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Twelfth Wildlife Damage Management Conference, April 9-12, 2007, Corpus Christi, Texas -- Final Program & Abstracts

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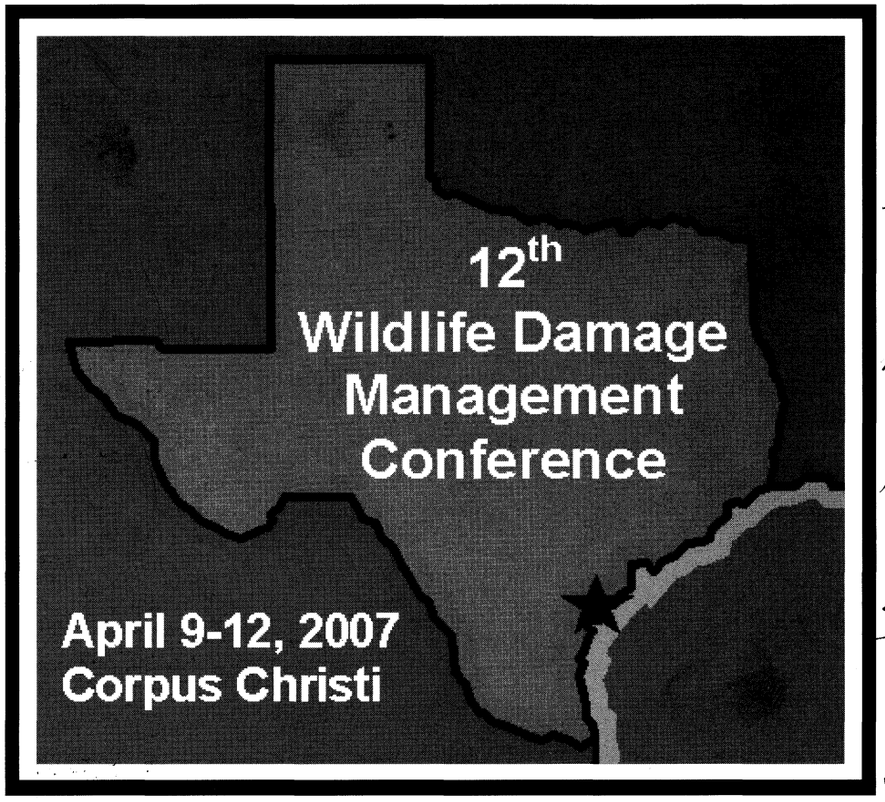

Omni Corpus Christi Hotel
Corpus Christi, Texas

April 9-12, 2007
Final Program & Abstracts

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Organized and Arranged by:
The Wildlife Damage Management Working Group of TWS

Twelfth Wildlife Damage Management Conference
April 9-12, 2007
Omni Corpus Christi Hotel
Corpus Christi, Texas

The Wildlife Damage Management Conference is organized by the Wildlife Damage Management Working Group of The Wildlife Society.

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Conference Proceedings

A copy of the Proceedings of the 12th Wildlife Damage Management Conference is included in your registration fee. Publication is anticipated within 1 year of the conference, and the Proceedings will be mailed to all registered attendees. To order additional copies contact: Scott Henke, Caesar Kleberg Wildlife Research Institute, MSC 218, 700 University Blvd., Texas A&M University-Kingsville, Kingsville, Texas 78363-8202, (361) 593-3689, kfseh00@tamuk.edu.

Continuing Education

TWS Development Credits will be authorized for attendance at this conference. The 12th Wildlife Damage Management Conference will have 25 contact hours available for credit through the TWS certification and professional development programs. The Professional Development Application form can be downloaded from the TWS website at http://wildlife.org.

Optional Field Trip

Optional field trips are scheduled for Thursday, April 12th, the day after the conference sessions. Five different field trips will be offered to conference attendees. All field trips will be available for a limited number of people, so sign up early!!
Tour 1 - ½ day tour of Texas wildlife on the Laureles division of the King Ranch.
General wildlife can include white-tailed deer, javelina, feral hogs, coyotes, birds of prey, various songbirds ($35/person, max 20).
Tour 2 - Full day tour of Texas wildlife on the Norias division of the King Ranch.
Tour bus will leave the Omni Hotel at 6am to arrive at Norias gate by 8am. Tour offers birds unique to South Texas such as ferruginous pygmy owls, tropical parula, and various migrating passerines (northern-beardless tyrannulet, Audubon's oriole, Botteri's sparrow, and white-tailed hawks) ($100/person, max 20).
Tour 3 - ½ day historical tour of King Ranch.
Learn history of largest working ranch in US (includes a stop at the King Ranch Museum). Tour ends with a catered ranch style B-B-Q lunch, tour bus will leave the Omni Hotel at 7:30am ($35/person, max 20).
Tour 4 - 9 hour fishing trip from Port Arkansas.
All fishing tackle is provided and no fishing license is required, tour bus will leave the Omni Hotel at 6:30 am ($80/person, max 80).
Tour 5 - Raffle Trip for a Hog hunt.
Enter for hunt before 3/16/07! Drawing will be conducted shortly after pre-registration deadline, so adequate notice can be given to those drawn. This will also be done on Thursday, so pre-registrants interested in the hog hunt will also need to indicate (and pay for) a second choice from the above field trips, in the event their name is not drawn (winners $25/person, max 10).

Registration and Welcome Reception

Registration (Alcove adjacent to Corpus Christi Ballroom) and a welcome reception (Corpus Christi Ballroom C) will begin at 6:00 PM until 8:00 PM on Monday evening, April 9. Registration will also be available starting at 7:00 AM Monday morning.

Complimentary Buffet Banquet

A complimentary buffet supper will be offered from 6:00 – 7:30 PM on Tuesday evening, April 10th, to all registered attendees of the conference (there will be an extra fee of $25.00 for guest/spouses of registered attendees). The buffet will be held in the Corpus Christi Ballroom A. You must bring your ticket to attend.

Poster Session and Vendor Displays

Posters and vendor displays will be available for viewing throughout the conference the foyer outside the conference rooms or in Ballroom C.

Keynote Speaker

Dr. Michael Hutchins, Executive Director/CEO, The Wildlife Society, Bethesda, MD

Dr. Hutchins is currently an Adjunct Associate Professor at the University of Maryland's Graduate Program in Sustainable Development and Conservation Biology, Senior Fellow at the Georgia Institute of Technology's Center for Behavior and Conservation and Executive Director of ZooThink, Inc., a Maryland-based consulting company that assists zoos, aquariums, conservation organizations and natural history museums in finding solutions to complex problems.

He has authored over 200 technical and popular articles and books, covering various topics in wildlife management, conservation and science. He is consulting editor for *Zoo Biology* and *International Zoo Yearbook* and formerly the primary editor of Smithsonian Institution Press' book series titled *Studies in Zoo and Aquarium Biology and Conservation*. Dr. Hutchins is also the Series Editor for *Grzimek's Animal Life Encyclopedia,* a 17-volume compendium covering the entire animal kingdom.

Dr. Hutchins has considerable experience with membership-based non-profit organizations, having served as Director/William Conway Chair, Department of Conservation and Science for the American Zoo and Aquarium Association (http://www.aza.org) for nearly 15 years. Prior to that, he was a curatorial trainee in mammalogy, conservation biologist and coordinator of research at the New York Zoological Park (Bronx Zoo)/Wildlife Conservation Society from 1985-1990. Among his many duties, Dr. Hutchins coordinated the selection process for AZA's Conservation Endowment Fund (CEF). In partnership with The Walt Disney Company and many other donors, the CEF provided nearly $2.6 million to support over 140 projects worldwide during his tenure.

Dr. Hutchins is an experienced conservation planner, facilitator, and coalition builder, organizing major planning efforts for the black-footed ferret, Micronesian kingfisher and Karner Blue butterfly recovery programs. His *Black-footed Ferret Recovery Program Analysis and Action Plan*, which was funded by a grant from the National Fish and Wildlife Foundation, was used to revise the U.S. Fish and Wildlife Service's Recovery Plan. He has also participated in recovery planning for a wide range of endangered taxa, including Southern sea otters, Sumatran and Javan rhinoceroses, Sumatran tigers, and Bali mynahs. In February 1999, Dr. Hutchins organized and moderated a meeting of agencies and organizations concerned about the illegal commercial bushmeat trade in tropical Africa. The meeting resulted in the formation of the Bushmeat Crisis Task Force (http://www.bushmeat.org)—a national coalition of more than 30 major U.S. conservation organizations and zoological parks working to find solutions to this significant and complex conservation challenge. Dr. Hutchins chaired the BCTF Steering Committee from 1999-2004. Dr. Hutchins was also responsible for establishing and managing the Butterfly Conservation Initiative (BFCI), a collaborative effort of over 50 AZA zoos and aquariums, conservation organizations, state and federal wildlife agencies, universities and other partners to recover the 22 federally listed imperiled butterflies in the United States and Canada (http://www.butterflyrecovery.org).

Dr. Hutchins will speak on why wildlife populations must be controlled.

Thursday Evening Farewell Reception

A final reception on Thursday evening, April 12th, will wrap-up the conference. The reception will be held at the Caesar Kleberg Wildlife Center of Texas A&M University-Kingsville. The reception will highlight the new NWRC disease research laboratory and the wildlife facilities of the Caesar Kleberg Wildlife Research Institute. A buffet and bar will be provided. A bus will pick up attendees at the Omni Hotel at 6 pm in Corpus Christi, drive to the Wildlife Center, and return to the Omni Hotel in Corpus Christi when the event is over. This event will provide a final opportunity for networking and fellowship between members of the Working Group.

12th Wildlife Damage Management Conference
April 9-12, 2007

Conference-at-a-Glance

Activity	Location			
	Corpus Christi Ballroom Foyer	Corpus Christi Ballroom A	Corpus Christi Ballroom B	Corpus Christi Ballroom C
Monday evening (4/9)	Registration			Reception
Tuesday (4/10)				
Registration opens 7:00 am 8:05 – 11:55 am	Registration and Vendors	Plenary Session		Posters
1:15 PM – 5:25 pm	Registration and Vendors	Bird Management	Reduction of Non-Target Hazards of Rodenticide Use	Posters
	Vendors			Banquet
Wednesday (4/11)				
7:45-11:55 am	Registration and Vendors	Feral Hog Management	Urban Coyotes	Posters
1:15-5:20 pm	Registration and Vendors	Research and Management Strategies	Urban Coyotes	Posters
Thursday (4/12)				
8:00 am-5:00 pm	Optional field trips			
6:00-9:00 pm	Farewell Reception at the Caesar Kleberg Wildlife Center of Texas A&M University-Kingsville. Transportation to the event will be provided.			

THE TWELFTH WILDLIFE DAMAGE MANAGEMENT CONFERENCE

Monday, April 9, 2007

6:00-8:00	**Registration and Welcome Reception: Corpus Christi Foyer and Ballroom C**

Tuesday, April 10, 2007

	OPENING SESSION: Corpus Christi Ballrooms A & B
8:00-8:10	**Conference Welcome and Introduction** *Art Smith*, WDMWG Chair
8:10-8:20	**Texas Welcome** *Fred Bryant*, Caesar Kleberg Wildlife Research Institute, Texas A&M University, Kingsville, TX
8:20-8:30	**Welcome from USDA, APHIS** *Bill Clay, USDA, APHIS, WS, Washington, DC*
	Plenary Session
	Moderator: John Steuber, USDA APHIS Wildlife Services
8:30-9:00	**Keynote Address: Why Wildlife Populations Must be Controlled.** *Dr. Michael Hutchins*, Executive Director, The Wildlife Society, Bethesda, MD
9:00-9:25	**Human-Wildlife Conflict Collaboration (HWCC): Improving Our Collective Efforts to Address Human-Wildlife Conflict** *Francine Madden*, Executive Director, HWCC, Bethesda, MD
9:25-9:50	**Danger, in Danger, and Endangered: How Cool Hand Luke may be Impacting the Future of Wildlife Damage Management** *Dale Rollins*, Texas Cooperative Extension, San Angelo, TX
9:50-10:15	**Break**
10:15-10:40	**Personalities in the Wildlife Damage Community: Are We Our Own Worst Enemies?** *Ben West*, Berryman Institute, Mississippi State, MS
10:40-11:05	**Conserving Cheetahs on Private Land: Using the Namibian Cheetah *Acinonyx jubatus* as a Case Study** *Laurie Marker and Amy Dickman*, Cheetah Conservation Fund, Otjiwarongo, Namibia
11:05-11:30	**Gray Wolves and Livestock in Montana: A Recent History of Damage Management** *Carolyn Sime*, Montana Fish, Wildlife & Parks, Helena, MT *Ed Bangs*, USFWS, Helena, MT *John Steuber, Kraig Glazier, and Paul Hoover*, USDA, APHIS, WS, Billings, MT *Val Asher*, Turner Endangered Species Fund, Bozeman, MT *Liz Bradley*, Montana Fish, Wildlife & Parks, Dillon, MT *Kent Laudon*, Montana Fish, Wildlife & Parks, Kalispell, MT *Mike Ross*, Montana Fish, Wildlife & Parks, Bozeman, MT *Jon Trapp*, Montana Fish, Wildlife & Parks, Red Lodge, MT
11:30-11:55	**USDA/State/Tribal Cooperator Summary for 2006 National Early Detection System for HPAI in Wild Migratory Birds: Accomplishments, Findings, and Future Directions** *Brandon Schmidt and Kerri Pedersen*, USDA, APHIS, WS, NWRC, Fort Collins, CO *Seth Swaford*, USDA, APHIS, WS, Riverdale, MD *Robert Beach and Thomas DeLiberto*, USDA, APHIS, WS, NWRC, Fort Collins, CO
11:55-1:15	**Lunch on your own**

	Concurrent Session 1: Corpus Christi Ballroom A	Concurrent Session 2: Corpus Christi Ballroom B
	Bird Management	**Reduction of Non-Target Hazards of Rodenticide Use**
	Moderator: Gary San Julian, Pennsylvania State University	**Moderator: Gary Witmer, USDA APHIS Wildlife Services**
1:15-1:40	**Cost Effectiveness of OvoControl G for Managing Nuisance Canada Goose (*Branta canadensis*) Populations** *Joe Caudell*, USDA, APHIS, WS, West Lafayette, IN *Stephanie Shwiff*, USDA, APHIS, WS, NWRC, Fort Collins, CO	**Introductory Comments** *John Eisemann and Gary Witmer*, USDA, APHIS, WS, NWRC, Fort Collins, CO
1:40-2:05	**Evaluation of Resident Canada Goose Relocation in Georgia** *Leif Stephens*, USDA, APHIS, WS, Athens, GA, *Michael Mengak*, University of Georgia, Athens, GA *Douglas Hall*, USDA, APHIS, WS, Athens, GA	**Is There a Problem?** *Michael Fry*, American Bird Conservancy, Washington, DC
2:05-2:30	**Chromaflair Bird Repellent for Blackbirds and Crows** *Scott Werner, Shelagh Tupper, and John Cummings*, USDA, APHIS, WS, NWRC, Fort Collins, CO	**T&E and Migratory Bird Treaty Act Considerations** *Nancy Golden*, U.S. Fish and Wildlife Service, Washington, DC (tentative)
2:30-2:55	**Blackbird Use of Wildlife Conservation Sunflower Plots** *George Linz*, USDA, APHIS, WS, NWRC, Bismarck, ND *Jonathan Raetzman and Heath Hagy*, North Dakota State University, Fargo, ND *Jeffrey Homan*, USDA, APHIS, WS, NWRC, Bismarck, ND *William Bleier*, North Dakota State University, Fargo, ND	**Rodenticide Manufacturer Perspective** *Thomas Schmit*, LiphaTech, Madison, WI
2:55-3:20	**Break**	**Break**
	Bird Management (continued)	**Reduction of Non-Target Hazards of Rodenticide Use (continued)**
	Moderator: Mark Tobin, USDA APHIS Wildlife Services	**Moderator: Gary Witmer, USDA APHIS Wildlife Services**
3:20-3:45	**Are Sunflower Fields for the Birds?** *Heath Hagy*, North Dakota State Univ., Fargo, ND *George Linz*, USDA, APHIS, WS, NWRC, Bismarck, ND *William Bleier*, North Dakota State Univ., Fargo, ND	**Agricultural Settings** *Terry Salmon*, University of California-Davis, San Diego, CA
3:45-4:10	**Cowbird Control: Management Issues, Controversies, Perceptions, and the Future** *Scott Summers, Richard Kostecke, and Garrett Norman*, The Nature Conservancy, Fort Hood, TX	**Forest Settings** *Wendy Arjo*, USDA, APHIS, WS, NWRC, Olympia, WA
4:10-4:35	**Avian Influenza in Wild Birds: Environmental Sampling Strategy for the Rapid Detection of Avian Influenza Viruses** *Robert McLean, Jeffrey Hall, and Alan Franklin*, USDA, APHIS, WS, NWRC, Fort Collins, CO	**Island Conservation Efforts** *Gary Witmer*, USDA, APHIS, WS, NWRC, Fort Collins, CO *Gregg Howald*, Island Conservation, Kelowna, BC
4:35-5:00	**Field Method for Analyzing Birds for Avicide 3-Chloro-*p*-toluidine Hydrochloride** *Jerome Hurley, Patricia Pipas, Shelagh Tupper, and John Cummings*, USDA, APHIS, WS, NWRC, Fort Collins, CO	**Urban/Suburban Settings** *Frank Meek*, Orkin Technical Services, Atlanta, GA
5:00-5:25	**Cumulative Use of Alpha-Chloralose by USDA Wildlife Services to Immobilize Birds from 1993 to 2005** *Jeanette O'Hare and John Eisemann*, USDA, APHIS, WS, NWRC, Fort Collins, CO *Lawanna Koch*, PPD Environmental Services, Riverdale, MD *Thomas Seamans*, USDA, APHIS, WS, NWRC, Sandusky, OH	**Risk Assessment and Research Needs** *John Johnston*, USDA, APHIS, WS, NWRC, Fort Collins, CO.

Tuesday, April 10, 2007
Evening

6:30-8:00	**Conference Banquet: Corpus Christi Ballroom C**
	Vendor's Forum: Corpus Christi Ballroom Foyer

Wednesday, April 11, 2007

7:45-7:55	**Announcements**	
	Concurrent Session 3: Corpus Christi Ballroom A	**Concurrent Session 4: Corpus Christi Ballroom B**
	Feral Pig Management	**Urban Coyotes**
	Moderator: Tyler Campbell, USDA APHIS Wildlife Services	**Moderator: Bob Timm, UC Hopland Research & Extension Center**
7:55-8:20	**Characterization of Wild Pig-Vehicle Collisions** *John Mayer*, Washington Savannah River Company, Aiken, SC *Paul Johns*, Carolina Wildlife Consultants, New Ellington, SC	**Introductions – Overview of Session and History of Urban Coyote Problems** *Bob Timm*, UC Hopland Research & Extension Center, Hopland, CA
8:20-8:45	**Ecological and Economic Risk Assessment for Wild Pigs in California Oak Woodlands** *Rick Sweitzer*, University of North Dakota, Grand Forks, ND	**Canid Behavior and Adaptations** *Robert H. Schmidt*, Utah State University, Logan, UT
8:45-9:10	**Assessment of Selected Pathogens of Feral Hogs in Mississippi** *Richard Minnis*, Mississippi State University, Mississippi State, MS *Lora Ballweber*, Colorado State University, Fort Collins, CO	**Urban Coyote Biology and Current Research** *Stan Gehrt*, The Ohio State University, Columbus, OH
9:10-9:35	**Feral Swine (*Sus scrofa*) in Florida – The Role of USDA Wildlife Services in Protecting Threatened and Endangered Species and Habitats from Feral Hog Damage** *Brian Schoch, Bernice Constantin, John Dunlap, John Woolard, and John Allen*, USDA, APHIS, WS, Palm City, FL *Richard Engeman*, USDA, APHIS, WS, NWRC, Fort Collins, CO	**Coyote Damage Control Techniques and Tools** *Alan Huot*, Wildlife Control Supplies, East Granby, CT *David Bergman*, USDA, APHIS, WS, Phoenix, AZ.
9:35-10:00	**Break**	**Break**

	Moderator: Mike Bodenchuck, USDA, APHIS, WS, San Antonio, TX	**Moderator: Bob Timm, UC Hopland Research & Extension Center**
10:00-10:25	**Urban Feral Hog Control: A Delicate Balancing Act in Fort Worth** *Robert Denkhaus*, Fort Worth Nature Center & Refuge, Fort Worth, TX	**Case Study: Management of Urban Coyotes and Attacks in Green Valley, AZ** *Christopher Carrillo and Jim Schmidt*, USDA, APHIS, WS, Phoenix, AZ *Gabriel Paz*, Arizona Game and Fish Department, Tucson, AZ *Tim Veenendaal and David Bergman*, USDA, APHIS, WS, Phoenix, AZ
10:25-10:50	**Missouri's Task Force Approach to Feral Hog Management** *Edwin Hartin*, USDA, APHIS, WS, Columbia, MO	**Panel: Impacts of Urban Coyotes on People and Pets** *Lou Berchielli*, NY Department of Environmental Conservation – Wildlife, Albany, NY *Randy Farrar*, USDA, APHIS, WS, Travis County, TX *Dorinda Pulliam*, City of Austin, TX
10:50-11:15	**Feral Hogs in Kansas – Using Legislation to Help Control Efforts** *Chad Richardson,* USDA, APHIS, WS, Fort Riley, KS	
11:15-11:30	**Feral Hogs: A Texas Perspective** *Mark Mapston, Bruce Leland, Douglas Steen, and Janean Romines*, USDA, APHIS, WS, Uvalde, TX	**Panel: Operational Challenges of Solving Urban Coyote Problems** *Terry Cox*, USDA, APHIS, WS, San Diego, CA *Tim Julien*, Nuisance Wildlife Control Operators Association, Indianapolis, IN
11:30-11:55	**A Landscape-Genetic Approach to the Management of Feral Pigs in South Texas** *Johanna Delgado-Acevedo and Randy DeYoung*, Caesar Kleberg Wildlife Research Institute, Texas A&M University, Kingsville, TX *Tyler Campbell*, USDA, APHIS, WS, NWRC, Kingsville, TX	
11:55-1:15	**Lunch on your own**	**Lunch on your own**
	Concurrent Session 5: Corpus Christi Ballroom A	**Concurrent Session 6: Corpus Christi Ballroom B**
	Research and Management Strategies	**Urban Coyotes (continued)**
	Moderator: Kathy Fagerstone, USDA APHIS Wildlife Services	**Moderator: Robert Schmidt, Utah State University, Logan, UT**
1:15-1:40	**Efficacy of 3 In-Burrow Treatments to Control Black-Tailed Prairie Dogs** *Charles D. Lee*, Kansas State Research and Extension, Manhattan, KS *Jeff LeFlore*, East Cheyenne County Pest Control, Cheyenne Wells, CO	**Panel: Social, Political, and Legal Considerations** *Robert H. Schmidt,* Utah State University, Logan, UT *Claude Oleyar*, Alpine Animal Control, Colorado Springs, CO
1:40-2:05	**Developing a Standard Tool for Assessing Suburban Deer Impacts to Vegetation** *Karleen Ami*, Nature Technologies, Inc., Pleasantville, NY *Paul Curtis*, Cornell University, Ithaca, NY	
2:05-2:30	**A Review and Update of Biomarkers Used for Wildlife Damage and Disease Management** *Tricia Fry and Mike Dunbar*, USDA, APHIS, WS, NWRC, Fort Collins, CO	**Successful Local Urban Coyote Management** *Rex O. Baker*, California State Polytechnic University, Pomona, CA (retired) *Robyn Worcester*, Stanley Park Ecological Society, Vancouver, BC *Dairen Simpson*, Wildlife Capture International, Durham, NC
2:30-2:55	**Alternative Bait Markers for Deer and Other Herbivores** *Abbey Thompson*, University of Wisconsin, Madison, WI *Michael Samuel*, USGS, Wisconsin Cooperative Wildlife Research Unit, Madison, WI	
2:55-3:15	**Break**	**Break**

	Moderator: Jim Armstrong, Auburn University, Auburn, GA	**Moderator: Robert Schmidt, Utah State University, Logan, UT**
3:15-3:40	**Research Strategies to Aid in the Elimination of Bovine Tuberculosis Infection in Cattle Through Interactions with Wildlife Reservoirs** *Are Berentsen, Mike Dunbar, and Bob McLean*, USDA, APHIS, WS, NWRC, Fort Collins, CO	**Emerging Methods of Management and Conflict Resolution** *Rob Erickson*, Wildlife Control Technology magazine, Cortland, IL *Bob Timm*, UC Hopland Research & Extension Center, Hopland, CA
3:40-4:05	**Efficacy of Milorganite® as a Deer Repellent** *George Gallagher, Kristie Moniz, Tiffany Turner, and Stacey Brown*, Berry College, Mount Berry, GA	
4:05-4:30	**GPS Telemetry Collars: Consideration Before You Open Your Wallet** *Christy Wyckoff and Scott Henke*, Caesar Kleberg Wildlife Research Institute, Texas A&M University, Kingsville, TX *Tyler Campbell*, USDA, APHIS, WS, NWRC, Kingsville, TX *David Hewitt*, Caesar Kleberg Wildlife Research Institute, Texas A&M University, Kingsville, TX *Kurt VerCauteren*, USDA, APHIS, WS, NWRC, Fort Collins, CO	**Panel: Management and Research Needs, Current and Future** *Paul Curtis*, Cornell University, Ithaca, NY *Kathleen Fagerstone*, USDA, APHIS, WS, NWRC, Fort Collins, CO *Bill Siemer*, Cornell University, Ithaca, NY
4:30-4:55	**The First Use of GIS Data from Trap Locations as a Technique to Identify the Spread of Skunk Rabies During an Epizootic in Northwestern Wyoming** *Craig Ramey and Jean Bourassa,* USDA, APHIS, WS, NWRC, Fort Collins, CO *Marshall Robin (retired),* USDA, APHIS, WS, Powell, WY	
4:55-5:20	**Impacts of Wildlife Diseases in Urban Environments** *Mike Dunbar, Ray Sterner, and Shylo Johnson*, USDA, APHIS, WS, NWRC, Fort Collins, CO	**Session Summary, and What's Next? (Round-Table Forum)** *Jeff Green*, USDA, APHIS, WS, Lakewood, CO *Scott Smith,* NY Department of Environmental Conservation – Wildlife *Tim Julien*, Nuisance Wildlife Control Operators Association, Indianapolis, IN
5:20-5:55	**Observations on the Use of the Contraceptive Vaccine GonaCon™ in Female Elk (*Cervus elaphus*)** *Gary Killian*, Pennsylvania State University, University Park, PA *Terry Kreeger*, Wyoming Game and Fish Department, Wheatland, WY *Jack Rhyan*, USDA, APHIS, VS, NWRC, Fort Collins, CO *Lowell Miller*, USDA, APHIS, WS, NWRC, Fort Collins, CO	

Thursday, April 12, 2007

	All-Day Field Trips (Optional – varying costs, varying start times)

MHS Kurt

POSTER SESSION:

TUESDAY AFTERNOON THROUGH WEDESDAY EVENING: CORPUS CHRISTI BALLROOM C

A 'Two-Probe' Method to Enhance Efficacy of Toxicant Delivery for Fossorial Mammals
Jay Paxson, University of Nevada Cooperative Extension, Elko, NV

Analysis of Diet and Habitat as a Device for Predicting Feral Hog Presence in the Davis Mountain Preserve, Texas, USA
Katie Ballard, Margarita Gomez, Tara Poloskey, and Sara Schultz, Sul Ross State University, Alpine, TX

Successful Capture and Relocation of Mourning Doves: A Multi-Agency Endeavor
David Borrowman, USDA, APHIS, WS, Kansas City, MO
Tony Mong, University of Missouri, Columbia, MO
Rosemary Heinen, USDA, APHIS, WS, Columbia, MO
Rick Bredesen, Missouri Department of Conservation, Lee's Summit, MO
Joshua Millspaugh, University of Missouri, Columbia, MO

Management of Monk Parakeet Populations at Electric Facilities
Eric Tillman and Michael Avery, USDA, APHIS, WS, NWRC, Gainesville, FL
James Lindsay, Florida Power and Light Company, Juno, FL
Christi Yoder, USDA, APHIS, WS, NWRC, Fort Collins, CO
James Newman, Pandion Systems, Inc., Gainesville, FL
Stephen Pruett-Jones, University of Chicago, Chicago, IL

Developing Strategies for Mitigating Vulture Damage to Structures and Property
John Humphrey, Michael Avery, Eric Tillman, and Michael Milleson, USDA, APHIS, WS, NWRC, Gainesville, FL

GnRH Immunocontraception of Immature Male and Female White-Tailed Fawns
Lowell Miller, USDA, APHIS, WS, NWRC, Fort Collins, CO
Jack Rhyan, USDA, APHIS, VS, NWRC, Fort Collins, CO
Gary Killian, Pennsylvania State University, University Park, PA

Fertility Control in Wild Boar Using a GnRH Vaccine: Effects on Physiology and Behaviour
Giovanna Massei and David Cowan, Central Science Laboratory, Sand Hutton, York, United Kingdom
Lowell Miller, USDA, APHIS, WS, NWRC, Fort Collins, CO

Overhead Gridline Systems to Exclude Waterfowl from Large Bodies of Water
Anthony Duffiney and Aaron Guikema, USDA, APHIS, WS, Okemos, MI
Bryan Wagoner and Jack Hamilton, Detroit Metropolitan Wayne County Airport, Detroit, MI

Development of Test Paradigms for Operant Conditioning of Norway Rats for Behavior Studies
Susan Jojola and Gary Witmer, USDA, APHIS, WS, NWRC, Fort Collins, CO

Chlorophacinone Baiting for Belding's Ground Squirrel
Craig Ramey, George Matschke (retired), and Richard Engeman, USDA, APHIS, WS, NWRC, Fort Collins, CO

Digestive Physiology: The Other Half of Oral Contraceptive Design
Christi Yoder and Lowell Miller, USDA, APHIS, WS, NWRC, Fort Collins, CO

A comprehensive needs assessment of wildlife professionals to identify education and training opportunities
Jessica Tegt and Ben West, Mississippi State University, Mississippi State, MS

Preliminary Results of Coyote Use of an Urban Landscape
Shannon Grubbs and Paul Krausman, The University of Arizona, Tucson, AZ
Elissa Ostergaard, Arizona Game and Fish Department, Tucson, AZ

Pekin duck model for action of Nicarbazin on fertility
Guy Barbato, Pennsylvania State University, University Park, PA
Alex McDonald, Innolytics, LLC, North Caldwell, NJ

Evaluation of Post-Calving Placental Removal on Vulture-Cattle Interactions
George Gallagher, Kayla Jackson, and Brian Warr, Berry College, Mount Berry, GA

Longevity of DayGlo® Fluorescent Particle Marker Used to Mark Red-winged Blackbirds
Shelagh K. Tupper, John L. Cummings and Richard M. Engeman USDA, APHIS, WS, NWRC, Fort Collins, CO, USA.

Commercial Displays

The Wildlife Damage Management Committee is pleased to have the following commercial exhibitors attend and participate:

Advanced Telemetry Systems – David Bryson, 470 First Avenue, North, Isanti, MN 55040

Critter Control – Mike Dwyer, 9435 E. Cherry Bend Rd, Traverse City, MI 49684

Liphatech – Scott McCalley, 349 Sussex Circle, Vacaville, CA 95687

NWCOA – Rick Finney, 13910 Amdio Avenue NW, Uniontown, OH 44685

Wildlife Control Supplies – Alan Huot, PO Box 538, East Granby, CT 060626

Genesis Laboratories, Inc. – Jeff Borchert, 10122 NE Frontage Road, Wellington, CO 80549

ORAL PRESENTATION

ABSTRACTS

Developing a Standard Tool for Assessing Suburban Deer Impacts to Vegetation

Karleen Ami, Nature Technologies, Inc., 101 Castleton Street, Suite 202, Pleasantville, NY 10570, USA
Paul D. Curtis, Cornell University, 114 Fernow Hall, Ithaca, NY 14853, USA

Over the past 30 years, populations of white-tailed deer (*Odocoileus virginianus*) have increased dramatically in many suburban communities, causing significant economic and ecological impacts. Homeowners have observed such deer population explosions and must cope with the problems of living in close proximity to deer. By applying knowledge of deer biology, behavior, and habitat requirements, this assessment tool provides a scale to estimate the severity of deer damage, and the potential success of control measures. The tool can be used to assist wildlife managers, wildlife control operators, environmental researchers, public health biologists, and pest control operators in their deer management strategies in suburban areas. To evaluate deer impacts, foraging pressure and vital components of the deer home ranges are considered. Details may include estimated numbers of deer, times and frequency feeding damage, and if possible, changes in behavior of local deer herds. Home range components may include geographical features, landscape configurations, habitat quality, historic and current land uses, human activities, and historic and current management techniques. These factors, once identified and quantified, are combined to provide an estimated level of impact severity. Expectations for the success of management interventions can be evaluated, and a consistent deterrent strategy applied. This assessment tool will prove valuable by achieving a greater understanding of suburban deer management through a methodical and standardized analysis of impact indicators. Furthermore, by instituting periodic assessments, damage abatement can be optimized, leading to long-term coordination of effective solutions.

Reducing Non-target Rodenticide Hazards in Forest Settings

Wendy M. Arjo, USDA Wildlife Services, National Wildlife Research Center, 9730-B Lathrop Industrial Drive, Olympia, WA 98512, USA
David Bryson, Advanced Telemetry Systems, Inc., 470 first Avenue North, Box 398, Isanti, MN 55040, USA

Mammalian damage to forest resources is widespread and causes annual economic loss. Wildlife damage control is very important to the intensified land use practices and economics of reforestation using seedlings. Reforestation areas provide ideal habitat for many wildlife species; however, animals negatively impact trees more severely during stand establishment than at any other time. While numerous non-lethal and lethal tools are available for large and medium-sized mammals, fewer tools are available for small mammals. The damage caused by these rodent species has in some cases warranted the use of rodenticides to control populations. Rodenticides are effective tools for reducing damage to trees by four of the more problematic rodent genera, voles (*Microtus*), pocket gophers (*Thomomys* and *Geomys*), and recently, mountain beavers (*Aplodontia*), when economic damage justifies this approach in a reforestation system. All of these rodents impede forest regeneration by impacting seedling establishment; however, pocket gophers, mountain beavers and pine voles can also damage saplings and more mature timber through girdling of roots and stems. For the subterranean rodents, primary non-target hazards are reduced from bait placement within the burrow systems during the fall and winter. Timing of bait placement limits exposure of baits to adults and not naïve juveniles who may be more susceptible to predators. Terrestrial secondary hazards are reduced in that the majority of animals that succumb to bait are recovered below ground in their nests. Above ground application for certain vole species can be more of a challenge due to costs, tools available and primary/secondary hazard. Wildlife species are integral to forest health, yet forest management practices can alter available habitat and influence rodent populations. When possible, managers should use rodenticides in an Integrated Pest Management approach to maximize efficacy and minimize secondary hazards.

A Review of Successful Urban Coyote Management Programs Implemented to Prevent or Reduce Attacks on Humans and Pets in Southern California

Rex O. Baker, Professor Emeritus, California State Polytechnic University, Pomona, CA, USA

Since the fatal coyote attack on a 3-year-old girl in Glendale, California in 1981, government agencies have emphasized developing coyote management programs to increase public safety. This presentation will focus on the success of numerous programs including: small neighborhoods, industrial sites, parks and large city and county wide projects. Local environmental conditions attracting coyotes, specific problems caused by the coyotes, public reaction, and the role of public relations including public education emphasizing environmental management will be discussed. Coyote population monitoring regarding behavior patterns, aversive conditioning and coyote population reduction methods will be reviewed. Trapping remains the most affective tool in removing problem coyotes and re-instilling the fear of humans in most cases; however, calling and shooting by well trained personnel are also a very important tool and sometimes the only option. However, factors in the environment influenced by human behavior must be changed to prevent re-occurrences of urban coyote conflicts between humans and pets. Wildlife must always be considered to be wild, not cuddly friends!

Impacts of Urban Coyotes on People and Pets in New York State

Louis T. Berchielli, New York State Department of Environmental Conservation, Albany, NY, USA

There is an apparent increase of coyotes in urban areas of New York State. These coyotes impact the general public by causing safety concerns for children and pets and by causing feelings of grief for attacked and missing pets. Politicians and agencies are impacted by calls to "do something" by constituents. Licensed Nuisance Wildlife Control Operators can be positively impacted by significant business opportunities. Pets are impacted by coyote diseases and by being chased and consumed by coyotes. Efforts to identify and

measure impacts include a Standardized Coyote Incident Reporting System and human dimensions studies. New York is also cooperating with two other studies researching urban coyotes, foraging ecology and statewide coyote population status.

Research Strategies to Aid in the Elimination of Bovine Tuberculosis Infection in Cattle Through Interactions With Wildlife Reservoirs

Are R. Berentsen, Mike R. Dunbar, and Bob McLean, USDA Wildlife Services, National Wildlife Research Center, 4101 LaPorte Ave., Ft. Collins, CO, 80521, USA

Bovine tuberculosis (bTB) is a zoonotic disease caused by *Mycobaterium bovis* and is transmissible to humans, wildlife and domestic livestock. In the northern Lower Peninsula of Michigan, white-tailed deer serve as a reservoir for the disease and pose a significant threat to domestic cattle and captive cervids. Scientists at USDA/APHIS/National Wildlife Research Center have designed a variety of laboratory and field studies to reduce or eliminate bTB infection in cattle by interrupting the transmission of the disease from wildlife reservoirs to domestic cattle. These strategies include reducing bTB in deer by delivery of efficacious oral vaccines, creating effective barriers to cattle/wildlife interactions, and determining the role of wildlife species, in addition to white-tailed deer, in the transmission of *M. bovis* in the environment. To this end, scientists are evaluating whether coyotes serve as a sentinel species to determine the spread of bTB in the environment. In addition, studies are being conducted to assess transmission risks between deer and cattle on cattle farms and to recommend mitigation measures to reduce these risks. Finally, scientists are assisting in the development of target specific vaccine delivery methods for an oral bTB vaccine recently developed for deer. These studies will provide comprehensive information on the role of wildlife-livestock interactions in the maintenance and spread of bTB as well as recommendations of measures to contribute toward its eventual eradication in domestic cattle.

Coyote Damage Control Techniques and Tools

David L. Bergman, USDA/APHIS/Wildlife Services, 8836 N. 23rd Avenue, Suite 2, Phoenix, AZ 85021, USA

The development of techniques and tools to manage coyote damage can be traced back through decades if not through centuries of practice and use in livestock protection and the fur trapping industry. Not all the tools developed for livestock protection on rangelands or for fur trapping can be used in urban environments. The urban coyote damage manager in today's world requires a plethora of tools and techniques that can be successfully used under an integrated wildlife damage management program. Methods include nonlethal management from trapping to harassment, lethal management, education, and legislation. This paper will review the methods that were traditionally developed for livestock protection and fur trapping and discuss their potential use in urban environments. In addition, we will review the recent advances in nonlethal management and the use of education and legislation to manage urban coyotes.

Management of Urban Coyotes and Attacks in Green Valley, Pima County, AZ

Christopher D. Carrillo and *Jim Schmidt*, USDA APHIS Wildlife Services, 8836 N. 23rd Avenue, Suite 2, Phoenix, AZ 85021, USA
Gabriel Paz, Arizona Game and Fish Department, Tucson, AZ, USA
Tim Veenendaal and *David Bergman*, USDA APHIS Wildlife Services, Phoenix, AZ, USA

Coyote attacks on humans, once thought to be rare, have increased in frequency over the past decade. In Arizona the number of wildlife human encounters has increased as our urban environments have expanded into the coyote's natural environment.
Coyotes have learned to utilize drip irrigation, pet food, household refuse, and pets as prey. The problem of potential coyote attacks is magnified if people intentionally feed coyotes. In some situations, coyotes have begun to act aggressively toward humans, chasing joggers/walkers, confronting people walking their dogs, and stalking small children.
People who live in areas where coyotes are present need to understand the potential hazard that these animals pose to their safety. To effectively manage coyotes in an urban environment a variety of control methods must be implemented since no single method is effective in every situation. In 2006, the State of Arizona passed a new law which makes it illegal to feed wild animals (except birds and tree squirrels) in Pima and Maricopa Counties to help alleviate issues with wildlife. Unfortunately, the word has not gotten out and the practice of feeding wildlife continues to occur.
Arizona Game and Fish Department had reported that there have been no bites reported in the Tucson, Arizona area in the past three years. The three year streak was soon to come to an end. During an 11 day period in November 2006 a coyote or coyotes were responsible for attacking and injuring eight people in Green Valley, Arizona, which is located south of Tucson, Arizona. Seven coyotes were removed from the area to end the biting of citizens by coyotes. This paper will review urban coyote issues in Arizona with emphasis on the numerous bite cases in Green Valley.

Cost Effectiveness of OvoControl G for Managing Nuisance Canada Goose (*Branta canadensis*) Populations

Joe N. Caudell, USDA Wildlife Services, 901 W. State Street, West Lafayette, IN 47907, USA
Stephanie A. Shwiff, USDA National Wildlife Research Center, 4101 LaPorte Ave, Ft. Collins, CO 80521, USA

The management of nuisance Canada geese (*Branta canadensis*) is often a necessity in many areas, such as parks and golf courses. Numerous techniques (e.g., egg addling, nest destruction, lethal removal, contraception, etc.) exist to aide in the management of this species; however, the use of certain techniques is often limited due to political or social reasons. A socially popular and potentially cost effective method of controlling Canada geese is the relatively new product OvoControl G, which reduces the hatchability of goose eggs. Our study examines per

unit (eggs, nests, or birds) application costs associated with OvoControl G in comparison to other, non-lethal techniques, such as egg addling and nest destruction. Application costs are composed of the market price of the technique and labor cost to apply the technique. Preliminary results suggest that at low goose densities, addling and nest destruction have a lower per unit application cost than OvoControl G; however, as the number of units rise the per unit costs for OvoControl G falls while the other techniques remain relatively constant. The initial fixed labor cost of OvoControl G, regardless of the bird density, is one of the main drivers of this result. This result indicates that there may be a threshold density where OvoControl G becomes more cost effective than addling and nest destruction. The results of our study highlight that threshold level and provide support for need to potentially reexamine the application restrictions for OvoControl G, if OvoControl G is to become a more cost efficient technique for managing nuisance Canada goose populations.

Operational Challenges of Solving Urban Coyote Problems in Southern California

Terrance A. Cox, USDA APHIS CA Wildlife Services, San Diego Co., CA, USA
John W. Turman, USDA APHIS CA Wildlife Services, Southern District, CA, USA
Joe R. Bennett, USDA APHIS CA Wildlife Services, San Luis District, CA, USA
Dennis L. Orthmeyer, USDA APHIS CA Wildlife Services, Sacramento, CA, USA

We present challenges, methodologies, and solutions related to solving urban coyote problems in Southern California. The physical environment, the diverse urban structure (green belts and parks) with its rich food resources support high coyote densities, combined with the human component (behavior, urbanization, politics), create operational challenges working in Southern California. The increasing disconnect between humans and wildlife, coyote emigration/ immigration in the increasing rural/urban interface, and coyote life cycles occurring exclusively in urban environments all contribute to the increase in coyote-human conflicts. California's southern counties' human population has expanded 13% over a period from 1990-2000 and is projected to increase 55% from 1990-2025. We documented a 228% increase in conflicts between coyotes and pet/hobby animals when comparing two 8-year periods, 1990-1998 to 1998-2006. In addition, we recorded a 300% increase in conflicts between humans and coyotes in comparing these periods. USDA documented (July 1, 2005 to Dec. 31, 2006) a large majority of coyote conflicts in southern California as urban conflicts. Resolving coyote-human conflicts in California requires knowledge of the physical and urban environments and how they affect coyote behavior, California statutes, regulations, and local ordinances, and the ability to work within the human component and understand how these issues place limitations on control methods. As part of an integrated pest management program, we present specific technical assistance solutions such as barriers, elimination of food resources, and harassment. We also discuss applications of direct control of coyotes when a coyote has become aggressive, or inflicted harm to humans or pets.

Suburban Coyote Management and Research Needs: A Northeast Perspective

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Gordon Batcheller, New York State Department of Environmental Conservation, Division of Fish, Wildlife, and Marine Resources, 625 Broadway, Albany, NY 12233, USA

Several factors may be responsible for increasing predator abundance in suburbia. These include an enhanced forage base associated with residential sprawl, and protection of predator species that were once persecuted and suppressed by hunters, trappers, and landowners. In the Northeast, anecdotal reports of coyotes killing pets in backyards are on the rise. The bulk of coyote complaints, concerns, and questions received from the public by state wildlife agencies are from areas with high human populations. Scant research exists on coyote behavioral ecology in human-altered landscapes. Biologists and managers need to understand changes in the social structure and territorial behavior of coyotes. It is important to know when a predator is active and where it forages, especially in relation to human activity. The emerging picture of suburban coyotes is that they move quickly through human-dominated landscapes and do not discriminate between wildlife and pets when foraging. Data concerning birth rates and survivorship are needed to model future population growth. Reliable and cost-effective census techniques are currently lacking. The impact of growing and more visible coyote populations on deer abundance is a concern in some areas. Studying coyotes in residential areas will provide baseline data for public education programs to reduce human behaviors that lead to coyote conflicts.

A Landscape-Genetic Approach to the Management of Feral Pigs in South Texas

Johanna. Delgado-Acevedo and Randy. W. DeYoung, Caesar Kleberg Wildlife Research Institute, Texas A & M University-Kingsville, MSC 218, 700 University Blvd, Kingsville, TX 78363, USA
Tyler. A. Campbell, USDA Wildlife Services, National Wildlife Research Center Texas A&M University-Kingsville, MSC 218, 700 University Blvd., Kingsville, TX 78363, USA

Feral pigs are considered an exotic invasive in the U.S., where conservative estimates indicate an annual loss of $200/pig due to agricultural damage. Feral pigs are susceptible to diseases that affect livestock, humans, and wildlife (e.g., brucellosis, pseudorabies, foot and mouth), provoking concern over the potential for disease risks associated with feral pig. Population reduction (trapping or shooting) is the best current alternative for controlling pig damage and reducing opportunities for disease transmission. However, reduction is crude and inefficient in terms of manpower and resources because pigs from neighboring areas quickly re-colonize managed areas. To achieve long-term control, re-colonization of managed areas must be prevented. Therefore, one must either 1) manage at the scale of local populations, or 2) identify and target dispersal corridors. The new discipline of landscape genetics, the combination of genetic methods with GIS technologies, offers a powerful new tool for the large-scale management of wildlife. Texas has one of the largest populations of feral pig in the world and suffers

significant agricultural damage and disease risk from pig. We will use a combination of genetic markers and GIS tools to define feral pig population structure, dispersal rates, and movement patterns at the landscape scale. The results will be used to formulate management plans for scenarios ranging from alleviating agroecosystem damage to coping with serious disease concerns. To date, we have collected over 400 samples throughout south Texas and are in the process of extracting and amplifying DNA. Sample collection will continue for an additional 2 years.

Urban Feral Hog Control: A Delicate Balancing Act in Fort Worth

Robert Denkhaus, Fort Worth Nature Center & Refuge, 9601 Fossil Ridge Road, Fort Worth, TX 76135, USA

Expanding feral hog (*Sus scrofa*) populations and urban sprawl have increasingly brought humans and hogs into contact. The methods for hog control are well documented; the methods for gaining unanimous support are not. Controlling urban hog populations can lead to significant conflict between wildlife managers and stakeholder groups and requires performing a delicate balancing act to be successful. Animal welfare groups may oppose the use of lethal control measures. Hunters may hope to gain access to a huntable resource. Community groups may desire a significant source of free meat. Natural resource managers wish to remove the offending hogs in the most efficient and ecologically sensitive manner possible. The Fort Worth Nature Center and Refuge, a 3,600+ acre urban green space managed as a natural, native landscape, developed and implemented a widely accepted ongoing lethal feral hog control program that addresses the concerns of the animal welfare community and other stakeholders. It is imperative that wildlife managers practice open communication and be sensitive to the diverse, and sometimes opposing, concerns of all stakeholders to facilitate a successful control program.

Evaluation of Corn and Soybean Damage by Wildlife in Northern Indiana

NOTE – this presentation was originally accepted into the conference but due to circumstances beyond the authors' control could not be presented. This presentation will be included in the conference proceedings.

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Monica I. Retamosa, Instituto Internacional en Conservación y Manejo de Vida Silvestre, Universidad Nacional, Apartado 1350-3000 Heredia, Costa Rica
Olin E. Rhodes, Jr., Department of Forestry and Natural Resources, Purdue University, 195 Marsteller Street, West Lafayette, IN 47907, USA

In 2003 we began a multifaceted research program to investigate aspects of wildlife damage to corn and soybean crops in northern Indiana. Moreover, we examined movement patterns, habitat use, and home-range characteristics of species commonly associated with row-crop damage to determine how their spatial ecology related to the extent and timing of depredation events. Here, we present a summary of our research, covering field surveys of crop damage (160 fields over two years), statistical models investigating landscape-level effects on the probability of crop damage (both within fields and among fields), radio-telemetry studies of white-tailed deer (*Odocoileus virginianus*), raccoons (*Procyon lotor*), and wild turkey (*Meleagris gallopavo*), and stakeholder surveys. We recorded 582,515 depredation events (73,100 to corn and 509,415 to soybeans) over two years of field sampling. Raccoons and deer were responsible for >97% of the damage to corn (87% and 10%, respectively); deer (61%) and groundhogs (*Marmota monax*; 38%) were responsible for nearly all damage to soybeans. Surveyed fields exhibited a high variance in levels of crop damage by wildlife. Statistical modeling indicated that crop damage was best predicted by a combination of local and landscape variables, although proximity to forest patches consistently was the most important indicator of crop damage. Radio-collared deer and raccoons constricted their home ranges when crop depredation was most severe, and exhibited increased use of forest fragments and crop fields over other habitat types. Our surveys suggested that most landowners suffered noteworthy crop damage by wildlife, but their perceptions regarding the species responsible for monetary losses did not correspond closely with our field survey data. In addition to regulated hunting, we suggest that targeted removals of depredating species, concentrated along crop-forest interfaces, may be an effective, cost-effective means of reducing corn and soybean damage in heavily affected areas.

Impacts of Wildlife Diseases in Urban Environments

Mike R. Dunbar, Ray T. Sterner, and Shylo R. Johnson, USDA Wildlife Services, National Wildlife Research Center, 4101 LaPorte Avenue, Fort Collins, CO 80521-2154, USA

Nearly 70% of diseases affecting humans originate in wildlife. Emergence and re-emergence of wildlife-borne diseases pose considerable health impacts and monetary costs. Monitoring, preventing and treating these diseases pose new challenges, with high density urban environments likely to exacerbate transmission and impacts. Specifically, bovine tuberculosis has become a re-emerging disease in some areas of the Mid-west, with wildlife reservoirs contributing to this re-emergence. Wildlife variants of rabies are costing over $300 million annually to detect, prevent and control in the U. S. West Nile virus, with wild birds as hosts and vectors, has killed over 785 people in the U. S., as well as thousands of horses, and millions of wild animals, mostly birds, since it was first detected in 1999. Concern over avian influenza virus (High pathogenic, H5N1), which some predict could mutate and result in a human to human transmission, and which could possibly be carried by wild birds from Asia, has resulted in sizable allocations of funds for surveillance, research and vaccine stockpiles. Will some wildlife borne disease, named or unnamed, become the next pandemic? As city dwellers and their pets have increased contact with wildlife via greenbelts, undeveloped areas and increased numbers of urban wildlife, wildlife-borne zoonotic diseases could exacerbate emerging disease impacts upon

society. This paper presents a review and analysis of select literature relevant to wildlife-borne diseases, their potential economic impacts and the risks posed by transmission within highly populated urban centers in the United States.

Reducing Rodenticide Hazards: Introductory Comments

John Eisemann and Gary Witmer, USDA Wildlife Services, National Wildlife Research Center, 4101 LaPorte Avenue, Fort Collins, CO 80521, USA

Rodents comprise the single largest group of mammals; about 40% of all mammal species. They occur worldwide and have adapted to most types of ecosystems. Rodents provide many ecosystems functions: e.g., aerating and mixing soil, seed and spore dispersal, alter plant succession, and are prey for many animal species. While most rodent species do not cause serious damage problems, a small number of species (both native and non-native) do. Rodent-caused damage includes crop and stored food consumption and contamination, forestry and nursery damage, rangeland damage, ornamental plant damage, property damage, cable and irrigation pipe damage, disease transmission, and, when introduced to islands, damage and even extinction of native flora and fauna. Many tools are used to reduce rodent populations and damage: e.g., traps, barriers, repellents, altered land use practices, flooding, predator introduction, glue boards, and rodenticides. Rodenticides are an especially important tool in rodent management. Many types of active ingredients and formulations are available for different species and situations. Rodenticides and their use are regulated by the U.S. Environmental Protection Agency (EPA) and authorized State agencies. Following regulatory review, the approved label dictates how the product must be used and who has authority to use the product. All labels contain mitigation measures are required to reduce the risk to workers, consumers, pets, livestock, non-target animals and the environment. Recently, the EPA has been re-evaluating many of the major rodenticides as part of the periodic re-registration process. To reduce the number of accidental exposures by children and impacts to non-target wildlife, the EPA has proposed new mitigation measures to reduce the hazards of certain rodenticides that are used in and around homes and other buildings. If implemented as proposed, these mitigation measures will significantly impact the availability of some of the most common rodenticides. In this Special Session, invited speakers address the many issues involved and the various perspectives on the uses of rodenticides and the reduction of potential hazards from their use in various settings.

Big Brother Is Watching You (Really!): Trapping Coyotes Among 8,000,000 People

Rob Erickson, Wildlife Control Technology Magazine, P.O. Box 480, Cortland IL, USA

The recent surge in coyote attacks on domestic animals and the presence of bold coyotes around humans in Chicago and its surrounding suburbs has prompted municipalities to inquire about the removal of aggressive coyotes. I will discuss the importance of creating a comprehensive program to assist municipalities in resolving these conflicts. The municipalities are in agreement that the issue is not that all coyotes are bad and in need of removal, but that aggressive coyotes cannot be tolerated. The techniques and strategies I use demonstrate sensitivity to varying opinions on coyote management, and city officials and residents been positive toward my methods. The use of selective restraining devices has been very successful as has the use of the 4-coil, padded jaw Jake trap (J. C. Conner, Newcomerstown, OH). A comprehensive plan to educate residents on how not to attract the animals to human areas needs to be provided along with the removal of the alpha coyotes (pairs) involved in these conflicts. I encourage the necropsy of all euthanized coyotes to gain additional information on their health status at the time of capture. Most often the animals have been feeding on domestic dog food, which reinforces the need for education programs for all residents.

Impact of Urban Coyote on People and Pets in the City of Austin and Travis Co., Texas

Randy O. Farrar, Texas Cooperative Extension – Wildlife Services, 1600-B Smith Rd., Austin, TX 78721, USA

The City of Austin collects citizen reports of coyote observations or conflicts through a toll free non-emergency 311 call system. The data generated by the call includes the time and location of the observation or incident, the type of coyote behavior exhibited (e.g., coyotes in streets or yards, or coyotes attacking pets), and constituent contact information. The 311 call system logged 1207 calls regarding coyotes between December 2004 and February 2007, of which approximately 22% of the calls generated ($n = 262$) were classified as "aggressive" coyotes by constituents. A total of 106 calls, or approximately 9% of the total calls generated, were reports of observations of coyotes attacking pets during night hours ($n = 51$), attacking pets during daylight hours ($n = 29$), attacking pets in close proximity to humans ($n = 11$), or observations of coyotes on school playgrounds ($n = 13$), or coyotes acting aggressive towards adults ($n = 2$). In addition, a total of 156 calls were reports of what constituents described as "aggressive" coyotes that were presumably responsible for missing pets, or constituent reports of the sounds of coyotes presumably attacking and killing pets or other animals in greenbelts. A total of two adult humans have undergone post-exposure rabies vaccination as a consequence of exposure to coyote bites and/or saliva. The implementation of an urban coyote management program in January 2005 involving public education for preventing conflicts with coyotes, and the targeted trapping of coyotes in problem areas has resulted in a 60% reduction in reported observations of pet depredation by coyotes and reports of coyotes threatening human health and safety between the years 2005 to 2006.

Reducing Rodenticide Hazards: Is There a Problem?

Michael Fry, American Bird Conservancy, 1731 Connecticut Avenue, NW, Washington, DC 20009, USA

American Bird Conservancy data compiled in the Avian Incident Monitoring System (AIMS) database indicate that approximately 10% of all identified wild bird poisonings are the result of primary or secondary poisonings by rodenticides, as indicated from residue analysis of

carcasses. Brodifacoum and bromodialone were responsible for the highest proportion of secondary rodenticide poisoning cases. The raptors killed in the highest numbers were red-tailed hawks, great horned owls, and eagles (bald and golden). Strychnine and, to a lesser extent, zinc phosphide were responsible for deaths of thousands of grain eating birds, presumably from primary poisoning. The increased risks from second generation anticoagulants have been confirmed with field data from California, Canada, France, and the UK, which all indicate significant secondary toxicity risks to predatory birds, bobcats, mountain lions, and foxes from second generation anticoagulants. Laboratory studies conducted under GLP conditions using EPA protocols for anticoagulants with first generation (chlorophacinone, diphacinone, warfarin) and second generation (bromodialone, brodifacoum, difethialone, and difenacoum) chemicals indicated that all compounds are greater than 90% effective (Mach, 2006). Furthermore, time to death was very similar for all compounds tested with median times to death of 4.5-6 days. Because time to death is similar, the more acutely toxic second generation compounds have a greater potential to overload target animals and pose a significantly greater secondary toxicity hazard to raptors and mammalian scavengers. Use of the lower acutely toxic first generation chemicals should reduce non-target risks. The US EPA recently proposed a mitigation plan for rodenticides that curtails over the counter sales of second generation anticoagulants, and requires the use of tamper resistant pre loaded bait stations for all non-restricted sales of first generation chemicals. American Bird Conservancy believes these measures will significantly reduce secondary poisonings of raptors and predatory mammals, and will reduce the approximately 15,000 child poisonings from rodenticides documented each year by the American Association of Poison Control Centers' National Poisoning and Exposure Database.
American Bird Conservancy believes the continuing use of grain baits above ground in agricultural settings is responsible for direct poisoning of many protected birds each year, and we recommend prohibition of aerial applications of chlorophacinone and strychnine, and curtailment of the special local needs (FIFRA Section 24(c)) use of grain baits in Western States for prairie dog control, unless better education and enforcement to eliminate illegal practices are conducted.

A Review and Update of Biomarkers Used for Wildlife Damage and Disease Management

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Biomarkers are distinctive biological indicators used to identify, often through indirect means, when an event or physiologic process of interest has occurred in an animal. Historically, a variety of biomarkers, as well as bait-markers, have been used in wildlife management including radioactive isotopes, sera markers, stable isotopes, dyes, and antibiotics. Research in developing a safe, easy to use, bio- or bait- markers continues to be of interest to wildlife researchers and managers. The ability to successfully track, monitor, and identify animals using minimally invasive techniques is becoming increasingly important as wildlife-human interactions increase. This paper is an overview of the benefits and limitations of previously and presently used biomarkers in wildlife management, and is punctuated with an update of research being conducted at the National Wildlife Research Center on the use of biomarkers including rhodamine B, a commercially available dye. Tetracycline has often replaced rhodamine B as the biomarker of choice because it is difficult to handle (stains). Encapsulation technology has mediated this problem and reignited interest in rhodamine B as a potential cost-effective, easy to use biomarker to evaluate animal damage programs and the USDA-APHIS Wildlife Services Oral Rabies Vaccination program. Rhodamine B marks animals by producing fluorescence in all growing tissue including vibrissae, fur, bone, and teeth after it is ingested. The variety of tissues it marks allows for non-invasive sampling techniques to be used to monitor the uptake of this biomarker. In addition to an overview of biomarkers used in wildlife management, we will present preliminary data on the effectiveness of rhodamine B as a biomarker in raccoons.

Efficacy of Milorganite® as a Deer Repellent

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The objective of this study was to determine the effectiveness of Milorganite® as a potential repellent to mitigate damage incurred to chrysanthemums (*C. morifolium*) by free ranging white-tailed deer (*Odocoileus virginianus*). Milorganite®, the biosolids by-product left from the activated sludge process from the Milwaukee Metropolitan Sewer District, has had extensive use as an organic, slow releasing fertilizer and soil amendment. Application of Milorganite® as a top dressing, at three dose levels (1200 kg/ha, 2500 kg/ha, 5000 kg/ha) reduced damage ($p<.05$) to planted chrysanthemums by white-tailed deer over the 35-day study. While not significantly different ($p>.05$) compared to the lowest treatment level (1200 kg/ha), there was a trend toward a dose response effect as determined by analysis of plant area from digital photographs. Protection appeared to be directly related to the topical application of the deterrent to the plant with odor from adjacent treated and control areas within a plot having no measurable influence on reducing plant damage. Based on these results, Mliorganite® was determined to be effective at reducing plant damage by the browsing of free-ranging white-tailed deer.

Ecology of Coyotes in Urbanized Landscapes

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Coyotes have become common in many metropolitan areas across the United States. Recent research has focused on the urban ecology of coyotes to better our understanding of how they exist in urbanized landscapes. I summarize findings from a variety of radiotelemetry studies of coyotes in or near metropolitan areas, and focus on three areas of coyote ecology: food habits, landscape/habitat use, and survival rates. Although there are variations among studies in scope of work and level of urbanization, some patterns are apparent. Coyote food habits in

urbanized areas are similar to rural areas, in which mammalian prey and vegetation (i.e., fruit) comprise most of the diet; however, there is a trend toward more anthropogenic items from more developed areas. Size of coyote home ranges (mean home range sizes among urban studies ranged 5 - 13 km^2) generally exhibit a negative trend with urbanization when compared to rural studies, but this is complicated by a trend within urban landscapes in which coyote home ranges tend to increase with fragmentation and development. This increase in home range size within urban landscapes is probably affected by a relatively low use by coyotes of human-use areas (in some cases avoidance), at least during the day. Studies have consistently reported a decrease in diurnal activity with human use areas. Although coyotes typically avoid human use areas, they are nevertheless frequently in close proximity to people. Most studies have reported relatively high survival rates (annual S = 0.5 - 0.72), with vehicle collisions the most common cause of mortality. The relatively small home-range sizes and high survival rates suggest coyotes are successful in adjusting to an urbanized landscape.

Endangered Species and Migratory Bird Treaty Act Considerations in Rodenticide Registration and Use

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The Endangered Species Act and the Migratory Bird Treaty Act protect wildlife from injury or harm resulting from human activities, including pesticide use. In administering these laws, the U.S. Fish and Wildlife Service (USFWS) advises federal and state agencies, and private landowners and organizations of ways in which to minimize the adverse effects of rodenticides upon threatened and endangered species, and migratory birds. Technical assistance and formal consultation with USFWS can occur on both the registration and use of a rodenticide, and may result in general mitigation to the overall labeled use of a product, or site-specific modification based on the presence of a sensitive species or habitat. To date, the U.S. Environmental Protection Agency, which is the federal agency responsible for registering pesticides, has consulted with the USFWS on rodenticide registrations limited to local areas (e.g., Special Local Needs registrations). However a comprehensive assessment of potential effects to threatened and endangered species and sensitive populations of migratory birds has not been completed to date for any currently registered rodenticide. Thus, reliance solely on labeled use restrictions may not adequately protect vulnerable species of wildlife. Rodenticides have been associated with mortality incidents involving the endangered San Joaquin kit fox, the threatened bald eagle, the previously endangered peregrine falcon, and numerous species of migratory birds.

Are Sunflower Fields for the Birds?

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The northern Great Plains host a variety of migratory birds throughout the year. Migratory species use small native grasslands, restored grasslands, introduced shelterbelts, and agricultural fields for food and shelter. We examined the literature in order to characterize avian use of agricultural fields in North Dakota. Blackbirds are a major component of agricultural systems and are capable of causing severe damage to sunflower, corn, and small grains in this region. Producers have a variety of management tools at their disposal to reduce blackbird damage to crops. These tools include harassment of birds with pyrotechnics, percussion devices, aircraft, olfactory repellents, genetically modified crops, or other means of disturbance. Few studies have assembled an inventory of nonblackbirds using small grain fields during the fall and spring in North Dakota that may be susceptible to these disturbances. Research conducted by North Dakota State University in cooperation with Wildlife Services has shown that at least 94 species use crop fields in the spring and fall in North Dakota. Seventy-eight species exceeding 22 nonblackbirds/ ha have been observed in sunflower in the fall and 29 species at 2.6 nonblackbirds/ha have been observed in the spring. Sunflower is an important stopover area for a variety of migratory birds in the fall in North Dakota. We recommend using an integrated pest management / wildlife habitat system including Wildlife Conservation Sunflower Plots (decoy plots) as an alternative to intense harassment.

Missouri's Task Force Approach to Feral Hog Management

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Feral hog (*Sus scrofa*) populations are expanding in the State of Missouri. The expansion of this invasive species is of concern to agricultural and conservation agencies and organizations. Feral hogs are well known for damaging the environment, crop damages, competition with other wildlife, and the threat of diseases to man and other animals. Missouri developed a 16 member task force to prepare a management strategy for the control/eradication of the feral hog. The state director (author) of USDA-APHIS-Wildlife Services serves as the chairman of the collaborative group making up the task force. The task force set 3 primary strategies: 1) document all hog sightings and locations in the state, 2) implement control methods to reduce/eradicate the feral hog population, and 3) conduct disease surveillance on all hogs collected to determine the risks the hogs pose to other livestock as well as man and other wildlife. The task force has been instrumental in implementing these management strategies during a time when all agencies and organizations are tight on funding. The collaboration has brought several groups together to plan and implement a management strategy that could not have been implemented by any single participant. This paper presents the management strategies successes and shortcomings of Missouri's task force approach and provides recommendations to other states that may implement feral hog management.

Suitable and Effective Coyote Control Tools for the Urban/Suburban Setting

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The incidence of human conflict with coyotes in urban/suburban environments continues to increase countrywide, and is fueling the need for suitable coyote trapping methods and devices. Traditional tools, such as footholds and snares, are just not politically acceptable in urban/ suburban situations because of public anxiety about the risks to non-targets associated with these devices. However, recent advances in trap technology, as exhibited by the KB Compound 5.5™, the Belisle™ footsnare, and the Collarum™, have gone a long way to address both capture efficiency and animal welfare concerns. While trap technology research continues, wildlife managers and regulators should keep these aforementioned devices in mind when looking for ways to resolve urban/suburban coyote conflicts.

Field Method for Analyzing Birds for Avicide 3-Chloro-*p*-toluidine Hydrochloride

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We developed a fast and simple method to detect presence or absence of DRC-1339 (CPTH: 3-Chloro-*p*-toluidine Hydrochloride) in birds that fed on DRC-1339 bait sites. We compared the effectiveness of the colorimetric method to the previously published analytical method using birds collected from DRC-1339 bait sites in Louisiana and Texas. We also conducted cage testing with Red-winged blackbirds to determine if time from consumption of DRC-1339 treated bait to death and time from death to colorimetric analysis had an affect on test results due to the unstable nature of DRC-1339. The colorimetric assay of DRC-1339 in birds collected from DRC-1339 bait sites was effective in detecting the presence or absence of DRC-1339. Four grains of treated rice consumed could be detected up to 120 minutes post consumption while 1 grain of treated rice consumed would go undetected. Frozen samples of 4 treated consumed rice grains could be detected up to 90 days post collection.

Why Wildlife Populations Must be Controlled

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Opposition to the active management of wildlife populations has been growing among the media, public, and key decision makers. The unnecessary killing of native wildlife should be opposed, as it can lead to ecological, conservation and other problems. However, there are many cases in which the lethal control of wildlife populations is both necessary and desirable. These include the control of: (1) destructive, exotic species; (2) wildlife that is threatening human safety or livelihoods; (3) wildlife that competes with or preys upon endangered or threatened species; and (4) locally over-abundant wildlife that has the potential to alter entire ecosystems. While much more can be done to prevent such situations from occurring, wildlife managers will need all of the tools in their toolbox in order to maintain the tenuous balance that exists between wildlife and humans and between various wildlife species and their habitats. A greater effort must be made to educate the public, media and key decision makers about the realities of wildlife management and conservation in our contemporary world.

Reducing Rodenticide Hazards: Risk Assessment and Research Needs

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Secondary hazards represent the most significant hurdle to the continued and possibly expanded use of anticoagulant rodenticides. Non-target scavenger and/or predator species may be exposed to these rodenticides via feeding on the carcasses of poisoned target species. Risk assessments provide a means to estimate the probability of rodenticide associated adverse effects to non-target species. Quantification of risk provides critical information for decision-makers to weigh the benefits versus the risks of proposed rodenticide uses. Risk assessment approaches can also be used to identify pesticide use strategies (formulations, bating practices) which minimize non-target secondary risks yet are efficacious. We are currently developing probabilistic and physiologically based pharmacokinetic models to improve the accuracy of anticoagulant rodenticide risk assessments.

Controlling Coyotes in an Urban Environment – Effective Evaluation of Request for Control Services by the General Public

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The incidence of request for control services in regards to human conflict with coyotes in urban/suburban environments continues to increase countrywide, and has created a need to have a systematic way of evaluating the perceived need for control to determine first if control is necessary and or would be effective in solving the problem. Generally we have found the Public is uninformed and surprised by their first sighting or encounter with Coyotes. We have taken an approach that allows us to evaluate the clients concerns and enable us to make recommendations to them on possible control methods that might be effective, practical and economically feasible for any given situation. Most calls from the public do not require control and we needed to save time and money for the client and ourselves as a business. This model decision process could be used by anyone to evaluate Urban Coyote Conflicts in deciding if control was needed or warranted.

Observations on the Use of the Contraceptive Vaccine GonaCon™ in Female Elk (*Cervus elaphus*).

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Overabundant populations of elk (*Cervus elaphus*) are a significant concern in some areas of the west because of potential ecological damage and spread of brucellosis to domestic livestock. *Brucella abortus* is likely transmitted among elk through direct contact with aborted fetuses, placentas and associated fluids or post partum discharge of infected animals. Because transmission of brucellosis is dependent on pregnancy, contraception or sterilization of cows would provide a tool for use in a disease management strategy as well as population control. In previous reports, we have documented the multi-year success of GonaCon™ as a contraceptive vaccine in female deer when administered as single shot. The objective of this study was to evaluate the contraceptive efficacy of GonaCon™ in female elk. In September 2004 cows maintained at the Wildlife Research Unit in Sybille, WY were given a single immunization of either 1mg GonaCon™ (n=14) or 2mg GonaCon™ (n=10) and compared to a group untreated controls (n-13). During the study several cows died in each group without apparent relationship to the treatments. At the beginning of November of 2004 and 2005 cows were grouped with bulls for the breeding season. Blood samples were taken in February of 2005 and March of 2006 for pregnancy testing, progesterone assays and antibody titers. The percent of cows in each group that did not did not calf in 2005 and 2006 was 93% and 90%, respectively for 1mg GonaCon™; 90% and 100% for 2mg GonaCon™ compared to 23% and 43% for Controls. These results indicate that a single administration of either dose of GonaCon™ is highly effective for reducing calving rates of cows for at least two year. These findings suggest that use of GonaCon™ to control overabundant populations of elk and/or to evaluate for a strategy to control brucellosis warrants consideration.

Efficacy of 3 In-Burrow Treatments to Control Black-Tailed Prairie Dogs

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Management of prairie dog movement by colony expansion or dispersal primarily involves the use of toxicants to reduce local populations. Hazards associated with the use of toxicants cause concern for nontarget species. Applying the bait in-burrow should reduce the primary exposure of the toxicants to nontarget wildlife. Some literature suggests prairie dogs will not consume bait when applied in the burrow. In this trial we compared efficacy of Rozol® (chlorophacinone), Kaput®-D (diphacinone) and 2% zinc phosphide oats applied in-burrow and 2% zinc phosphide applied on the surface as the standard..

Blackbird Use of Wildlife Conservation Sunflower Plots

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In North Dakota, annual blackbird damage to sunflower ranges from $5-10 million. Blackbird damage to ripening sunflower has forced some growers to plant alternative crops. From 2004 to 2006, USDA-Wildlife Services cost-shared Wildlife Conservation Sunflower Plots (WCSP) with sunflower growers. The objective of the WCSP was to provide blackbirds an attractive nearby alternative food source to reduce damage to commercial fields. A secondary benefit of WCSP was to provide a safe-haven for other wildlife that may frequently use shelterbelts and wetlands along the edges of sunflower fields. In 2004 (n=13), 2005 (n=21), and 2006 (n=25), sunflower damage in the WCSP's was 39%, 32%, and 60%, respectively. Damage in nearby commercial fields was 5% in 2004, 4% in 2005, and 18% in 2006. In 2006, dry conditions may have concentrated blackbirds into bigger roosts in the larger and deeper wetlands, contributing to higher levels of sunflower damage compared to 2004 and 2005. Lower levels of damage in 2004 and 2005 may have been caused by the greater availability of wetlands, which dispersed the groups. We believe that avian use of WCSP was influenced by the nearness of shelterbelts, cattail-dominated wetlands, and contiguous blocks of commercial sunflower. We speculate that WCSP can reduce bird damage in nearby commercial fields.

Human-Wildlife Conflict: A Case for Collaboration

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Human-wildlife conflict (HWC) is a serious obstacle to conservation world-wide and will continue to become more prevalent as human population and development increase. Conservation and development efforts often lack knowledge, tools, resources and expertise needed to address the complexities of HWC, especially when working in isolation from one another. Practitioners in all sectors would benefit from opportunities to exchange ideas and information across project sites and with other organizations, in order to learn about and develop best practices in preventing and mitigating HWC. The Human-Wildlife Conflict Collaboration (HWCC) aims to prevent and mitigate human-wildlife conflict (HWC) through a global network and partnership of diverse stakeholders across sectors and disciplines that facilitate collaborative learning, innovation, scientific analysis and development of best practices. Targeted activities of the collaboration will meet the collective need for improved information exchange, awareness raising and communication among key sectors; capacity building and training among practitioners; improved decision making and policy development; and enhanced understanding of the human dimensions of HWC.

HWCC evolved out of consultations among HWC practitioners who realized that sharing ideas, information and experiences was an essential resource in preventing and minimizing human-wildlife conflict in the areas where they work, despite differences in culture, language, wildlife species managed, ecological conditions and political obstacles. The need for a partnership initiative like HWCC was identified by a workshop of HWC practitioners at the 5th IUCN World Parks Congress in 2003, in Durban, South Africa, and recognized in the Congress's formal recommendations. In November 2006, more than fifty conservation professionals convened in Washington, D.C. to identify priorities for collaboration in HWC and to develop a framework for pursuing those priorities. The result was the launch of the HWCC. The Wildlife Society, located in Bethesda, MD, committed to host the HWCC's office and serve as fiscal agent.

Feral Hogs: A Texas Perspective

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Feral hog (*Sus scrofa*) populations are a growing concern, and evidence of their presence has spread, throughout the state. With the exception of a few areas in the northern panhandle, this invasive species successfully exists in almost every county; and evidence of their exponential population growth and the damage they cause is no longer confined to rural areas. Feral hogs affect farmers, livestock producers, private and public industry, and individuals living in suburban and urban areas. Wildlife, agriculture, property owners, animal health and public health interests are all experiencing feral hog issues at different levels. Surveys indicate that the presence of feral hogs, impact Texans in a variety of ways including: damage to croplands, predation of livestock, destruction of natural resources and urban landscaping, and the threat of disease transmission to domestic livestock and people. The perspective most often heard in Texas is one of disdain for the feral hog. However, there are some that enjoy the sporting and economic opportunities feral hogs provide. The consensus is, however, that there is much to learn about this adaptable species. Continued research is needed to understand the biology and behavior of feral hogs to better manage this species and how their presence impacts all the parties involved. The perspective of the feral hog in Texas is one of differing viewpoints and priorities. This paper will seek to explore some of the issues surrounding this invasive species.

Conserving Cheetahs on Private Land: Using the Namibian Cheetah *Acinonyx jubatus jubatus* as a Case Study

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Conflict between humans and large carnivores is widespread and well documented in Africa, and has been one of the chief causes of the dramatic population declines seen in species such as lions *Panthera leo*, cheetahs *Acinonyx jubatus* and African wild dogs *Lycaon pictus*. While protected areas provide important refuges for many carnivores, some species, such as cheetahs and African wild dogs, cover such large areas that presently demarcated protected areas are insufficient to maintain long-term viable populations across much of their range. Over the past century, the world's cheetah population has undergone severe reduction in both numbers and range. This is due to factors such as habitat fragmentation resulting from human development, the depletion of their natural prey base as land becomes dominated by agriculture and the resultant conflict with humans for livestock and farmed game and removals of the carnivore which exacerbates population decline. Although long-term studies have provided useful information regarding the ecology and biology of the cheetah, the real conservation challenge lies in a better understanding of human behavior and attitudes towards the cheetah. Only by addressing human issues can cheetah conservation strategies be implemented across large areas of their range. This paper examines and discusses novel approaches aimed at modifying human behavior including non-lethal predator control and incentives for conservation on private land. We use the example of a long-term study of cheetahs living on commercial Namibian farmland to explore these issues and to share information regarding conservation strategies that have proved effective. Although techniques used in Namibia would have to be refined depending on individual circumstances, lessons learned through this study are likely to have widespread applications in other places where conservation on private land is critical to the maintenance of viable populations of large carnivores and in those areas most critical for future cheetah conservation.

Characterization of Wild Pig Vehicle Collisions

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Wild pig (*Sus scrofa*) collisions with vehicles are known to occur in the United States; however, data characterizing these collisions have not been reported to date in the scientific literature. Some information from the native portions of the species range in Europe is available. In an effort to better characterize these accidents, data were collected from wild pig-vehicle collisions from a location in west central South Carolina between 1968 and 2006. The data collected included parameters pertaining to the animal(s) involved, the timing of the accident, and the location of the collision. The age structure of the animals involved in these collisions was significantly older than that found in the population. Yearling males were the most frequent age class/sex grouping. Most collisions involved single animals, although this ranged up to seven animals involved in one accident. As the number of animals increased, the mean age of these individuals decreased. The percentage of males was significantly higher in the single-animal accidents. Estimated annual attrition to vehicles collisions varied from 0.10 to 2.52 percent of the population. Wild pig-vehicle collisions occurred throughout the year. The frequency varied significantly by month, weekday and general daily time period; however, seasonal differences were not significant. Most accidents took place on primary roadways. The only roadway parameter associated with a significantly higher frequency of wild pig collisions was the presence of lateral barriers. The vehicle damage estimates from these collisions with wild pigs ranged from $100 to $4,000.

Avian Influenza in Wild Birds: Environmental Sampling Strategy for the Rapid Detection of Avian Influenza Viruses

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All subtypes of influenza Type A virus infect wild birds, especially waterfowl and shorebirds, and rarely cause disease or mortality in these aquatic species. Aquatic birds are the natural reservoirs for low pathogenic avian influenza viruses (LPAI) which are distributed globally. However, some AI subtypes can be virulent in other animals and humans and some highly pathogenic AI viruses (HPAI) have caused major outbreaks in poultry and even pandemics in the human population. The recent emergence of a HPAI H5N1 subtype in southeast Asian poultry in 2003 subsequently involved migratory waterfowl in 2005 and has since spread westward throughout the Asian, European, and African continents. This rapid continental spread alarmed animal health and human health agencies in North America and initiated the establishment of a National Strategy For Pandemic Influenza in the United States (USA) to increase and expand surveillance for the early detection of this virus, to improve and expand preventative measures, and to develop contingency responses to possible outbreaks. One of the methods of emergency surveillance that was developed and implemented was an interagency, early detection system for HPAI H5N1 avian influenza in wild migratory birds that have the potential to introduce the virus from Asia or Europe and spread the virus throughout the USA. As part of this early detection system, the Wildlife Services National Wildlife Research Center developed sampling protocols, guidelines, and analyzed 50,000 environmental samples from all 50 states. AI virus was detected by RT-PCR in fecal samples from aquatic birds and from the water where waterfowl congregate. Positive H5 and H7 subtypes were shipped to the National Veterinary Services Laboratory for further evaluation and confirmation. This monitoring effort was successful in diagnosing AI viruses in environmental samples and has proven to be a rapid and cost effective surveillance method.

Reducing Rodenticide Hazards: Urban / Suburban Settings

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Depending on the part of the U.S., the service professional could be fighting several different species of rats and mice;

- Norway Rat *Rattus norvegicus*
- Roof Rat *Rattus rattus*
- Cotton Rat *Sigmodon spp.*
- House Mouse *Mus musculus*
- Deer Mouse *Peromyscus maniculatus*
- White Footed Deer Mouse *Peromyscus leucopus*

In many situations the service professional may find not just one, but multiple species cohabitating.
In the urban / suburban setting there are three primary hazards that must be taken into account prior to placing any rodenticide out for controlling rodents; primary off target exposure, secondary off target exposure, and secondary pest infestations from rodenticide placements. Reduction of hazard is based on proper identification of the target so that the correct treatment can be implemented to achieve the fastest results while reducing the potential liability exposure. Proper liability exposure reduction includes the understanding of rodent biology and habits, understanding of local regulations, understanding of corporate policies and the ability of the service professional to communicate these issues to the home or business owner. Hazard reduction is also dependent upon cooperation between the two parties involved. If these issues are completely understood, agreed on and carried out, the possibility of having an issue that results in unnecessary hazard or liability exposure can be greatly reduced.

Evaluation of Resident Canada Goose Relocation in Georgia

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Resident Canada goose (*Branta canadensis*) populations in Georgia have increased dramatically during the past 20 years. The increased population has created increased human health and safety concerns throughout the state. Several management techniques are being implemented to regulate resident goose populations. Capture and relocation is one technique frequently used by United States Department of Agriculture Wildlife Services (WS) to regulate local populations. Relocation effectiveness was the focus of this study. We studied relocation data of 5,592 birds banded by WS during 1993-2002. Analyses included reviewing banding data provided by WS and Bird Banding Lab (BBL). This study determined the capture site return percentage of relocated Canada geese. The average return percentage to the capture site was 2.4% statewide. A sub-sample of reoccurring capture sites showed a 6.1% return rate. We recommend relocating nuisance Canada geese to different watersheds greater than 160 kilometers away from the original capture site as a successful management tool.

Assessment of Selected Pathogens of Feral Hogs in Mississippi

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Feral hogs carry a wide variety of infectious diseases; many of which are transmissible to humans or domestic animals. Bacterial diseases carried by feral swine include brucellosis and leptospirosis. Viral diseases carried by feral swine include pseudorabies (PRV), porcine parvovirus, swine influenza virus (SIV), and porcine respiratory and reproductive syndrome. More recently, concern has arisen that if the high

pathogenic Asian strain of avian influenza (AI) were to reach the United States, the feral hog could be instrumental in the genetic recombination to a human influenza virus that could cause another pandemic. Numerous parasites also occur in feral swine. *Toxoplasma gondii, Cryptosporidium parvum, Giardia intestinalis,* and *Trichinella spiralis* are some of the most widespread and clinically important human parasites in the world and are all carried by feral swine. A study was conducted in Mississippi to assess the prevalence of these pathogens. Four of the major physiographic regions of the State were sampled. Prevalence rates ranged from no infection (including, brucellosis and PRV) to 48% for PPV and 42% for *Toxoplasma.* Ten percent of the hogs sampled showed titers to SIV, with 5% also showing titers to AI (1 dual infection). To date, PRV and brucellosis have not been found within hogs in Mississippi while every bordering state has infection. Three human cases of brucellosis have been reported in Mississippi within the last 2 years, but none associated with hogs. The high prevalence of some pathogens, including PPV and *Toxoplasma,* indicates a potential threat to humans and domestic animals throughout the State. The number of people associated with hunting of feral hogs and the domestic hog industry is increasing annually. Thus, we need to monitor the pathogens of feral hogs more closely to determine transmission to these other species.

Cumulative Use of Alpha-chloralose by USDA Wildlife Services to Immobilize Birds from 1993 to 2005

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In 1992, the U. S. Food and Drug Administration (FDA) granted the U. S. Department of Agriculture, Animal and Plant Health Inspection Services (APHIS) an Investigational New Animal Drug (INAD) for, the immobilizing agent, alpha-chloralose (AC). This INAD authorized trained Wildlife Services (WS) personnel to use AC to immobilize and live-capture nuisance waterfowl (*Anatidae*), American coots (*Fulica Americana)* and pigeons (*Columba livia).* Later in response to the growing need to facilitate scientific research and assist with bird conservation programs, APHIS requested and was granted approval by FDA to add common ravens (*Corvus corax*) and sandhill cranes (*Grus canadensis*) to the list of approved species on the AC INAD label. In addition, special one-time uses for operations involving Indian peafowl (*Pavo cristatus*), American crows (*Corvus brachyrhynchos*), black-crowned night herons (*Nycticorax nycticorax*), red-winged black birds (*Agelaius phoeniceus*), mitered conures (*Aratinga mitrata*), and wild turkeys (*Meleagris gallopavo*) were also granted by FDA. Over time the use of AC has proven to be a valuable tool for WS and the number of live-captured birds using alpha-chloralose has increased more than four-fold between 1993 and 2005. One requirement for using AC is the submission of detailed semiannual reports to FDA documenting product use. Consequently, a large database exists for all Wildlife Service use of AC over the last 13 years in each State. This manuscript draws on that database to describe the distribution of WS operations by 1) State, year, and time of year; 2) the target species and number of birds, the proportion of birds captured at a site, and percent mortality; and 3) the nontarget impacts including species, number, and percent mortality.

The Current Regulatory Environment of Urban Coyote Control – A Private WCO Perspective

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Social, political and legal considerations have contributed to an unfavorable regulatory environment for lethal control of urban coyotes. I analyze and break down that environment from a WCO perspective. Currently 3 significant factors frame the issue, but a fourth could be emerging: 1) Our hands are tied: I use the situation in Colorado to illustrate the point. Compounding factors include the need for a paradigm shift in how rules are derived, the lag-time factor in agency response to issues, and the tendency toward bureaucracy/over-regulation; 2) Human dimensions rule: I critique the downside of human dimensions in WDM, including over-reliance on public opinion tools/processes, the sacred cow of humaneness, the influence of animal welfare/rights protagonists, and changing demographics; 3) Most people prefer coexistence over lethal control: I briefly look at how this factor defines the current American mind-set, but is nonetheless unrealistic; 4) The coyotes are coming: I highlight how the burgeoning urban coyote problem could be changing perceptions and attitudes about lethal control and the regulatory environment.

Response to Coyote Predation on Pets

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An urban coyote management program was initiated in Austin, Texas in January 2005 to address citizens' concerns that coyotes were becoming aggressive towards humans. Although preserving public safety is the fundamental foundation for the program, concomitant program objectives have evolved to include addressing citizens' high levels of concern regarding predation and attacks on house pets. From the citizen's perspective, it is unacceptable to ignore this issue and demands for responsiveness have been heavy. The City of Austin program has responded to this public concern in two ways. First, coyote conflicts involving pets are included in the reporting and coyote behavior scoring system. These encounters are then analyzed in terms of public safety impacts. Second, an education/communication program is implemented with a heavy focus on what pet owners can do to protect their pets. Methods for disseminating information regarding techniques and methods for preventing coyote predation on pets include internet websites, city-wide press conferences, education seminars in problem areas, and e-mail and postal mailings of information leaflets to complainants that outline methods that constituents are encouraged to implement to prevent pet depredation by coyotes.

The First Use of GIS Data from Trap Locations as a Technique to Identify the Spread of Skunk Rabies During an Epizootic in Northwestern Wyoming

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Marshall Robin (retired), Wildlife Services, Powell, WY 82435, USA

Striped skunks (*Mephitis mephitis*) are one of the most important reservoirs of wildlife rabies transmission to humans in the Great Plains. During an epizootic in a previously rabies free zone of northwestern WY, we studied the spread of the epizootic from the index case in 1989 near Cowley. We were the first to use global positioned satellites (GPS) for locations used in a rabies geographic information system (GIS) for the public's health and safety. Because the area was primarily agricultural, trapping was accomplished by USDA's Wildlife Services (WS). GIS trap location data were obtained using equipment on loan from the military. WS cooperated with state and local officials in a rabies monitoring and control program starting in 1990. The goal was to address the public's concerns about human and domestic animal's health and safety. At town meetings both public and private individuals wanted more exact locations with a quicker information transfer than was being provided by local veterinarians, news outlets, and traditional county summaries used by the Center for Disease Control (CDC). Following several rabid skunk attacks reported to authorities and recounted in local newspapers, a more responsive technique was required. Thus WS's trapping using GIS data identified the locations of positive rabid skunks within days to weeks. These actions helped alleviate the public's fears about where the rabies was and where it was moving. The epizootic area was about 400 square miles. The rabies died out in 1993 with more than 200 rabid cases analyzed during the epizootic. The use of GIS data from this epizootic assisted in keeping the local populace abreast of the spread of the skunk rabies and demonstrated the usefulness of the GIS technique for planning future surveillance/control programs.

Feral Hogs in Kansas – Using Legislation to Help Control Efforts

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Feral hogs (*Sus scrofa*) have been documented in Kansas for approximately fifteen years in small isolated populations. In 1995, Kansas Legislature passed a law prohibiting the possession, importation or transportation of feral swine in the state to hopefully prevent future introductions of feral swine. The first substantial population to be controlled and eradicated by USDA/APHIS/WS occurred in 1995 at the Fort Riley Military Installation near Junction City, KS. Nearly 400 hogs were removed over a five year period and no hogs have been reported since 2000. By 2000, it was evident that other populations existed in Kansas, but with no funding or any kind of coordinated control program, no action was taken. In 2006, ten years from the passage of the feral swine law it was obvious from landowner complaints and other reports that Kansas had a growing population of feral swine. It was suspected that many of these populations were transplanted for the purpose of hunting and the current legislation was having no impact on the movement of feral swine. Efforts to strengthen the law were made in 2006 to include language that prohibited hunting or guiding of feral swine for the purpose of sport, pleasure or profit. This new legislation provided discussion and ultimately helped acquire funding to develop a statewide feral swine control program.

Danger, in Danger, and Endangered: How Cool Hand Luke May be Impacting the Future of Wildlife Damage Management

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An understanding of how various stakeholders perceive issues in wildlife damage management, i.e., animal health concerns versus animal rights, is prerequisite to sustaining consumptive wildlife management. Consumptive resource managers are sometimes befuddled about how easily today's youth, and other mostly non-consumptive users, become so enamored with various endangered species while being largely ignorant about common species of wildlife. I submit that elementary students who confuse the concept of "endangered species" and individual animals that are "in danger" of being hunted or trapped are likely to be opponents of consumptive wildlife management, including wildlife damage management. While pilot testing a multimedia school enrichment curriculum (i.e., Predators in the Classroom) to fourth graders in Texas, I discovered that students confused the words/phrases "danger", "in danger" and "endangered." As students were exposed to information about control of predators in general, and coyotes (*Canis latrans*) specifically, they believed incorrectly that the respective populations were endangered. When a majority of students in Texas consider coyotes and white-tailed deer (*Odocoileus virginianus*) as endangered, we definitely have a Cool Hand Luke syndrome, i.e., "failure to communicate." One may argue that older students would eventually use critical thinking to avoid confusion over such terms, but such has not been evaluated to my knowledge. I will discuss the implications that such ecological ignorance has for wildlife damage management professionals.

Reducing Rodenticide Hazards: Agricultural Settings

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Rodenticides including anticoagulants, zinc phosphide and strychnine are frequently used for rodent control in agricultural and rangeland areas in California. While considered safe and effective for many years, recent reports of secondary hazards related to anticoagulants and other materials have been published. As a result, the U.S. Environmental Protection Agency (EPA) is proposing changes in the registration and use of anticoagulants and other rodent control materials. Primarily to reduce secondary hazards, EPA wants to change the concentration and restrict the use of baits used in agricultural settings. There are considerable questions about the need and impact of these proposed changes. While much effort has concentrated on secondary hazards associated with rodenticide use, there have been significant changes in agricultural

uses of some rodenticides that have improved their effectiveness and reduced primary exposure to non-target wildlife. This presentation will discuss bait formulation, baiting strategies, carcass condition and other issues impacting hazards associated with rodenticide use in agricultural settings.

Complexities of Coyote Management: Reaching the Unreachable, Teaching the Unteachable, and Touching the Untouchable

Robert H. Schmidt, Dept. of Environment and Society, Utah State University, Logan, UT 84322-5215, USA

Coyote management is often complicated, but the technical portion of any management program is only one part of the equation. The use of lethal (traps, snares, shooting, toxicants) and non-lethal (exclusion, guard animals, husbandry practices, harassment) coyote management strategies can be successful, less than successful, or not successful depending on the appropriate match of technical skill and technology availability to a particular situation. However, technical sophistication is only a portion of the management dilemma. Issues of policy, law, politics, and economics, as well as human values, attitudes, and ethics, play an obvious and profound role in shaping the development, implementation, and evaluation of coyote damage management programs.
I describe how I teach university students about coyote management. I approach the classroom with the philosophy of teaching students how to think, not what to say or do. This involves giving them detailed information, and all of it. This "all of it" is the heart of the matter, and reflective journals indicate that students respond with "deep learning." For the broader public, however, I will discuss "the wildlifer's lament," or why we wish we could educate the public. In most cases, we cannot.

Bad Dogs: Why Coyotes and Other Canids Become Unruly

Robert H. Schmidt, Dept. of Environment and Society, Utah State University, Logan, UT 84322-5215, USA
Robert M. Timm, Hopland Research & Extension Center, University of California, Hopland, CA, USA

We summarize the behavior of several species of canids (coyotes, domestic dogs, dingoes, gray wolves) in relation to their habituation to humans and to human food sources. Striking parallels exist between coyotes and these other species in terms of their inclination to act aggressively toward humans and even attack, once they have come to associate humans with food. We review the stages of coyotes' behavioral adaptation to suburban ecosystems, listing 7 steps toward increasing habituation, that can be used as action thresholds for invoking active coyote management or removal efforts. We consider the hypothesis that coyotes may regard small children as potential prey, as demonstrated by stalking and attack behaviors. We discuss the difficult in extinguishing aggressive behavior, once it has become established, by hazing or other non-lethal stimuli. Finally, we raise questions about the future of human-coyote interactions, given an increasingly urbanized society and the tendency of humans to create inviting environments for coyotes.

USDA/State/Tribal Cooperator Summary for 2006 National Early Detection System for HPAI in Wild Migratory Birds: Accomplishments, Findings, and Future Directions

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In late 2005, at the request of the Homeland Security Council's Policy Coordinating Committee for Pandemic Influenza Preparedness, the U.S. Departments of Agriculture (USDA) and Interior (DOI) began developing a National Strategic Plan for the early detection of HPAI introduction into North America by wild migratory birds. This plan was stepped down by various regional and state/tribal entities and was implemented nationwide in mid-2006. The effort included five surveillance strategies: the investigation of morbidity/mortality events, live wild bird sampling, hunter-killed sampling, sentinel species, and environmental (fecal) sampling. Samples collected under the first four strategies were sent to local AI certified laboratories that belong to the National Animal Health Laboratory Network (NAHLN) where they were screened for the presence of AI viruses and H5/H7 hemagglutinin subtypes using rRT-PCR techniques. Environmental (fecal) samples were sent to the National Wildlife Research Center (NWRC), Fort Collins, CO for screening. All presumptive H5/H7 positive samples were sent to the National Veterinary Services Laboratory (NVSL) in Ames, Iowa for confirmation testing. USDA funded Federal, State, and Tribal cooperators began with a goal of collecting over 75,000 surveillance samples during the 2006 surveillance period. Their 2006 accomplishments, findings, and AI surveillance results will be reported. Lessons learned and future HPAI surveillance and data management strategies will be discussed as preparations begin for the 2007 sampling season.

Rodenticide Restrictions: The Precautionary Principle in Action

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In the EPA's proposed mitigation measures (published 1/17/07 Federal Register), we can see the precautionary principle in action: "When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically." (Wingspread Statement, 1998).
EPA's proposed measures would classify all second-generation anticoagulant rodenticides as "restricted use," so that they cannot be sold to the general public. In the years since they were introduced, these products have been clearly demonstrated to be more effective than the older, first

generation anticoagulants. This proposed restriction will diminish the ability of consumers to control rodents in their own residence, and will disproportionately affect minority and low-income citizens in the large cities of America. EPA's analysis fails to properly account for the potential impact on public health and other social costs of their mitigation proposal.

The EPA's analysis ("Potential Risks of Nine Rodenticides to Birds and Nontarget Mammals: a Comparative Approach" EPA 2004) does not show that second-generation anticoagulant rodenticides present a significant hazard to nontarget birds and wildlife. This comparative risk assessment (CRA) that is the basis for the proposed mitigation measures is fundamentally flawed: it does not assess "risk" because it does not assess the "exposure" component of the risk equation (i.e. risk = toxicity x exposure) as is necessary if one is to assess risk. At best, the CRA simply makes a case that primary and secondary hazard are possible. It does not allow any conclusions about the actual risk posed to wildlife. Based on this weak argument presented by the CRA, EPA proposes remove these tools from the hand of consumers who would use them to protect their health and property from well-known hazard posed by rodent infestation.

Liphatech (and other manufacturers, through the Rodenticide Registrants' Task Force, RRTF) have proposed alternative mitigation measures to address both risks to wildlife and risks to children, while preserving the public's access to the most effective rodent control pesticides. The proposed alternatives include:

- limiting consumer rodenticide use to inside of buildings
- use of bittering agents in consumer products
- directing consumers to use smaller bait placements
- using label language that is more clear and understandable to the consumer
- providing consumer education through internet sites and point-of-sale signs/brochures

All of these reasonable mitigation can help to reduce the exposure of wildlife to rodenticides. These measures should be implemented and carefully evaluated before EPA denies consumers' access to these effective rodent control products.

Feral Swine (*Sus scrofa*) in Florida – The Role of USDA Wildlife Services in Protecting Threatened and Endangered Species and Habitats from Feral Hog Damage

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Feral swine populations in Florida are booming. The ecological consequences of the "hog heaven" that Florida has become are multi-faceted. The non-indigenous swine are detrimental to many native plant and animal species, including threatened and endangered species. Environmentally-sensitive habitats are under constant attack from feral swine rooting activities. Land managers seeking to preserve Florida's ecological integrity have long been searching for a solution to this problem. Land management entities from county, state, and federal agencies, as well as non-governmental environmental organizations, have paired with USDA APHIS Wildlife Services in Florida to combat the burgeoning feral hog populations. Removal efforts performed by WS personnel have proven to be effective in decreasing damage and reducing hog populations on control sites. Effective tools utilized in the effort have been portable cage traps, neck snares, suppressed firearms, and night vision equipment.

Urban / Suburban Coyote Management: Human Dimensions Research Needs

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Coyote management is emerging as an issue in urban/suburban areas across the continent. Despite increasing expectations for management attention, wildlife professionals lack a comprehensive information base to support coyote management decisions in such settings. Experience in other arenas of wildlife management over the last 30 years suggests the challenges of urban/suburban coyote management will be best met if wildlife managers' efforts are supported by a diverse and integrated ecological and sociological research program that can inform decision making. We discuss HD information needs and research opportunities that would support a rational decision-making process for coyote management in urban/suburban landscapes. The steps in a rational decision-making process are well established (i.e., defining goals, identifying problems and opportunities, identifying management objectives, developing management action alternatives, and implementing and evaluating alternatives). We describe general HD information needs associated with each step, and then suggest corresponding HD research priorities in the specific context of urban/suburban coyote management decisions.

Gray Wolves and Livestock in Montana: A Recent History of Damage Management

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The gray wolf population in Montana grew from 2 wolves in 1979 to a minimum of 256 wolves by late 2005. Resolving conflicts, both perceived and real, between wolves and livestock was a dominant social issue for the federal recovery program, and it remains so today. The U.S. Fish and Wildlife Service and now Montana Fish, Wildlife & Parks work with USDA-APHIS- Wildlife Services to reduce depredation

risks and address wolf-related conflicts through a combination of non-lethal and lethal management tools. The number of wolf complaints investigated from 1987 to 2005 increased as the population increased and expanded its distribution into Montana after reintroduction into Yellowstone National Park and central Idaho in 1995/96. Montana wolf packs routinely encounter livestock, though depredation was a relatively rare cause of livestock death and difficult to predict or prevent. Cattle and sheep were killed most often from March to October, although losses have been confirmed every month of the year. From 1987- 2005, wolves in Montana were confirmed to have killed 214 cattle and 443 sheep. However, confirmed losses probably represent a fraction of actual wolf-caused economic losses. Other types of livestock have also been killed. Conflicts are addressed on a case-by-case basis, striving to connect the agency response to the damage in space and time and to decrease the potential for future losses. Lethal control is implemented incrementally after predation has been verified and 202 wolves were killed from 1987 – 2005. Only complete removal of either wolves or livestock eliminates the potential for wolf depredation. The continued presence of a viable wolf population in the northern Rockies will require that a wide variety of non-lethal and lethal tools be investigated and implemented. Active management of wolf depredation on livestock will be required to maintain local public tolerance of wolves where the two overlap.

My Experience: Setting Up an Urban Campaign or Trapping Project for Urban Coyote Management

Dairen Simpson, Wildlife Capture International, Durham, NC, USA

I will discuss my personal experience is urban coyote management project, including the following elements: 1) necessary liaisons and alliances (who are they?); 2) choosing methodology (pluses and minuses of each option); 3) necessity for target selectivity and minimal time at site (knowing when to quit, and ways to know); 4) public contact and on-site education for all concerned; 5) inter-agency contact and communication (remaining allies through the thick of it); 6) media communication; 7) following up actively after incidents or control work; and 8) examples of train wrecks and successes.

Cowbird Control: Management Issues, Controversies, Perceptions, and the Future

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Abstract: Brood-parasitic brown-headed cowbirds (*Molothrus ater*) are reviled by many in the general public because of the damage they purportedly inflict on songbird populations. Cowbirds have been implicated as one of several primary causal factors in songbird population declines. Their impacts on populations of some endangered songbirds can be particularly severe. Thus, cowbird removal, particularly trapping, has become a popular management action used to benefit hosts. Trapping often decreases brood-parasitism and increases host productivity, but the importance of its role in the recovery of host populations has recently been debated. Since 1988, cowbirds have been controlled (trapped and shot) at Fort Hood Military Reservation, Texas, to benefit 2 endangered songbirds. First, based on our experience, we discuss factors that are potentially important to the success of a cowbird control program (e.g., placement of traps, timing of control, removal technique). Second, although many managers have come to accept cowbird control as a standard tool of songbird conservation, they need to be aware that many aspects of cowbird control are controversial. We review some of the economic, ethical, legal, and scientific controversies associated with cowbird control (e.g., lack of uniformity in cowbird control policy among states and regions). We also discuss perceptions of cowbird control held by academics, the general public, and managers. Ultimately, our ability to continue to use cowbird control as a conservation tool may depend on the resolution of these controversies and the correction of misperceptions. Finally, we discuss the future of cowbird control. Is cowbird control a viable long-term management solution to songbird population declines? We argue that cowbird control by itself is not a viable long-term solution, but that it can be an integral part of long-term management strategies.

Ecological and Economic Risk Assessment for Wild Pigs in California Oak Woodlands

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Wild pigs were established around coastal Spanish settlements in California in the 1800s and then expanded by hunting introductions, domestic swine releases, and dispersal. Recent analyses of a large database of locations of hunter-killed wild pigs indicate that wild pigs have expanded by over 18,000 km^2 in California since the mid 1990s. The animal's current distribution in the state is closely associated with ecologically rich oak woodlands, where their rooting and foraging activities impinge on native organisms. California's oak woodlands either encompass or are adjacent to major agricultural production areas, which experience regular damage to crops and infrastructure by wild pigs. A mail survey was sent to county Agricultural Commissions in California in 1996 by a USDA Wildlife Services employee in a first attempt to estimate economic costs to agriculture of wild pigs. No prior effort has attempted to estimate costs incurred by parks and other natural areas of managing to protect and repair ecological damage caused by wild pigs, including costs associated with controlling/removing wild pigs. As part of a larger research initiative to develop a statewide risk assessment for wild pigs in California, my research group developed and recently implemented two different surveys to estimate the economic costs associated with ecological and agricultural damages being caused by wild pigs in California. Our "Natural Areas Ecological Damage/Economic Costs" survey was sent to managers and supervisory officials of national, state, regional and private parks, forests, preserve areas, and other natural areas. An "Agricultural Damage/Economic Costs survey" that was designed based on the previous damage survey from 1996 was sent to Agricultural Commissioners for all 58 counties in California. We finished mailing the total 452 surveys in early January; 56 have already been returned. In this paper I will detail the information received from both surveys, and integrate the results with other aspects of the project describing recent expansion dynamics for wild pigs, and identifying distributional overlaps between wild pigs and plants and animals of conservation concern across California. The ultimate goal of this risk

assessment initiative is to identify alternative management approaches for reducing conflicts between wild pigs and valuable agricultural and natural resources in California.

Alternative Bait Marker for Deer and Other Herbivores

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We compared alternative bait markers for free-ranging white-tailed deer (*Odocoileus virginianus*) based on the following criteria: 1) detectability in fecal matter, 2) ease of incorporation into corn bait, 3) palatability, and 4) cost. We used penned sheep (*Ovis aries*) as an experimental model to compare Microtaggants, metallic flakes, plastic chips, and rare earth elements as bait markers; and molasses and soy lecithin as marker adhesives. The metallic flake-soy lecithin combination best met our evaluation criteria and was successfully used in our field study assessing the affects of supplemental feeding on deer behavior and activity in central Wisconsin. Metallic flakes readily adhered to shelled corn bait and were easily detected under field conditions. Furthermore, they enabled assessment of deer activity at distinct feeding sites. Metallic flakes would be appropriate for use in wildlife damage studies investigating animal movements between depredation areas, consumption of vaccines or toxic bait, and as a tool for indexing deer density.

A History of Urban Coyote Problems

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An early, documented report of human-habituated coyotes is one from Yellowstone National Park in 1947, when park staff observed two coyotes that repeatedly begged for food from tourists and posed for pictures. Consistent reports of coyotes attacking humans in suburban areas don't occur until the 1970s, beginning with an incident in April 1973 in Los Alamos, NM, where two young women in sleeping bags on the lawn of a residence were attacked and repeatedly bitten. Multiple coyote attacks on both children and adults occurred in Los Angeles County, CA, in the late 1970s, and in August 1981 a 3-year-old girl was fatally attacked in the front yard of a Glendale, CA residence. While we now have reports of coyote attacks on humans from approximately 16 states plus 4 Canadian provinces, the vast majority of attack incidents (totaling >160 in our database) are from California, primarily from 5 urbanized counties. We look at early literature regarding coyotes in the Los Angeles basin, and we raise the question of whether the Southern California environment has unique characteristics that allow coyote conflicts to develop to a more serious level than in other locations throughout North America.

Chromaflair Bird Repellent for Blackbirds and Crows

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Nonlethal alternatives are needed to manage emerging and sustained conflicts between humans and several wild birds. We evaluated the chromaflair "Crow Buster," a device developed in Japan to protect crops from avian depredation. The Crow Buster consists of a strip (1.5-3.5 cm wide) of stiff, shiny plastic cut into a spiral shape. The device is iridescent green-purple in color. We developed 2 studies to determine the influence of the chromaflair product on the foraging distribution of red-winged blackbirds (RWBL) and American crows (AMCR) in captivity. For both bird species, we conducted a study in 6 flight pens (35 RWBL or 5 AMCR in each 0.07 ha pen) during 3 weeks, including a pretreatment (chromaflair absent), test (chromaflair present), and posttest period (chromaflair absent). We measured daily food consumption in each of 12 bowls (per pen) positioned 5 m, 10 m, or 15 m from a vertical post used to suspend the chromaflair product. We observed no difference in the foraging distribution of RWBL associated with or without the chromaflair bird repellent. We will discuss additional data regarding the efficacy of the chromaflair bird repellent for blackbirds and crows.

Personalities in the Wildlife Damage Community: Are We Our Own Worst Enemies?

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Authors have, for years, lamented about the poor communication and human relation skills held by professionals in the wildlife arena. University programs have been continually chastised by agencies and organizations to produce students better equipped to operate in the real world. However, I propose that the general lack of these skills is not a result of inadequate education or training, but is instead a by-product of the type of person attracted to the wildlife profession. Psychologists have developed a variety of personality assessments, but the most widespread is the Myers-Briggs Type Indicator (MBTI), a personality theory and assessment methodology developed from the works of Carl Jung. In this presentation, I provide the basic theory of MBTI and discuss the prevalent personality types found in the wildlife profession, which differ significantly from that of the general population. In general, wildlife biologists tend to be introverted, analytical, and orderly, which allows these individuals to excel in certain tasks, but that produces challenges in communication and human relations. I make suggestions about how we can overcome these personality tendencies and improve our ability to interface with our various stakeholders, clientele, and cooperators.

Reducing Rodenticide Hazards in Island Conservation Efforts

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Non-native rats and mice have been introduced to >80% of the island groups around the world. They have caused ecosystem-wide impacts, including the extirpation and extinction of many native and endemic species which evolved in a mammalian predator-free environment. Fortunately, practitioners have developed techniques to eradicate introduced rodents, allowing ecosystems to recover. Rodenticides have proven an effective tool in eradications, having been used in >300 successful eradications worldwide. Careful planning, adequate resources, and a sustained effort by competent field staff are needed to help ensure a successful eradication program. Island eradications are logistically complex and often quite expensive, requiring that once initiated, removal of 100% of rodents is paramount to facilitate support for future projects. However, efforts must be made to reduce potential rodenticide impacts to non-target animals, especially native birds and mammals. Standard considerations include confirming the species present, their behavioral characteristics and scale of risk, the legal status of species present, and population levels and distributions. To minimize risks, the type of rodenticide used, bait formulation, placement (stations or broadcast), timing of application, number of applications, and weather needs to be considered. It is important to recognize the great value of a successful invasive rodent eradication to island resources; recovery of native flora and fauna is usually rapid and remarkable. With careful planning and appropriate mitigation, impacts to non-target animal populations are small and they typically recover soon after the rodents have been removed, despite the temporary impacts to individual animals. Taking a population-level perspective to eradications facilitates maximizing efficacy on target rodents, while minimizing the population-level risk to non-target species. The eradication of rodents from islands could be the single most important and long-term positive action for biodiversity conservation world-wide.

The Co-Existing with Coyotes Program in Vancouver, B.C.

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When coyotes first arrived in Vancouver, BC, they brought surprise, myths, and concern to the public as they grew comfortable in our city parks, golf courses, and neighborhoods. Although public opinion was divided on the issue, there was a consistent demand for accurate and reliable information. Attempts to relocate the first coyotes failed, and problems began to arise as coyotes lost their natural fear of humans. A multi-agency meeting resulted in the creation of the Co-existing with Coyotes program in 2001. This program aims to reduce conflict between coyotes, pets, and people by providing information to both targeted and general audiences as well as providing a direct response to individual coyotes that are starting to, or are displaying behaviour of concern. The program coordinator will discuss the methodology of the program and how it operates in Vancouver. Information is relayed to the general public through an information phone line, the distribution of brochures and posters in 11 languages, website resources and permanent signs in parks and green spaces. Specific audiences are taught through the Coyote 101 school program, interpretive walks and presence at public events. Program staff coordinate with public agencies to locate, evaluate, and use non-lethal deterrents whenever possible with problem coyotes. The CWC program has begun its 7th year of operation and has played a key role in reducing conflict between people and coyotes in the greater Vancouver area. Municipalities across North America have recognized CWC as a model program and have implemented similar programs as a result.

GPS Telemetry Collars: Considerations Before You Open Your Wallet

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Telemetry is a widely used method to gain information about animal movements, habitat use, and social behaviors. Standard VHF telemetry involves hours in the field following animals to gain this knowledge. In addition, researchers could bias animal movements by their presence. GPS technology uses satellites to remotely monitor animal movements, stores the information within the collar and offers several options for data recovery. Additionally the number and quality of acquired locations collected with GPS technology can far surpass traditional telemetry capabilities. However, GPS technology is not a panacea to all problems associated with conducting telemetry studies. The GPS equipment is considerably more expensive than standard VHF equipment and thus researchers expect a proportional increase in data quantity and accuracy. Unfortunately, collar malfunctions ranging from battery failure to hardware failure are a frequent complaint against GPS technology. Therefore, trade-offs occur between VHF collars and GPS collars and must be assessed by individual researchers. We report our experiences with GPS collars and offer advice and considerations that should be addressed prior to their purchase.

POSTER PRESENTATION

ABSTRACTS

Analysis of Diet and Habitat as a Device for Predicting Feral Hog Presence in the Davis Mountains Preserve, Texas, USA

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Damage caused by feral hogs (*Sus scrofa*) is detrimental to soil quality, agriculture, ground-nesting birds, and resource availability to native wildlife. Feral hogs also cause erosion and eventual sedimentation of riparian habitats, which are crucial to wildlife survival. Our primary objective was to determine the winter diet of feral hogs at the Davis Mountains Preserve, Jeff Davis County, Texas. We analyzed stomach contents of 20 feral hogs from 2005 January through March. Habitat analysis was completed to determine affinity for woody material versus grass material by analyzing rooting sites for proximity to large trees. Results show woody vegetation to be higher in adult diets compared to juveniles and that grasses are the primary winter diet throughout both age classes. Using a one sample t-test measure of variability, the habitat analysis predicted rooting sites to exist within 1.871m from large trees ($P < 0.05$). The results from this study will allow managers to make sound decisions for the eradication of this invasive species by helping to understand their preferred habitat.

Pekin Duck Model for Action of Nicarbazin on Fertility

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The study determined the dose response relationship for the effect of Nicarbazin in reducing hatchability and egg production in ducks. The Pekin duck represents a model for waterfowl, widely distributed, ecologically important in the United States with very high egg production, and can be artificially inseminated to allow highly sensitive reproduction studies.
The study design used each test group as its own control with a 14-day unmedicated pre-dose period, a 14-daydose period, and a post dose period of 14 days. The dose concentrations of Nicarbazin were 0, 31.25, 62.5, 125, 250, and 500 ppm in the total diet. All 12 bird female groups were individually caged and artificially inseminated with the same semen pool weekly. Eggs were collected daily and hatchability and production rate determined.
The average untreated fertility rate was 86% and all groups showed a decrease after 3 days. The 500 ppm groups had no fertile eggs after 7 days. The 125 ppm and 250 ppm had no fertile eggs after 12 days. The 31 ppm and 63 ppm groups decline to 30% fertility by day 14. All groups returned to normal fertility 14 days after treatment stopped.
Egg production was decreased in the 250 ppm and 500 ppm groups within 2 days of treatment and in the 125 ppm group after 4 days treatment. All groups returned to normal production after 14 days post treatment.
No toxic effects were noted for any of the dosed ducks or hatched ducklings.
Nicarbazin is an effective, safe, and reversible treatment to reduce chick production.

Successful Capture and Relocation of Mourning Doves: A Multi-Agency Endeavor

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Capture and relocation has been successfully used for decades as a means of wildlife damage control and is readily accepted by the public as a humane method for reducing wildlife damage. USDA-APHIS-Wildlife Services (WS), Missouri Department of Conservation (MDC) and the University of Missouri Department of Fisheries and Wildlife Sciences (MU) were involved in a collaborative project which produced benefits for the cooperator, and all agencies involved. At an industrial site located in northern Kansas City, MO mourning dove droppings accumulated under the roosting area. In addition to being unsanitary it also ran the risk of causing equipment to malfunction in a secondary chemical containment system. Benefits of our interagency capture and relocation program included a non-lethal solution to resolve the wildlife problem, positive public relation opportunities for the cooperator and provided data to a long-term mourning dove banding study. Mourning doves were trapped, banded at an industrial area and then released 31.4 km to the southeast (153°) at the James A. Reed Memorial Wildlife Area (JARMWA), near Lee's Summit, Missouri. We captured and relocated 566 (499 HY, 36 AHY and 31 unknown age) doves from July 12 to August 11. During that period there were no recaptures at the problem roost site, however birds were recaptured at the JARMWA at a rate similar to that of birds captured at the release site (3% JARMWA; 4% industrial site). During the opening 2 days of mourning dove hunting season birds released on the JARMWA from the industrial area were harvested at a slightly lower rate than birds caught and released on JARMWA (18% industrial site and 23% JARMWA). Results from our study indicate that capture and relocation of "problem" mourning doves can be successful.

Overhead Gridline Systems to Exclude Waterfowl from Large Bodies of Water

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The presence of birds at retention/detention basins located on or adjacent to airport property increases the probability of an aircraft/wildlife collision. Overhead gridline systems have proven effective for reducing the presence of birds on small water bodies. While there are several grid materials available to address bird hazards associated with small basins, the list of options decreases quickly as the distance to be spanned increases. The Michigan Wildlife Services program (WS) tested five types of grid material on three large detention basins at Detroit Metropolitan Airport (DTW) to determine which materials could span up to 675 meters (2214.5 feet) without center supports. An additional constraint was that the line material could not sag substantially, because of water fluctuations of up to 1.5 meters (5 feet) depending on the frequency and duration of rain events. Sagging lines have been determined to "stick" to the water surface due to surface tension and subsequent freeze events caused line breakage. The material found to be superior in our tests, was a braided fishing line made of Spectra® called PowerPro. Grid lines were suspended in two directions on 30-meter (100 foot) spacing. Preliminary results show a notable reduction in bird usage by waterfowl and gulls.

Evaluation of Post-Calving Placental Removal on Vulture-Cattle Interactions

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Turkey vulture (*Cathartes aura*) and Black vulture (*Coragyps atratus*) populations have experienced continuous growth in the past 20-years. In contrast to the Turkey vulture, Black vultures have been documented to prey on animals including livestock. It has been suggested that vultures appear more intent on recovery of the placenta, post-calving as opposed to initially attacking the cow or calf. It has been further suggested that livestock producers consider utilization of indoor facilities or barns to facilitate the birthing process. From a livestock producer's perspective, this procedure would be cost prohibitive and impractical. The objective of this experiment was to determine the effects of post-calving placental removal on vulture-cattle interactions. Approximately 120 cows, calving between November 2006 and March 2007, were divided into two geographically separated groups. In one group attempts were made to recover and remove placenta following parturition. In the second group, no attempts to recover placenta were made. Point counts to determine vulture activity within treatment sites were accomplished two times per week. Attempts to observe and subsequently identify food sources when vultures were feeding were also accomplished.

Preliminary Results of Coyote Use of an Urban Landscape

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Coyotes are known to inhabit many cities across North America. A rise in human-coyote conflicts has led to several studies being conducted in recent years. Advancement of technology allowed us to intensively study coyotes in Tucson from November 2005 – November 2006. To understand how coyotes are using the urban landscape we radio collared 8 coyotes in central Tucson and fitted them with store-on-board Global Positioning System (GPS) collars. The collars acquired locations four times daily and each location was assigned to one of 11 land use categories (natural, vacant, riparian, medium density residential, high density residential, commercial, park, golf course, agriculture, road, and military).

Coyote locations (n = 6, 028) by land use category were compared to that available in the study area using a Chi-square goodness of fit test. There was a significant difference in observed locations when all coyote locations were compared to that available in the study area (X^2 = 28,691, df= 10, $P < 0.001$). The study area was comprised of 60% natural areas while the highest percentage of coyote locations occurred in medium and high density residential areas (23% and 21%, respectively). We determined the 95% fixed kernel home range for each coyote (x= 38 km^2). We compared land use categories within each individual's home range with that of the entire study area and used Bonferroni confidence intervals to determine which categories were preferred and avoided by each coyote.

The majority of the study animals (75%) preferred riparian areas, medium density residential areas, and golf courses. While each coyote had a large portion ($\geq$ 30%) of high density residential within their home range, this category was avoided by all coyotes. Overall, the most heavily utilized categories are riparian, medium density residential, and golf courses. This is most likely due to the abundance of cover and numerous water sources associated with these land use categories.

Developing Strategies for Mitigating Vulture Damage to Structures and Property

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Black Vultures *Coragyps atratus* and Turkey Vultures *Cathartes aura* are important components of wildlife communities because they consume vast amounts of road-kill and other carcasses. However as their populations increase and natural vulture habitat shrinks, these large birds are becoming more of a nuisance to homeowners, boating enthusiasts, and commercial businesses, and communication tower owners. The birds deposit copious amounts of feces and regurgitated pellets and they exhibit a penchant for destroying petroleum-based materials such

as roof shingles, caulking, and gaskets. The key to reducing or eliminating this type of damage is to prevent vultures from roosting nearby and from perching on roofs where damage occurs. Over the past several years, we evaluated and developed various methods that wildlife managers can implement to disperse problem roosts or prevent vultures from perching where they are not wanted. This presentation illustrates the various methods developed and tested, their applications and efficacy, and identifies some methods which we found ineffective. While no one tool will be effective for all situations where perch prevention and exclusion is needed, we believe that the proper selection and placement of the most effective methods tested can greatly reduce damage caused by vultures.

Development of Test Paradigms for Operant Conditioning of Norway Rats for Behavior Studies

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Eradication efforts to remove rats from islands have been successful and often include intensive trapping and/or a blanket application of toxic baits. Eradications are expensive and labor-intensive which makes early detection of, and response to, initial (re)invasion by rats critical. Thus, a better understanding of rat behavior immediately after (re)invasion is a key research priority for many land managers. This behavioral information (e.g., exploration; risk-taking; social dominance; resource time allocation) could facilitate more effective approaches to trap placement and toxicant bait dispersal to intercept invading rats. We intend to examine some of these behaviors in the laboratory using operant conditioning. Operant conditioning of rats provides behavioral information, such as foraging patterns, learning, memory, and avoidance. Operant conditioning is the process of associating specific reinforcements (e.g., food, water, access to a mate) with specific responses (e.g., lever pressing, wheel running, or nose poking). A schedule of reinforcement is a prescription, assigned by the observer, which states how and when discriminative stimuli and behavioral consequences will be presented. Responses of rats can provide insight to priorities or preferences based on previously learned associations. Currently, we are developing test paradigms to condition rats to run on an activity wheel and to press a lever for use in future behavior studies. Conditioning rats occurs in two or three phases: adaptation to the pellet dispenser and stimulus light, hand-shaping movements that approach the desired response, and auto reinforcement schedules. In this study, we've learned that different schedules are necessary for rats with various activity levels. In other words, all rats do not learn the same response within the same amount of time. This information is useful for future operant conditioning studies by providing an indication of the time necessary to condition rats for specific responses and techniques that may enhance some rats' activity levels.

Fertility Control in Wild Boar Using a GnRH Vaccine: Effects on Physiology and Behavior

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Fertility control has been suggested as one of the few humane, effective, non-lethal methods to manage overabundant wildlife populations. Single-dose injectable immunocontraceptive vaccines have recently been developed to inhibit the fertility of individual animals for several years. This paper will the result of a study, carried out on captive wild boar, aimed at testing the effectiveness and potential side effects of the Gonadotropin Releasing Hormone (GnRH) vaccine GonaCon©.
The effectiveness of GonaCon© to induce infertility was monitored by measuring serum antibodies to the GnRH vaccine and by using the concentration of faecal progesterone as an indicator of pregnancy and maintenance of pregnancy in 12 captive wild boar females. Behavioral data on time budget and dominance ranks were collected before and after vaccination. Body weight and physiological data were derived from health profiles based on serum samples collected at vaccination and 6 and 12 weeks after treatment with the vaccine.
All control females and none of the treatment females gave birth. No differences in time budget, social ranks, biochemical and haematological parameters were observed between treated and controls before and after vaccination. The body weight increased more in treated females than in control females. The results of this study suggest that GonaCon© can be regarded as an effective, humane and safe contraceptive.

GnRH Immunocontraception of Immature Male and Female White-Tailed Fawns

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As part of a large immunocontraceptive study using the Penn State deer herd, we earlier demonstrated that both male and female white-tailed deer could be immunosterilized using a GnRH conjugate (prepared at NWRC in Fort Collins, Colorado) combined with Freunds adjuvant (Miller 2000). The GnRH vaccine acts to inhibit production and secretion of GnRH from the hypothalamus, which in turn prevents sex hormone and gamete production. The question we attempted to answer in the study was whether administration of the GnRH vaccine to 3 month old white tailed deer would prevent sexual develop. Twelve 3 month old fawns, 6 male and 6 female were given two 450 ug GnRH/Freunds vaccinations; a prime at 3 months and boost at 4 months. The results suggested that the young deer produced an immune response, although the response only lasted one year. Most of the male and female fawns were sexually normal deer as yearlings. We conclude that treating immature white tailed deer with the GnRH vaccine is not a viable approach for sterilization, contraception or prevention of sexual development.

'Two-Probe' Method to Enhance Efficacy of Toxicant Delivery for Fossorial Mammals

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Accurate delivery of baits and fumigants is essential when managing fossorial mammals. Misapplied toxicants increase the cost of control operations and result in undesirable environmental contamination. Properly placed toxicant baits greatly increase the chance that target animals will locate and consume them. Proper placement also greatly enhances the liberation, diffusion, and distribution of fumigants within burrow systems.

Using a simple steel probe, underground burrows or "runs" are located *by feel* while probing near the freshest activity. Probing into undisturbed soil produces a characteristic resistance. However, upon entering a void, a significant reduction in resistance is felt through the probe, signifying the presence of a burrow. A simple probe, however, cannot readily disclose whether the burrow is open or back-filled with loose soil— an essential determination in efficacious delivery of toxicants. To determine if the burrow is open, a soil-sampling probe following the same penetration line as the initial probe, will "collect" a soil sample for measurement. When withdrawn, soil will be visible in the probe's 'window'. If the soil equals the approximate depth of penetration observed during the initial probing, then the burrow is back-filled. If the soil measures significantly less than this, however, the burrow is clear and can be presumed to be open to the remainder of the active burrow. As a result, baits placed down the ¾" diameter probe-hole are much more likely to be discovered by target animals as they negotiate the burrow system. Similarly, fumigants placed in open burrows are able to evolve lethal gas that will be unimpeded in its distribution throughout the burrow, resulting in death of the target animal. Surface holes resulting from probing can be easily sealed by poking a large leaf or small piece of newspaper part-way down the hole and sealing the top with a small handful of soil.

Chlorophacinone Baiting for Belding's Ground Squirrel

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The efficacy of using 0.01% chlorophacinone on steam-rolled oat (SRO) groats applied in CA alfalfa by spot-baiting/hand baiting around burrow entrances (~11.5 g) to control free-ranging Belding's ground squirrels were compared in 6 randomly assigned square treatment units (TUs). Four TUs were given the rodenticide and 2 treated with placebo bait. Each TU was a 0.4 ha square surrounded by a similarly treated 5.5 ha square buffer zone. Baits were applied on May 13 and re-applied, on May 20 and May 22, after 7 days of un-forecast cool wet weather had greatly reduced their above ground activity. Pesticide (EPA SLN CA-890024) efficacy was calculated as % reduction (PR) of ground squirrels on each TUs measured directly by visual counts (VCs) and indirectly by active burrow counts (ABCs). VCs and ABCs provided mean PRs that met US EPA's 70% minimum standard efficacy threshold for field rodenticides ($\bar{x}$=73.5%, SD$\pm$13.3; $\bar{x}$=80%, SD$\pm$6.2, respectively). Percent Reduction results were highly significant (F=29.72, df 1/4, p=0.0055 and F=72.92, df 1/4, p=0.001, respectively). All carcasses (38) located above ground were analyzed for pesticide and 80% had detectable levels in whole animals ($\bar{x}$=0.1131 ppm, SD$\pm$0.0928). Suggestions to improve the pesticide's efficacy and lessen its potential non-target hazards were discussed.

A Comprehensive Needs Assessment of Wildlife Professionals to Identify Education and Training Opportunities

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The increasing human population coupled with wildlife habitat fragmentation and development, multiply the risk and potential for human-wildlife conflicts. Successful co-existence of humans and wildlife depend on many criteria being fulfilled. Among the most important of those is the ability of trained wildlife professionals to communicate effectively with concerned and involved stakeholders. An understanding of the local culture and their attitudes are equal in importance to understanding the physiogeographic location where potential conflicts arise. Customarily, wildlife biologists do not enter their discipline with the desire to interpose managerial and public conflicts, nor is adequate training provided to do so. This lack of preparation can often be disastrous when wildlife agencies propose management plans that contradict the opinions of the community. Worldwide, the need for education and training tools is being recognized. The problem remains, however, in understanding exactly what those needs are, and how to best deliver the tools to fill those gaps. This needs assessment is a first of its kind for wildlife professionals across the United States. Research has never been conducted to assess where educational gaps lie, where the limits on both knowledge and equipment reside, or where compromise can be sought to resolve conflict. This comprehensive study will examine these issues from both bureaucratic and private wildlife management agencies. It will assess how to better understand what wildlife employees need to reach maximum job performance potential, and where political, social, and even cultural barriers can begin to subside to make way for sound, successful wildlife management plans that can benefit future generations.

Management of Monk Parakeet Populations at Electric Utility Facilities

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The monk parakeet (*Myiopsitta monachus*) is native to South America but has been introduced and become established in several locations throughout the United States and in other parts of the world. The monk parakeet population in the US is increasing exponentially with no indication of slowing. Unlike other psittacines, this species does not nest in cavities but instead builds a bulky nest structure of sticks. Parakeets often build their nest structures on electric utility facilities, and nest materials cause short-circuits that result in costly power outages and damage to the equipment or facility. In south Florida, monk parakeet damage and associated outages have increased substantially in recent years, and it is evident that current methods to manage the problem at electric utility facilities are inadequate. This research project is focused on developing new management alternatives for reducing power outages caused by parakeet nesting activity. To date the most effective approach has been a concerted effort to trap birds at nests on utility structures and then to remove the nests. Dispersal of birds using a hand-held laser caused overnight desertion of nest sites, but did not provide long-term relief. Recent investigations of reproductive control using the chemical diazacon have been promising and additional field trials will take place in 2007.

Longevity of DayGlo® Fluorescent Particle Marker Used to Mark Red-Winged Blackbirds.

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We monitored the longevity of a DayGlo® fluorescent particle marker applied to Red-winged Blackbirds (*Agelaius phoeniceus*) under simulated field conditions. In supplement to banding and other forms of attached markers researchers often apply fluorescent markers to migrating birds to monitor regional and continental movements for several months. We evaluated the longevity of the fluorescent marking relative to persistence through the intended duration of field monitoring efforts. We applied fluorescent marker to 52 blackbirds using hand-held spray equipment to simulate aerial applications used in the field. Red-winged Blackbirds maintained fluorescent marks throughout 254 d (8.5 mo) of testing. We terminated our study at the initiation of molt. No birds were completely devoid of marks among the 4 body parts monitored: body, head, tail and wings, although strong statistical differences were shown between body parts for the two highest marking categories. The marks on wings (both dorsal and ventral sides) lasted an average of 100 d longer than those on the head, tail, or body. This formulation enables researchers to mark large numbers of birds at fall roosts and to track them well into breeding season. This technique could also be applicable to shorebirds, waterfowl, and other flocking birds. Wings retain DayGlo® fluorescent particle marks longer than other body parts and thus should be used to identify marks in large-scale collections.

Digestive Physiology: The Other Half of Oral Contraceptive Design

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Wildlife contraception is becoming a viable management tool for use in an integrated management program. A large part of designing contraceptives is identifying areas of the reproductive process that can be disrupted to limit reproduction. For oral contraceptives, much attention is given to developing bait that is palatable to the target animal. However, this is only half the battle in the use of oral contraceptive agents. Although frequently overlooked, an understanding of digestive physiology is extremely important in determining how well an oral contraceptive agent will be absorbed by a particular species. There are some basic differences between avian and mammalian digestive physiology. The digestive tract of a bird is typically comprised of an esophagus, crop, proventriculus, gizzard, stomach, small intestines, cecum, and colon. The digestive tract of a mammal is typically comprised of an esophagus, stomach, small intestines, and colon. Within each class, there are family differences in digestive physiology, such as the presence of a rumen in ruminants. The major sites of absorption for drugs in the gastrointestinal tract are the stomach and small intestines, depending on the type of drug. There are three basic types of absorption: passive transport, facilitated transport, and active transport. Different compounds utilize different transport mechanisms to be absorbed in the gastrointestinal tract. Therefore, something must be known both about the drug and the digestive physiology of the target animal. A good example of a contraceptive agent for which such an understanding would have been useful is nicarbazin. Nicarbazin absorbs much more readily in chickens, ducks, and geese than it does in pigeons or rose-ringed parakeets. Each species needs to be tested to determine the optimal dose of a compound because physiologic differences among species make it likely that the effective dose will differ among species. Part of any program to develop an oral contraceptive should include an understanding of the drug and the physiology of the target species.

-- NOTES --

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