National Wildlife Disease Surveillance and Emergency Response Program

THE CARRIER

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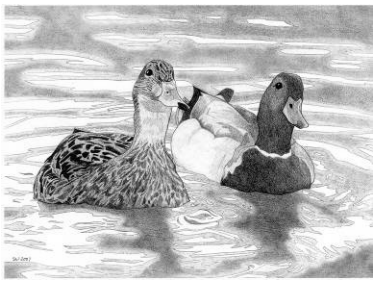

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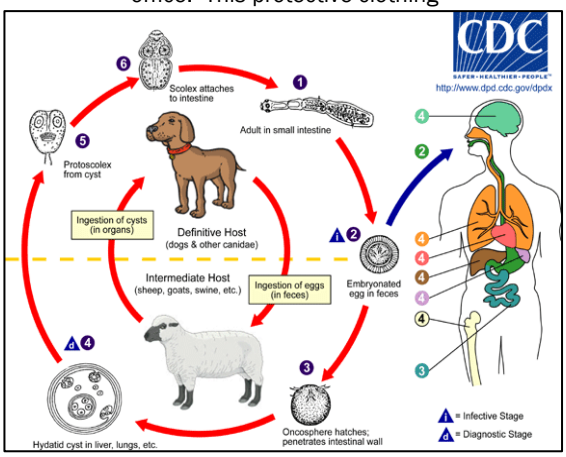
COORDINATOR COMMENTARY

By Dr. Thomas DeLiberto

I have received a number of inquiries over the last few months regarding specific protocols for protecting our personnel from infection with parasites. Most of these requests relate to *Baylisascaris procyonis* (raccoon roundworm) and *Echinococcus spp.* (tapeworms). It is important for wildlife biologists to recognize they may be at risk of infection with these parasites when handling animals and products (e.g., feces, tissues), and they should take the appropriate biosafety precautions in the field and lab.

Although infection with *B. procyonis* and *Echinoccocus spp.* can lead to serious disease in people, minimizing your risk of infection is relatively easy. People become infected with these parasites through inadvertent ingestion of feces from raccoons (*B. procyonis*) or canids (*Echinococcus spp.*). While canid feces containing *Echinococcus spp.* are infective upon defecation, *B. procyonis* eggs require at least 30 days in the environment before they mature and become infective. Once in the environment, *Echinococcus* eggs survive from days to a year depending on temperature and humidity, whereas *B. procyonis* eggs can survive for years. Eggs from all these parasites can survive in soil, vegetation, and on the hair of animals, including pets. However, the simple hygienic techniques we normally recommend when working with wildlife will dramatically reduce your risk of infection when working with animals, carcasses, or feces. The techniques include wearing gloves, avoid touching your face, frequent hand washing with soap and water (or using alcohol-based hand disinfectants if no water is available), and do not eat, drink, or smoke when working with animals. Also, you should wear coveralls, boots, or other protective clothing that can be removed prior to getting in your vehicle or entering an office. This protective clothing should be washed frequently.



Life Cycle of Echinococcus granulosus

A number of excellent resources are available if you wish to learn more about these parasites including these CDC web pages:

http://www.cdc.gov/ncidod/dpd/parasites/baylisascaris/default.htm

http://www.cdc.gov/ncidod/dpd/parasites/alveolarechinococcosis/factsht_alveolarechinococcosis.htm

You also may find the following review articles informative:

McManus DP, W Zhang, J Li, PB Bartley. 2003. Echinococcosis, The Lancet 362:1295-1304.

Gavin PJ, KR. Kazacos, ST Shulman. 2005. Baylisascariasis. Clinical Microbiololgy Reviews 18:703 - 718.

Remember, while our jobs as wildlife biologists expose us to a variety of biological risks, most of these can be minimized through the use of some relatively inexpensive and simple personal protective equipment. It is each of our responsibilities to learn about the biological risks inherent in our jobs and manage those risks accordingly.

The wildlife drawings on this page are original artworks created by the National Wildlife Disease Program's Administrative Support Assistant Erika Kampe (prairie dog) and Wildlife Technician Sarah Goff (ducks).

APHIS Preparing for Emergency Response

By Dr. Dale Nolte

Responding to emergencies is common for Wildlife Services. Most of these emergencies are relatively routine, such as requests to assist in the depopulation of captive cervid facilities infected with a disease of concern. Some, though, are unique such as assisting with sea turtle rescues due to abnormally cold temperatures in the South (see related article on page 7). Consequently, Wildlife Services maintains a cadre of professionals trained to respond to almost any emergency request. Likewise, other APHIS programs have expanded their capabilities to respond to requests for assistance within their areas of expertise, such as virulent Newcastle disease outbreaks in poultry and pale cyst nematodes in potatoes. This expansion of the APHIS mission to provide assistance and coordination during all-hazards emergencies is a result of the U.S. government's efforts to enhance its capacity to assist the American people during times of need.

Pigs seeking refuge on top of a barn during a flood.

An overview of APHIS' role in emergency preparation and response is provided in the Emergency Preparedness and Response Factsheet (http://www.aphis.usda.gov/publications/aphis_general/content/printable_version/fs_emerpre..pdf). Highlights of this Factsheet are provided below to demonstrate how Wildlife Services is incorporated into the APHIS plan.

> "APHIS recognizes the key to effective emergency response is a strong network of people trained and prepared to respond".

> "APHIS employees responding to an emergency…use the Incident Command System (ICS) as a standardized management tool that meets the demands of small or large emergency or nonemergency situations. As an approach and structure for managing personnel, functions, and other resources, ICS is flexible and can be used during incidents of any type, scope, or complexity, including those requiring resources from multiple agencies and from various levels of government and private institutions. ICS places teams of emergency personnel and managers directly in the field to coordinate response efforts. By virtue of their placement and size, the teams and their commanders have a high level of autonomy, are able to respond quickly to new or evolving situations, and can provide extremely timely information to decision makers. In addition, teams from various local, State, and Federal agencies all share a common vocabulary when working an emergency and can tap into a wider network of resources. Many APHIS employees have been trained in ICS and deployed to incidents across the country."

> "In recent years, APHIS' mission has expanded and evolved to provide assistance and coordination during all-hazards emergencies."

> "APHIS recently released its Emergency Mobilization Guide. This guide was developed to allow the agency to effectively and efficiently respond to any agricultural or homeland security situation by outlining how APHIS personnel will be deployed in an emergency. Under a declaration of "Total Mobility," all APHIS employees are considered available for direct assignment in the event of an emergency. Therefore, they may be called upon to deploy to the site of an emergency and work irregular hours and perform duties beyond their normal job description to support the response effort. The Emergency Mobilization Guide spells out how APHIS employees will be selected for service, and it addresses all issues concerning their deployment from reporting requirements and notifications to the procedures for how an employee will receive mobilization instructions."

> "APHIS also recently developed and implemented the Resource Ordering and Status System (ROSS), which allows the agency to identify and track resources that are needed to support emergency response. ROSS provides a database of qualified emergency response personnel. The database can be searched according to personnel training levels and subject of expertise, such as procurement, epidemiology, or public information. Being able to quickly identify and dispatch appropriate personnel and supplies is a key component of emergency response, and ROSS facilitates that process."

WS Hotline: 970-266-6363

How do these new emergency protocols affect Wildlife Services employees, especially Wildlife Disease Biologists? The short answer is very little. Basic ICS training is already required for all APHIS employees and Wildlife Disease Biologists are required to take more advanced ICS training. Also, mobilizations through ROSS will still rely on the National Wildlife Disease and Emergency Hotline number to initially reach Wildlife Services emergency management contacts, who in turn work with State and Regional Directors to identify appropriate resources. Therefore, our current approach for mobilizing Wildlife Services employees will remain the same. As new policies are developed by APHIS, the NWDP will ensure that Wildlife Services approach to emergency response is consistent with Departmental and Agency guidance.

http://www.aphis.usda.gov/wildlife_damage/nwdp/

Wisconsin CWD Surveillance Assistance

By Barb Bodenstein

Background

The discovery of Chronic Wasting Disease (CWD) in southern Wisconsin in 2001 represents a significant threat to the state's white-tailed deer *(Odocoileus virginianus)* population and the culture of deer hunting in the state. Wisconsin has more than 700,000 deer hunters who have harvested an average of 460,000 deer annually during the past decade. Deer hunting contributes more than 7 million days of recreation each year, and generates more than $500 million dollars in retail sales and over $1 billion in total impact to the state's economy.

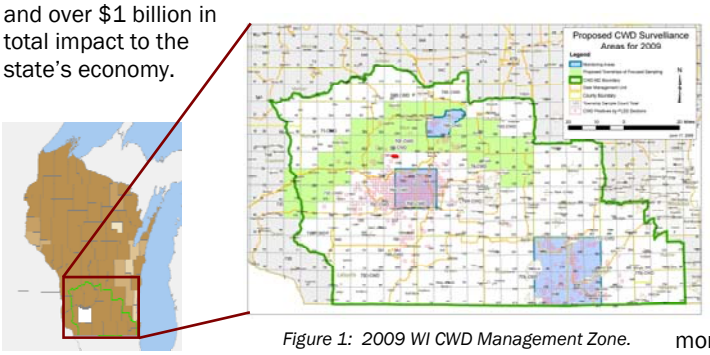


Figure 1: 2009 WI CWD Management Zone.

The Wisconsin Department of Natural Resources (WDNR) began active surveillance for CWD in 1999 following increased awareness of interstate transport of elk from CWD infected game farms. During the hunter harvest sampling effort in 2001, three deer from South-central Wisconsin tested positive for CWD. This discovery launched an intensive surveillance effort that continues today in Wisconsin and accounts for over 487,085 samples from wild white-tailed deer as of April 2009, 1,172 of which have tested CWD-positive. CWD has been found in 12 southern Wisconsin counties. The current CWD Management Zone (CWD-MZ) encompasses all the known locations of CWD test-positive free-ranging deer (Figure 1).

Mandatory hunter harvest surveillance occurs annually in the monitoring areas within the CWD Management Zone (CWD-MZ). Additionally, focused voluntary hunter harvest surveillance was a high priority in the area of the northwest portion of the CWD-MZ that encompasses the known geographic distribution of the disease (Figure 1).

The Statewide sampling goal for 2009 was roughly 8,000 samples with an estimated 2,500 from the monitoring areas. In order to achieve this goal, the WDNR requests assistance from partner agencies. USDA Wildlife Services has been providing assistance to Wisconsin since 2002.

During 2009, the NWDP provided three Wildlife Disease Biologists to assist the WDNR in collecting retropharyngeal lymph node samples from hunter harvested deer. The Wildlife Disease Biologists worked at a deer registration station in Plain, Wisconsin and at the Black Earth CWD Processing Center. During four days of assistance the Wildlife Disease Biologists collected approximately 1,250 samples. Total deer sampled to date in the state for the 2009 sampling season was 6,742. Out of those, 6,328 were analyzed and 68 samples were CWD positive.

Wildlife Disease Biologist Bodenstein and DNR staff collecting CWD data from hunter-killed deer.

This mobilization opportunity provided excellent experience for lymph node sampling as well as agency networking.

Biologists extracting retropharyngeal lymph nodes at Black Earth CWD Processing Center.

Trichinella spiralis and *Toxoplasma gondii* Surveillance in Feral Swine

By John Baroch and Seth Swafford

The U.S. feral swine population is estimated at 5 million animals and is growing rapidly based on natural range expansion as well as illegal transplanting of animals for hunting opportunities. *Trichinella spiralis* and *Toxoplasma gondii* are important zoonotic parasites (able to spread from animals to humans) with worldwide distribution, and feral swine may be infected with either of these organisms without showing clinical signs of disease. Production of domestic hogs in small scale, non-biosecure operations can allow direct disease transmission between feral and domestic swine, and direct or indirect transmission between feral swine and humans is possible.

Trichinella spp. were once widespread in domestic swine but have been largely controlled in commercial settings by banning the feeding of raw food products to pigs and through rodent management. Properly cooking infected meat and meat products will kill the parasite; however, an estimated 10,000 human infections occur annually worldwide (Dupouy-Camet and Murrell 1997). Symptoms vary depending on the stage of the infection. The initial symptom in humans is often abdominal discomfort. Ingested larvae mature into adult roundworms in the intestines, which produce new larvae that enter the blood stream. Larvae eventually migrate to the muscles where they may become encysted, causing muscle pain, aching joints, skin rash,

(Continued on page 5)

TB Surveillance / Depopulation in Indiana

By Dr. Joe Caudell

Bovine tuberculosis (TB) is a bacterial infection that affects wildlife, livestock, and humans worldwide. While it has been a significant wildlife and livestock issue in Michigan for more than 15 years, it had never been a problem for surrounding states until recent years.

In early 2009, the Indiana State Board of Animal Health (BOAH) detected TB in several elk (*Cervus canadensis*) sent to slaughter from a farmed cervid herd in Franklin County. Additional deer (*Odocoileus virginianus*) were tested on the elk farm and more positive animals were found. Cervids were traced both to and from the facility to determine the source of the infection and how far the disease had spread. Two additional herds were found to be infected; one in Wayne County and one in Harrison County. BOAH, working with USDA APHIS Veterinary Services, decided that indemnity, depopulation, and disinfection were the best course of action. The Indiana Department of Natural Resources (IDNR) and USDA Wildlife Services assisted with wildlife surveillance, depopulation, and other related activities. Wildlife Services was tasked with euthanizing captive cervids for testing and depopulation, verification that pens were empty at each of the facilities, checking the status of fence lines, assisting the IDNR with wild white-tailed deer surveillance, and conducting surveillance in mammals such as raccoons (*Procyon lotor*) opossums (*Didelphis virginiana*), and coyotes (*Canis latrans*).

Preparing for depopulation and disease testing at captive cervid farm.

Raccoon necropsy.

The first objective was to remove and test animals at the Franklin County farm, which was approximately 100 acres in a single, 8-foot high fence. We mobilized a team of wildlife disease biologists and technicians from Indiana, Michigan, Hawaii, and Ohio. The depopulation and testing of approximately 70 animals was completed during July and August. Remote cameras and bait were used to locate any remaining cervids and to verify the absence of deer once the remaining animals were removed. Wildlife Services also worked with the Indiana DNR Law Enforcement Division, USDA Veterinary Services, and BOAH to kill and test 30 wild white-tailed deer in a five-mile radius around the farm. Wildlife Services collected approximately nine raccoons and opossums in the Franklin County area. None of the wild animals collected were positive for TB.

The next objective was to depopulate the Wayne County facility. This farm was only 4 acres and under high fence, which allowed the deer to be herded into a small area and euthanized by sharpshooters. Approximately 80 fallow deer, elk, red deer, bison, pigs, and llama were euthanatized in less than 4 hours. The remaining farm in Harrison County was depopulated by the property owner and verified by Wildlife Services and BOAH personnel.

Euthanizing deer by sharpshooting.

The final objective was to collect 700 samples from hunter-harvested white-tailed deer during opening weekend of hunting season. The IDNR collected deer heads at check stations from the three counties with TB farms. The heads were shipped to a central location where the WDB from Indiana and personnel from Veterinary Services and BOAH collected lymph nodes for testing. During the two opening days of firearms season, 433 heads were collected and sampled. To date, no wild animals have tested positive for bTB.

Submitting Morbidity/Mortality Samples to the USGS National Wildlife Health Center (NWHC)

By Jennifer Bradsby and Dr. Jonathan Sleeman

The NWHC provides complete diagnostic services, which includes direct access to Field Investigation Team (FIT) members to assist with carcass submission, wildlife disease questions, or outbreak management support through phone, email, and on-site assistance. The FIT members are sources of information for choosing appropriate diagnostic specimens, communication and interpretation of results, and field response activities.

NWHC Field Investigation Team Contact Information

Western U.S.: Dr. Krysten Schuler, 608-270-2447, kschuler@usgs.gov

Central U.S.: Dr. LeAnn White, 608-2491, clwhite@usgs.gov

Eastern U.S.: Dr. Anne Ballmann, 608-270-2445, aballmann@usgs.gov

Nationwide, single animal cases only: Jennifer Bradsby, 608-270-2443, jbradsby@usgs.gov

Prior to submission, contact a member of the FIT to obtain shipping approval and discuss shipping arrangements. The NWHC prefers chilled specimens if they can be sent within 24-36 hours of collection or death. If you cannot call or ship chilled samples within 24-36 hours, freeze the carcasses. Specimens should be shipped by overnight service, Monday through Wednesday, to guarantee arrival at NWHC before the weekend. If specimens are fresh and need to be shipped on Thursday or Friday, special arrangements can be made with a FIT member. A specimen history form and tracking number are required before specimens arrive at NWHC. Contact information for FIT members, Specimen History Forms, and shipping instructions can be found at our website http://www.nwhc.usgs.gov/mortality_events/reporting.jsp.

(Trichinella/Toxoplasma: Continued from page 3)

headaches, fever, chills and other symptoms. The disease can be fatal if large numbers of larvae are ingested (Dupouy-Camet and Murrell 1997).

Members of the cat family (*Felidae*) are the definitive hosts of the protozoan organism *T. gondii,* and excrete oocysts in their feces (Meng et al. 2009). Many other warm-blooded animals may be intermediate hosts, including domestic livestock, feral swine and white-tailed deer (Davidson 2006). Feral swine are likely to acquire infection through ingestion of feces or tissue containing larvae (Meng et al. 2009). Feral swine generally do not display clinical signs of toxoplasmosis; however, infected domestic swine, particularly young animals, may be symptomatic (Dubey 1986). In humans, food-borne transmission of the parasite is an important route of infection, usually due to eating under-cooked or improperly processed meats. Infected, healthy humans often have no clinical symptoms. The disease is primarily of concern in pregnant women because the organism can move transplacentally to infect the fetus, causing hydrocephalus, blindness, and mental retardation (CDC 2010; Jones et al. 2001).

Previous studies of feral swine serum performed at local or state scales have reported *Trichinella* spp. exposure rates of up to 39% (Gresham et al. 2002). Antibodies to *T. gondii* have been found at varying rates in feral swine in the U.S., ranging from about 1 – 49% in earlier studies (Clark et al. 1983; Diderrich et al. 1996; Dubey et al. 1997; Gresham et al. 2002). While these studies suggest the parasites may have a significant impact on human health, large-scale surveillance is needed to determine risk, occurrence, and distribution of the organisms and develop mitigation measures.

Wildlife Disease Biologist Janean Romines collecting samples from feral swine.

Since October 2008 USDA Wildlife Services NWDP has been working with the USDA Agricultural Research Service (ARS) to test feral swine serum for antibodies to *T. spiralis* and *T. gondii*. The testing has become an important component of the NWDP's Comprehensive Feral Swine Disease Surveillance effort, which also includes investigating zoonoses such as brucellosis in feral swine. Our collaborative surveillance project has tested over 2,000 feral swine from 20 states for antibodies to *T. spiralis* and *T. gondii*. Preliminary results indicate that approximately 2% of the samples are sero-positive for *T. spirali*, and 18% of the samples are sero-positive for *T. gondii*.

As feral swine hunting and management becomes more widespread, risk of exposure to *Trichinella* and *Toxoplasma* by people will increase. Although outbreaks of Trichinosis in humans is still relatively rare in the US (Roy et al. 2003), they have become so common in Europe that the parasite is considered a re-emerging zoonotic disease (Dupouy-Camet and Murrell 1997; Rodriguez-Osorio et al. 1999). *Toxoplasma* infection rates in wild boar hunters can be as high as 36-38% (Gauss et al. 2005; Ruiz-Fons et al. 2006).

Good hygienic practices, safe handling and processing, and proper cooking of wild game meats will minimize the risk of trichinosis and toxoplasmosis in humans (Dubey 1996). Soap and water will kill all life stages of Toxoplasma in meat. To prevent infection, wash hands, clothing, and all equipment thoroughly after coming in contact with feral swine (CDC 2010). Wildlife biologists and hunters should also wear disposable rubber gloves when handling feral swine.

The NWDP will continue its national surveillance efforts to document the distribution of *Trichinella* and *Toxoplasma* in feral swine. This effort will allow for the development of management strategies that mitigate risks posed to humans and domestic animals.

Sea Turtle Morbidity and Mortality in Florida

By Michael Milleson and Dan Wolf, DVM

For roughly two weeks in early January, ambient temperatures dipped to record lows, and South Florida experienced freezing temperatures for the first time since 2003, as an extreme cold front swept over the southeastern US. Many of Florida's flora and fauna are not well adapted to such cold weather events, and the effects were wide ranging. A large fish mortality occurred resulting in the closure of the snook (*Centropomus* spp.) fishery by the Florida Fish and Wildlife Commission (FFWCC) until September. At least 300 manatees (*Trichechus manatus)* and thousands of sea turtles were casualties of the freeze, and non-indigenous green iguanas (*Iguana iguana*) were reportedly falling from trees in South Florida.

Rescued green sea turtles being prepared for transport to a holding facility.

The below average water temperatures adversely affected the sea turtles primarily by "cold stunning" groups of individuals, leaving them to float defenselessly in the ocean. According to National Marine Fisheries Service (NMFS) biological technician Nancy Evou, cold stun events are not unusual for sea turtles. In an average year about 100 turtles are rescued from the waters off of Florida's panhandle. However this January, nearly 1,800 stunned turtles were pulled from the same waters. Fortunately, several state and federal agencies, along with many volunteers and private organizations worked together to rescue and rehabilitate as many of the endangered reptiles as possible.

While sea turtles were being pulled from the ocean in various locations along the coast of Florida, Wildlife Services was asked to support the operation taking place in Florida's panhandle. The sea turtles pulled from the Gulf of Mexico near Port St. Joe, Florida by the FFWCC, Navy, and Coast Guard were transported to Gulf World Marine Park, in Panama City Beach, Florida. There, park employees assisted by personnel from NMFS, FFWCC, US Fish and Wildlife Service, and volunteers with RMA Turtle Watch and south Walton County

(Continued on page 8)

Management of Highly Pathogenic Avian Influenza in Wild Migratory Birds

By Clint Turnage, Kerri Pedersen, and Seth Swafford

The possibility of Highly Pathogenic Avian Influenza (HPAI) entering the U.S. via illegal movement of domestic or wild birds, contaminated poultry products, infected travelers, bioterrorism, or migration of infected wild birds is addressed through an interagency response plan. This plan focuses on the threat to the poultry industry, with the goal of detecting, controlling, and eradicating the virus as quickly as possible. The primary objective would be to return individual poultry facilities to normal production and the U.S. to disease free status. This plan also recognizes that the migratory nature and broad geographic distribution of wild birds would make eradication in these species unlikely.

Cleaning and decontamination of equipment must be thorough at the scene of an outbreak.

In the event of a HPAI introduction involving wild birds, the management objectives are to enhance existing surveillance programs and predict disease spread based on migratory patterns and habitat use of the species involved. Depopulation or mass euthanasia is not supported by the World Organization for Animal Health, the Food and Agriculture Organization, or the U.S. government due to mobility of wild birds. However, harassment and exclusion of wild birds on poultry facilities within the affected areas would be implemented through an integrated wildlife damage management program to minimize the risk of transmission among domestic and wild species.

Specific elements of a response to detection of HPAI in wild birds would include the following elements:

a. Assess the presence of susceptible wild birds in the affected areas,
b. Assess the potential for spread of the disease agent to wild birds,
c. Develop a protocol for enhanced surveillance in wild bird populations,
e. Provide education and outreach material,
f. Implement and integrate wildlife damage management program in the affected area, and
f. Determine if HPAI is spreading via wild birds.

These activities have been successfully implemented in previous avian influenza outbreaks on poultry farms, and will be crucial in the event of a HPAI detection in either domestic or wild birds. All elements would be closely coordinated with state wildlife agencies as well as agriculture and public health departments. An important component of outreach efforts is to encourage the public and agency personnel to assist with disease monitoring efforts by reporting sick or dead birds.

Wildlife Services has become very active in responding to and managing low pathogenic avian influenza detections in domestic poultry, upland game birds, and backyard poultry. Our role generally focuses on enhancing surveillance in wild birds in areas surrounding the detection. Participation in these LPAI management events as well as our role in the HPAI early detection system, has provided Wildlife Services unique opportunities to work closely with state wildlife agencies, agriculture and health departments, and diagnostic laboratories to mitigate potential damages and evaluate the epidemiology of pathogens. These cooperative and coordinated approaches to interagency disease management have enhanced the capabilities of the U.S. to respond to an introduction of foreign animal diseases including HPAI.

Wildlife Services and state partners host a media event during routine HPAI surveillance.

RECENT NWDP PUBLICATIONS

DeLiberto, TJ, SR Swafford, DL Nolte, K Pedersen, MW Lutman, BB Schmit, JA Baroch, DJ Kohler, and A Franklin. 2009. Surveillance for highly pathogenic avian influenza in wild birds in the USA. Integrative Zoology 4:426-439.

Nolte, DL, and H He. 2009. Importance of collaboration on wildlife disease issues. Integrative Zoology 4:323-324.

Spraker TR, KC VerCauteren, **TL Gidlewski**, RD Munger, W. David Walter and Aru Balachandran. 2009. Impact of age and sex of Rocky Mountain elk (Cervus elaphus nelsoni) on follicle counts from rectal mucosal biopsies for preclinical detection of chronic wasting disease. Journal of Veterinary Diagnostic Investigation 21:868-870.

STATE HIGHLIGHTS

Western Region

River otter reintroduction
Washington Wildlife Disease Biologist Darren Bruning coordinated and implemented the translocation of six river otters (*Lontra canadensis*) from Wash-

ington to Taos Pueblo Tribal lands and the upper Rio Grande watershed in New Mexico. Prior to translocation, health examinations were performed, and data on gender, age, weight, and morphological measurements such as body length were taken. Blood, oropharyngeal swabs, and rectal swabs were taken for disease testing. A physical examination was performed to detect injuries (including teeth), physical abnormalities, and clinical signs of diseases including mastitis, dermatitis, ringworm, abscesses, canine distemper, influenza, tuberculosis, and ectoparasitism. Ivermectin (antiparasitic agent) was administered to each otter to treat heartworm, ectoparasites, and gastrointestinal tract helminthes. Each otter was also vaccinated for canine distemper and rabies.

Additionally, fecal samples were collected from seven live-captured river otters and were provided to Frostburg University in Maryland for a research project designed to quantify physical stress in captured river otters by measuring fecal glucocorticoid levels.

Baylisascaris procyonis (raccoon roundworm)
Wyoming Wildlife Disease Biologist Michael Pipas, and other Wildlife Services employees, continued trapping raccoons in Niobrara County, Wyoming for a raccoon roundworm study being conducted by Dr. Kevin Kazacos at Purdue University. To date, 159 raccoons (*Procyon lotor*) from 11 of Wyoming's 23 counties have been tested. Prevalence based on examination of the small intestine for adult *B. procyonis* is 52.2%, with intensity ranging from 1 to 91 worms (mean=12.3 worms, median=6 worms). A subset of the raccoons sampled was tested for *B. procyonis* by fecal flotation exam. Fecal flotation test results revealed a 58.6% prevalence of *B. procyonis* eggs (41/70 samples). Intensity of infection ranged from low (2 eggs/g feces) to extremely high (too numerous to count); eighteen of the 41 positive samples had high egg counts (>200 eggs/g feces). Final results will be published when the project concludes.

Eastern Region

Chronic Wasting Disease (CWD)
Wisconsin Wildlife Disease Biologist Barb Bodenstein, working with other Wildlife Services staff, the National Park Service, and the Great Lakes Indian Fish and Wildlife Commission (GLIFWC), assisted the Wisconsin Department of Natural Resources in sampling white-tailed deer (*Odocoileus virginianus*) that were being removed from the Apostle Islands National Lakeshore. The project focused on sampling retropharyngeal lymph nodes from adult deer. In addition, GLIFWC was interested in collecting other biological samples (femur, rumen, kidneys, and lower jaw) for herd health analysis. Weather made the operation difficult, but 48 deer were removed and sampled. The Red Cliff Band of Lake Superior Chippewa tribe received and processed the meat from all removed deer.

Contaminants
Georgia Wildlife Disease Biologist Darrell Kavanaugh and other Wildlife Services employees cooperated with a utility company in Whitfield County to collect, process, and submit biological samples collected from white-tailed deer *Odocoileus virginianus*). The samples were collected for a chemical contamination study evaluating potential impacts to wildlife of wastewater treatment operations. Based on environmental sampling at various locations in May 2009, the utility company decided to test deer for levels of perfluorooctanoic acid and perfluorooctanesulfonic acid. There was no established protocol set by the Environmental Protection Agency for this type of sampling, so the company worked with Wildlife Services to establish a testing protocol. Darrell gathered information from state and federal agencies, universities, and the testing laboratory to assist in drafting the sampling methodology. Blood serum, liver, and skeletal muscle from seven deer were sampled. Due to the cost of testing (approximately $7,500.00 per deer), samples from only 2 deer (a 0.5 yr female and a 3.5 yr male) were submitted to the laboratory. Samples from the remaining 5 deer are being stored pending the testing results from the first 2 animals.

Parasites
Pennsylvania Wildlife Disease Biologist Kyle Van Why is working with a researcher from the University of Pittsburgh to coordinate parasite collection from red foxes (*Vulpes vulpes*) and coyotes (*Canis latrans*) throughout Pennsylvania.

Sample collection from Wildlife Services operational activities, licensed trappers, and organized coyote hunts maximizes sampling efficiency and provides adequate data for the analysis. Forty samples have been collected from coyotes this year with plans to evaluate another 100 more in February and March. The project will conclude with a comparison of findings in Pennsylvania with those in Arizona, Texas, and various mid-western states.

EDITOR'S NOTE:

In the article "Wildlife Surveillance in Mexico" published in Volume 1, Issue 2 of The Carrier, we reported that 15 and 86 matrix positive samples were detected in 2006-07 and 2007-08, respectively. We should clarify that the National Laboratory of Reference for Exotic Diseases in Mexico did not isolate any viruses from these matrix positive samples. Consequently, a report to the World Organization of Animal Health was not required.

National Wildlife Disease Surveillance and Emergency Response Program

For more information on the Wildlife Services Wildlife Disease Program in your state, please call 866-4 USDA WS, or contact the following staff:

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(sea turtles: Continued from page 5)

Turtle Watch worked to rehabilitate turtles in the facility's large salt water tanks. Wildlife Services NWDP Wildlife Disease Biologist in Florida and FFWCC veterinarian Dan Wolf assisted with tagging of newly arrived turtles, and worked with FFWCC and several NMFS interns to separate turtles (*Chelonia mydas*) with signs of green turtle fibropapillomatosis (GTFP) from the larger group. GTFP is thought to be caused by a herpes virus and is characterized by the presence of multiple papillomatous growths around the eyes, cornea, and skin of the head, neck, limbs, shell, and tail. The disease is not well understood, making it important to isolate the turtles with obvious signs of GTFP to minimize the potential for transmission. The GTFP positive turtles were taken to the Welaka Fish Hatchery, where they joined roughly 400 additional turtles with GTFP from around the state.

Photo: Courtesy of Brian Stacy

Fibropapillomatosis (GTFP) in a green sea turtle.

When sea temperatures rose to an acceptable level, the majority of the turtles were safely returned to the ocean. According to FFWCC's state-wide sea turtle stranding coordinator, Dr. Allen Foley, over 4,500 turtles were rescued and roughly 3,500 turtles have been returned to the ocean as of 3 February. About 100 turtles remain in various rehabilitation facilities. While nearly 1,000 rescued turtles succumbed to the cold temperatures, the mortality rate would have been much higher if not for the dedication and hard work of agency personnel and volunteers.

Photo of the Quarter

Feral hogs doing very well in a northern climate (notice young pigs). Wildlife Disease Biologist Anthony Musante captured this photo of feral hogs trapped by New Hampshire Wildlife Services in December. Coming to a state near you....