HUMAN WILDLIFE CONFLICT WORKING GROUP

MEETING MINUTES

Chair: Brian Wakeling (Montana)
Vice-Chair: Doug Brimeyer (Wyoming)

Wednesday, March 10th, 2021
10:00 AM – 12:00 PM (CST)

86th North American Wildlife and natural Resources Conference

Minutes of the virtual meeting

- Call to Order/Review Agenda/Introductions (B. Wakeling/D. Brimeyer)
    - 62 individuals attended the meeting

- Approval of HWC WG Minutes from the AFWA Annual Meeting (B. Wakeling)
    - The minutes were approved

- Update on Wildlife Services Risk Assessment Reviews by AFWA (B. White)
    - AFWA began working with Wildlife Services in 2019 to have state agency experts review techniques often used by Wildlife Services to manage wildlife damage. Since that time some 17 methods have been reviewed with the participation of ~ 100 agency experts. More methods will be reviewed. Methods reviewed to date include:
    - Cage traps
    - Cable Restraint Devices
    - Foothold Traps
    - Aircraft Use
    - Firearms
    - Sodium Cyanide
    - Gas Cartridge Carbon Monoxide
    - Aluminum Phosphide
    - Zinc Phosphide
    - GonaCon
    - Nets
    - Egg addling
    - Use of dogs
    - Lead use
    - Quick kill trap use
    - DRC-1339
    - Hand Capture and Disease Sampling

- Report on progress toward the development of peer reviewed publications on human-wildlife conflicts (B. White) https://digitalcommons.usu.edu/hwi_monographs/
    - Urban Coyotes
    - An ad hoc group of urban coyote conflict experts has been developed to produce this document. A draft is expected by early summer 2021 and will be distributed to this committee for review. This document will be similar to those already produced through the HWC WG on urban black bear and urban deer conflicts, both of which were published in the HWI Monograph Series.

- USDA-APHIS-Wildlife Services (Janet Bucknall)
    - Wildlife Services Deputy Administrator, Janet Bucknall and National Wildlife Research Center, Director, Jason Suckow, provided an update on some leadership changes that have taken place with the organization (see Appendix for the full report) and some new budget allocations and programs including:
    - feral swine management
    - Chronic Wasting Disease (Cervid health)
    - Non-lethal methods for livestock protection
    - black vultures
    - fertility control for feral horses.

- Berryman Institute (Terry Messmer)
    - Nicki Frey provided an update on the work of the Berryman Institute. (See Appendix for the full report).
    - Of note the HWI Spring edition will focus on wild pigs.
    - The 19th Wildlife Damage Management Conference will take place virtually during April 19-22. A call for abstracts is open through March 12.
    - "Toolkit to Address Free-ranging Domestic Cats on Agency Lands Managed for Native Wildlife and Ecosystem Health" is in the peer-review process for publication in the HWI Monograph series

- Development of an AFWA document on "humane dispatch of wildlife by agency personnel" (Colin Gillin, Tom DeLiberto)

    - An outline for this document has been produced.
    - An ad hoc group has been developed to begin the process of writing the document.
    - WRPC will be asked to review this outline
    - The AFWA Fish and Wildlife Health Committee is also involved in this effort

- USGS National Climate Adaptation Science Center: Impacts of Climate Change to Wildlife Conflicts (Kate Malpeli)
    - A presentation was given to generate interest and discussion amongst the group to begin a potential study to investigate the impacts of climate change on human wildlife interactions and conflicts. Climate change will alter some animal behaviors and this may increase conflicts with humans. The HWC WG is discussing further steps on how to proceed.

- Other topics of interest
    - New *Wildlife Monograph* on Best Management Practices for Furbearer Trapping in the United States
        - This document is the culmination of over 20 years of research on trapping conducted by state agencies in partnership with USDA-APHIS-Wildlife Services
        - This document is available at https://wildlife.onlinelibrary.wiley.com/doi/10.1002/wmon.1057
    - Sixth International Human Bear Conflicts Workshop will be held at Lake Tahoe in October 2022. For more information see https://gallantdev.com/HBC2021/

- Western Association of Fish and Wildlife Agencies is scheduled to publish updated Cougar Management Guidelines in 2021. Final approval is expected in July 2021.
- Funding???
  - This topic was tabled for lack of time

- State/Federal/Tribal/Provincial/Regional Associations/AFWA Members Roundtable
  One representative per agency highlights a couple of human wildlife conflict issues
  - *Reports submitted may be found in the Appendix*

- Wrap-up Discussion and Assignments for Next Meeting (B. Wakeling/D. Brimeyer)

Appendix
Committee Reports and Documents

- Report on Human Health and Ecological Risk Assessment Review of Methods Used to Manage Wildlife Damage
- Report from USDA-APHIS Wildlife Services
- Report from the Berryman Institute
- Outline of "Humane Dispatch of Wildlife by Agency Personnel"
- Report from the North Carolina Wildlife Resources Commission
- Report from the Wyoming Game and Fish Department

Association of Fish and Wildlife Agencies Progress Report

On

Human Health and Ecological Risk Assessment for the Use of Wildlife Damage Management Methods by USDA-APHIS-Wildlife Services

Prepared by: Bryant White

Updated: 12-22-2020

Background:

Wildlife Services is engaged in a process to evaluate and minimize risks associated with methods used to manage wildlife damage. The evaluations will consider risks to:

- Target species (mammals, birds, reptiles, amphibians, fish, insects) and disease damage
- Nontargets
- People, Pets and the Environment
- Humaneness
- Personnel

A similar effort was originally conducted in 1992, but methods have changed and improved since that time. During this review, fifty-three methods are being evaluated. The reviews will be grouped into thirty chapters (chemical and nonchemical). Following a completion of all reviews, chapters will be available at https://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/programs/nepa and will be regularly updated.

Progress:

The Association of Fish and Wildlife Agencies (AFWA) was asked to finding state agency experts to review methods used by Wildlife Services to manage wildlife damage. Eleven methods were reviewed in 2019 (Table 1) and an additional six methods were reviewed in 2020 (Table 2). This review process was formally initiated by the cooperative efforts of AFWA and Wildlife Services during the spring of 2019. The six methods under review will be completed by December 2020. Dr. Tom Deliberto is serving as active liaison to AFWA, and Bryant White is coordinating the effort on behalf of AFWA.

Table 1. Methods used to manage wildlife damage under review by AFWA for Wildlife Services, 2019.

Method	Completed (# reviews)	Expected final completion
Cage Traps	Yes (3)	
Cable Restraint Devices	Yes (5)	
Foothold Traps	Yes (6)	
Aircraft Use	Yes (6)	
Firearms	Yes (6)	
Sodium Cyanide	Yes (4)	
Gas Cartridge Carbon Monoxide	Yes (5)	
Aluminum Phosphide	Yes (4)	
Zinc Phosphide	Yes (4)	
GonaCon	Yes (5)	
Nets	Yes (4)	

Table 2. Methods used to manage wildlife damage under review by AFWA for Wildlife Services, 2020.

Method	Completed (# reviews)	Expected final completion
Dog Use	Yes (3)	
DRC 1339	Yes (4)	
Egg Addling	Yes (4)	
Hand Capture and Disease Sampling	Yes (3)	
Quick Kill Traps	Yes (3)	
Use of Lead	Yes (3)	

Report to Human Wildlife Conflict Working Group

AGENCY: USDA-APHIS-WS **DATE: March 2021**

Wildlife Services (WS) Leadership Changes in 2020

- WS Associate Deputy Administrator – Jessica Fantinato
- WS Associate Deputy Administrator *(acting)* – Dr. Donna Lalli, started January 10, 2021
- WS National Wildlife Research Center (NWRC) Director – Jason Suckow
- WS Western Regional Director – Keith Wehner
- WS Idaho State Director *(acting)* - Jared Hedelius following retirement of Todd Grimm
- WS Nevada State Director - Mark Ono following the retirement of Mark Jensen
- WS Oregon State Director *(acting)* - Kevin Christensen following retirement of David Williams

CONFLICT INCIDENT REPORT

Livestock Protection – Non-Lethal Program

MOST SIGNIFICANT ISSUES

WS assists producers with predator damage to livestock via direct control and technical assistance. In FY20 WS protected livestock in 48 states and Guam from predators including coyotes, feral dogs, wolves, foxes, mountain lions, bobcats, black bears, grizzly bears, feral swine, black vultures, raptors, crows, ravens, skunks, raccoons, ringtails, mink, weasels, opossums, and rattlesnakes. WS also protects silage, livestock feed, rangeland, and pastures.

SIGNIFICANT REGULATORY OR POLICY CHANGES OR ISSUES?

- **Congressional Allocations for Nonlethal Livestock Protection.** Congress appropriated $1.38M to WS in FY20 and FY21 for nonlethal livestock protection from large carnivore predators. Distribution of funding occurred to 12 states and NWRC, states include: AZ, CA, CO, ID, MI, MN, MT, NM, OR, WA, WI, and WY. The primary purpose of the funds is for WS to provide technical assistance and operational activities for landowners via 18 positions (15 full-time) across the 12 states. These funds support existing employees on nonlethal projects in addition to new hires. Non-lethal methods for operational activities included range riding, fladry, electric fencing, permanent fencing, harassment, and husbandry practices.
- The new WS employees provide nonlethal livestock protection services to more than 200 cooperators and reached several hundred additional landowners via free-of-charge technical assistance.
- WS collaborated with state wildlife agencies, NGOs, and FWS to complete projects protecting agriculture and property and developing outreach materials to assist landowners in conflict with wildlife.

RESEARCH

- NWRC is analyzing data from research conducted alongside the operational work to determine the efficacy of various nonlethal methods. Results will inform management decisions and best application tools.
- NWRC is also evaluating producers' attitudes towards using the methods and tools.

CONFLICT INCIDENT REPORT

Cervid Health – Chronic Wasting Disease

MOST SIGNIFICANT ISSUES

Chronic Wasting Disease (CWD) is an infectious, degenerative disease of animals in the family cervidae that causes brain cells to die, ultimately leading to the death of the affected animal. Most WS state programs submit CWD samples to state or national diagnostic labs from deer removed as part of normal field operation projects and the majority of WS state programs are involved in the development or implementation of state CWD taskforce plans.

SIGNIFICANT REGULATORY OR POLICY CHANGES OR ISSUES?

- For FY21, APHIS received additional funding for the Equine, Cervid, and Small Ruminant line item.
  - APHIS received $7M for Cooperative Agreements with state agriculture and wildlife agencies to further develop and implement CWD surveillance, testing, management, and research activities.
  - From the $7M allocation, WS received $2.975M to distribute directly to state wildlife agencies for CWD activities. The cooperative agreements will be further developed during the APHIS CWD stakeholder engagement held virtually the week of February 22, 2021.
  - The chronic wasting disease management and response activities 2020 cooperative agreements spending report ($2.8M) is available on the APHIS website.
  - WS NWRC received a FY21 increase of $2M for CWD research.

CWD SURVEILLANCE

- WS is conducting CWD surveillance and sampling in 17 Eastern states (including Washington D.C.) and Alaska. CWD is already well established in Western states.
  - Surveillance is occurring in: AK, AL, FL, IL, ME, MD (DC), MI, MN, MS, IA, NH, NC, OH, PA, SC, VA, WI, and TN.
  - Sampling incorporates a diverse array of techniques and involve state wildlife agencies, state and national diagnostic laboratories, and other local governments.
- Upon request, WS assists state game programs at hunter harvest deer check stations sampling for CWD. In FY20, WS sampled approximately 900 deer from hunter harvest deer check stations. WS anticipates this form of assistance to increase.
- WS has six Cooperative Service Agreements (CSA) to remove wild deer in infected areas to help control the spread of CWD and provide data to the state wildlife agencies.
  - States with CSAs: IL, ME, MI, MN, OH, and TN
  - In FY20, WS actively removed 1,864 cervids in CWD infected areas for sample collection.

- APHIS Programs (WS and Veterinary Services) work together to de-populate CWD positive captive cervid herds.
  - Deer: IA, OH, PA, WI, and OK (MN provided technical assistance)
  - Elk: KS
  - In FY20, APHIS removed 960 cervids from captive facilities.
- WS' National Wildlife Disease Program (NWDP) deploy wildlife disease biologists (WDB) to help with targeted deer removal in infected areas. The enhanced surveillance helps state wildlife agencies better understand the role wildlife play in the spread of the disease.
  - In 2020, WDBs and other WS personnel deployed to Minnesota to help remove 463 deer from infected areas.
    - Seven deer tested positive for CWD and one deer found dead tested positive.
    - MNDNR is in the process of renewing a $350K CSA with WS for targeted deer removal with a projected project date of February – March 2021.
    - During the expanded MN hunting season, test results from hunter harvests will help to determine the specifics of the removal efforts in February and March.
  - In 2020, WDBs deployed to Michigan to help remove 203 deer from infected areas.
    - Five deer tested positive for CWD and one deer struck by a vehicle tested positive.
  - In 2021, WDBs will deploy to assist Tennessee with targeted deer removals in infected areas. This deployment was scheduled to take place in 2020 but was postponed due to COVID-19.

CONFLICT INCIDENT REPORT BY SPECIES

Feral Swine

MOST SIGNIFICANT ISSUES

- Feral swine negatively impact resources with damage costs estimated to be at least $2.5 billion per year, $800 million of which is direct damage to agriculture.
- Feral swine occur across the United States, the highest concentrations occur in Southeastern portions of the country and stretch as far west as Texas and Oklahoma with high populations also found in California.
- To date, efforts have been successful in eliminating feral swine in four states - Idaho, New York, New Jersey, and Maryland. An additional 6 states are in monitoring phase (Washington, Colorado, Minnesota, Iowa, Wisconsin, and Maine) and will consider feral swine eliminated if the state detects no activity for an additional two years.

SIGNIFICANT REGULATORY OR POLICY CHANGES OR ISSUES?

- APHIS receives $30.55 million to implement the WS' National Feral Swine Damage Management Program (NFSP). WS distributes NFSP base funding to 37 states and 3 territories.
- WS FY21 federal allocation includes an increase of $1M in support of feral swine eradication efforts.
- APHIS and NRCS jointly implement The Feral Swine Eradication and Control Pilot Program (FSCP). The 2018 Farm Bill provides a one-time multiyear authority of $75M equally distributed between the two Agencies over 5 year (authorized by Section 2408 of the Agriculture Improvement Act of 2018, P.L. 115-334). The FSCP main objective is to address feral swine threats to agriculture, native ecosystems, and human and animal health.

- WS is collaborating with Texas A&M University to identify best practices for feral swine removal and implementation of APHIS pilot projects.
- WS purchased necessary equipment to enhance operational removal efforts in preparing for project activities, for example WS purchased five helicopters which are critical to reducing feral swine populations in difficult to access areas.
- FSCP prioritizes response to states that have the highest and most damaging feral swine populations. The FSCP builds upon and expands work already underway by WS' NFSP to remove feral swine and address emerging populations in conjunction with states, local government, the private sector, industry, and academia.
- WS and NRCS collaboratively identify pilot areas for FSCP in consultation with state technical committees. FSCP delivers three coordinated components within pilot areas.
  - First, WS works directly to control feral swine populations.
  - Second, NRCS provides funding to partner organizations to provide technical and financial assistance to agricultural producers for on-farm trapping and other means of feral swine control. Partner organizations also provide other services including pre- and post-project damage assessments and other means to assess progress in control efforts.
  - Finally, once population control occurs, NRCS provides technical and financial assistance for restoration of damage caused by feral swine.
- In this first year of the program, FSCP identified 20 pilot projects in 10 states with the highest feral swine densities. Project implementation started in early FY20 in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, and Texas.
- In FY20, the FSCP identified and selected an additional 14 projects in 8 states during the second round of soliciting projects. States with new projects include Hawaii and Missouri, the six other states were also a part of the first round of projects, Alabama, Mississippi, North Carolina, Oklahoma, South Carolina, Texas. FSCP will fully implement these projects in FY21.

RESEARCH

Sodium Nitrite. WS will conduct field trials and food safety studies to support registration of sodium nitrite as a feral swine toxicant. Pending EPA issuance of an experimental use permit, the WS' National Wildlife Research Center (NWRC), with assistance from NFSP, WS state programs in Texas and Alabama, and the Texas Parks and Wildlife Department, will conduct two large-scale field studies to evaluate the efficacy and safety of a sodium nitrite toxic bait for use against feral swine.

- The EPA-required studies will produce a comprehensive report that EPA will use to consider registering the toxicant.
- In a 2018 study the toxicant showed great promise against feral swine, but non-targets, mainly passerine birds, consumed crumbs produced by feral swine feeding on the bait and died.
- NWRC reformulated the bait to make it more palatable to feral swine and less prone to spilling and modified baiting strategy to add a bird deterrent device to scare away birds the

morning after WS deploys the toxicant. These modifications remove ~90% of pigs in just one night of toxic baiting with very few non-targets.

- For the upcoming studies, WS will evaluate the bait in Texas and Alabama during the summer.
  - WS will collar feral swine and raccoons in Texas and Alabama.
  - WS will then go back to the states to attempt to remove feral swine and document any non-targets, walking transects to recover carcasses, and using camera images to derive data.
  - WS will continue analyzing data to include in the report to EPA. Simultaneously, the NWRC Registration Unit is working to complete other aspects of the data package. WS anticipates EPA review to occur over 2 years.
  - Australia has registered this product for over a year and the feedback has been very positive.

CONFLICT INCIDENT REPORT

Livestock Protection – Vultures

MOST SIGNIFICANT ISSUES

New world vultures (turkey and black vultures) are expanding both spatially and numerically, causing an increase in reports of damage and depredation permits issued. For black vultures, this conflict is increasing in a disproportionate manner, with damage to agriculture (livestock) and property (both personal and infrastructure based) occurring at a higher rate than human health and safety (airport hazards, disease concerns).

RESEARCH

- NWRC research is focusing on livestock producer-vulture conflicts in S. Indiana and N. Kentucky, areas where black vultures conflict reports are on the rise. The research is in collaboration with Purdue University, USFWS, and WS state programs in Kentucky and Indiana. This project aims to:
  - Develop diagnostic criteria for helping identify vulture depredation events;
  - Gain a better understanding of livestock producer perceptions of the vulture-producer conflicts;
  - Investigate black vulture movement ecology through GPS/GSM transmitters;
  - Test mitigation strategies to reduce black vulture predation on livestock; and
  - Perform a risk assessment to determine what landscape features make depredation events more likely to occur on farms.
- Recent accomplishments for this project include trapping and affixing transmitters to black vultures and developing the producer survey. The distribution of the producer survey will occur in February or March.
- A new vulture research biologist, stationed at the NWRC Florida field station, will lead multiple vulture studies collaborating with 18 WS state programs (TN/KY, SC, GA, MS, FL, NC, VA, AL, AR, IN, LA, MO/IA, OH, OK, PA, TX, WV). Current vulture studies include:
  - Testing tools and methods to reduce vulture damage to property.

- Estimating black vulture home ranges. Vulture home ranges will be incorporated into the study design of estimating local vulture population size using a wing tag mark re-sight approach.
- If the study protocol is approved, NWRC will test the effectiveness of inflatable scarecrows for deterring black vulture use of flat rooftops throughout the Eastern United States.

CONFLICT INCIDENT REPORT

Resources Protection – Fertility Control-Feral Horses

MOST SIGNIFICANT ISSUES

Overpopulation is an issue for wild horses due to limited forage and diminishing water sources resulting in animal suffering and potentially permanent damage to the land.

RESEARCH

- NWRC continues research into sterilizing mares without surgical ovariectomy. There are no vaccines that cause permanent sterility in mares. Females are born with all the oocytes that they will ever have; research is targeting the oocyte cells. Oocyte-specific proteins, Bone Morphogenetic Protein 15 (BMP-15) and Growth Differentiation Factor 9 (GDF-9), are involved in every stage of follicular development and ovulation.
  - In previous studies, WS investigated the effects of a combination vaccine consisting of oocyte-specific growth factors, BMP-15 and GDF-9, on mare cyclicity and estrous behavior. WS hypothesized that immunization against the combination of these two growth factors would result in no ovarian cyclicity.
    - WS found that all control mares (10/10) cycled normally with ovulations associated with estrus at approximately 3-week intervals as expected.
    - Importantly, none (0/10) of the treated mares developed appropriately sized follicles or ovulated during the 8-month breeding season.
    - WS noted mixed estrous behaviors in a few mares throughout the study. Low progesterone levels in serum samples confirmed these findings.
    - Additionally, WS found that over 80% of the horses remained infertile for the following breeding season even though they were not reimmunized.
  - Current research focuses on identifying the best adjuvant for a single dose administration and the active duration of the vaccination to determine the length of effectiveness.
    - The adjuvant trails began in January 2021, in Fort Collins, Colorado, and will conclude in November 2021. WS has 14 mares on the adjuvant trials, studying 4 different adjuvant formulations.
    - The active duration of the vaccine effectiveness trails began in May 2020 at BLM facilities in Carson City, Nevada, and will conclude in 2023. There are 32 mares on the vaccine duration trails.

Human-Wildlife Interactions (HWI) Report

Berryman Institute, Utah State University, Logan, Utah.

Prepared by Ms. Rosanna Vail, HWI Managing Editor, hwi@usu.edu
and Rae Ann Hart, Staff Assistant Berryman Institute, raeann.hart@usu.edu

HWI journal

HWI's recently published issue (Winter 2020, Vol. 14, Iss. 3) was a special issue on bird damage (associate editor George Linz). The special issue contained published work on bird strikes, blackbirds, starlings, and vultures. Extensive interest in raven submissions developed into a separate special issue on raven management, slated as HWI's Fall 2021 issue. The call for papers is nearly closed, but interested authors should contact HWI or associate editor Peter Coates with questions about contributing to the raven issue.

The forthcoming HWI Spring 2021 issue is currently in production. This is a special issue on wild pigs (associate editor John Tomeček). Accepted articles will be early-published ahead of the full issue as they are finalized for publication, with the full issue slated to distribute later this spring.

Plans are in the works for a forthcoming special issue on fertility control and community involvement in managing wild horses and burros, planned as the last issue of 2021, in conjunction with the 50th anniversary of the Wild Free-Roaming Horses and Burros Act. Plans are also in the works for a special issue on island invaders. Calls for papers will be published in the next issue of HWI.

HWI's total download counts across all published works nearly doubled in 2020. Increases in submissions, published articles, and downloads can largely be attributed to the journal's indexing in the Directory of Open Access Journals as of May 2020.

Upcoming Conferences

The Berryman Institute, a sponsor of the 19th Wildlife Damage Management (Virtual) Conference, advertised the call for abstracts through HWI email (approx. 3,100 recipients) and social media platforms as an upcoming event relevant to journal readership. Several inquiries and/or abstract submissions resulted from these communications.

Monographs

The Human–Wildlife Interactions Monographs submission, "Toolkit to Address Free-ranging Domestic Cats (*Felis catus*) on Agency Lands Managed for Native Wildlife and Ecosystem Health," is currently in the peer-review stage. Nicki Frey is serving as EIC for this monograph.

Three HWI monographs have been published thus far and are available as print and/or digital downloads at https://digitalcommons.usu.edu/hwi_monographs/ .

Total downloads from start of online access (1/14/20) to the present:

- "Methods for Managing Human–Deer Conflicts in Urban, Suburban, and Exurban Areas" Publication date: 2019 | Downloads: 508 | Print copies still available | The Deer monograph had more pages so there are only 44 books in a box. We currently have 79 boxes left. Originally we charged $110 for each box. On June 12, 2020, we dropped the price to $95 for each box. We have tried to market it and there is an ad in each issue of HWI. We cannot put it on Amazon since the monograph has no ISBN number. A couple of things to think about. Covid probably has affected agency budgets for purchasing materials. The deer monograph was put on-line for free almost immediately after it was done so there wasn't as much incentive to buy a paper copy. Maybe deer issues are just not as critical to folks as bear issues. We may have other reasons for low sales that I haven't thought about.
- "Human–Black Bear Conflicts: A Review of Common Management Practices" Publication date: 2018 | Downloads: 186 The Bear monograph sold out of paper copies in about a year. We started with 2500 books (not all were sold, some were sent to authors and given out at meetings). The cost was $120 for a box of 58 books. After paper copies were mostly gone, we made it available on-line for free downloads.

- “Managing Wild Pigs: A Technical Guide” Publication date: 2009 | Downloads: 173

Cougar management book: The Berryman Institute is working with WAFWA to publish the second edition of the book “Managing Cougars in North America.” Each chapter was peer-reviewed during 2020, and feedback from WAFWA directors was received during their January meeting. Once the co-editors Jonathan Jenks and Dan Thompson finalize revisions to secure WAFWA approval, the book will enter the production stage in the Berryman Institute for final copyediting, layout, and publication. This book is slated for 2021 publication, though a final timeline is still in discussion with the editors.

HUMANE KILLING AND EUTHANASIA OF WILDLIFE

THREE BASIC THINGS TO REMEMBER

1. Plan ahead for the unexpected – plan on providing animal welfare & humaneness
2. Use/review AVMA Euthanasia Guidelines (for vets)-2020 (this is a new edition)
3. ODFW vet staff approval of non-standard procedures

THE AVMA (AMERICAN VETERINARY MEDICAL ASSOCIATION)

- "Acknowledges an inherent lack of control over free-ranging wildlife"
- "Accepts that firearms may be the most appropriate approach"
- "Acknowledges that the quickest and most humane means of terminating the life of free-ranging wildlife may not always meet all criteria established for euthanasia"

EUTHANASIA

- The Basics of Wildlife Euthanasia "Eu" meaning good and "Thanatos" meaning death (greek). The goal of any animal euthanasia should be a respectful end of life event and "Good Death", without suffering .

•"The overall goal should be to minimize animal distress and pain, as well as emotional impact and physical risks to personnel." (IACUC, 2016. P. 1)

MECHANISMS OF EUTHANASIA

1. Rapid loss of consciousness
2. Cardiac or respiratory arrest
3. Subsequent loss of brain function

WHY IS UNCONSCIOUSNESS BEFORE DEATH IMPORTANT?

- All animals experience hypoxia before death
- Hypoxia = low oxygen levels
- Hypoxia is painful and it causes panic
- No pain is perceived when unconscious
- Brain function must be stopped before other organs stop
- Organ failure before brain functionceases can also be painful
- <u>When brain function stops, all other functions will stop within minutes</u>

HUMANE KILLING

Involves the quickest and most humane method of terminating the life of a free-ranging wildlife species.

- May not meet all the criteria for euthanasia
- Should minimize and avoid pain, suffering, distress just like euthanasia
- Will often involve procedures less palatable to the public
- Top consideration is still animal welfare, same as euthanasia

REASONS WE MAY EMPLOY HUMANE KILLING/EUTHANASIA OF WILDLIFE

- Wildlife captures: injuries or research/collection requirements
- Disease investigation, control, and/or prevention
- Population management
- Orphaned, injured, or sick animal(s)
- Public safety
- Damage (crops, livestock, etc.) or nuisance animals

AN EVOLVING HISTORY

- "Euthanasia" at animal pounds at the turn of the 20th century
  - Shooting
  - Clubbing
  - Decapitation
  - Drowning

- "Humane" killing of food animals
  - Stunning by bolt trauma or pithing
  - Exsanguination (bleeding out)
  - Cervical dislocation (neck wringing)

CREATIVE BUT NOT HUMANE

- Poisoning early 19th century
  - Paralytics to suffocate (succinylcholine, anectine, nictone, strychnine)
  - Magnesium or potassium to stop heart
- Commercial electrocution
  - Primitive machine in 1915
  - "More humane" electrocution chamber 1970
- Hypoxic chemicals (CO, CO_2) and decompression chambers (60's, 70's)
  - Engine exhaust generated CO
  - Then commercial CO chambers

WE START TO DO A BETTER JOB

- Humane Slaughter Act – 1958, 1978, 2002
  - Rendering animals unconscious prior to euthanasia becomes paramount
  - Chambers not appropriate for large numbers of animals (reduce injury during procedure)
  - Restraint at some level adds complexity to the event, but is better for the animal
- Use injectable CNS depressants (sodium pentobarbital)
  - Controlled substances require training, safety, storage, disposal issues
  - IntraCardiac, IntraPeritoneal, IntraVenouS

WILDLIFE TAKING

- Federal, state, and local regulations apply to the taking of wildlife; management primarily under state jurisdiction.

- The most humane method applied will vary by species, situation, and individual animal and include minimizing distress and pain, and considering the safety of personnel and bystanders.

PEOPLE HAVE A STRONG EMOTIONAL INVOLVEMENT WITH WILDLIFE

Killing an animal should always be completed outside of public view, if possible, further providing a barrier for public safety

PUBLIC SAFETY AND DAMAGE

- Urbanized landscapes and the spread of cities
  - Conflict wildlife encounters -bears, cougars, raccoons, rodents
- ODFW Damage Policy often involves removing wildlife
  - Nuisance
    - may do damage to property - not a threat to public safety
  - Depredation
  - Dangerous

- Humane treatment still applies

AVMA CRITERIA TO RANK EUTHANASIA METHODS (CONSIDER FOR HUMANE KILLING TOO)

1) Ability to induce loss of consciousness and death without causing pain
2) Time required to induce loss of consciousness
3) Reliability
4) Safety of personnel
5) Irreversibility
6) Compatibility with requirement and purpose
7) Emotional effect on observers and operators
8) Compatibility with subsequent examination or use of tissue
9) Drug availability
10) Human abuse potential
11) Compatibility with species, age, sex, and health status
12) Ability for equipment to be maintained in proper working order
13) Safety for predators or scavengers, should the carcass be consumed

CONSIDERATIONS FOR TECHNIQUES USED

- Safety (of staff and animals)
- Restraint needed?
- Staff trained in the humane techniques?
- Drugs and equipment available?
- Is the method / technique acceptable to bystanders? (Think cameras)
- Disposition of carcass- scavengers an issue
- Diagnostic samples - brain intact?

OTHER CONSIDERATIONS

- Field projects should have euthanasia policies in proposal and permits
- If possible, always use anesthesia first

METHODS: FREE-RANGING WILDLIFE

TWO-STEP EUTHANASIA

- Where an animal is rendered unconscious from chemical anesthesia followed by a secondary technique that results in death
- Examples
  - T/K/X sedation on turtle followed by decaptitation and pithing
  - Ketamine/xylazine anesthesia on bat followed by cervical dislocation

INHALANTS

- Ether, halothane, isoflurane, sevoflurane
- Small animals in a closed receptacle
- Used under direct guidance of veterinarian (state board of pharmacy registration)
- Human exposure: abortions, congenital abnormalities in early pregnancy (<2ppm)

CHEMICAL METHODS: INHALED AGENTS

- Gas anesthetics
  - Ether
  - Isofluorane, desfluorane, sevofluorane- currently available in the US
    - Isoflurane- most commonly used
  - May be primary method of euthanasia for mammals < 7kg
    - Death needs to be confirmed – cessation of heart beat and respiration
  - Can also be used as part of 2-step euthanasia to render animal unconscious followed by secondary kill method

GAS ANESTHETICS-DELIVERY METHODS

- Open drop method = application of liquid isoflurane to an absorbent material which is then placed into the bottom of the chamber
  - E.g. -Container with cotton ball
  - For use on mammals <7 kg
- Do not have animal directly contact the liquid
  - caustic to tissues
- Prevent personal exposure –open air or under a hood preferred

GAS ANESTHETICS- OPEN DROP METHOD

Advantages

- May be used as primary euthanasia method in mammals < 7kg if confirm death (e.g. stethoscope)
- Fairly portable
- Socially acceptable

Disadvantages

- Don't want to use in enclosed spaces (e.g. caves) human safety
- Pregnant individuals most at risk
- Need to capture animal first

CHEMICAL METHODS: POTASSIUM CHLORIDE

- Given only to anesthetized animals
- Must be given IV or IC (intracardiac)
- K overdose causes heart to stop (basically a heart attack)

Advantages

- Minimal risk to humans
- Inexpensive
- Non-toxic drug residue (but other anesthesia drugs will likely have residues)

Disadvantages

- Often takes large volume
- May be difficult to access vein (low pressure) or heart

CO_2 EUTHANASIA

- Compressed CO2 gas inflow can be regulated precisely
  - CO2 flow should displace air at a rate of 30% of the chamber volume per minute
  - CO2 generated by other methods (e.g., dry ice) is unacceptable
  - Procedure:
    - a) Euthanasia of caged animals is preferred.
    - b) CO2 delivered from a pressurized tank with flow rate set to displace 30% of the chamber or cage volume/minute.
    - d) Animals monitored for cessation of respiration plus at least an 60 seconds after respiration has ceased.
    - e) Never leave a euthanasia chamber with flowing gas unattended.

CO_2 EUTHANASIA

- Office set-up

GUNSHOT TO HEAD – KNOW SPECIES ANATOMY

GUNSHOT OR CAPTIVE BOLT

- Following physical or chemical capture/injury
- Frontal or side brain entry
- Neck shot if brain needed to be preserved
- Close placement of barrel if possible
- High potential risk of human injury

<u>CERVICAL DISLOCATION OR DECAPITATION</u>

AMPHIBIANS

- MS-222 Tricaine methanesulfonate
  - Buffer with sodium bicarbonate to a pH of 7.0 or 7.5
  - Water bath-1-5 g/L
  - Injected into coelomic cavity (200 mg/kg)
- Topical benzocaine gel- applied to ventral belly
- Pithing, hypothermia, decapitation, exsanguination, electrocution and inhaled agents <u>not</u> recommended as primary euthanasia techniques

REPTILES

Extremely tolerant of low oxygen levels and research has shown that the decapitated reptile head can perceive sensation for over 1 hour. Decapitation of conscious turtles is not considered a humane method of euthanasia.

1. Anesthesia followed by decapitation. If turtles cannot be delivered to the wildlife health lab then they can be anesthetized by intramuscular injection with a Telazol/Xylazine/Ketamine (T/K/X) cocktail.** After the anesthetic agent has taken full effect and the turtle is non-responsive, then the animal can be decapitated. After decapitation the skull should be crushed to ensure destruction of the brain.
2. Decapitation (with no anesthesia) followed by immediate crushing of the skull and destruction of the brain. This method should only be used if the turtle has been approved for human consumption or in emergency situations.
3. Destruction of the brain by blunt force trauma (with no anesthesia) followed by decapitation. This method should only be used if the turtle has been approved for human consumption or in emergency situations.
4. Anesthesia combined with intravenous administration of a barbiturate (can only be perfomed by veterinary staff) . When possible, turtles should be delivered to the Wildlife Health Lab.

5. w metabolic rate, anaerobic metabolism

- IV barbiturates
- Physical methods: animals for human consumption
- Decapitation (brain viable for >1 hour)
- Freezing is painful (forms of ice crystals)

AVIAN

- Cervical dislocation
- Gunshot
- CO^2 on small birds (< 3 lbs.)
- Thoracic compression not recommended but could be used if anesthetized

SMALL MAMMALS

- CO^2 (<3 pounds)
- Cervical dislocation (<150g)*
- Decapitation*
- Concussion or stunning (neonatal or < 2-3 lbs)*
- Thoracic compression *
- Other methods (liquid nitrogen, kill traps)
- *(With anesthesia)

UNACCEPTABLE METHODS –THESE ARE NOT HUMANE

- Hypothermia/freezing
- Nitrogen/Nitrous Oxide
- Ketamine alone
- Neuromuscular blockers
- IP/IC injections w/o anesthesia
- Thoracic compression w/out anesthesia
- CO/chloroform/ether
- Car exhaust
- Strychnine/nicotine/cyanide
- Nail polish remover
- Air embolism

UNACCEPTABLE PARALYSIS METHODS USING DRUGS

- Muscle paralysis does not block cerebral cortex
  - Succinylcholine (Sucostrin)
  - Strychnine
  - Curare
  - Nicotine
  - Potassium
  - Magnesium salts
- Animals are fully conscious
- Distress and perception of pain

EUTHANASIA AND THE MEDIA

LITERATURE CITED

1. AVMA Guidelines for the Euthanasia of Animals: 2020 Edition.
2. Julien, T. J., S. M. Vantassel, S. R. Groepper, S. E. Hygnstrom. 2010. Euthanasia methods in field settings for wildlife damage management. Human-Wildlife Interactions 4:158-164.
3. Thompson, T. 2018. Field euthanasia methods for wildlife. OLAW Online Seminar.

Report to AFWA Human Wildlife Conflict Working Group

AGENCY: NC Wildlife Resources Commission **DATE:** Feb. 11, 2021
STATE/PROVINCE/FEDERAL/TRIBAL: State – North Carolina

Submitted by: Falyn Owens

Telephone: 919-616-2208 **E-mail:** falyn.owens@ncwildlife.org

---

1. **MOST SIGNIFICANT ISSUES**
    a. On-Going

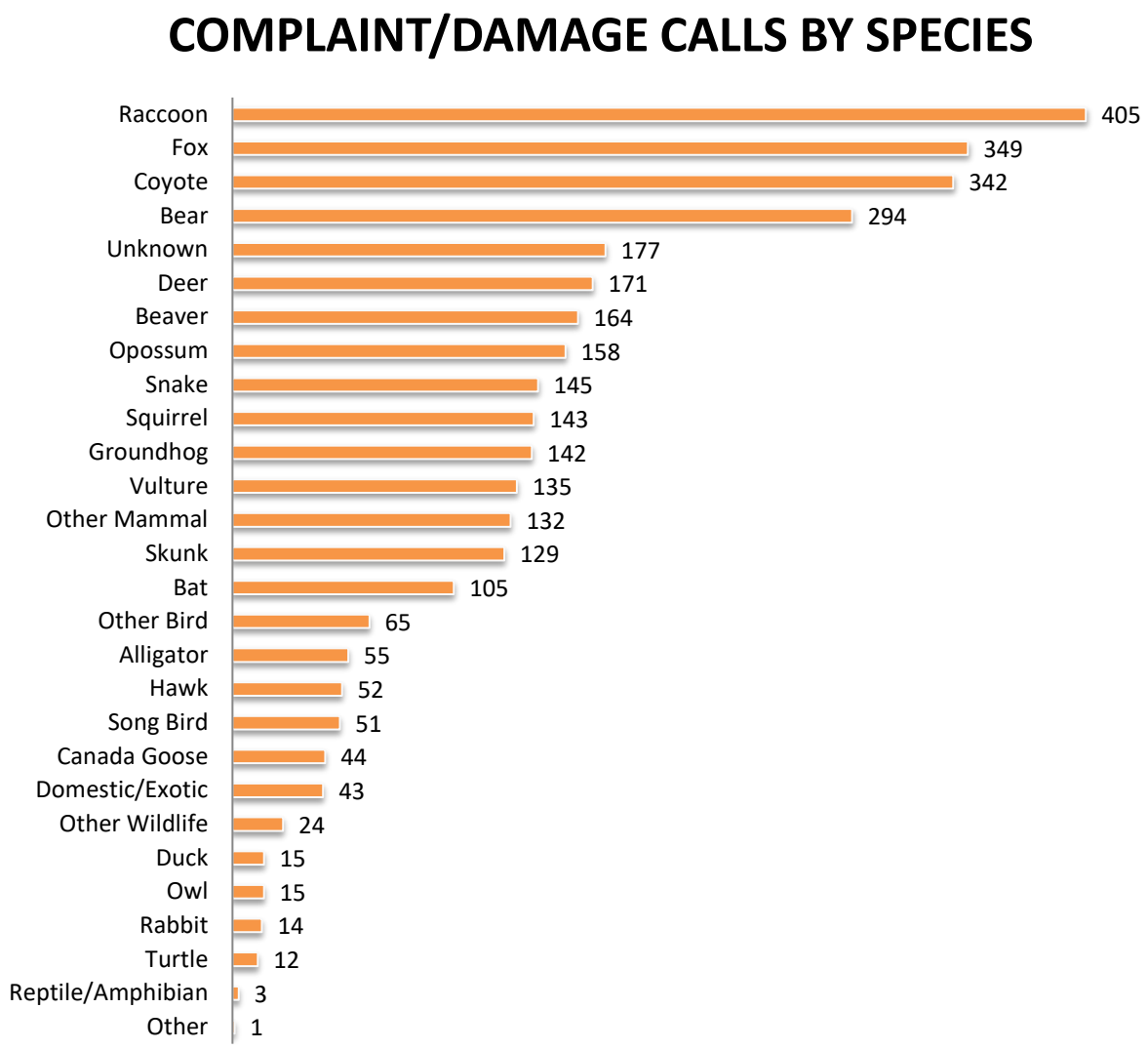
While the COVID-19 pandemic caused significant shifts in how the agency captured human-wildlife interaction data in 2020, the data show continued frequent complaints related to ubiquitous species which are also top rabies vector species in North Carolina: raccoons and foxes (grey and red). Also common are concerns about coyotes. For these species, most of these complaints were fear-based, and not associated with damages caused by the animals. NCWRC is continuing to focus on digital engagement to help communicate conflict prevention and coexistence strategies, including recorded webinars, short video blog-style resources on YouTube, and outreach via the neighbourhood networking app, Nextdoor.

Complaints related to sightings and encounters with black bears continue to be a common issue across the state, but particularly in the western Mountain Region (e.g., Asheville area). NCWRC continues to promote BearWise practices to prevent conflicts with bears. See section 4 for more details.

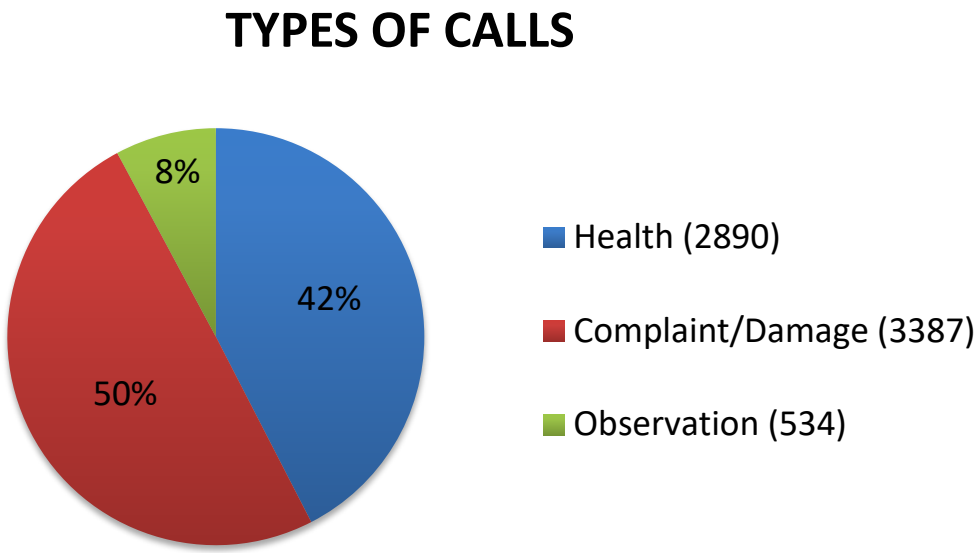
    b. Emerging

None to report for 2020.

2. CONFLICT INCIDENT REPORT BY SPECIES



The data above were captured by NC Wildlife Helpline staff in 2020. This does not include complaints received directly by field staff, and overall data collection has been impacted by COVID-19 measures, so totals for each species are likely higher, but the proportions should be relatively accurate. “Other” categories (e.g., “Other mammal”) include species not explicitly listed in the chart. “Unknown” represents complaints where the reporting person was unsure of the species involved, could not provide enough information for our staff to identify the species, or a cryptid was reported.



Notably, only about half of the human-wildlife interactions reported by the public to the NC Wildlife Helpline involved complaints about wildlife. A significant portion of reports involved injured, situationally endangered, or orphaned wildlife (both perceived and actual), or general concerns about the wellbeing of wild animals. A small proportion involved reported sightings of rare or unusual wildlife.

3. SIGNIFICANT REGULATORY OR POLICY CHANGES OR ISSUES?

A new rule proposal is under review that would create certified alligator control agents in NC. While euthanasia is often used to manage alligators in other states, due to their slower growth rate and lower densities, alligators in North Carolina are typically relocated when necessary to reduce conflict. As coastal NC becomes more populous, conflicts with alligators are expected to increase along with requests for relocations. A certification program for alligator control agents will allow NCWRC to continue to collect data on relocated alligators, and issue permits to allow those activities to occur, while allowing certified agents to use their own resources in the capture, transport, and release of those animals. The proposed rule could be adopted as early as May 2021.

4. RESEARCH /SPECIAL PROJECTS

Bearwise – a joint outreach initiative among SEAFWA states. NCWRC began its Bearwise community certification program, which encourages communities to adopt practices that prevent human-bear conflicts (e.g., removing bird feeders, securing trash containers). Though COVID-19 hindered progress, two communities in the Asheville, NC area are close to receiving certification. NCWRC also engaged in several messaging campaigns via Facebook and other

social media platforms, including a commercial promoting the six BearWise Basics. Virtual outreach events reached ~5,200 people.

NC Feral Swine Task Force – collaborative partnership among several state and federal agencies in NC. We created a new website to share information and resources about feral swine management efforts with the public (hyperlink in header). Predominant in outreach efforts is a new feral swine reporting app where residents can report sightings, harvest, and damages related to feral swine. Special on-the-ground effort is being directed at a pilot eradication program in Sampson County which aims to systematically assess damages and remove feral swine from the area with landowner cooperation. A second project involves initiating a trap-loan program which will provide corral-style traps to landowners, along with providing technical assistance on trapping and shooting techniques.

5. OTHER

Report to AFWA Human Wildlife Conflict Working Group

AGENCY: Wyoming Game and Fish Department
DATE: 3/09/21
STATE/PROVINCE/FEDERAL/TRIBAL: STATE
Submitted by (name): Doug Brimeyer

Telephone: **E-mail: Doug.brimeyer@wyo.gov**

---

1. **MOST SIGNIFICANT ISSUES**
   a. **On-Going**

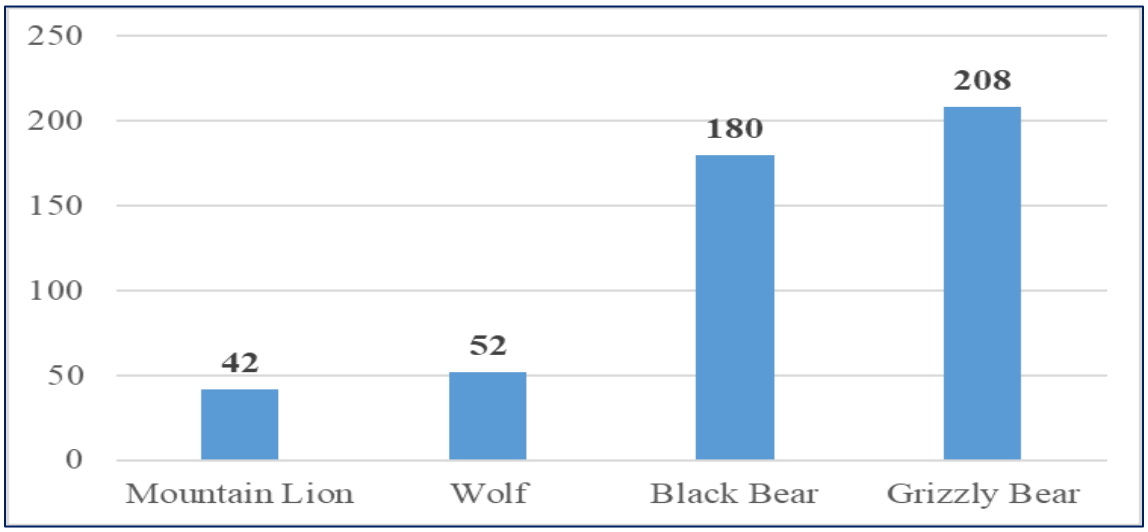
Continued increasing distribution of large carnivores, primarily grizzly bears into more residential and agricultural settings and areas that are inherently more prone to conflict. There is increasing scrutiny on management of large carnivores and it is heavily polarized especially in the case of wolves. Public tolerance is always a factor on both sides of management issues regarding large carnivores and more pressure from outside entities opposing state management of large carnivores. Public sentiment towards carnivores and predators was especially volatile this past year, more so in damage scenarios with black bears and mountain lions. There is continued interest from landowners regarding the Agency's damage compensation program.

b. **Emerging**

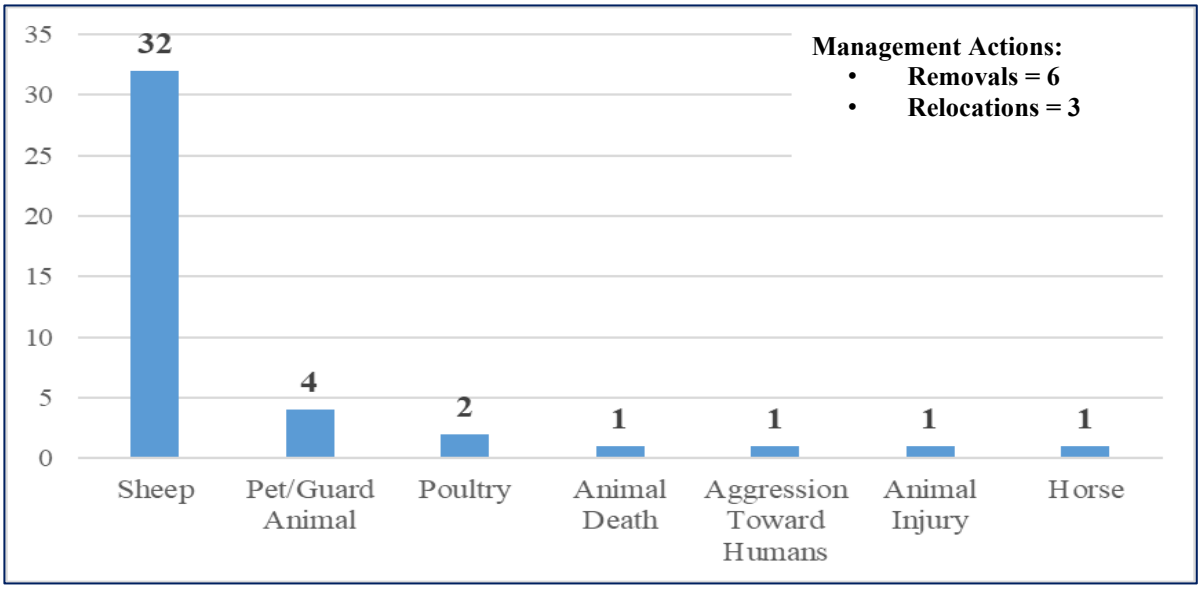
There are more issues related to seeking damage compensation for depredation and stress from bears, wolves, and mountain lions beyond what is outlined in regulation. This past year recreational use was considered an anomaly based on previous years and increased human use of areas occupied by large carnivores was observed across Wyoming. Current drought issues have a potential to impact black and grizzly bear conflicts in the coming year. Opposition to managing large carnivores by special interest groups appears to be increasing, especially through social media platforms. The use of records requests for information is being used as a tactic to burden personnel away from standard work duties.

.

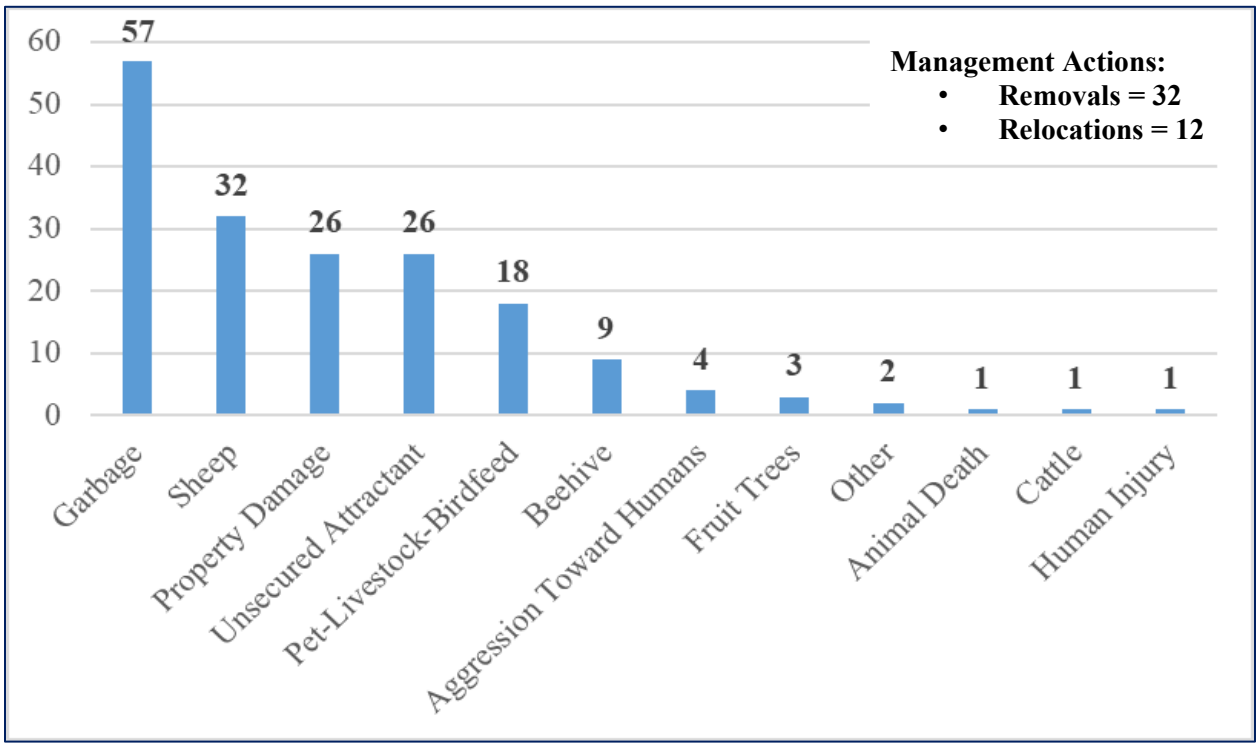
2. CONFLICT INCIDENT REPORT BY SPECIES (482 Verified Conflicts Total):



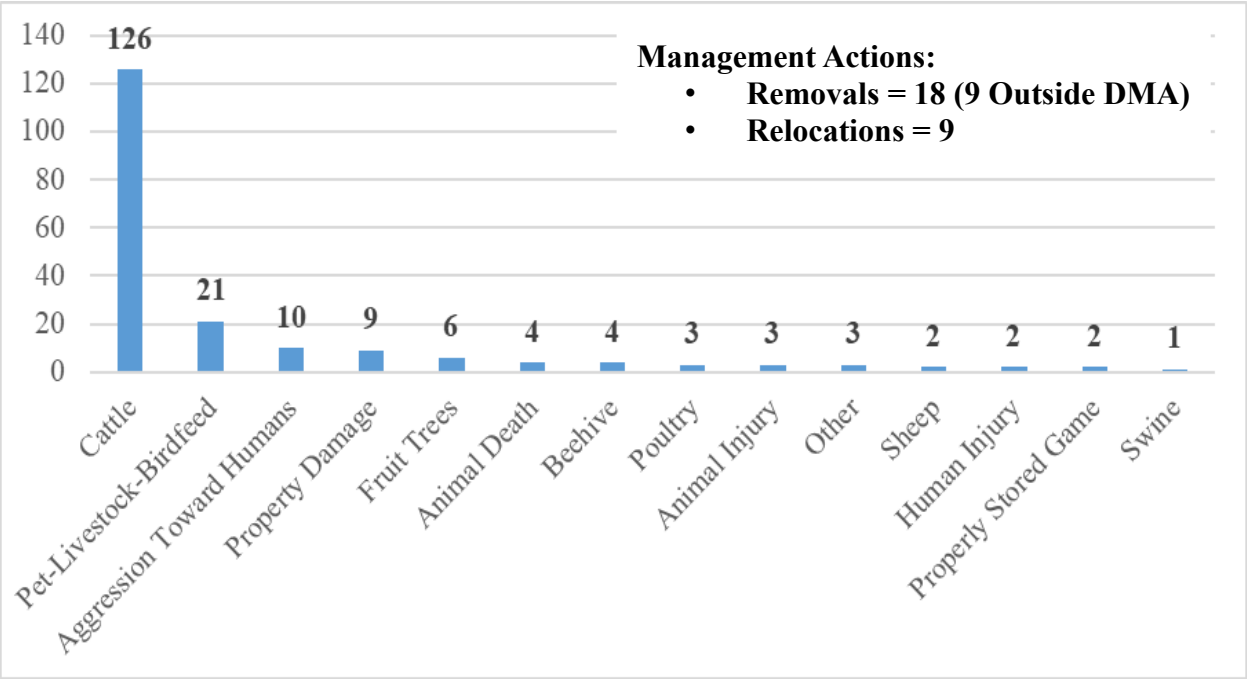
Mountain Lion Conflicts and Management Actions (42 Conflicts Total):



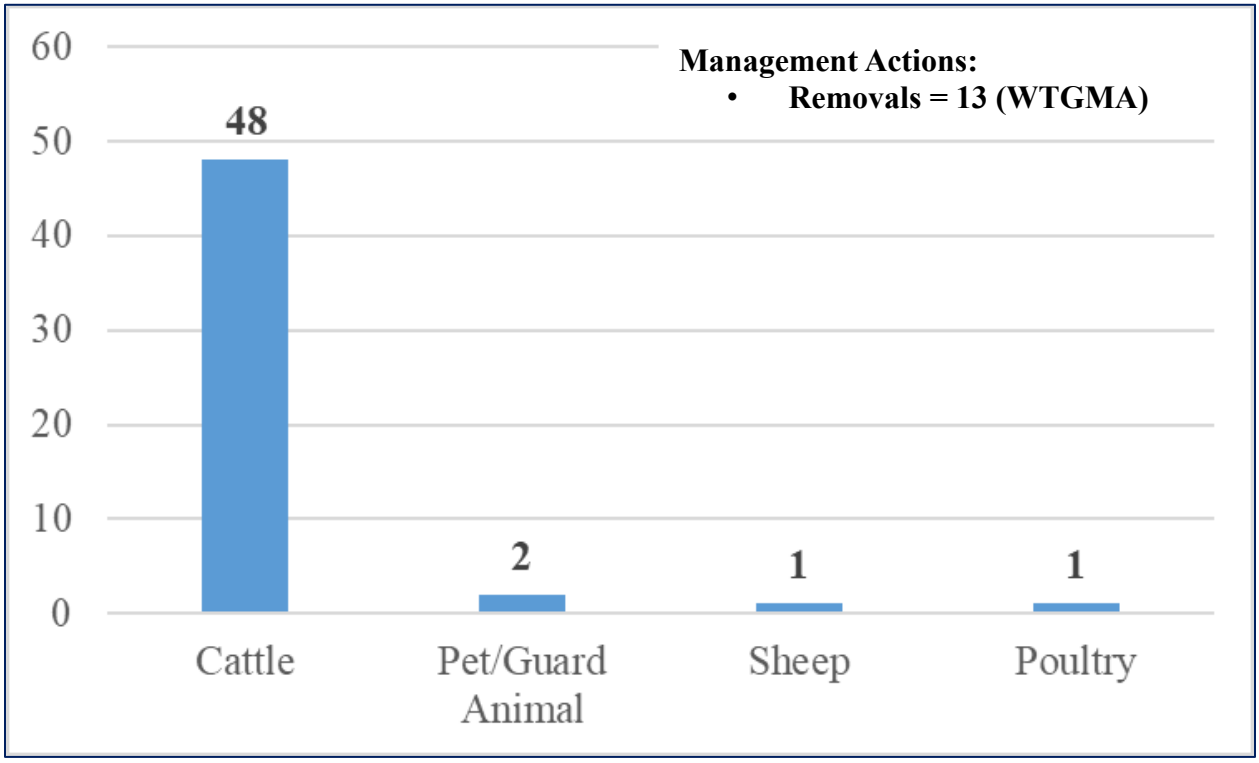
Black Bear Conflicts and Management Actions (180 Conflicts Total):



Grizzly Bear Conflicts and Management Actions (208 Conflicts Total):



Wolf Conflicts and Management Actions (52 Conflicts Total):



3. SIGNIFICANT REGULATORY OR POLICY CHANGES OR ISSUES?

Endangered Species Act protections for grizzly bears as a threatened population in the Greater Yellowstone Ecosystem create challenges for on the ground management when dealing with conflicts and managing public perceptions. Based on grizzly bear recovery criteria, the bear population is fully recovered in Wyoming, yet due to litigation and court decisions grizzly bears are still classified as threatened. This classification impacts management but also brings into play multiple additional jurisdictional involvement regarding land use practices in areas with grizzly bears (biological opinions on grazing, development etc.)

4. RESEARCH /SPECIAL PROJECTS

We are currently engaged with a research project with University of California/Berkeley evaluating cause specific mortality of bovine calves in an area with an intact large carnivore guild and known depredation by wolves and grizzly bears on domestic cattle. We have engaged with USDA Wildlife Services on multiple permanent fencing structures and nonlethal measures to mitigate conflict between large carnivores and people and continue to evaluate our current data and procedures to increase our efficacy in dealing with conflicts and overall conflict management.

5. OTHER

Grizzly bear management captures, relocations, and removals in northwest Wyoming- https://wgfd.wyo.gov/WGFD/media/content/PDF/Wildlife/Large%20Carnivore/2020-Grizzly-Bear-Relocation-Report.pdf

Wyoming Wildlife Magazine grizzly bear issue.
https://www.nxtbook.com/wyominggame/WyomingWildlife/December2020/