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December 1998

## The Probe, Issue 195 – December 1998

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# Rabies

Mike Dwyer, NADCA Director, Great Lakes Region

Exposure to the rabies virus is not good. But current commonly held misconceptions regarding post exposure treatment (PET) in many cases make the experience worse than it has to be. It's amazing how many people still think PET means 21 very painful injections in the stomach with a really large needle. Well, times have changed.

Before we talk treatment, let's review rabies. Skunks, raccoons, coyotes, foxes, bobcats and bats are responsible for the majority of human exposures in the United States since 1960. Rodents (such as squirrels, hamsters, guinea pigs, gerbils, chipmunks, rats and mice) and lagomorphs (including rabbits and hares) are rarely found to be infected with rabies and have not been known to cause human rabies in the United States. Physicians should evaluate each potential exposure on a case by case basis. Local and state health authorities should be consulted if there is any question. However, bites from rodents and lagomorphs almost never call for PET.

Rabies is transmitted by introducing the virus into open cuts or wounds in the skin or via mucous membranes. The likelihood of rabies infection varies with the nature and extent of exposure. Two types of exposure should be considered: bite and nonbite. Bite exposure is fairly simple to understand. It is any penetration of the skin by teeth. Nonbite exposure results from scratches, abrasions, open wounds or mucous membranes contaminated with saliva or other potentially infectious material, such as brain tissue, from a rabid animal. Unless an animal is tested and found to be negative for the rabies virus, PET should begin following a bite or nonbite exposure. If subsequent testing finds that the exposing animal is not rabid then the treatment can be discontinued.

Casual contact, such as petting a rabid animal (without a bite or nonbite exposure as described above), does not constitute an exposure and in most instances does not warrant PET (however,

see related story on p. 4—*editor's note*). There have been 2 instances of airborne rabies acquired in laboratories and two probable airborne rabies cases acquired in a bat-infested cave in Texas. The only documented cases of human-to-human transmission occurred in four patients in the United States and overseas who received corneas transplanted from patients who died of rabies undiagnosed at the time. Improved and more stringent transplant guidelines should reduce this risk.

It is nice to know what you're in for, once it is determined an exposure has occurred and the decision to start PET has been made with appropriate medical or health professional input. The first injection you can expect is the Rabies Immune Globulin (RIG) or Antirabies Serum

(ARS). The volume is determined by bodyweight. In a 190-pound man, this turned out to be 4 rather large injections. If possible, up to half of the volume

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*Rodents . . . are rarely found to be infected with rabies and have not been known to cause human rabies in the United States*

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of this first shot will be made at the site of the wound. The other half is made in the "gluteal region" which turns out to be rather high up in the hip towards the rear. In my experience, these first shots were relatively painless but did result in some stiffness in the hips which lasted for a few days.

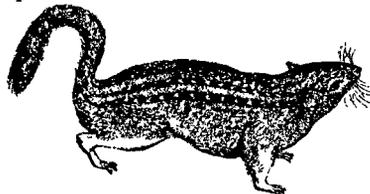
At the same time you receive the RIG or ARS shot you can expect your first injection of 1 ml. of human diploid cell vaccine (HDCV) in the deltoid, the outside upper arm near your shoulder. This is a very little shot, producing low pain and no stiffness. Additional 1 ml. injections of HDCV will be made on days 3, 7, 14, and 28. Medical personnel will likely have you stick around for a few minutes to make sure there is no adverse anaphylactic reaction to the injection. Serious reactions are very rare but can be life threatening when they occur. "Immune complex-like reactions" may occur in up to 6% of those receiving HDCV appearing as almost flu-like symptoms. All together, it's 6 shots, one in the hip which may be split up, and 5 in the arm.

*Continued on page 2, col. 1*

# CALENDAR OF UPCOMING EVENTS

January 31 - February 3, 1999: Fifth Annual Wildlife Control Technology (WCT) Instructional Seminar, Imperial Palace, Las Vegas, NV. For further information, contact Lisa at (815) 286-3039.

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>>.



Continued from page 1, col. 2

## Rabies

Pre-exposure immunizations are available and are recommended for people whose employment or recreational pursuits bring them into contact with potentially rabid animals. Wildlife professionals certainly fall in that category. However, pre-exposure immunization does not eliminate the need for prompt PET following an exposure. It only reduces the PET regimen.

The bulk of the information contained in this article was taken directly from the printed drug insert which accompanies the rabies vaccine produced by Connaught, a Pasteur Merieux Company. Be careful out there.

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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.

April 27-29, 1999: 14th Great Plains Wildlife Damage Control Conference and Feral Swine Symposium. Manhattan, Kansas. CANCELLED BECAUSE OF LACK OF SUBMITTED PAPERS. Contact: Charles D. Lee, phone (785)532-5734, fax (785) 532-5681, email <[clee@oz.oznet.ksu.edu](mailto:clee@oz.oznet.ksu.edu)>.

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](mailto:mackinb@tc.gc.ca)>. Exhibitors wishing to display products should contact Jeff Marley at Margo Supplies Ltd., phone (403) 652-1932. Book hotel rooms prior to Feb. 8 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](mailto:elfitzhugh@ucdavis.edu)>.

## Position Available: Wildlife Biologist, JFK Airport

The Port Authority of New York and New Jersey is seeking a Wildlife Biologist to supervise the Bird Control Unit at JFK Airport. Responsibilities include developing and managing the Bird Hazard Management Program, coordinating and overseeing bird control activities, supervising the collection of biological field data, developing surveys, and monitoring the effectiveness of wildlife control programs.

Applicant must have Master's degree in wildlife biology/management or a closely related field, and at least 3 years experience in applied wildlife management. Background should include research, data analysis, and formulation recommendations on a variety of wildlife management issues. Supervisory experience is desirable. Competitive salary and excellent benefits. Qualified individuals should forward a scannable resume, including salary history, to: The Port Authority of NY & NJ, HR Dept. 61E, Box SLD-WB, 1 World Trade Center, New York, NY 10048, or email

<[sl-desir@pamail.panynj.gov](mailto:sl-desir@pamail.panynj.gov)>.

## NWCO Organization Forms in Calif.

The California Nuisance Wildlife Control Operators Association has become incorporated as a 501c(6) Trade Association and has launched its 1998 recruitment drive to register Charter Members. Annual membership dues are \$40 for the first year and then \$25 thereafter. A matching grant has been awarded to the California NWCO Association by Peninsula Community Services, Inc. a local non-profit environmental organization. The grant will provide matching funds, on a dollar-for-dollar basis, for all dues collected in 1998.

Membership in this Trade Association is open to all persons willing to support the economic, political, and professional interests of persons working in the nuisance wildlife control industry in California. Persons willing to serve as officers of this new Association are being actively recruited. The first meeting of the general membership is scheduled for January 1999 when there will be an election of officers and ratification of the Association's By-Laws. Interested persons should contact Alan Merrifield, Organizing Committee Chairman, at P.O. Box 90, Burlingame, CA 94011-0090 or phone (650) 685-4146.



## Update on Idaho Wolf Damage

*The following update was received from George Graves, co-author of the feature article in the November PROBE (Issue #194).*

A final tally of wolf damage by the Idaho Wildlife Services program for FY98 is as follows:

WS conducted 16 wolf depredation investigations. Of these, WS has concluded that wolves were not involved in seven of the 16 cases. For the remaining nine cases, five were confirmed wolf predation, and four were highly probable or possible, but lacking sufficient evidence for confirmation. Total confirmed livestock losses to date are four calves, four cows, and five sheep killed, and one calf injured; five calves unconfirmed killed by highly probable; and five calves, one cow, and 14 sheep unconfirmed but possible.

## Wildlife Wins in UT, OH, MN, Loses in CA

Wildlife managers were successful in winning four of five initiatives nationwide in the November election. In Alaska, sportsmen successfully defeated a proposed ban on wolf snaring. In Ohio, a ban on mourning dove hunting was defeated. In Utah, a measure was passed that requires future ballot initiatives dealing with wildlife management to have a two-thirds majority for approval. And in Minnesota, voters amended the state constitution to declare hunting and fishing part of the state's heritage.

However, in California a restrictive anti-fur, anti-trap initiative passed by a 57%-43% margin. Thirty of California's 58 counties, primarily in rural and agricultural areas, voted against the measure; however in the popular vote, the measure was approved 4.3 million to 3.2 million votes statewide. The initiative was placed on the ballot by a coalition of animal rights and animal welfare groups that had been unsuccessful in their earlier attempts to introduce legislation. It bans leghold traps including padded-jaw traps for essentially all purposes—including research, protection of livestock or other resources, and endangered species protection. Through changes in the state Fish & Game code, it makes use of Compound 1080 and sodium cyanide illegal, effectively eliminating all use of the Livestock Protection Collar and the M-44 device for coyote damage control.

## Schmidt to be Appointed NADCA President

Long-time NADCA member Robert H. Schmidt, currently a faculty member at Utah State University, has agreed to fill the remainder of Bob Giles' term as NADCA President (through Dec. 1999). Treasurer Grant Huggins has polled all Executive Council members regarding this appointment and has received an overwhelming response. Normally, in the event of a presidential vacancy, the office would be filled by one of the two Vice Presidents. However, neither individual was in a position to accept this assignment, and both agreed that Schmidt should be appointed to fill this vacancy. A conference call of Executive Council members scheduled for Dec. 2 will formalize this action. Schmidt served as co-editor of **THE PROBE** from 1990 to 1995.

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# Rabies in Bats

*Editor's Note: The following article was authored by Kate Lewandowski and is reprinted with permission from "SCWDS Briefs," the quarterly newsletter of the Southeastern Cooperative Wildlife Disease Study, The University of Georgia, Athens, GA.*

Every state except Hawaii has reported rabies in bats, with the highest numbers of cases reported from California and Texas. Although bats are not the most common wildlife species diagnosed with rabies (positive bats range from 8 to 27% of rabies-positive wildlife cases per year), almost all recent human rabies deaths from exposures acquired in the United States have been traced to bats. This fact was determined by genetic analyses of rabies viruses recovered from humans. These tests can distinguish bat rabies virus from other virus strains such as raccoon, skunk, coyote/dog, etc.

Since 1981, 24 people have died from rabies infections acquired in the United States, and 21 were due to strains of rabies virus associated with bats. In addition, case studies revealed that bat bites may go unnoticed or are disregarded as "insect bites." Only 1 of the 21 human bat rabies cases had a documented bat bite, while another 10 involved some retrospective account of contact with bats. Thus, it appears that only 52% of the victims had any known exposure to bats. Because bat bites and virus transmission may go unrecognized by victims, public health authorities have changed their recommendations regarding post-exposure vaccination of people. It is now recommended that vaccine treatment should be considered under many circumstances where there is no demonstrable bite or scratch, e.g., a sleeping person awakens to find a bat in the room, or an adult finds a bat in a room with a child or incapacitated person. Treatment is indicated if the bat cannot be tested.

Randomly sampled, normal bats have a rabies prevalence of less than 1%. Because many bats submitted for rabies testing are displaying abnormal behavior, higher prevalence rates are found by diagnostic laboratories that test bats found by the public. For example, in recent years approximately 11% of bats submitted in the southeastern United States were positive for rabies. The big brown bat, *Eptesicus fuscus*, is one of the species most frequently submitted for rabies testing. Some of the reasons big brown bats are submitted can be explained by their biology; they are numerous, relatively large in size, and tend to live in colonies in or around buildings. However, the most common strain of bat rabies virus found in human victims has been associated with the less common silver-haired bat (*Lasiurus noctivagus*) and eastern pipistrelle bat (*Pipistrellus subflavus*). In contrast to the big brown bat, silver-haired and pipistrelle bats are smaller, less colonial, and do not commonly come into contact with people when compared to other bat species. The silver-haired/eastern pipistrelle bat strain of rabies virus is involved in about 80% of the human rabies cases, which is peculiar when one considers that between 50

and 60 rabies strains have been found among numerous bat species. Review of available data on bat accessions revealed that from 5 to 15% of silver-haired and eastern pipistrelle bats encountered by people were rabid. Bat species other than silver-haired and eastern pipistrelle bats also can be infected with this particular strain of rabies virus.

From a wildlife management perspective, the relationship between bats and rabies provides many challenges. Personnel involved in hands-on biological studies of bats should receive pre-exposure vaccination, and employees who assist the public with bat problems should be aware of the potential rabies risk and advise people accordingly.

Furthermore, wildlife personnel should be prepared to provide an accurate identification of bats that are submitted for testing because this information will be helpful in learning more about the natural history of bat rabies. Unfortunately, when bats are submitted to the laboratory, they frequently are recorded only as "bats."

One would expect that bats being obtained by wildlife rehabilitators would have a rabies prevalence similar to the prevalence found among bats submitted for diagnostic testing. The relatively high prevalence of rabies in bats that are submitted for testing indicates that the rehabilitation of sick bats is not a safe activity. Furthermore, the handling of live bats in school rooms or other such places is not advisable. Data from the Texas Department of Health show that more human exposures occur per rabid bat episode than with any other type of rabid wildlife. Freedom from rabies is difficult to prove in live bats. There is no reliable test for rabies that can be performed on a live bat, and the use of quarantine may not reduce the rabies risk because there is limited information on the expected incubation period for rabies in bats. A recent report from Europe indicated that persistent subclinical rabies infections in bats are more common than previously believed. Because cold temperatures and hibernation slow down rabies viral replication, bats may incubate the virus for over a year.

All of the above information provides a strong case for caution when dealing with bats; however, conservationists must be careful to maintain a rational position of rabies awareness while avoiding "bat phobia" among the public. The public health significance of bat rabies is small and is balanced by major ecological benefits that bats provide to the natural web of life through aerial insect predation, pollination of plants, and seed dispersal. The best rules are (1) to enjoy bats from a distance and (2) to think about rabies when close encounters occur.



# Bird-Strike Committee -USA Abstracts

## CANADA GEESE AND SNOW GEESE - REASSESSING TRADITIONAL PARADIGMS FOR MANAGEMENT

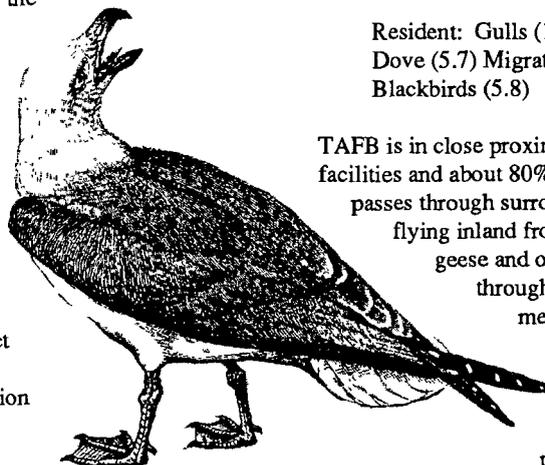
Robert Blohm, U.S. Fish & Wildlife Service, Migratory Bird Management Office, Arlington, VA

Critical management issues remain unresolved for several North American goose populations and require intervention to minimize additional damage to natural ecosystems and local economies. "Resident" Canada geese have increased in numbers dramatically in recent years, particularly in urban and suburban environments and in agricultural landscapes. Their abundance and distribution continue to cause conflicts with homeowners, municipalities and airports as well as severe economic losses for farmers. Mixing of these resident birds with immigrant flocks further complicates their management, particularly when they commingle with populations of Canada geese whose numbers are perilously low. The mid-continent snow goose population is increasing at an alarming rate with numbers currently exceeding 4 million birds, compared to levels of less than 1 million in the late 1960s. As a result, vast expanses of fragile arctic vegetation are being denuded and destroyed for generations to come. This degradation of habitats is of critical concern for several dozen species of other migratory birds as well. These expanding Canada and snow geese populations present wildlife managers with significant challenges as traditional control measures are ineffective in many situations and other non-traditional means of population reduction are not acceptable to all segments of the general public. Possible approaches to resolve this management dilemma will be presented and discussed.

## HAMILTON HARBOUR RING-BILLED GULL CONTROL PROJECT, 1997-1998

Ulrich Watermann, Bird Control International Inc., Georgetown, Ontario, Canada

In 1997, Bird Control International (BCI) was contracted to control 25% of the resident ring-billed gull (*Larus delawarensis*) population in Hamilton Harbour, Ontario. The population had reached 48,000 pairs of breeding birds in 1996. The purpose of the program was to prevent the gulls from nesting and roosting in areas which were to be developed in 1997. The program was 100% successful in reaching its intended goal. The Harbour Commission decided to extend the program in 1998 to encompass 90% of the colony as well as another newly created colony of some 12,000 pairs of ring-bill gulls at Windermere Basin about 1 mile from the main colony. BCI was chosen again to handle the contract and is presently working on the contract which is the largest gull control project ever undertaken in the world. The program comes to an end 31 May 1998 when the ovulation period of the gulls is past.



## DEMONSTRATING THE EFFECTIVENESS OF TRAINED FALCONS AS PART OF THE BASH PROGRAM AT SCOTT AIR FORCE BASE, ILLINOIS AND TRAVIS AIR FORCE BASE, CALIFORNIA

Michael R. Cooke, World Bird Sanctuary, St. Louis, MO

Both Scott AFB and Travis AFB suffer serious problems caused by large flocks of birds invading their air space. This causes long periods of time when aircraft movements in and around the airfield are restricted. At Scott AFB, this problem is most severe during spring and fall when flocks containing thousands of blackbirds attempt to fly over and land on the airfield. At Travis AFB, the problem is most severe during winter when large flocks of California gulls disrupt operations. By the effective use of trained falcons, large flocks are diverted around the airfield. On occasions when birds do land on the airfield they are driven off within minutes.

The results include:

1. Reduction of 80% time spent in Bird Condition Severe and Moderate
2. Reduction in bird strikes of 50%
3. Mission delays due to bird condition almost eliminated
4. Safer flying conditions over the airfield
5. A reduction in operating costs

## USE OF FALCONRY AS PRIMARY BIRD HARASSMENT TOOL AT TRAVIS AIR FORCE BASE, CALIFORNIA

Dennis Palmer, Travis AFB, CA

Steve Wicklund, Wing Flying Safety Office, Travis AFB, CA  
Travis Air Force Base (TAFB) employed a falconry program to test the effectiveness of birds of prey as its primary harassment tool. The bird problem at TAFB becomes acute in fall (October 1) with the arrival of migratory birds and continues until spring (April 30). During this period, the most common species (as a % of total bird strikes) are:

Resident: Gulls (17.3%), Hawks (9.6), Turkey Vultures (5.8), Dove (5.7)  
Migratory: Ducks (25%), Geese (7.6), Blackbirds (5.8)

TAFB is in close proximity to several wildlife refuges and landfill facilities and about 80% of strikes occur in the local airport area. Two passes through surrounding hills act as major flight paths for birds flying inland from the San Francisco Bay area. Gulls, ducks, geese and other birds leave and return to local marshes through the southwest pass en route to the Sacramento River Delta and to land surrounding TAFB. Farming contributes to large populations of small birds in the spring and early fall, as well as 400,000-500,000 blackbirds during winter. Large rodent populations on the base and surrounding agricultural land support large numbers of raptors. To reduce bird/ aircraft strikes and make the task of bird harassment less of a strain on the operations staff, TAFB engaged a falcon test program from 1 January-15 March 1998. The falcon team was tasked to:

Continued on page 6, col. 1



The Editor thanks the following contributors to this issue: Mike Dwyer, Kate Lewandowski, Robert Schmidt, Alan Merrifield, George Graves, and Richard Dolbeer. Send your contributions to The PROBE, 4070 University Road, Hopland, CA 95449.

## **Bird-Strike Committee -USA Abstracts continued**

- a. Perform "on-call" services to harass birds
- b. Perform preemptive flights at regular time intervals
- c. Provide traditional bird-harassment methods
- d. Report bird conditions
- e. Maintain documentation

The falcon test was a complete success. Bird strikes were reduced by 50% from the same period last year, and aircraft damage from bird strikes was reduced from over \$200,000 to \$0! Additionally, since the falconers conducted all harassment functions, the operations staff saved some 40 hours. The bird of prey program proved itself as a natural, humane, and most importantly, cost-effective initiative at TAFB.

### **TESTING OF THE AUDIBLE MICROWAVE BIRD STRIKE REDUCTION SYSTEM**

*James Genova, Raven, Inc., Alexandria, VA*

Raven, Incorporated (with the support of the Air Force Research Laboratory, Wright-Patterson AFB and U.S. Department of Agriculture, National Wildlife Research Center) has tested an audible microwave avian warning system that makes it easier for birds to "hear" an approaching aircraft during take off and landing. This paper presents the measurement of the resulting improved vehicle avoidance response capability of birds.

Brown-headed cowbirds (*Molothrus ater*) were captured and placed in flocks of 8 in a large, caged area adjacent to a road at NASA Plum Brook Station, Erie County, Ohio, October 1997. The birds' activity was observed and recorded with video equipment. A small truck was driven along a straight road at 75 mph for over 1 mile to represent the danger of a rapidly approaching vehicle. Runs were conducted with and without introducing a low-level audible stimulus just ahead of the vehicle. The flocks' avoidance reaction and the probability of a bird strike were quantified from measures of the time of flight for each bird. Using several statistical tests, it was confirmed that the audible microwave stimulus does modify the birds' avoidance response. The projected reduction in bird strikes for aircraft was 62% to 99%. These results do not prove that this technique will eliminate aircraft/bird collisions, but they do validate the basic premise that making the aircraft more noticeable will modify the birds' avoidance response and reduce the probability of bird strikes. This basic concept and the use of audible microwaves offer exciting new possibilities in the development of bird strike reduction techniques.

### **AVOIDANCE OF LOW FREQUENCY VIBRATION BY WATERFOWL**

*Martin Lenhardt, Biomedical Engineering, Virginia Commonwealth University and Sound Techniques Systems, Richmond, VA*

Some birds, notably primitive ground birds, have the ability to detect very low frequency airborne sound. Very low frequency stimulation has not been very successful as part of a bird strike reduction strategy. Rather than just projecting low frequencies in the air, sound was propagated in either water or substrate. Using a rare earth magnet (neodymium)/coil ferrofluid cooled driver encased in a rugged air tight polycarbonate "clam shell", vibratory energy in the 5-50 Hz range was readily delivered to each medium. Airport substrate (earth, concrete) and shallow water are relatively quiet environments, potentially suitable for a vibrational-based alerting system. Propagating a

pressure wave in shallow water or a wave in the substrate has limitation, however local disturbances can be produced which are sensed by birds. Two species of ducks (N=4) and two species of geese (N=4) reacted with avoidance (average 85% of the time) to the low frequencies over a series of seven trials (two controls) spaced 1 week apart. In mammals, these frequencies produce a flutter sensation in the somatosensory system as well as sound. The nervous system phase locks to this form of stimulation, making it perceptually salient and induces multisensory activity that serve alerting and orienting reflexes. If visual stimulation (i.e., a plane) is simultaneously present, increased activation of the multisensory pathway is likely, and habituation may be reduced.

### **EVALUATION OF AN INTEGRATED BIRD HAZING SYSTEM AT THE JIM BRIDGER POWER PLANT, ROCK SPRINGS, WYOMING**

*Gwen R. Stevens, Colorado State University, Fort Collins, CO  
Larry Clark, USDA-WS, National Wildlife Research Center, Fort Collins, CO*

*Richard A. Weber, Knight Piesold LLC, Elko, NV*

Waste water impoundments resulting from industrial operations can be a significant contributory risk factor for mortality and morbidity of migratory birds. Legal standards such as the Migratory Bird Treaty Act require zero mortality of migratory waterfowl due to human activities. Birds often habituate to typical hazing strategies involving predictably presented visual and/or auditory scare tactics. We investigated the efficacy of an integrated, demand-performance hazing system at the Jim Bridger Power Plant, WY, that combines visual, auditory, and chemical stimuli to repel birds from two large (90 and 200 acres) desulphurization ponds. The system incorporates pyrotechnic launchers and loudspeakers with aerosol sprayers that deliver the chemical avian repellent Methyl Anthranilate (MA). Results of this observational study indicate substantially lower rates of use by waterfowl for the treated (i.e., with the hazing system) desulphurization ponds than for an adjacent freshwater (untreated) pond. The frequency of incoming flights over the freshwater pond was 10 times greater than that over the desulphurization ponds, and the percentage of flights that resulted in waterfowl landing on the water was considerably less for the treated (22.0%) than the untreated (84.9%) ponds. In addition, laboratory studies on the aerosol exposure of European starlings (*Sturnus vulgaris*) to MA showed a clear and immediate irritation response, and a lack of habituation over the course of the trial. Combining field and lab results, this study indicates that incorporating aerosol delivery of MA with traditional hazing strategies may minimize habituation and increase the salience of visual and auditory stimuli.

### **INTRODUCING THE NEW GIS-BASED BIRD AVOIDANCE MODEL**

*Curt Burney, U.S. Air Force BASH Team, HQ AFSC/SEFW, Kirtland AFB, NM*

Thirty years of bird distribution and population data were correlated with remotely sensed and ground-sampled environmental data to help predict occurrence of bird concentrations potentially hazardous to military aircraft. Data on numerous bird species were derived from over 4,000 survey sites and correlated with environmental data from a

*Continued in col. 1, page 7*

## **Bird-Strike Committee -USA Abstracts continued**

variety of sources in a raster-based GIS system. Environmental data include climatic, geographic, and physiographic factors sampled from meteorological monitoring stations. USGS topographic data and AVHRR satellite imagery are all spatially registered on a 1-km<sup>2</sup> grid system. A model was designed based on these correlations to predict bird distributions and abundance for the entire continental U.S. Over 50 bird species considered most hazardous to military flight operations are included in the model. The data sets are normalized by bird weight so a single relative risk is represented for each 1-km<sup>2</sup> block of the United States for 26 periods of the year and 4 daily time periods. The risk surface was generated to enable flight planners and air crews to choose flight routes that minimize potential bird strikes to their aircraft.

### **EFFECTS OF HARASSMENT ON GULLS AT THE LEBANON SOLID WASTE LANDFILL IN LEBANON, NEW HAMPSHIRE**

*Cheryl Allen, and Dennis Slate, USDA, APHIS, Wildlife Services, Concord, NH*

Large numbers of gulls (*Larus* spp.) are attracted to landfills and use them as loafing and feeding areas. From fall through late winter, between 400 and 800 gulls have been observed in the Connecticut River Valley near Lebanon, New Hampshire. Many of these gulls have been known to congregate at the nearby Lebanon Solid Waste Landfill. Gull numbers, activity, and towering behavior pose a significant air traffic safety hazard to nearby Lebanon Airport. USDA Wildlife Services and the City of Lebanon initiated an integrated gull harassment project in September 1997. The project emphasized nonlethal harassment using various pyrotechnics accompanied by the selective removal of specific gulls to enhance nonlethal methods. Keene Landfill, located 60 miles south of Lebanon, performs no harassment activities and was monitored as a control site. The average number of gulls observed at the Lebanon Landfill totaled 62/day compared to 3,573/day at the Keene Landfill. Results of the integrated gull harassment project implemented at the Lebanon Landfill include: reduced gull numbers, a reduction in towering behavior by gulls, and improved aircraft safety.

### **THE NATIONAL WILDLIFE STRIKE DATABASE FOR CIVIL AVIATION IN THE UNITED STATES, 1991-1997**

*Edward Cleary, Federal Aviation Administration, Washington, DC; Sandra Wright and Richard Dolbeer, U.S. Department of Agriculture, National Wildlife Research Center, Sandusky, OH*

Bird and other wildlife strikes to aircraft are a serious economic and safety problem in the United States. The Federal Aviation Administration (FAA) has a standard form (5200-7) for the voluntary reporting of bird and other wildlife strikes with aircraft. Although FAA personnel have monitored these reports since 1965 to determine general patterns in wildlife strikes, no quantitative analyses of the data were conducted until 1995.

The United States Department of Agriculture (USDA) National Wildlife Research Center, through an interagency agreement with the FAA, initiated in April 1995 a project to obtain more objective estimates of the magnitude and nature of the bird and other wildlife strike problem nationwide for civil aviation. This project includes: 1) editing all strike reports (Form 5200-7) sent to the FAA since 1990 to ensure consistent, error-free data; 2) entering all edited strike reports

since 1990 into a Wildlife Strike Database; 3) supplementing FAA-reported strikes with additional, non-duplicating strike reports from other sources; 4) providing FAA with an updated computer file each quarter containing all edited strike records; and 5) assisting the FAA with the production of annual reports summarizing the results of analyses. Such analyses are critical to determine the economic costs of wildlife strikes, the magnitude of safety issues, and most importantly, the nature of the problems (e.g., bird species, aircraft and engine types, airports, seasonality) so that corrective actions can be justified and taken.

Since November 1995, three reports on wildlife strikes to civil aircraft in the USA, covering the respective years 1994, 1991-1995, and 1992-1996, were completed. These reports are available from the authors. A fourth report, presenting an analysis in tabular and graphic form of data on wildlife strikes to civil aircraft in the United States for the 7-year period, 1991-1997, will be published and available from the authors in summer 1998. For this 7-year period, 16,949 (avg. 2,421/year) non-duplicating strike reports were obtained from all 50 states and some U.S. territories. About 97% of reported strikes involved birds (primarily gulls, blackbirds/starlings, raptors and waterfowl) and 3% involved mammals (primarily deer). We estimate that <20% of all wildlife strikes were reported and that total costs of the strikes to civil aviation exceeded \$200 million/year. A new poster entitled "STRIKE ONE—YOU'RE OUT!" has been produced for airports to promote the reporting of wildlife strikes. In addition, anyone can now report a bird or other wildlife strike by accessing Form 5200-7 on-line at <http://www.faa.gov/arp/birdstrike>.

### **U.S. AIR FORCE BIRD STRIKE UPDATE, 1997**

*Leah Fry, U.S. Air Force BASH Team, HQ AFSC/SEFW, Kirtland AFB, NM*

Over the past 13 years, 1985-1997, the United States Air Force (USAF) has average 2,681 bird strikes/year including about 3,000 in 1997. Since the Elmendorf Air Force Base (AFB) tragedy in September 1995 (E3 crash killing 24 airmen), the USAF has suffered two confirmed Class A (total loss of aircraft or life, or damage exceeding \$1 million) bird strikes, both in 1997. One strike at Travis AFB cost \$1.2 million in damage to a C-5 aircraft and the other resulted in loss of a F-16 aircraft in Nebraska. In 1997, about 75% (1350 of the 1,800 strikes where phase of flight was reported) occurred in the airfield environment, meaning the traffic pattern, landing, takeoff, or missed approach and 18% (335) occurred during low-level training. Although only about 18% of our total strikes occur at low level, these strikes constitute 56% of total damage costs. Through our database, we have determined that 97% of all military bird strikes occur below 3,000 feet. Accordingly, in 1997, Altus AFB, with copious pattern work and large aircraft, reported the most bird strikes (235), Little Rock AFB was second (112), and Laughlin AFB was third (94). In 1997, our most frequently struck aircraft was the C-130 (all models) with 501 strikes (17%), the KC-135R with 353 strikes (12%), and the F-16 (all models) with 248 strikes (8%). Our most frequently struck species identified by feather remains in 1997 were horned larks (83), mourning doves (50), and barn swallows (37). These data and other changes to the BASH Team and strike-reporting procedures are presented.

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