

**PENNSYLVANIA GAME COMMISSION  
BUREAU OF WILDLIFE MANAGEMENT  
ANNUAL PROJECT REPORT**

**PROJECT CODE NO.:** 05300

**TITLE:** Wildlife Health Program

**PROJECT JOB NO.:** 30002

**TITLE:** Wildlife Health Activities

**PERIOD COVERED:** 1 July 2014 to 30 June 2015

**COOPERATING ENTITIES:** Pennsylvania Game Commission Bureaus of Wildlife Protection, Information and Education, and Automated Technology Services, Region Offices, Pennsylvania Departments of Health and Agriculture; The Pennsylvania State University Animal Diagnostics Lab; U.S. Department of Agriculture-Veterinary Services; U.S. Department of Agriculture-Wildlife Services; University of Pennsylvania School of Veterinary Medicine New Bolton Center; Pennsylvania Cooperative Fish and Wildlife Research Unit.

**WORK LOCATION(S):** Statewide

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**DATE:** 30 June, 2015

**ABSTRACT** Wildlife health associated activities occurred statewide with emphasis on surveillance for and prevention of wildlife disease, including those with impacts on wildlife, agriculture, and/or public health sectors. The activities associated with Objective 1 (i.e. administration) connect the other two objectives and forms a system for their completion based upon cooperation between specific disease- or species-associated projects and the Pennsylvania Game Commission Regions. All objectives were met, though lessons were again learned about how to improve the efficiency of the effort and where deficiencies in capacity exist.

**OBJECTIVES**

1. To administer the Wildlife Health Program throughout Pennsylvania.
  
2. To manage activities relating to surveillance, planning, and response to wildlife disease events, including those with impacts on the health of wildlife, domestic animals, humans, and the environment. Activity categories within this objective include the following: specific wildlife disease threats, general health and disease surveillance, original research, veterinary support of related research, and disease events and responses.

3. To facilitate the safe capture and chemical immobilization of wildlife when necessary during Pennsylvania Game Commission (PGC)-related activities.

## **METHODS**

Administration of the Wildlife Health Program in Pennsylvania was completed through collaborations and communications with personnel of the PGC, the Pennsylvania Department of Agriculture (PDA), and the Pennsylvania Department of Health (PDH), as well as numerous other state and federal wildlife and agricultural health entities. A large component of the relationship with the state agriculture agency involves interaction with the Resident Directors or diagnostic personnel of the three laboratories of the Pennsylvania Animal Diagnostic Laboratory System (PADLS) and the Animal Health Diagnostic Commission (AHDC). The PGC is also a member of the Southeast Cooperative Wildlife Disease Study (SCWDS) and frequent interactions with personnel of this organization are critical to the completion of this objective. Another important component of administration involves communication and facilitating the flow of information related to the Wildlife Health Program and PGC activities to interested parties at numerous levels, including (but not limited to) the PGC, collaborating partners, other state or federal agencies, private organizations, and the general public.

Wildlife disease surveillance, planning, and response was met through a combination of field and laboratory responses to specific disease threats, general surveillance through PGC field staff, original wildlife disease research, and veterinary support of related research. Diagnostic investigations of specific disease topics or general surveillance were achieved through a wide-diversity of efforts, including submission of carcasses to diagnostic laboratories for complete necropsies, field necropsies, and/or submission of tissues to diagnostic laboratories for examination (including microscopy and ancillary tests). Diagnostic laboratories used by the Wildlife Health Program include SCWDS, the National Wildlife Health Center (US Geological Survey), National Veterinary Services Laboratory (US Department of Agriculture [USDA], Animal and Plant Health Inspection Service [AHPIS]), USDA-APHIS-Wildlife Services laboratory, or one of the three PADLS laboratories.

Providing safe capture and chemical immobilization of wildlife was largely accomplished through direct interaction with Bureau of Wildlife Management (BWM) and PGC regional personnel. The web-based Pharmaceutical Management System (PMS) and procedures relating to pharmaceutical use in PGC activities continue to evolve with additional features and relatively minor changes during 2014. These changes were incorporated into the revised Standard Operating Procedure (SOP) 40.9, which was completed in September 2014. These changes were accomplished in coordination with the Bureau of Automated Technology Services (BATS).

A significant component of all three objectives involves frequent training of BWM and PGC regional personnel, which is provided through didactic lectures in support of SOP 40.4 (Disease Surveillance) and 40.9 (Pharmaceutical Use), as well as a variety of other opportunities as they present, including hands-on workshops, presentations, distribution of informational documents, and correspondence via email, phone, etc.

## **RESULTS**

### **Administration of the Wildlife Health Program**

One AHDC meeting was attended at which time updates on PGC activities were provided. Multiple additional conference calls and meetings were held with PDA to discuss topics including feral swine, Avian Influenza (AI), and Chronic Wasting Disease (CWD). The Interagency CWD Task Force met and discussed the evolving epidemiology of CWD in Pennsylvania. During this meeting the task force revised the Pennsylvania CWD Response Plan to account for changes that occurred over the preceding year. There were numerous interactions with field personnel of the PDA, USDA-APHIS, and PDH on diagnostic examinations, disease events, and planning for surveillance efforts, particularly those relating to CWD, rabies, AI virus, West Nile virus (WNV), diseases of feral swine, and tick-borne diseases.

Wildlife disease information was provided as needed or in response to requests from bureaus, regions, PGC Comments (email questions received by the PGC), other state and federal agencies, and directly to citizens. National and international news and information regarding wildlife diseases was proactively forwarded to interested parties and stakeholders as needed. Programs were provided to a wide diversity of audiences from the public to various agricultural, wildlife, and public health agency personnel. Through these presentations, we were able to improve the audience's general appreciation of wildlife, their awareness and understanding of wildlife health and disease, describe the activities of the PGC, and answer any questions that may arise.

### **The following programs were provided:**

-A lecture on diseases of upland game birds was provided to students in the Pennsylvania Institute for Conservation Education's Wildlife Leadership Academy *Drummers* camp. In addition, a hands-on workshop on ruffed grouse anatomy and dissection was provided to the students.

-Two lectures were provided to students in the Pennsylvania Institute for Conservation Education's Wildlife Leadership Academy *Bucktails* camp, including one on deer anatomy/physiology and one on CWD. In addition, a hands-on workshop on deer evolution, anatomy, and dissection was provided to the students.

-A lecture on deer anatomy, physiology, and necropsy techniques and a necropsy workshop was provided for members of the Pennsylvania Chapter of The Wildlife Society during the annual meeting.

-Nine interviews were provided to reporters by phone or in person on the following topics: diseases of wildlife, Lymphoproliferative Disease Virus (LPDV) of wild turkeys, CWD, rabies, living safely around wildlife, supplemental feeding of wildlife, and wildlife diseases that can be transmitted to domestic animals.

-A lecture on diseases of feral swine was provided to Pennsylvania Association of Sustainable Agriculture at the annual meeting. The lecture was followed by a panel discussion.

-A lecture on Hemorrhagic Disease (HD) of cervids was provided to the Pennsylvania Vector Control Association at their annual conference.

-A lecture on animal welfare and waterfowl diseases was provided during the PGC Waterfowl Banding Workshop.

-Six lectures were provided for the Wildlife Diseases course at the Penn State University covering the following topics: Wildlife Epidemiology, Artificial Wildlife Activities, Invasive Species and Disease, Diseases of Ungulates, and CWD in Wild Cervids.

-Programs on CWD in Pennsylvania were provided at the annual Pennsylvania Wildlife Rehabilitation and Education Conference, the Animal Diagnostic Laboratory's Annual Veterinary Practitioners Meeting, Juniata College's Mammalogy Summer Course, the January Meeting of the Board of Commissioner's, Disease Management Area (DMA) 1 and 2 Taxidermist and Processor Meetings, DMA 3 Public Meeting, PGC Deer Management Training, House Game and Fisheries Committee, and the Annual Interstate CWD Meeting.

-Programs on WNV in ruffed grouse were provided at the April Meeting of the Board of Commissioner's and at the reception of the Ruffed Grouse Society's Upland Bird Hunt in the Pennsylvania Wilds.

-Programs on AI virus were provided at the Juniata College's Ornithology Summer Course and the University of Pennsylvania, College of Veterinary Medicine's Wildlife Medicine course.

-A presentation on LPDV of wild turkeys was provided at the Annual Meeting of the Pennsylvania Chapter of The Wildlife Society.

-We co-authored abstracts for 6 oral presentations at local, national, and international meetings, including the ninth International Symposium on AI, the Annual Meeting of the Pennsylvania Chapter of The Wildlife Society, the fourth International Conference on Bluetongue and Related Orbiviruses, and the Annual Meeting of the Southern Society of Parasitologists.

**The following publications or informational documents were provided:**

-Nine peer-reviewed manuscripts were accepted for publication on topics including AI virus, LPDV, a novel viral disease of sea ducks, paramyxoviruses, and Eustrongylides (refer to LITERATURE CITED section).

-Three book chapters were accepted for publication on AI virus in wild birds (refer to LITERATURE CITED section).

-An informational brochure on mange in black bears was developed in collaboration with the Northcentral Regional Office personnel. The document will be distributed to the general public to provide information on the disease, parasite, epidemiology, and measures that can be taken to reduce the spread of mange in Pennsylvania bears. The document was also distributed to other regions to serve as a template.

-An article on the epidemiology and ecology of mange in Pennsylvania black bears was published in the Newsletter of the International Association for Bear Research and Management (refer to LITERATURE CITED section).

### **Wildlife Disease Surveillance, Planning, and Response; Specific Wildlife Disease Threats**

*Chronic Wasting Disease.*--Since 2012, CWD has been identified in three locations within Pennsylvania, referred to as DMA 1, 2, and 3. The disease has only been identified in captive deer in DMA 1 and 3, and only identified in wild deer in DMA 2. To date, there have been 10 CWD positive captive deer detected on 3 separate cervid facilities in Pennsylvania. All 3 facilities have been depopulated. Eleven CWD positive wild white-tailed deer have been identified, all within DMA 2. Extensive time and resources have been dedicated to planning, surveillance, and response to CWD. Additional details on the surveillance and management efforts can be found in the Annual Report on CWD (Brown 2015).

*Feral Swine Disease Surveillance.*--Over the last year, diagnostic samples were collected from 3 feral hogs to test for exposure to multiple disease of importance for agriculture or public health, including Classical Swine Fever, Pseudorabies, Swine Brucellosis, and Swine Influenza. The 3 hogs were from the Southcentral Region, including 2 from Bedford County and 1 from Cumberland County. All 3 hogs tested negative for the pathogens listed above.

*Causes of Morbidity/Mortality In Bald Eagles.*--We continued to submit bald eagle mortalities to SCWDS as part of the ongoing study to identify causes of morbidity and mortality in Pennsylvania. This year 16 bald eagle carcasses were submitted to SCWDS for diagnostic examination. A diversity of causes of mortality were identified, including trauma, lead toxicosis, electrocution, anticoagulant rodenticide toxicosis, and gunshot. These results have been compiled with similar bald eagle data collected over previous years and are currently being analyzed to better understand risks for morbidity and mortality in this species throughout the state.

*Captive Pheasant Disease Surveillance.*--Coccidiosis and nematodiasis are important diseases in captive pheasants that can lead to morbidity, mortality, and significant production losses. The causes and management of both these diseases were discussed extensively at Game Farm Superintendent's Meetings as well as the Pennsylvania Game Breeders and Hunting Preserves Conference. Standardized testing, management, and treatment protocols for both diseases continue to be modified for the 4 PGC game farms.

*Avian Influenza Virus.*--Since December 2014, strains of H5 highly pathogenic avian influenza (HPAI) virus have been identified in wild, domestic, and captive birds in multiple states in the Pacific, Central, and Mississippi flyways. To date, the virus has been detected in 21 states and affected nearly 50 million domestic birds. No HPAI viruses have been detected in Pennsylvania or the Atlantic flyway. Most isolations of H5 HPAI virus from wild birds have been made from ducks, geese, or raptors. Raptors appear to be highly sensitive to infection and are likely to exhibit severe clinical signs. Clinical signs in waterfowl are inconsistent and several isolations have been made from asymptomatic ducks and geese. After the emergence and rapid eastward spread of these HPAI virus strains, the PGC initiated surveillance for AI virus both through active and passive mechanisms. During the spring of 2015, 371 asymptomatic ducks in the Northwest, Northcentral, and Southcentral regions were sampled during regular banding efforts. Samples were

delivered to SCWDS for laboratory testing and results are pending. In addition, any sick or dead upland game bird, waterfowl, or raptor without obvious cause of mortality was tested for AI virus. Since 1 January 2015, 12 waterfowl and 5 raptors experiencing morbidity or mortality have tested negative for AI virus.

### **General Wildlife Health and Disease Surveillance**

A total of 122 cases (representing 143 animals) were submitted for diagnostic examination, including necropsy and/or microscopic examination of tissues, as well as any ancillary tests needed to confirm a diagnosis. Of the 122 cases, 45 (37%) were evaluated at the ADL by the PGC wildlife veterinarian. The remaining 77 (63%) cases were submitted to diagnostic laboratories, including SCWDS, PADLS, or the National Wildlife Health Center. There were 27 different species submitted for post-mortem examination. The most common species included bald eagles, wild turkeys, white-tailed deer, elk, and black bear.

Annual training in support of SOP 40.4 (Wildlife Disease Surveillance) was provided in all 6 regions to PGC regional staff and BWM personnel. Topics covered this year included causes of morbidity and mortality in Pennsylvania bald eagles, causes of skin lesions in deer and wild turkeys, mange in bears, CWD, and HD of cervids.

### **Original Wildlife Health Research**

*Mange in black bears.*--A pilot study was initiated during 2014 to address to basic gaps in our understanding of mange in black bears. The primary objectives were: 1) to determine the type of sample and method of preservation best suited for a population-scale surveillance program of mange in Pennsylvania black bears; 2) to identify the species of mites infecting Pennsylvania black bears with severe mange, and 3) compare the performance of different diagnostic approaches for detecting those infections. A protocol was developed to address these objectives and sampling packets were distributed to select Wildlife Management Supervisors and WCOs located in areas with a historically high prevalence of mange. To date, samples have been collected from 58 bears with severe mange. These samples have been submitted for laboratory analysis to collaborators at SCWDS and results are pending. For additional details on this project, refer to the Annual Report on Mange in Black Bears (Brown and Ternent 2015).

*Chronic Wasting Disease.*--A multi-year collaborative project was initiated with the Pennsylvania Cooperative Fish and Wildlife Research Unit (U.S. Geologic Survey) focusing on defining the landscape genetics of white-tailed deer in Pennsylvania. The objectives of this study are: 1) to determine the landscape genetics of wild white-tailed deer in order to deduce potential pathways of infection and spread for CWD within Pennsylvania; and 2) to quantify the genotype-specific rates of CWD infection utilizing the prion protein (PRNP) gene and determine prevalence and distribution of more susceptible genotypes throughout the state. Such information has value in understanding the ecology of CWD within Pennsylvania, as well as guiding future response and surveillance efforts. Last year 654 samples were collected from 24 counties throughout central and western Pennsylvania. The majority of these samples were collected from counties within DMA 1, 2, and 3. These samples were collected from 526 hunter-harvested deer, 124 road-killed deer, 3 crop damage deer, and 1 clinical suspect. Locality data was confirmed with ArcMap for 567 of the samples. Samples are currently being processed and tested by collaborators at the Pennsylvania Cooperative Fish and Wildlife Research Unit. Laboratory analysis for Objective 1 is underway

and results are pending. A protocol for Objective 2 is being finalized and testing will begin during the summer or fall of 2015. Samples will continue to be collected during this upcoming year in DMA 1, 2, and 3.

### **Veterinary Support of Wildlife Research**

Because of their critical role in the statewide black bear population research, radio-collared female bears are extremely valuable. Den visits for collar maintenance and tagging of offspring are a time when these physiologically challenged bears are, out of necessity, subjected to anesthesia. To insure the best possible outcome of these events, and to continue to refine our anesthetic protocols, physical examinations and anesthetic management were provided. Also during these trips, serum was collected from the majority of bears to begin to bank samples for future antibody surveys for mange and other infectious diseases (i.e. toxoplasmosis and distemper). The veterinarian accompanied the bear biologist on yearling and cub den visits, at which time assistance was provided in anesthesia management, providing health examinations for sows, yearlings, and cubs, and providing medical care when indicated. The veterinarian also accompanied the elk biologist on multiple elk immobilization events providing anesthesia management and medical care when indicated.

### **Disease Events and Responses**

Significant time and effort were dedicated to surveillance, communication, education, and response to CWD. A detailed description of CWD surveillance activities and results can be found in the Annual Report on CWD (Brown 2015). A new Executive Order was issued to account for the markedly expanded DMA 2 and creation of DMA 3. All the previously established restrictions were established for the 352 square mile area of DMA 3. Increased surveillance efforts and public education campaigns occurred within the region last year and will continue. The Pennsylvania Interagency CWD Response Plan was revised and will be published soon. Informational documents on the PGC website were updated and revised as needed. Guidance was frequently provided for the CWD testing of escaped captive cervids and clinical suspects.

No other significant or exotic disease events occurred this year that were not handled at the region level.

### **Safe Capture and Chemical Immobilization of Wildlife**

Activities relating to this objective centered on the acquisition, control, and safe, effective use of all pharmaceuticals by agency personnel. Pharmaceuticals were acquired and provided to projects and regions as ordered. An annual inventory of all pharmaceuticals was conducted in each of the regions and with all BWM project biologists. At that time, all out-of-date or contaminated drugs were inventoried, collected, and disposed of via approved methods.

The following training related to the safe capture and chemical immobilization of wildlife was provided to PGC personnel:

- Field instruction in immobilization and anesthetic monitoring was provided to WCOs at spring (February and March) den visits when opportunity presented.

-Members of the cadet class at the PGC Ross Leffler School of Conservation received training on Safe Capture and Chemical Immobilization of Wildlife.

-Annual mandatory training was provided for PGC personnel involved in chemical immobilization of elk with Carfentanil.

-Annual training in safe capture and chemical immobilization was provided for members of the Deer and Bear Trapping Teams.

-Triennial training in support of SOP 40.9 (Pharmaceutical Use) was provided for 4 of the 6 PGC Regions. Training in the remaining 2 regions was provided during the previous year.

## **RECOMMENDATIONS**

1. All objectives should be continued. Modifications should be based on changing disease, personnel and fiscal conditions.

2. Training of PGC field personnel should be completed in support of SOPs 40.4 (Wildlife Disease Surveillance) and, if needed, 40.9 (Use of Pharmaceuticals).

3. The searchable Wildlife Disease Database development should proceed with input from BATS.

4. Each of specific disease projects should continue.

## **ACKNOWLEDGEMENTS**

The US Fish and Wildlife Service Pittman-Robertson funds reimbursed 75% of the cost of this program.

## **LITERATURE CITED**

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