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Building a BASH Program*

Eugene LeBoeuf, Bird Strike Scientist, HQ Air Force Safety Center, Kirtland AFB, New Mexico, and President, NADCA

**Condensed from an article published in Flying Safety, April 1997*

The crash of an E-3 AWACS aircraft at Elmendorf AFB, Alaska, in September 1995 brought renewed interest in all things BASH. For the uninitiated, "BASH" stands for *Bird Aircraft Strike Hazard*. If you're not familiar with bird problems and management in airfield environments, you might find it worthwhile to take a look at Air Force Instruction (AFI) 91-202, dated October 1, 1995. This document outlines a BASH reduction program in detail.

The Successful Plan

Frequently, the USAF BASH Team at the Air Force Safety Center is asked, "What does it take to make a successful BASH plan?" To be honest, a good BASH plan shouldn't require the skills of a brain surgeon or even a Ph.D. in wildlife biology. While it's wise to consult with a member of the BASH team or similar expert before undertaking any program, an airport can have a successful BASH plan if they keep a few simple things in mind.

First, from the book of Harry Callahan, "A man's got to know his limitations." No matter how well managed the control plan, it's impossible to completely control all birds and wildlife on an airfield. If you're successful in relocating one target population of wildlife, another will most likely take its place. Hopefully, the newcomer will be less hazardous or more easily controlled.

For example, if you allow your infield turf to grow taller to discourage flocking birds, you may see an increase in rodent which may, in turn, attract predators such as coyotes. Although coyotes have been struck by aircraft on takeoff roll and are thus a hazard, they are more predictable and controllable.

Now that we understand species composition around the airfield may change as a result of a successful control operation, we must next keep in mind that seasonal changes may also necessitate adjustment to the BASH plan. For example, an airport may experience problems with gulls during winter months and smaller flocking birds in the summer. The gulls may migrate into the area during the winter to feed at a local landfill and be gone by spring at which time small flocking birds may move into the area to feed behind mowing machinery. Just remem-

ber—the problem will dictate the solution, and if in doubt, call for expert assistance.

Finally, for a plan to be successful, it must have a clear protocol, personnel support, and a commitment to implement the plan with vigilance.

Four-Legged Hazards

A point of clarification—a BASH plan shouldn't be limited to birds alone. Although birds provide the greatest hazard to aircraft, any animal on or near a runway area creates the potential for catastrophe. Deer often weigh in excess of 100 pounds and can ruin a pilot's day if struck. And remember—they are most active after dark then they are difficult to detect.

Smaller burrowing animals, such as woodchucks and prairie dogs, have undermined pavements, taxiways, and safety areas. Woodchucks have caused runway blackouts by gnawing through underground wiring. Beavers have flooded airfields by damming drainage ditches. Small field rodents frequently attract larger predators, such as hawks and coyotes, to safety areas, and so on. The point here is BASH is more than birds, and managers should pay close attention to all wildlife sightings on the airfield and respond accordingly.

An Animal's Perspective

By now, some of you may be wondering why significant numbers of wild animals would be found around an airfield when there seems to be more hospitable choices elsewhere. Most would agree that an airfield is a noisy place, teeming with lots of activity arising from the frequent movement of large, jet-powered machinery. One would think timid denizens of the field and forest would have nothing to do with such a piece of real estate. Not so!

As you look at your airfield from a BASH perspective, keep in mind the recurrent theme from the movie *Field of Dreams*, "If you build it, they will come." This same rule applies to your airfield. If the airfield provides habitat, wildlife will come. Viewed from the perspective of an animal in the wild, an airfield has much to offer.

Airfields are normally surrounded by large expanses of open area to facilitate an additional margin of flight safety. In addition, most are fenced to

Continued on page 5, Col. 1

CALENDAR OF UPCOMING EVENTS

April 27, 1997: Vole Damage Management in Orchards, Framingham, Massachusetts. Sponsored by Northeast Association of Wildlife Damage Biologists (NEA-WDB), in conjunction with the Northeast Fish & Wildlife Conference. Includes topics on vole identification and biology, regulations, damage identification, survey and sampling techniques, and control methods. Registration: \$59 (members), \$69 (non-member biologists), and \$84 (others). Contact: Laura Henze at (413) 253-2403, or Richard Chipman at (802) 828-4467.

April 28, 1997: Annual Technical Meeting and Field Trip (April 30), Northeast Association of Wildlife Damage Biologists (NEA-WDB), Framingham, Massachusetts. Massachusetts furbearer biologist Tom Decker is the featured speaker at the Monday evening technical session, discussing the MA referendum and how it was passed despite efforts of biologists and others. Five or six short presentations on topics of interest will follow. The Wednesday (April 30) field trip will look at goose, muskrat, and other wildlife damage to cranberries. Contact: Jenifer Lynch at (413) 253-2403 or Richard Chipman at (802) 828-4467.

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.

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.

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. 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.

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. 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

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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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.

Guy Connolly Retires

Guy Connolly retired from the USDA Denver Wildlife Research Center on March 29 following 25 years of government service. He began his DWRC employment in 1975 as Wildlife Research Biologist at the Twin Falls, Idaho field station, and subsequently served as Liaison Officer, Staff Officer, and Staff Specialist, moving to Denver in 1989. His field research led to the development and registration of the Livestock Protection Collar and expanded use of the M-44 in coyote control. Prior to joining the DWRC, Guy worked for 12 years as a Research Associate with Dr. William Longhurst at the UC Hopland Field Station, conducting research on deer, coyotes, and other species. His outstanding photographs of coyotes and sheep taken at Hopland have been widely used in publications and educational programs.

Guy and his wife Helen, who are both accomplished musicians, intend to continue living in Lakewood, Colorado, and pursue their interests in music and travel.

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

(continued from The PROBE, Issues #172, #173 & #174)

Social and economic assessment of black bear damage in coastal North Carolina

Robert C. Maddrey and M.R. Pelton

Damage to agricultural crops by black bears (*Ursus americanus*) is a widespread problem in coastal North Carolina. The extent and duration of damage to 1,802 ha of corn crops was examined through aerial surveys conducted in the summer of 1993. Additionally, crop damage estimates for grain crops and farmer attitudes about bears and bear damage were obtained through a mail survey of farmers on the Neuse-Pamlico Peninsula in 1994. The heaviest corn damage occurred during early stages of kernel ripeness. Approximately 0.6% of the corn crop was damaged by bears. Most farmers (77.8%) enjoyed seeing bears on their farms; however, 45.4% worried about crop damage. Farmers who had received crop damage were more likely to view bears as nuisances. Although corn was the major crop damaged, with estimated losses of over \$27,000, soybean losses seem to be increasing. Future management efforts should focus on alleviation of bear/farmer conflicts through education and population manipulation which could keep bear numbers at a socially acceptable level without negatively impacting populations.

Options for wildlife contraception in California

Terry M. Mansfield

California supports the largest human population and a wide variety of wildlife resources and habitats. As natural habitats have been lost and altered by humans, proposals to use nonlethal means of controlling wildlife populations in limited habitats have been presented. Specific examples in California involve deer and elk in enclosures ranging in size from <5 to >2,500 acres. Public policy related to wildlife resource use encourages recreational hunting as a traditional method of both controlling wildlife populations and maintaining a hunting heritage. Contraception has proven practical and effective in small captive herds of deer and elk in park settings. Large-scale applications have not been attempted. Natural resource managers and public policy decision makers need to recognize interest-based concerns of wide range of public opinion in considering the use of wildlife contraception as a population control mechanism on a case-by-case basis. This paper reviewed policy implications and case studies in California where wildlife contraception has been proposed and/or used.

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The Editor thanks the following contributors to this issue: Eugene LeBoeuf, Franklin Anderson, Scott Hygnstrom, Richard Chipman, Bob Turner, and Stephen Vantassel. Send your contributions to The PROBE, 4070 University Road, Hopland, CA 95449.

Cooperative beaver management in the Riding Mountain National Park region

Constance E.L. Menzies, Richard K Baydack, and Jack E. DuBois

The beaver (*Castor canadensis*) is a significant part of the wildlife in the Riding Mountain National Park region of Manitoba. The Park is 3,000 km² of well-forested wilderness surrounded by heavily modified agricultural land. During recent years of high beaver populations the Park received many complaints from the adjacent municipalities about impacts of beaver activity on roads and agricultural lands particularly flooding of areas bordering the Park. Within the Park, beaver management techniques commonly used include: payment of bounties on various body parts all year long, contract kill trapping, dynamiting dams, and live trapping for transplanting. Alternative management techniques, which are practiced successfully in other jurisdictions across North America, may also be appropriate for this ecosystem. A comprehensive and cooperative ecosystem-based approach to beaver management is needed involving the Park, local landowners, and the governments. This approach must attempt to establish a better equilibrium between landowners and the beaver by providing policies and management techniques that are fair in cost-assignment, resource efficient, and promote sustainability of both beaver and human societies.

Wildlife damage management and its professional evolution

James E. Miller

The term "wildlife damage management" —in lieu of animal damage control, vertebrate pest control, or nuisance animal control—has currently become the recognized term for an area of wildlife management in which a growing number of wildlife professionals spend a significant part of their time and/or career. Acknowledgment and acceptance of this terminology has occurred over time, somewhat in synchrony with: increased scientific capabilities and professionalism of those working this field; expanded interaction between humans and wildlife; growing public opposition to some tools and technologies; changing policies and philosophies of responsible agencies; and the determined leadership of dedicated wildlife professionals. It is suggested that current acceptance of this terminology by most who conduct research, education, technical assistance, or operational work in this area is a part of the continuing evolution of the profession and not simply a name change for political correctness. Obviously, efforts to control or manage

Continued on page 7, col. 1

Video Review

Stephen Vantassel, Probe NWCO Correspondent

Video: Pocket Gopher Trapping by Ken Carver

We don't have pocket gophers here in New England, but having heard about them I wanted to learn a little more about them. Ken Carver has produced a video that provides basic information about trapping these rodents. I was amazed at how much digging those gophers could accomplish. It seems that farmers need to control pocket gophers for two different reasons. The first reason is the damage they do to the roots of various plants. The second reason is the mounds they leave behind can damage farming equipment. Or at best, these mounds require the farmer to raise the equipment above the mounds thereby reducing his productivity.

Mr. Carver begins the video by providing an overview of the four traps he uses. The visual quality of the picture at the beginning of the video is too poor to really glean much from the opening about the traps. On the other hand, his overview of the other equipment was very informative. Like the rest of the film, Mr. Carver provides a meat and potatoes discussion of the gopher trapping experience. It is to his credit that he refrains from hawking some new fangled gopher trapping super tool that isn't really even needed. He tells you what you equipment you need to trap gophers.

The tape moves quickly to identifying gopher damage and setting traps. Mr. Carver emphasizes the need to set traps in the fresh mounds. While it was difficult to see the difference between an old and new mound by looking at the tape, I think common sense would tell a novice trapper the relative age of the mound. Basic biology of the gopher is covered, but only those aspects relevant for the trapper to capture them. This video is very focused on the "how to's" of catching gophers.

The central and lion's share of the tape is spent on setting traps and removing gophers. Mr. Carver explains how to set traps in the plug holes and in the main tunnels. A careful viewer will note how he probes to find the tunnels. The examples get a bit repetitive but repetition is a good teacher. Like most animal damage control, gopher trapping requires attention to the fundamentals. Although all the gophers shown in the video were dead, Mr. Carver does wisely warn the viewer that a small percentage will still be alive when the traps are checked. I would also add that it wouldn't be a bad idea to wear gloves when handling wildlife whether it is dead or alive.

I appreciated Mr. Carver's demonstration of how to make a gopher set that would be safe around children and pets. Too often ADC information is given that doesn't consider the liability risks of urban and suburban settings. Another bonus was how he described how to make another child-safe set, thus giving the viewer two safer ways to trap for gophers. I am confident that his concern for safe sets flows from being the father

of two fine boys. I was also impressed to hear how to make your sets less susceptible to trap thieves.

The video concludes with a discussion on the four basic traps he uses along with demonstrations on how to set them. This portion was more useful than his discussion of the same traps in the beginning, because the video was much clearer. This video doesn't cover all the gopher traps available, but it does mention the most common.

I have given the video an animal damage control grade of "B." Its strengths lie in its straightforward approach to gopher trapping. Mr. Carter has provided enough information to get someone started in gopher trapping. The negatives of the video as I see them are as follows: First, the quality of the taping could have been higher. For example the video lacks picture clarity at various times making it hard to see what he is describing. This doesn't happen too often, but the general lack of high definition can be annoying. The audio also recorded the grinding noise of the camera's turning of the tape. Second, regarding content, I would have liked more information on pricing jobs. If that isn't possible, then a description of how much time it should take to trap a given amount of land would have been helpful. In fairness to Mr. Carter, he does talk about the costs of traps and how many sets could be made in an hour. But mentioning a bounty of two dollars per gopher isn't enough to tell us what should be charged to trap gophers.

Finally, I would have liked to have seen some discussion on handling misfired traps and problem situations. For example, how long should one set traps in an area? Moles can go deep during the dry summer months only to reappear on the surface after a rain. Do pocket gophers act in a similar way? This information would be important to know for the beginning gopher trapper.

Despite these negatives, the video still merits a "B" rating. It is almost eighty minutes long and does include information on where to buy traps. It even has Mr. Carter's address; I am confident that he would answer other questions if you wrote him. Bottom line, for twenty dollars post-paid, this tape is a bargain. You could certainly make your money back in gophers in no time.

You can obtain your post-paid copy of "Pocket Gopher Trapping" by sending a check for \$20 to Ken Carver, 3034 Furness Ct., Maplewood, MN 55109.

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Building a BASH Program

reduce inadvertent entry. As it's desirable to land on relatively flat surfaces free of standing water, it's necessary to provide storm-water capacity via retention basins and drainage ditches. As wildlife see it, the only visitors to these secluded, fenced-off grassy areas of ditches and ponds are usually operators of mowing machines who generally pose no threat. However, they leave behind lots of goodies, like mowed straw for nest construction and shattered seed heads or maimed insects for food. When one considers these points, there's little wonder why many wild animals call your airfield a refuge. All the food, water, and potential shelter, enclosed by a fence to keep out humans and their pets, is worth the risk of being struck by an aircraft.

The Mechanics of the Plan

Now let's look at the mechanics of a general BASH plan. A sample plan may be obtained from the BASH Team at the Air Force Safety Center. Bird strike data from specific airports and military airfield may be available from the appropriate authority or administrator. Check with airport operations personnel as well to see whether they have been keeping logs of runway checks. Find out if they have been responding to any wildlife activity, or when bird watch condition codes have been listed as moderate or severe. These two sources of information can shed light on the kind of wildlife present on an airfield and when they are creating hazardous conditions.

If these sources don't provide enough information, the airfield may choose to contract with a wildlife biologist who specializes in the field of wildlife damage control. Regardless of whether the biologist is employed with a private company or with a government agency, the contractor should have a good background in wildlife control and be able to perform an ecological study to establish a baseline of wildlife activity that could be hazardous to aircraft. The USDA ADC program has agreed to provide different levels of assistance to military airfields, through signed Memorandum of Understanding (MOU) with the Department of Defense. USDA-APHIS personnel often provide similar services to public airports. Such services range from a cursory technical assistance visit to a contracted, fully operational wildlife control program.

This baseline, or wildlife profile, is primary to the development of a successful BASH reduction program. The type of wildlife on or near an airfield and the habitat that's being used are what drive a program. Once these components are identified, you can then begin to assemble the respective parties who may be able to effect a change to the habitat the wildlife are using. These "respective parties" will become the members of your Bird Hazard Working Group (BHWG).

The Working Group

By military regulation, such a Working Group is supposed to meet at least twice a year. The BHWG is normally comprised of all those who have anything to do with airfield operations, engineering, environmental control, air traffic control, safety, security, and of course, bird control. Minutes should be maintained for every meeting.

Representation on the BHWG from persons representing the diverse aspects of airfield operations is necessary in order to provide the best opportunity for open discussions of all related issues. For example, if the operations staff has frequently harassed birds away from an unmowed area near the north end of the airfield, those in charge of airfield maintenance may be asked why the area is not being maintained. Maintenance supervisors may explain that this area is holding water and can't be drained. Why? Because it is currently under investigation by the environmental staff as to whether or not it should be classified as a wetland and thus protected. Because the environmental staff is present, they may then discuss options available to the airfield to reduce the attraction of wildlife to the area. One can quickly see why such meetings are so important to a bird hazard reduction program.

We're Not Quite There Yet

Let's say you have become more enlightened about the regulations, have a good base-line of wildlife activity due to surveys and good record keeping, and you are maintaining an open line of communication between all responsible parties. Does this mean you have a good BASH reduction program? Not quite. Just because you have blueprints doesn't necessarily mean that you have a house. There are a few more things to consider.

Probably the most important part of a BASH reduction program is *implementation*—often the weak link in a good chain. It's absolutely necessary to have a sound protocol spelling out how you will react to wildlife activity near the airfield and who is going to respond. Since you're now keeping good records, you should be able to look back and, based on past history, "predict" when wildlife activity is greatest. This should give you a clue as to when to have your personnel ready for action. If your airfield records are lacking, go back to any bird strike data available from your particular airfield.

You may be beginning to think you have all your bases covered, right? Not yet. Just because you have all your information going in the right directions and you have a reliable person ready to respond, does this person have the right tools?

Continued on page 6, col. 1

Building a BASH Program

Before we get into the tool department, let's back up just a bit. We should keep in mind the first line of defense should be to try to alter the habitat the birds or other wildlife are using. This could mean mowing the airfield to the recommended height or keeping drainage ditches open and free of tall vegetation. Another good rule of thumb for airfield maintenance is if it sticks up and isn't fixed by a function, then have it removed. If the airfield had been well drained, made as uniform and unattractive to wildlife as possible, and a few wild nonbelievers still, remain, then it's tool time.

Your Tool Box

The first tool many airfield BASH programs include in their wildlife control tool box is the propane cannon. Most expect far too much from a propane cannon. They place it in too large an area and set it to fire too frequently. Wildlife are accustomed to noise on an airfield, and cannons repeatedly going off do not affect them. Propane cannons require active management and serve to reinforce other harassment techniques.

Live ammunition should be part of your control program if it's legal for use. Studies at John F. Kennedy International Airport have shown conclusively that shooting is effective in reducing wildlife hazards to aircraft. If you're not occasionally shooting birds where and when legally possible, you're reinforcing a behavior of ignoring the sound of gunfire (propane cannons and pyrotechnics). However, one must never shoot live ammunition before making sure all questions of legality are answered.

One thing specifically required prior to using live ammunition to control birds is a depredation permit. This permit is issued by the U.S. Fish & Wildlife Service (FWS). The FWS will usually request you contact the USDA ADC specialist in your area to review your current program. They want to ensure no threatened or endangered species present on the airfield will be at risk and that other attempts at controlling wildlife have met with less-than-desired results.

If you are successful in reducing the numbers of birds on the airfield through depredation, you should try to learn as much as possible from them. By performing a necropsy (a fancy word for cutting them open), you may be able to identify the food source attracting the birds to your airfield. If you have problems performing a necropsy, specimens may be frozen for later inspection by a BASH team member or a USDA biologist.

Other Harassment Techniques

What about those other techniques? It's often recommended broadcasting taped bird distress calls. Distress tapes can be effective, but they must be used properly. To get certain birds to respond, you must use a distress call tape recorded from that species of bird. In other words, gulls will not respond to black-bird distress calls.

Another thing to remember is birds will respond differently to distress calls. When gulls hear another gull calling in distress, they will usually take flight and investigate the source of the call. Blackbirds, on the other hand, will take flight, circle a bit, and leave the area. Knowing this can be very useful. If you want to move gulls away from the end of the runway, don't park your vehicle there to broadcast a gull distress call. It's recommended you park in an area where you can safely disperse the birds with pyrotechnics or use live ammunition to shoot a few.

There goes one of those \$20 words again! What are pyrotechnics? Simply industrial or agricultural fireworks. Pyrotechnics include shellcrackers, bird bombs, and screamer sirens. These devices are probably the most widely used wildlife harassment tools on the market today. They are safe, readily available, inexpensive, non-lethal, and normally don't require a permit for use. However, they would be illegal to use around birds actively occupying a nest site or around threatened or endangered species.

Another useful technique for reducing wildlife strikes is avoidance. If there are large, known movements of birds (such as migrations during spring and fall), you may choose to schedule flight operations around these well-known periods of bird activity. The BASH team recommends military low-altitude flying be restricted 1 hour before and after sunset during increased bird activity. Before scheduling low-level flights, areas of known bird activity may be avoided by contacting the BASH team and having the desired routes checked against our Bird Avoidance Model, or BAM. The BAM plots known waterfowl movements by season of the year to give a prediction of bird activity for specific routes. The BASH team is currently revising this model by employing GIS techniques to include more data field to provide schedulers up-to-date information.

One Step At A Time

All this information may seem a bit overwhelming when considered all at once. However, once you get underway and take it one step at a time, you will see that most of these recommendations rely on good old common sense. *The key is you must remain flexible with your approach* because if you are successful in removing one species, another will likely move in to fill the void. The idea is to manage the wildlife population down to a number and type of species less hazardous to your specific operation. Always remember no program will ever completely eliminate all wildlife from an airfield or achieve the desired results unless properly implemented through perseverance.

Finally, when questions arise, don't hesitate to contact a member of the USAF BASH Team at the Air Force Safety Center, Kirtland AFB, New Mexico. The author can be contacted at (505) 846-5679, or by e-mail at leboeuf@smtps.saia.af.mil.

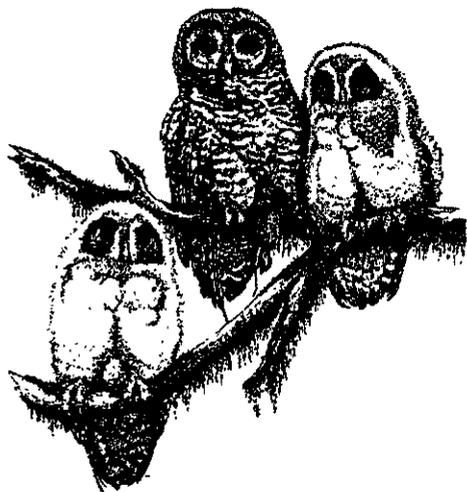
More Abstracts...

depredating wildlife have taken place since the beginning of time; however, events occurring since 1980 are highlighted as having the most influence on the professional evolution of wildlife damage management. Significant historical reports (e.g., the Leopold Report), and policies such as the Animal Damage Control Policy, the USDA Fish and Wildlife Policy (DR 9500-4), The Wildlife Society's Conservation Policies, and others are noted as to their relevance in prompting, or contributing to this professional evolution. A discussion of perceived challenges that must be addressed to continue this professional evolution are provided for consideration.

Biochemical and endocrinological aspects of immunocontraception

Lowell A. Miller

Immunocontraceptive vaccines can control reproduction at various stages. They can shut down reproductive activity of both sexes by interfering with the biological activity of GnRH, block sperm penetration of an ovulated egg, or prevent implantation and development of the fertilized egg. Each vaccine technology may be applicable for control of various wildlife pest species. Advances in immunocontraceptive technology have followed increased understanding of the hormonal reproductive process, the enzymes involved in the sperm-egg interaction, and broad advances in the fields of biotechnology and immunology. Species-to-species variation in reproductive hormones and immune responses frustrates the widespread application of contraceptive technology for pest wild species. Also, practical application of immunocontraception to free-roaming wildlife depends on oral delivery of the contraceptive vaccine. Recent advances in understanding the pathology of mucosal infections has provided us with new tools to develop oral vaccines. Oral immunocontraceptive vaccines encapsulated in bioadhesive liposomes or engineered into nonvirulent live vectors are possible approaches to vaccine delivery. Oral immunocontraceptive vaccine technology for reproductive management of wildlife populations holds great promise, but this new technology will take time to develop.



Letters to the Editor

Editor:

Just a short note to try and review some of the problems we are facing in Colorado. The people of Colorado (Denver) voted to ban trapping in Colorado (Amendment 14) and we currently are in the process of evaluating how that is going to affect us. The Amendment as passed in November 1996 did not have any penalties in it, so that is currently being worked out with DOW, Dept. of Ag, and representation by the livestock people.

The Forest Service is still going to authorize ADC work and BLM hasn't made any overtures at this time. What we do see is lots of problems as livestock people will be only be able to conduct work on a 30-day period and then that is it—The environmental side of the house is concerned that livestock owners will really concentrate their control efforts during the 30-day period and be more destructive because of the limited time to do control work.

To summarize, it was a poorly thought-out piece of legislation that our Colorado DOW personnel did nothing to try to prevent or correct false information. Now we all have to live with it.

Along this side... I am enclosing an article that I find very interesting and entertaining because of the problems that non-professionals are encountering in the urban/country sides because of their lack of knowledge of wildlife—yet these are the same people that vote for regulations that they really have no understanding of the long term effects...

Enjoy reading the **Probe**. Keep up the good work.

Franklin Anderson

Editor:

Always enjoy **The Probe**. Especially appreciated the current membership list for NADCA. Serving on the Agriculture & Livestock Committee in the Texas House and having served on the State Recreational Resources Committee, I have watched animal rights extremist groups lobby our Parks & Wildlife Commission to promulgate rules banning lethal means of animal control. Thank goodness they have been unsuccessful. It now appears these groups have become avid believers in Initiative & Referendum in hopes of bypassing the state legislature. This process has been extremely successful in several states, including Colorado. This is a matter of grave concern for not only agriculture, but all facets of society who rely on Animal Damage Control for their very survival.

Keep up the good work with **The Probe**.

Bob Turner, State Representative
District 73, State of Texas

The Probe

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Mail to: Wes Jones, Treasurer, W8773 Pond View Drive, Shell Lake, WI 54871, Phone: (715) 468-2038

Membership Renewal and Application Form

NATIONAL ANIMAL DAMAGE CONTROL ASSOCIATION

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