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March 1997

## The Probe, Issue 174 – March 1997

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# Outwitting Urban Beaver

C. E. "Ki" Faulkner, Regional Director, Region 0, NADCA

I resided, for years, in an urban community with a large private lake. Over one half of the shoreline was wild with overhanging tree branches, shrubs and brush. Each year beaver entered the lake from a stream that flowed out of the lake. The beaver in the river would swim up the stream, walk around the dam, and enter the lake. Shortly afterwards residents with shoreline property would begin losing trees due to beaver activity. When not feeding, the beaver would dwell under docks, under overhanging banks, or in storm sewer outlets around the lake.

It was decided by the residents that the beaver should be removed. However, only live traps should be used as they didn't want their "pets" injured by body gripping traps. But it was difficult, due to the wild shoreline, to locate the beaver much less to find a suitable live-trapping site at their suspected dwelling location.

Trapping sites were located on the shoreline where the beaver recently caused damage. Fresh cut weeping willow branches, which were readily available, were placed as bait on the shoreline at the trapping sites. The residents visited the sites on their property each day and reported any active beaver feeding on the weeping willow branches.

Bailey live traps were used at the active beaver feeding sites. The Bailey live trap is shaped and operates like a large suitcase. It must be set in an open position, entirely under water, with the pan about 8 inches below the water surface. It required a lot of digging with a shovel, while wearing hip boots, to install the trap.

Long sticks were placed in the mud, in a vertical position, around the trap, to form an open "V" on the lake side. The open "V" forces the beaver to swim over the pan of the trap to reach the weeping willow bait on the shore at the rear of the trap. The beaver's body, as it swims over the trap, hits the pan and springs the trap. The trap in the sprung position is about one-half out of water, capturing the beaver unharmed and able to breathe. The installation of the Bailey live trap was very time consuming, however it was successful in capturing the beaver.

During the trapping of the beaver with the Bailey live trap, the use of the Hancock live trap was explored. The Hancock live trap is also shaped like and operates like a large suitcase. It is set out of water and could be placed on the banks along the shoreline. It could also be placed in the water stairways that some beaver used to gain access to the trees on the shoreline property. It was found that the Hancock live trap best fit the trapping situation encountered around the lake.

The baiting procedure used with the Bailey live trap was used with the Hancock live trap. However, fresh cut weeping willow branch bait could be placed anywhere along the shoreline banks where the beaver could climb out of the water to feed on the trees. Again the property owners reported any

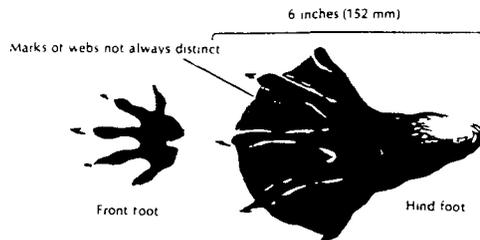
active beaver feeding on the bait.

Hancock live traps were used at the active beaver feeding sites. Pieces of weeping willow branches, to serve as bait, were threaded into the top of the trap in the set position. The set trap was placed on the bank with the bottom half of the trap in the water. The trap was anchored so it wouldn't slide into the water. The beaver, in its attempt to feed on the

*It was decided by the residents that the beaver should be removed. However, only live traps should be used as they didn't want their "pets" injured by body gripping traps. But it was difficult, due to the wild shoreline, to locate the beaver much less to find a suitable live-trapping site at their suspected dwelling location.*

bait at the top of the trap, has to pass over the pan of the trap. In doing so, it hits the pan and springs the trap. The captured beaver is entirely out of water, unharmed and able to breathe.

The Hancock live trap, due to its ease of installation and the sites in which it could be installed, was used extensively to capture the beaver in the lake. It became the basic live trap to capture nineteen beaver that entered the lake over several years.



# CALENDAR OF UPCOMING EVENTS

**April 3-7, 1997: 2nd International Bear-People Conflicts Workshop, Canmore, Alberta, Canada.** Workshop will focus on practical methods and strategies to address bear-people conflicts; will include presentations, posters, and workshop sessions. Contact: Blair Cormier, (403) 652-1932, FAX (403) 652-3511, e-mail: margo@wldlf-cntrl.com or visit <http://www.wldlf-cntrl.com>.

**April 16-19, 1997: 13th Great Plains Wildlife Damage Control Workshop, Lied Conference Center, Nebraska City, Nebraska.** Sessions on Predator Management, Urban Wildlife Control, Trapping & Capture Techniques, Media & Communications Skills. Will include Annual NADCA Membership Meeting. Contact: Charles Lee, Kansas St. Univ., (913) 532-5734 or e-mail [clee@oz.oznet.ksu.edu](mailto:clee@oz.oznet.ksu.edu); or Scott Hygnstrom, Univ. of Nebraska, (402) 472-6822.

**May 22-23, 1997: 9th Northern Furbearer Conference, Yellowknife Inn, Northwest Territories, Canada.** Tentative topics include: ecology and management of wolverine, marten, lynx, beaver, otter, arctic fox; humane trapping and the fur industry; and First Nation (aboriginal) perspectives. Participants wishing to present a paper or poster must submit an abstract by 3/15 to the address below (E-mail submissions encouraged). Registration CDN\$30 plus banquet; rooms CDN\$85-155/night. Contact: Kim Poole, Wildlife & Fisheries Division, NWT Resources, Wildlife and Economic Development, 5102 50th Ave., Yellowknife NT X1A 3S8 Canada, (403) 920-6315, Fax (403) 873-0293, e-mail: [kpoole@gov.nt.ca](mailto:kpoole@gov.nt.ca).

**June 14-18, 1997: 77th Annual Meeting of the American Society of Mammalogists, Oklahoma State University, Stillwater, Oklahoma.** Contact: Kaye White Walker, Arts & Sciences Extension, OSU, Stillwater OK 74078, (405) 744-8377, FAX (405) 744-6992, e-mail: [kayeww@okway.okstate.edu](mailto:kayeww@okway.okstate.edu).

**August 12-14, 1997: 7th Annual Meeting, Bird Strike Committee—USA, Ramada Inn, Logan Int'l. Airport, Boston, Massachusetts.** Paper and posters for presentation are solicited, and abstracts due June 23. For details on abstract format, contact Richard Dolbeer at (419) 625-0242, FAX (419) 625-8465. Pre-registration fee \$35 by July 14; room rate \$89. For information regarding meeting, contact: James E. Forbes or Mark Carey, USDA/APHIS/ADC, 1930 Route 9, Castleton, NY 12033-9635, (518) 477-4837, FAX (518) 477-4899.

**August 17-20, 1997: Symposium on Mammal Trapping, Univ. of Alberta, Edmonton, Alberta, Canada.** Sessions to include History, Economic, and Socio-Cultural Status of Trapping Technology; and Trapline Management and Data Analyses. Registration CDN\$275 includes refereed proceedings. Univ. of Alberta dorm rooms available for CDN\$26.88/night (single) or \$35.84/night (double); other nearby hotels are reasonable. Contact: Dr. Gilbert Proulx, Alpha Wildlife Res. & Mgmt. Ltd., 9 Garnet Crescent, Sherwood Park, Alberta, Canada 8A 2R7, (403) 464-5228, FAX (403) 417-0255, e-mail: [alpha@xpress.ab.ca](mailto:alpha@xpress.ab.ca).

**September 21-27, 1997: 4th Annual Conference of The Wildlife Society, Snowmass Village, Colorado.** Includes wildlife damage symposium and annual meeting of Wildlife Damage Management Working Group. Contact: Scott Hygnstrom, chairperson, TWS WDM Working Group, (402) 472-6822; or TWS, 5410 Grosvenor Ln., Bethesda, MD 20814, (301) 897-9770, FAX (301) 530-2471.

**October 16-19, 1997: 8th Eastern Wildlife Damage Management Conference, Clarion Hotel and Conference Center, Roanoke, Virginia.** In addition to formal presentation sessions (management of bird, large/small mammal, unique damage problems, techniques) and the annual field trip, the 8th Eastern also will feature a special session, co-sponsored with the Humane Society of the US, on damage management problems in the suburban/urban interface. NADCA Membership Meeting planned. Contact: Jim Parkhurst, Virginia Coop. Ext., Dept. of Fisheries & Wildlife Sciences, Virginia Tech, Blacksburg, VA 24061-0321, (540) 231-5573, FAX (540) 231-7580, e-mail: [jparkhur@vt.edu](mailto:jparkhur@vt.edu)

**October 19-24, 1997: Second International Congress of Vector Ecology, Holiday Inn Int'l. Drive Resort, Orlando, Florida.** Sponsored by Society for Vector Ecology. For registration information, contact: Gilbert L. Challet, Sec-Treas., P.O. Box 87, Santa Ana, CA 92702, (714) 971-2421 ext. 148, FAX (714) 971-3940.

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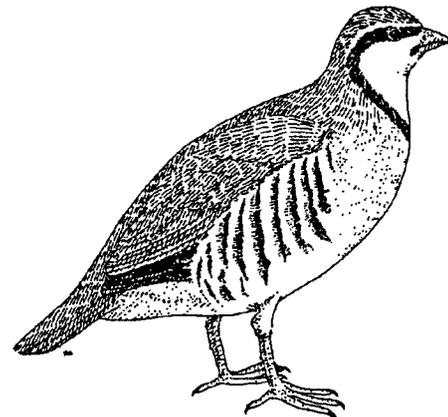
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Your contributions of articles to *The Probe* are welcome and encouraged. The deadline for submitting materials is the 15th of the month prior to publication. Opinions expressed in this publication are not necessarily those of NADCA.



# **ADC News, Tips, Ideas , Publications . . .**

## **Wildlife Damage In the News..**

Pennsylvania is planning an early goose hunting season in an effort to control a growing population that is fouling swimming areas, parks, golf courses, and playgrounds with goose droppings.

Responding to farmers' complaints of crop damage, the Missouri Dept. of Conservation authorized killing of 60 female deer before breeding this year to help reduce the population.

Wyoming agriculture officials have stated that ranchers need public support and changes to the Endangered Species Act in order to deal with the growing problem of predation on their livestock. Farmers say grizzly bears are a big problem, and wolves are likely to become one also. Some advocate that farmers take their case to the public and to legislators outside their state.

The Canadian National Trappers Alliance is a newly-formed national trappers group, resulting from the merger of two former associations. Newly-elected president Howard Noseworthy from Newfoundland remarked that the group will "ensure national representation of trappers' interests and intends to work closely with the Fur Institute of Canada." Institute chairman Bruce Williams, said "It is important to have one national voice that speaks in the interest of trappers and promotes the forward-looking professionalism that is essential to all consumptive users of natural resources."

## **Bear Gets Attention in Southeast**

A black bear, dubbed "No-Neck" by Florida wildlife officials, created quite a stir in the Southeast, when it walked over 450 miles from Pensacola, FL arriving in the Baton Rouge, LA suburb of Greenwell Springs on July 1.

The 11-year-old bear had been spotted a week earlier near the community of Tallisheek in St. Tammany Parish, Louisiana. Three days later it walked through the city of Hammond, LA, where ADC became actively involved in monitoring its movements. Despite intense pressure to capture and move the bear, ADC continued to facilitate its westward movement. After crossing through the city of Denham Springs, Louisiana Dept. of Wildlife & Fisheries deemed it a safety hazard and made the decision to capture the bear and return it to Florida. ADC, with the assistance of LDWF personnel, captured the bear without incident using a rifle-fired tranquilizer dart.

Media coverage of "No-Neck's" travels was intense, as was the onslaught of curious onlookers. At least 4 television stations and 4 newspapers covered the bear's trek. Early on, ADC established itself as the lead agency and was given very positive coverage in the media, which provided the public with daily bear-watch updates.

--from the Louisiana ADC Monthly Activity Report, July 1996

## **Chinese disease Threatens Rabbits**

A disease first reported in China in 1984 is threatening Britain's rabbits, according to the Ministry of Agriculture, Fisheries and Food. Viral Haemorrhagic Disease (VHD) has killed about 80 per cent of the wild rabbit population in Spain and Portugal. Despite this, a spokesman for the Ministry said there was no evidence of an epidemic in Britain. No one knows how many rabbits have died from the disease. It also affects pet rabbits, which should be vaccinated, said the spokesman. She stressed that it was not dangerous to humans.

The disease is extremely painful and kills in two to three days. It attacks the internal organs and causes bleeding from the nose and eyes. VHD has been spread through the international trade in pet rabbits and rabbit meat. It is the second time this century that Britain has faced a plague in the rabbit population. Myxomatosis killed millions of them in the 1950s and 1960s. The virus was deliberately introduced to counter the growing number of rabbits, which destroy crops and the landscape.

The Ministry of Agriculture has tried to combat VHD by making it a notifiable disease. Owners of infected animals are also prevented from moving other rabbits from their premises. Although VHD has spread throughout the country, it remains most prevalent in the southwest, where it was first found.

The ministry spokesman said that scientists at the Central Science Laboratory in Surrey were studying the disease. Resources were limited, because the laboratory's top priority was tackling the BSE scare, she added. Britain has an estimated rabbit population of 37 million.

-- from *The Electronic Telegraph*, July 15th, 1996

## **Send in Your Answers to the Wildlife Damage Management Conference Survey ASAP**

There are currently three major wildlife damage management conferences: the Vertebrate Pest Conference, the Great Plains Wildlife Damage Control Workshop, and the Eastern Wildlife Damage Management Conference. In order to solicit readership opinions regarding scheduling and content of these conferences, we have included a survey in this issue. Please respond ASAP and return the survey to Grant Huggins, The Noble Foundation, P.O. Box 2180, Ardmore, OK 73402.

*The Editor thanks the following contributors to this issue: Dwight LeBlanc, Ki Faulkner, Jim Parkhurst, Jim Miller, Grant Huggins, and Stephen Vantassel. Send your contributions to The PROBE, 4070 University Road, Hopland, CA 95449.*

# Product Announcements

*Stephen Vantassel, Probe NWCO Coorespondent*

*Reviewer's Note: I have titled this issue's column "Product Announcements" rather than my usual full review of publications and audio-visual productions, in part because of the difficulties in evaluating these two items. This is not to imply that there is something wrong with them. My goal is simply to make the NADCA membership aware of these products for their own more thorough evaluation. Despite my disclaimer, the reader will find that I make a few evaluative comments anyway. I did refrain from giving an animal damage control grade.*

BEAR BE GONE™ is a device designed to deter bears from foraging in trash cans. It consists of a large plastic barrel (55 gallon size) with a trigger system that, when fired, will release a blast of pepper spray into the bear's face. The result, says the manufacturer, is pure bear education. The device is very user-friendly. The barrel can be used on concrete or grass surfaces. The trigger system can be removed from the barrel and secured to a large trash bin if needed. BEAR BE GONE™ is baited by securely attaching a baited burlap bag to the "T" lever with heavy gauge wire. Recommended bait consists of a combination of bacon and liquid smoke inside the bag with honey poured over the outside of the bag.

Obviously, one needs to have concerns over safety. Given the present liability industry, the risk of spraying a non-target creature could have a negative effect on one's wallet. To reduce this possibility, the manufacturer recommends that the unit be removed during daylight hours and that warning signs be posted when the device is used in public areas. The barrel is also copiously covered with warnings. I asked Ron Curly how much force did a bear have to exert on the "T" bar to fire it. I figured that if the force was high enough, it might make it harder for a small child or dog to fire the device. Although he wasn't sure, he estimated between 20 to 50 lbs. of pulling force was needed to fire the pepper spray. He said it wasn't too easy to pull on the bar because it's designed not to accidentally fire if jostled.

According to the 5-minute instructional video, BEAR BE GONE™ has been tested in Colorado with excellent results. Ron Curley says the testing was performed for two years by a Colorado Fish and Game official with 100% results (defined as: the bear not returning to the area). The tape also says that a Southern California humane society has purchased three of the units for use in the California foothills. And Mammoth Lakes, California will be getting 30-40 units.

Although this is not a review per se, I do have several concerns that I would like to proffer. First, the trapper in me says no deterrent ever works forever. Perhaps this is an unfortunate self-serving prejudice on my part. But if BEAR BE GONE™ doesn't deter bears forever, how many years will it take for the bears to learn to avoid BEAR BE GONE™ and go back to raiding trash cans? I don't know the answer to this

question, but given the price tag, it is a good question to consider. My second concern surrounds the pepper spray. I encourage all potential purchasers of this product check their state's regulations regarding pepper spray before sending in their check. My final concern is whether this device will simply force the bears to forage in even more sensitive areas like houses. About thirty miles north of Springfield, one bear was noted to have broken into a house.

I don't want to be accused of bashing this product. I just want my readers to think carefully about what this product can do for them. Chances are it will need to be a part of a larger bear management program. Each BEAR BE GONE™ costs \$419. This price includes the barrel and trigger mechanism, one container of Counter Assault Pepper Spray™, and shipping and handling in the continental U.S. For further information, contact the manufacturer at Curley's Critter Catchers MFG., 1980 Fernridge Dr., San Dimas, CA 91773. Phone (800) 834-4314 FAX (213) 681-6506.

## **Booklet: "Using Guard Animals to Protect Livestock"**

This is a 14-page (8 1/2 x 11") booklet published by the Missouri Department of Conservation. This 1996 publication was written by Wildlife Damage Biologist Jim Braithwait. Like the beaver control booklet written by Missouri's Ron McNeely (see *Probe* #167, July '96), this one is just as well-written and informative. Mr. Braithwait begins the booklet by saying that no single approach will solve all predator control problems. Despite that caveat, the booklet is very sanguine about the results that can be obtained with guard animals.

The booklet approaches its topic from the perspective of an animal damage consultant. Mr. Braithwait is educating the rancher about the various options so that he/she can make an informed decision that fits his/her needs best. He opens by making the reader aware that not all livestock damage is caused by coyotes. In fact, wild and free-roaming dogs also take their share of animals. Proper identification of the cause of the predation is crucial in order to obtain the best results. For if the predation is caused by your neighbor's pet, perhaps you can convince him to restrain the dog and solve your problem in a less expensive way.

Mr. Braithwait covers the pros and cons of using guard dogs, guard donkeys/mules, and guard llamas for herd protection. The information provided is succinct and uses data provided from studies and conversations with actual ranchers. The final technique discussed for flock protection is multi-species grazing. Essentially, the rancher co-mingles sheep with cattle so that the latter may protect the former. To make the information even more readable, the pros and cons of each method are listed in call-out boxes in each section. The author ends the guide with sources of more information on guard animals. I have little

*Continued on page 5, col. 1*

# Abstracts Published at the 3rd Annual Conference of The Wildlife Society

(continued from The PROBE, Issues #172 & #173)

## A case study of black bear movements and survival after landfill closure in the central Adirondacks

Ann M. Russell and S.L. Simek

This study was conducted by the New York State Department of Environmental Conservation to obtain information on movements and behavior of bears after a landfill closure in the central Adirondacks. Trapping was conducted for 1 month in late summer 1994. Trap success was calculated as 1 capture/1.88 trap nights. A total of 8 bears were captured and all captures were adult males. Two bears dropped their collars, and 2 bears were legally harvested within 2.4 km of the capture site. One male traveled a total of 116 km from the trappingsite, in the fall. Another bear was visiting the dumpster of a local restaurant and getting into the garbage of town residents. This was the only incident, to our knowledge, of "bear problems" in the town since the landfill converted. The survival rate was calculated as 0.66 with 95% confidence intervals of 0.47-0.85. This value is low, compared to the adult male survival rate (0.80) calculated for bears in the central Adirondacks; yet, the value does lie within those confidence intervals (0.30-0.97). This fact — combined with the vulnerability of dump bear to legal, illegal, and nuisance mortalities — reinforces the accuracy of the calculated survival rate. It is difficult to ascertain whether the landfill closure will have a pivotal effect on bear movements and survival in this area. However, it is evident that further study on this topic will better prepare wildlife professionals for similar situations.

Continued from page 4

## Product Announcements

doubt that this guide will be useful to anyone wanting to decide whether guard animals will suit their herd protection needs.

The guide is available at no cost to Missouri residents and non-residents alike. You may obtain a copy by sending your request to: Missouri Department of Conservation, 2901 West Truman Blvd., P.O. Box 180, Jefferson City, MO 65102-0180. You can also call them at (573) 751-4115.

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## Ecology of coyotes in a sheep ranching environment

Ben N. Sacks, J.C.C. Neale, M. Jaeger,  
and D.R. McCullough

Coyotes (*Canis latrans*) were studied at Hopland Research and Extension Center (HREC) from 1993 through 1995. Information was obtained through radio tracking of 16 coyotes and necropsies of 50 coyotes removed by Animal Damage Control (ADC) and hunters. No coyote control occurred during the first study year but control was intensive during the second. Annual survival rates were: 0.69 ( $\pm 0.27$ ) for the first year, and 0.31 ( $\pm 0.22$ ) for the second year. Twenty-nine (58%) of the coyotes captured were less than 1 year old; another 8 (18%) were less than 2 years old, and the remaining 11 (24%) were 2 to 4 years old. Prewelping density was estimated at 0.5 coyotes/km<sup>2</sup>. Average annual 95% MCP home range was 5.0 km<sup>2</sup> (range: 3.0-7.4 km<sup>2</sup>) for resident coyotes. Territories of breeding adults were mutually exclusive. Nonbreeding coyotes varied in their space use, falling on a continuum ranging from resident (probably in natal territories) to transient. When transient or out of their natal territory, nonbreeders avoided breeding coyote territories. Nonbreeders also seemed to avoid breeders temporally by being active during the middle of the day when breeders were least active.

Resident coyotes were crepuscular when no control occurred (1993-1994) but nocturnal when control was intensive (1994-1995). During winter 1995, a pair situated on the central part of HREC, where (1) human activity was high, (2) sheep (*Ovis aries*) were abundant, and (3) vegetative cover was limited, had movements clustered in space and time around isolated patches of cover; this pair included sheep and little deer. In contrast, a pair whose territory was located on the periphery of HREC during the same time period, where (1) human activity was relatively low, (2) sheep were scarce (but nearby), and (3) vegetative cover was abundant, had movements that were more uniformly distributed over space and time; this pair's diet included little or no sheep and much deer. During pup-rearing, breeders used space similarly regardless of human activity within their territory, centering their activity around den or rendezvous sites. Pup-rearing was a cooperative effort between the breeding male and female of a pair. Mothers that were widowed during pup-rearing spent more time away from dens, were in poorer nutritional condition, and were more vulnerable to control, than mothers living with mates. Health of pups did not seem to be diminished by the death of their father.



Continued on page 6, col. 1

## **The Wildlife Society Abstracts**

### **Design and analysis of carnivore scent-station surveys**

*Glen Sargeant, Douglas H. Johnson, and William Berg*

The scent-station survey method has been widely used to estimate spatial patterns and temporal trends in carnivore abundance. However, the presence of useful relationship between scent-station indices and carnivore abundance has been neither demonstrated nor disproven. Statistical properties of the method are poorly understood. We assessed properties of scent-station indices by analyzing visits by gray wolves (*Canis lupus*), coyotes (*Canis latrans*), red foxes (*Vulpes vulpes*), skunks (*Mephitis mephitis*, *Spilogale putorius*), raccoons (*Procyon lotor*), and bobcats (*Lynx rufus*) to scent station in Minnesota during 26,516 scent-station nights from 1986 to 1993. Spatial and temporal confounding, misidentification of tracks, multiple visits by individual carnivores, and low visitation rates were implicated as important sources of error and bias. Visits to stations within approximately 2,500 m of one another were correlated for all species; for wolves, correlations probably extended to 4,320 m or more. Scoring lines, rather than stations, as visited or not increased visitation rates, removed short-scale spatial dependence, and made results more robust to habitat patchiness and individual differences among carnivores in behavior toward stations. Sampling biases may vary among areas, so indices should not be used for spatial comparisons. Trends, rather than differences between years, should be interpreted to help control temporal changes in confounding variables and sampling bias. Poor spatial and temporal resolution, susceptibility to confounding, misidentification of tracks, and low statistical power limit the usefulness of scent-station methodology.

### **Public attitudes toward wildlife damage management**

*Robert H. Schmidt, M.W. Brunson, and D. Reiter*

Numerous state, regional, and national surveys have explored attitudes of people toward environmental and natural resource management issues such as pollution, wilderness, hunting, and gray wolf (*Canis lupus*) reintroduction programs. Wildlife damage management programs, techniques, and strategies have not received a great deal of attention, yet issues relating to trapping, predator control, and government involvement in managing wild animals that damage human interests are certainly controversial. We developed and administered a national mail survey to explore this topic. Our survey was sent to 1,500 randomly selected households throughout the U.S., with samples stratified into 5 regions. The overall response rate was 47.1%, and a telephone survey of 10% of the nonrespondents were pro-wildlife damage management and progovernment involvement (at both

the state and federal level) in resolving wildlife damage. They favored predator management to protect livestock, especially when nonlethal techniques were used, and were clearly not in favor of government-sponsored compensation programs. On a humaneness scale, shooting animals from aircraft, leghold traps, foot snares, and neck snares scored the lowest (not humane), while fertility control, adjustment of planting or grazing schedules, fencing out wildlife, scare devices, and using human guards or livestock herders scored highest (very humane). Overall, we interpret respondents to be both realistic and idealistic in their concerns for the management of wildlife damage.

### **Human dimensions of wildlife contraception**

*Robert H. Schmidt and D.E. McIvor*

Wildlife contraception is an emerging and promising tool for managing populations of locally abundant wild animals. Biological considerations alone, however, will not dictate how this technology will be used, where it will be used, who will use it, and which species are appropriately treated with contraceptive agents. An increasing number of studies are beginning to give wildlife managers a sense of how a variety of publics may respond to wildlife contraception programs. A survey of members of the Wildlife Society indicated that fertility control was an "ethically acceptable technique for controlling growth of wildlife population." There were no significant differences between male and female response. A survey of the general public demonstrated that fertility control was considered a "humane" wildlife management tool. Employees of the USDA APHIS Animal Damage Control program rated fertility control low in effectiveness, but high on a humaneness scale. Perceptions of various publics and wildlife professionals will dictate how wildlife contraception technologies will be used. One theory we will explore in detail is the potential impact of wildlife contraceptive strategies on the tradition of hunting.

### **Economic assessment of rabies control efforts in Texas**

*Randy M. Smith*

Texas has experienced 2 rabies epizootics since 1988. Urban canine rabies and gray fox (*Urocyon cinereoargenteus*) rabies were confirmed in 1,435 total cases in Texas during 1988-95. Both epizootics have posed a significant threat to human health and safety, and livestock resources. The need for rabies control is imperative. In July 1994 the governor declared a state health emergency and promised funding to support eradication of these disease threats. Emergency funds have been received from both federal and state appropriations and are being used to continue public education, direct control of wildlife hosts, and to fund the oral rabies vaccination project (ORVP). The Texas ORVP, which began conducting yearly bait drops in February

*Continued on page 7, col. 1*

## The Wildlife Society Abstracts

1995, is the largest effort ever attempted in aerial distribution of a rabies vaccine. In January 1996, approximately 2.5 million dog-food baits, each containing 2 ml of Raboral V-RG vaccine in a plastic sachet, were dropped over 108,160 km<sup>2</sup> of south, west, and central Texas in 2 separate but similar projects (gray fox rabies and urban canine rabies). Both projects are planned to continue for 5-7 years. Total cost for the projects is estimated to approach \$22 million if it continues to the year 2001. In contrast, if the ORVP were not implemented, the cost to the health care system alone is estimated to be \$28.8 million by the year 2001 and \$63.4 million by the year 2004. If no major control effort were implemented before this date, it could be expected that the 2 epizootics would by then have reached such a large area that to conduct a mass vaccination or population reduction campaign would not be economically practical.

### Methyl salicylate: a naturally occurring avian repellent

Shirley Wager-Page

Essential oils containing methyl salicylate (MeSal) provide an excellent source of candidate avian repellents. Volatile essential oils, such as sweet birch (SB; *Betula lenta*) and wintergreen (WG; *Gaultheria procumbens*), that contain chemosensory compounds are aversive to birds. SB (1.0% vol/wt) applied to the surface of feed inhibited intake (preference ratios <0.05) by European starlings (*Sturnis vulgaris*). Avoidance of SB-adulterated feed did not vary over the 4-day test period indicating that habituation did not occur. Feeding in birds was decreased by exposure to the volatile cues of WG oil alone. SB and WG oils contain 98-99% MeSal, a commercially-available flavor and fragrance ingredient approved for human consumption. MeSal (1.0% vol/wt) treated feed was avoided by starlings. Data from these laboratory trials suggest that MeSal-containing essential oils may provide a source of naturally occurring avian repellents.

### A brief historical perspective on wildlife contraception research

Robert J. Warren

Researches have examined contraception for wildlife population control in a number of situations: (1) in areas where legal restrictions prohibit the use of lethal methods, (2) in wild canid populations for disease control, (3) to reduce the cost of controlling wild rodent pest and feral equid populations, or (4) because of public opposition to lethal control of wildlife in urban/suburban areas. Surgical sterilization generally has been deemed infeasible because of the need for field surgery and the cost and time required for animal capture. Advances in human fertility control with oral steroid hormones in the 1950s led to research with chemical contraception in wild birds and mammals. Earliest research efforts with wildlife fo-

cused on chemicals that killed gametes or disrupted meiosis. Subsequently in the 1960s, researchers examined the use of orally administered synthetic steroid hormones to create an endocrine imbalance that either inhibited folliculogenesis or ovulation, disrupted spermatogenesis, caused implantation failure, or induced early embryonic resorption. In the 1970s, research shifted from oral exposure trials to use of encapsulated or implanted steroid hormones in an effort to increase the duration of effective contraception. In the 1980s, wildlife contraception research focused on longer-acting steroid hormone implants, but also shifted to the new area of immunocontraception that had revolutionized the field of human fertility control. In the 1990s, successful applications of immunocontraceptives in wildlife have caused a major redirection in this area of research, which probably will continue on into the 21st Century. Immunocontraceptive techniques have some advantages over earlier contraceptive technologies; these includes potentially longer term efficacy, less potential effects on nontarget organisms, and potential for remote delivery, all of which may improve the practicality of immunocontraceptives.

### Wildlife-caused losses to agriculture in 1994

Alice P. Wywialowski

The U.S. Department of Agriculture, National Agricultural Statistics Service, surveyed 16,000 agricultural producers in January 1995 to determine; the percent of producers who reported wildlife-caused losses to agricultural commodities, the wildlife believed to have caused the losses, and the estimated dollar value of the losses for 1994. Based on 10,144 respondents nationwide, 59% believed they had wildlife-caused losses of their commodities, an increase from 55% in 1989. Deer (*Odocoileus spp.*) were cited by >34% of all producers as causing losses of field crops, or vegetable, fruits, and nuts. Coyotes (*Canis latrans*) were cited by >14% of livestock-poultry producers as causing losses of livestock and poultry. Birds were most frequently cited as causing losses of catfish and trout. Based on the median value of all producers' estimates of their losses, wildlife-caused losses cost producers approximately \$625 million in 1994, \$164 million more than in 1989. If all producers estimated their losses accurately (especially those citing very high values) and their losses represented producers nationwide, then wildlife-caused losses based on the mean of producers' estimates may have been as high as \$1.7 billion in 1994, compared to \$1.3 billion in 1989. While wildlife-caused losses represent ≤1% of the value of agricultural production, these losses are not equitably distributed, and some producers may sustain substantial losses. Wildlife managers need to recognize the magnitude and distribution of perceived wildlife-caused damage to agriculture and consider both perceptions and damage in their decisions about wildlife management actions.

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