in the urban environment. Blood samples were collected in Cook County, IL from a deer management program and live-captured deer between December 1995 and April 1997. A total of 380 serum samples were tested by serum agglutination for *Toxoplasma gondii* at dilutions of 1:25, 1:50, 1:500, and >500. One hundred eighty-seven of 380 (49.2%) deer serum samples tested positive for *T. gondii*. There was no significant difference between the sexes, although the prevalence was higher in females than males. There was a significant trend of increasing infection with age (fawn prev. 25.8%, yearling 44.1%, adult 61.4%). Significant difference in seroprevalence was detected among the 12 removal locations and between the 2 live capture sites. The difference between the two capture locations remained the same when adjusted to remove for potential confounding due to sex or age. Locations of seropositive and seronegative deer were mapped on a geographical information system in order to analyze demographics and habitat types that may be conducive to toxoplasmosis. The differences in toxoplasmosis among the various study locations were discussed. Information from this study will allow wildlife biologists to include public health considerations in urban deer management as well as provide health professionals with background data on the prevalence of toxoplasmosis in Cook County, IL.

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Black Bears Who Really Cares (?)

D.A. Immell, M.C. Boulay, K.L. Higgins, D.H. Jackson, and J.P Sagar.
Oregon Dept. of Fish & Wildlife, Roseburg

Voter initiatives are becoming a popular tool for special interest groups to legislate state wildlife policy. Many non-informed public vote on these initiatives. We conducted a survey of 2 groups, registered voters chosen at random (n=569) and black bear hunters who purchased a bear tag for our study area (n=271), to compare their understanding of black bear biology and how this might influence their vote on wildlife management policy. Hunters were more willing to answer the phone survey (<1% refused) than were voters (38% refused). Hunters were more aware of (1) current black bear distribution (96% vs. 60%), (2) bear forage items (70% vs. 52%), and more likely to have encountered a bear (82% vs. 38%) than were voters. When asked about black bear populations in Oregon, 78% of the hunters and 20% of the voters believed populations were increasing. We also examined the sources of information that individuals were relying on regarding wildlife. Hunters indicated their information sources were the Oregon Dept. of Fish & Wildlife, personal experience, and outdoor magazines while voters primarily used television news and newspapers, nature shows, and other people. A larger percentage of hunters (33% vs. 11%) were more active in wildlife-oriented organizations than were voters. A majority of the voters agreed that (1) regulated hunting was acceptable, (2) regulated bear hunting was also acceptable, and (3) wildlife populations were a more important consideration in managing wildlife than was the well-being of an individual animal.

Evaluation of Rabies Awareness among Middle School Students from Southern Texas

A.E. Kresta and S.E. Henke
Caesar Kleberg Wildlife Research Instit.,
Texas A&M University-Kingsville

An epidemic of canine rabies transmitted by coyotes began in 1988 along the U.S.-Mexico border. The disease spread rapidly throughout southern Texas and resulted in four human deaths and more than 1,500 rabies exposures in which prophylactic treatment was required. To combat this epidemic, the Texas Dept. of Health conducted an oral vaccination program that targeted free-ranging coyotes and offered free immunization of pets. However, the latter program met with resistance from the public. We hypothesized that the general public lacked knowledge as to the seriousness and spread of rabies, which resulted in their apathy for partaking in precautionary measures. To test our hypothesis, we developed a questionnaire for middle school students and tested their knowledge of rabies. This age category was selected because it involved the majority of the human cases exposed to rabies. Surveys (n=16,000) were sent to 48 rural and urban schools within and outside the endemic area. Teachers were instructed not to discuss rabies issues with students until after the surveys were administered. Completed surveys were categorized by region (i.e. within or outside the endemic area), respondent age, sex, ethnicity, and residency type (i.e. urban, suburban, and rural) and scored as to the number of correct responses. Thirty-one of 48 schools returned >9,000 completed surveys. Score did not differ among regions, respondent's age, ethnicity, or residency type; however, males scored higher than females. The average score was 56% of the maximum possible score. Due to the low average score of students, educational programs should be implemented in schools to increase the publicís knowledge of rabies.

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History of Wildlife Services

be dropped, and that the recommendations of the committee were given to them before they met.) As a result of the committee recommendations, on February 8, 1972, President Richard Nixon signed Executive Order 11643 banning the use of toxicants for the control of predators in federal programs or on federal lands. The EPA then canceled the registrations of Compound 1080, strychnine, and sodium cyanide. It also cancelled the registration of thallium sulfate, although this toxicant had not been used since the 1940s.

To offset the loss of toxicants, several feasibility studies using helicopters were initiated throughout the Wildlife Services program. The best known study was on the Bridger National Forest in Wyoming. Until this time, the helicopter had been used in the program only on a limited basis. However, the studies showed that helicopters could be used effectively, particularly in the mountains and in areas with dense cover where fixed wing aircraft could not be effective.

In 1974, the Division of Wildlife Services was dissolved. The Enhancement and Pesticide branches were moved to another division in the FWS, and the Branch of Animal Damage Control (ADC) was set up only as an "office" at the Washington level.

In 1975, President Gerald Ford amended President Nixon's executive order to allow the experimental use of sodium cyanide in the M-44 device for one year. The following year, President Ford amended it again to allow for its operational use.

In 1978, again because of environmental pressures, Interior Secretary Cecil Andrus appointed an Animal Damage Control Policy Study Committee to review the Animal Damage Control (ADC) program. This resulted in a policy statement by Andrus on November 8, 1979, which stopped the practice of den hunting of predators and discontinued the research on Compound 1080. However, Andrus overturned the ruling on 1080 after he received additional input from knowledgeable sources.

In 1980, Congress passed Public Law 96-528, which directed the Secretaries of Agriculture and Interior to assess the pros and cons of transferring some or all of ADC's functions from USDI to USDA.

In 1981, Interior Secretary James Watt rescinded the Andrus policy statement, and on January 27, 1982, President Ronald Reagan issued Executive Order 12343 which revoked President Nixon's executive order and the two amendments by President Ford. In December 1985, Congress amended the appropriations bill and transferred the ADC program to the U.S. Dept. of Agriculture, Animal and Plant Health Inspection Service. The title "State Supervisor" was changed to "State Director." In August 1997, the name of the program was officially changed back to "Wildlife Services," after more than five years of work within APHIS to bring about this name change.

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