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A JOINT PROJECT BETWEEN

USDA APHIS WILDLIFE SERVICES

AND

INDIANA DNR DIVISION OF FISH AND WILDLIFE

Indiana Wildlife Disease News

Volume 2, Issue 1 January 2007

Special points of interest:

- Report on viral hemorrhagic septicemia
- Avian influenza surveillance concludes for 2006
- Tularemia surveillance in Indiana
- Bat rabies in Indiana

Inside this issue:

Fish importation restrictions	2
Avian influenza update	3
Bat rabies in Indiana	4
Tularemia surveillance	4
Wildlife Disease Surveillance Prog	5
Midwest wildlife disease update	5

National Tularemia Surveillance Expanded to Include Indiana

Tularemia is a potentially serious illness that occurs naturally in the United States. It is caused by the bacterium *Francisella tularensis* sometimes found in wild animals (most commonly rodents, rabbits, and hares).

Beaver are one of the species sampled in tularemia surveillance. Photo: USDA

Human symptoms of tularemia infection could include sudden fever, chills, headaches, diarrhea, muscle aches, joint pain, dry cough, and/or progressive weakness. Infected people can also develop pneumonia, chest pain, bloody sputum, have trouble breathing, and can sometimes stop breathing. Other symptoms of tularemia infection depend on the route through which the person was exposed to the tularemia bacteria. These exposure route symptoms can include ulcers on the skin or mouth, swollen and painful lymph glands, swollen and painful eyes, and sore throat.

Tularemia can be spread to people in many different ways, including being bitten by an infected tick, deerfly or other insect, handling infected animal carcasses, eating or drinking contaminated food or water, and breathing in the bacteria, *F. tularensis*. Tularemia is not known to be spread from person to person. People who have tularemia do not need to be isolated. People who become infected from exposure to the tularemia bacteria should be treated as soon as possible, as some tularemia infections can be fatal if it is not treated with the right antibiotics.

The CDC operates a national program for bioterrorism preparedness

Continued on pg. 4

Emerging Disease Issues
Viral Hemorrhagic Septicemia

Viral hemorrhagic septicemia (VHS) is a serious disease of marine and freshwater fish species. Primarily a marine organism, it has attacked freshwater trout farms in Europe, is managed against within the hatchery systems of the Pacific Northwest and is now an emerging disease within the Great Lakes basin. The pathogen responsible, VHSv, is a rhabdovirus (the same type of virus as rabies) affecting fish but does not pose any threat to human health. Other fish rhabdoviruses cause infectious hematopoietic necrosis and spring viremia of carp.

The host and geographic range includes many marine species from Japan, the west coast of North America, North Sea, Baltic Sea and Atlantic coast of Canada. Historically, VHS has been known in Europe as the most serious viral disease of introduced rainbow trout. Information suggests that VHSv adapted to the freshwater environment in Europe when it was common for wild caught herring to be fed raw to rainbow trout. Great Lakes isolates are most closely related to those found along the East coast of Canada. Most probable vector of introduction is ballast water or migratory fish.

The low genetic diversity of the Great Lakes isolates (<1 nt) suggest a recent introduction. The earliest recorded appearance of VHSv is 2003 in a muskellunge from Lake St. Clair, Michigan. In 2005, a freshwater drum mortality event occurred in the Bay of Quinte, Lake Ontario, Ontario. Multiple fish kills

Continued on pg. 2

Viral Hemorrhagic Septicemia (continued from Pg. 1)

from VHS occurred in 2006. These affected musky and yellow perch in Lake St. Claire, gizzard shad in the St. Claire River, musky and gizzard shad in the Detroit River, freshwater drum, white bass and yellow perch in Lake Erie, round goby in Lake Ontario and musky in the St. Lawrence River. As of January 2007, VHSv has been isolated from Chinook, walleye and whitefish in Lake Huron.

Clinical signs of VHS are hemorrhaging of the liver, spleen, and intestines. The swim bladder is also congested with hemorrhages, giving the otherwise transparent membrane a mottled appearance. Externally, severe hemorrhaging in the skin can produce large red patches, particularly on the sides and anterior portion of the head. However, infected fish may only exhibit very minor external hemorrhaging (petichia) or no external signs at all.

The prognosis for the Great Lakes will be many years of significant die-offs of susceptible species during spring spawning events; especially for aggregate spawners and species with schooling fry or juveniles. VHSv will become widely established. Additional host species will become involved. Recovered fish will become immune leading to fish kills occurring primarily in younger age classes. Density of some species may never recover as VHS may cause mortality at some critical population level. Eventually, as resistance builds in the genotypes, VHS will become less explosive in most years.

What can be done to prevent the spread of VHSv?

VHS is an obligate pathogen. This enveloped RNA virus is unstable in water but will persist longer in tissue or organic matter. It has been demonstrated to survive in plain water up to 14 days. If bound to organic matter, in sediment or in dead fish, survival of two months has been realized.

To reduce the likelihood of spreading VHSv in the Great Lakes, anglers and boaters are encouraged to abide by the following guidelines:

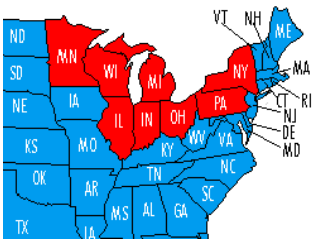
- Remove all mud, aquatic plants and animals from all gear, boats, motors and trailers before leaving a body of water;
- Drain your live well, bilge and bait tanks before leaving the water you are fishing or boating on. Anglers or boaters using any waterbody known to be infected with the VHS virus should disinfect their live wells and bait wells with a 10 percent chlorine/water solution. Rinse well to remove all residual chlorine;
- Do not transport fish from one body of water to another.
- Only release bait fish into the waterbody it was taken from. Bait purchased commercially should not be released into any body of water; and
- Do not dispose of fish carcasses or by-products in any body of water.

According to Bill James, Chief of Fisheries for the Division of Fish and Wildlife, "the viral hemorrhagic septicemia (VHS) issue, including the USDA-APHIS federal emergency order last October vaults this issue to the top. VHSv was confirmed in Lake Huron in late January and we expect it to continue its advance on an unchallenged, naive fish community in the Great Lakes and likely beyond. The whole country needs to be concerned and working collaboratively to combat unwanted species and pathogens."

Article by Dave Meuninck and Brian Breidert, IDFW

USDA-APHIS Federal Order Prohibits Importation of Certain Species of Live Fish

Due to the potential adverse effects of this disease to fish populations and the desire to prevent or delay its spread to other states, the Animal and Plant Health Inspection Service (APHIS) issued a Federal Order on October 24, 2006, that prohibits the importation of certain species of live fish from Ontario and Quebec and interstate movement of the same species from eight states bordering the Great Lakes, effective immediately. The states included are Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania and Wisconsin.



States (in red) affected by the restrictions.

Fish species included in the federal prohibition are: Atlantic Cod, Black Crappie, Bluegill, Bluntnose Minnow, Brown Bullhead, Brown Trout, Burbot, Channel Catfish, Chinook Salmon, Coho Salmon, Chum Salmon, Emerald Shiner, Freshwater Drum, Gizzard Shad, Grayling, Haddock, Herring, Japanese Flounder, Largemouth Bass, Muskellunge, Pacific Cod, Pike, Pink Salmon, Pumpkinseed, Rainbow Trout, Redhorse Sucker, Rock Bass, Rockling, Round Goby, Smallmouth Bass, Sprat, Turbot, Walleye, White Bass, White Perch, Whitefish, Yellow Perch.

Additional fish may be added to the order as they are confirmed to be carriers of this disease. Additional information on the Federal Order can be found on the APHIS website www.aphis.usda.gov/vs/aqua/.

The World Organization of Animal Health has categorized VHS as a transmissible disease with the potential for profound socio-economic consequences. Because of this, they list VHS as a disease that should be reported to the international community as an exceptional epidemiological (study of diseases in large populations) occurrence.

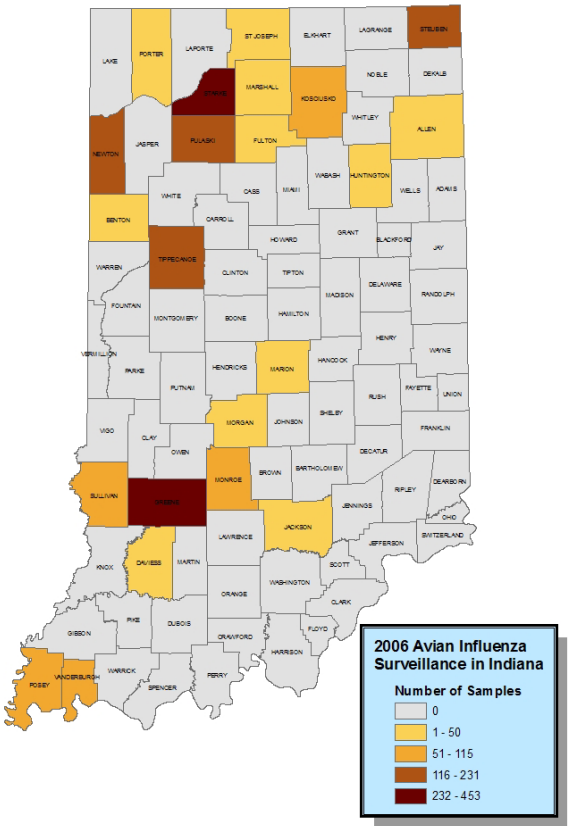
Article by Dave Meuninck and Brian Breidert, IDFW

Indiana Avian Influenza Surveillance Update

The avian influenza surveillance for 2006 concluded at the end of December in Indiana. Below is a summary of surveillance in wild birds and dead birds calls in Indiana.

Species	Number	Percent
American black duck	7	.3
American green-winged teal	268	12.1
American wigeon	30	1.3
Bufflehead	1	.0
Blue-winged teal	3	.1
Canada goose	163	7.3
Gadwall	9	.4
Gray-cheeked thrush	8	.4
Least sandpiper	72	3.2
Lesser yellowlegs	5	.2
Mallard	590	26.5
Northern pintail	22	1.0
Northern shoveler	11	.5
Ring-necked duck	2	.1
Red-necked phalarope	1	.0
Swainson's thrush	11	.5
Tundra swan	1	.0
Environmental samples	1000	45.0
Total	2223	100.0

Table 1. Summary of surveillance efforts in Indiana by USDA APHIS Wildlife Services and Indiana DNR Division of Fish and Wildlife.



Surveillance

USDA APHIS Wildlife Services and Indiana DNR Division of Fish and Wildlife exceeded their total goal of 1200 cloacal swabs. Wildlife Services collected 1000 environmental samples, bring the total to 2200 avian influenza samples from throughout Indiana.

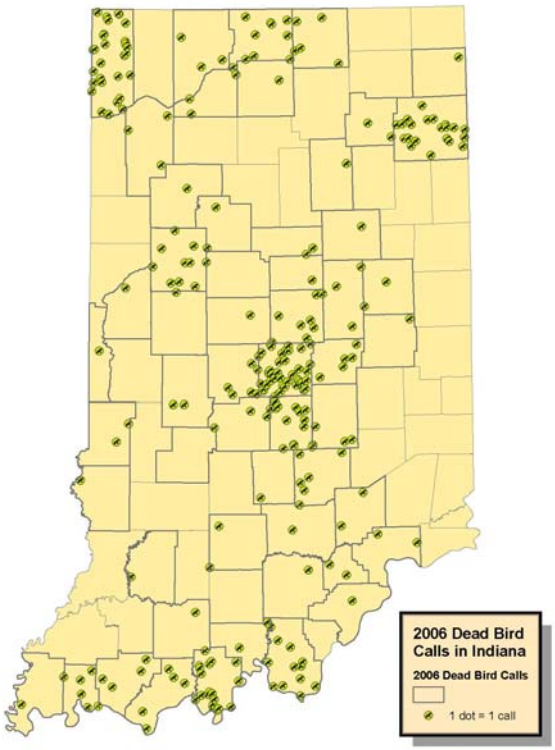
Of the cloacal samples, most (1031 birds or 86 %) of the samples were collected from hunter harvested birds. The remaining samples consisted of cloacal swabs from 166 live captured birds (14 %) and 26 investigations of mortality events (2 %). The samples were pooled together in groups of up to 5 swabs for analysis. Approximately 66 samples were positive for native influenza viruses. Only one of the environmental samples were positive for a native avian influenza virus. No samples were positive for either low pathogenic or high pathogenic H5N1 avian influenza.

Dead Bird Calls

USDA APHIS Wildlife Services received over 260 calls about dead birds and or concern about avian influenza in birds. Table 2 is a summary of the dead bird calls, excluding calls about domestic birds. Calls regarding domestic birds were forwarded to USDA APHIS Veterinary Services.

Species Group	Frequency	Percent
Columbrids (Doves)	18	6.8
Coots	1	0.4
Herons	6	2.3
Passerines	163	61.7
Raptors	23	8.7
Shorebirds	1	0.4
Unknown	5	1.9
Waterfowl	44	16.7
Woodpecker	3	1.1
Total	264	

Table 1. Summary of dead bird calls taken by USDA APHIS Wildlife Services in Indiana.



Note: Location of dots are placed randomly inside each county and does not indicate location of dead birds or caller

Article by J. Caudell, USDA APHIS

Bat Rabies in Indiana

Indiana Wildlife Disease Research

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Our objective was to determine rates of rabies infection in bats submitted to the Indiana State Department of Health (ISDH) between species, over time, and in normally behaving bats. Those are important questions for public health reasons and also for protection of bats. Bats were tested by ISDH by using the immunofluorescent method. We tested 8,262 bats for rabies at the ISDH from 1966 to 2003, of which 445 (5.4%) tested positive. The 2 most common species, the big brown bat (Eptesicus fuscus; n = 5,584; 173 [3.1%] rabid), and the red bat (Lasiurus borealis; n = 1,512; 169 [11.2%] rabid), accounted for 85.9% of submissions. We found the highest rates of rabies in the hoary bat (L. cinereus; 54 of 178 [30.3%] rabid) and eastern pipistrelle (Pipistrellus subflavus; 41 of 314 [13.1%] rabid). Rates of rabies in other species ranged from 3.7% in the silver-haired bat (Lasionycteris noctivagans) to zero in Indiana myotis (Myotis sodalis) and evening bats (Nycticeius humeralis). The above data were mostly for incapacitated bats that people found sick or dead rather than normally behaving bats. None of 259 normally behaving big brown bats examined from areas where rabid bats had occurred were rabid. Levels of rabies in the big brown bat remained relatively stable throughout the study period with peak activity during late summer and fall.

Journal of Wildlife Management 70(6):1569-1573.

Members of The Wildlife Society can access full-text articles of the the *Journal of Wildlife Management* through the Internet at www.wildlife.org/publications/index.cfm.

Source: TWS - JWM

Tularemia Surveillance (continued from pg 1)

and response that incorporates a broad range of public health partnerships. Wildlife Services has partnered with CDC in establishing nationwide surveillance of wildlife diseases such as tularemia. Other things CDC is doing include: stockpiling antibiotics to treat infected people, creating new education tools and programs for health professionals, the public, and the media, and coordinating a nation-wide program where states share information about tularemia.

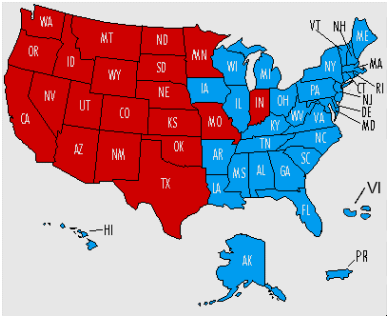

Figure 1. States where Wildlife Services currently conducts surveillance for tularemia (in red).

An integral facet of the nation-wide sharing of tularemia information is the development of baseline information on where tularemia is occurring, identification and mapping of tularemia types and strains, and notification to health facilities of the local presence of the organism. Routine monitoring of wildlife populations by Wildlife Services provides CDC with information to accomplish these goals.

In 2005, CDC initiated a nationwide surveillance for tularemia and asked USDA APHIS Wildlife Services to assist in collecting the blood samples for testing. Wildlife Services collects a small amount of blood on a Nobuto strip from various wildlife species taken during routine operational activities. Information including the species, location, and collector are recorded. The collected Nobuto strips are forwarded to the National Wildlife Research Center in Colorado for processing and then passed on to the CDC diagnostic laboratory in Fort Collins, Colorado for testing and mapping.

The goal of the surveillance program is to develop information on locations where tularemia occurs naturally, type the tularemia for each location, identify the animals involved and see if there is any correlation to human cases. Once this is accomplished it will be much easier for health officials to detect when introduced infections, whether accidentally or purposely (terrorists) introduced, can quickly be identified as not being a "normal occurrence" and determine where it came from.

Historically, surveillance for tularemia has occurred primarily in the western U.S. However, recently, surveillance has expanded to the eastern U.S. Figure 1 shows the current states where surveillance occurs.

In 2006, USDA APHIS Wildlife Services, in cooperation with Indiana DNR Division of Wildlife Resources, initiated tularemia surveillance in Indiana. Samples are collected by the Indiana Wildlife Disease Surveillance Network (IWDSN; see April issue to read about the IWDSN) and sent to Wildlife Services for processing. Surveillance occurs primarily in predators (i.e., coyotes, foxes, etc.) and aquatic mammals, such as muskrats and beaver. If you routinely work with these animals (i.e., research, recreational trapping, nuisance control, etc.) and would like to participate in this surveillance effort, please contact Dr. Joe Caudell, USDA APHIS Wildlife Services Wildlife Disease Biologist at 765-496-3913.

Article by J. Caudell, USDA APHIS

Midwest Wildlife Disease Update

Minnesota- In July 2006 the Minnesota Department of Health Laboratory confirmed tularemia in a sick gray squirrel that came from St. Cloud in central Minnesota. Homeowners who submitted the squirrel reported observing 6-7 dead squirrels, 6-7 dead cottontail rabbits and 3-4 dead eastern chipmunks over a four week span. A second gray squirrel found dead tested positive as well for *Francisella tularensis*, the bacterium that causes tularemia. The Southeast Cooperative Wildlife Disease Lab reports that tularemia has been found in more than 200 vertebrate species, most frequently in rabbits and rodents. Tularemia, also known as rabbit fever, is considered a life threatening though rare disease in humans.

CWD- According to a news story in the Milwaukee Journal Sentinel by John Fauber, researchers have found virus-like particles in the brain tissue of animals infected with so-called prion diseases like Chronic Wasting

Continued on pg. 6

USDA APHIS Wildlife Services

National Wildlife Disease Surveillance and Emergency Response Program

Goals and Philosophy

The goal of the National Wildlife Disease Surveillance and Emergency Response Program is the proper development and implementation of a nationwide system to survey for wildlife diseases and respond to a variety of emergencies including natural disasters and disease outbreaks. The system, which is managed by the Wildlife Services (WS) unit in the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS), is designed to provide assistance to Federal, Tribal, and State agencies with wildlife disease threats. Partnerships have been developed with other APHIS programs (including Veterinary Services and International Services), with other Federal entities (including the U.S. Department of the Interior and the U.S. Department of Health and Human Services), and with Canadian and Mexican agriculture, health, and natural resources agencies. The nationally coordinated wildlife disease surveillance system will support existing programs with the collection of samples, facilitate information exchange among the programs, ensure that samples are adequately collected, and provide additional laboratory infrastructure. The program is implemented through a national coordinator and wildlife disease biologists assigned to APHIS field offices. These biologists conduct monitoring and surveillance activities and collect biological samples through a variety of techniques (e.g., trapping, mist netting, lethal means, etc.). To maximize efficiency, efforts are made to obtain samples in coordination with existing WS operational (e.g., protection of livestock, airports, and aquaculture, urban wildlife management, etc.) and research activities. Wildlife disease biologists are available to respond quickly to assist with disease outbreaks and other such emergencies requiring program participation. In the event of an emergency, biologists are required to immediately mobilize and arrive at the emergency site within 48 hours of notification.

In addition to providing assistance to the many different cooperators, WS is focusing on strengthening emergency preparedness and response and managing issues related to the health of U.S. animal resources and conflicts between humans and wildlife. The strategies to accomplish these objectives include developing a more robust, nationally coordinated pest and disease-surveillance system. An international border disease-surveillance system will proactively reduce the likelihood of terrorist attacks on agriculture, wildlife, and humans. The international partnership will allow for better implementation of a border disease-surveillance program in both livestock and wildlife.

Research Activities

An important component of the program is science-based knowledge provided by research on disease organisms, their reservoirs, their transmission cycles, and ways to block the transmission. WS' National Wildlife Research Center supports the program by conducting research on reservoir populations, methods to control diseases, and diagnostic and epidemiologic support.

Locations of WS' Wildlife Disease Biologists

At present, biologists are stationed in Alabama, Arizona, California, Colorado, Georgia, Illinois, Indiana, Maine, Maryland, Michigan, Missouri, Nebraska, New Jersey, New York, North Carolina, North Dakota, Oklahoma, Oregon, South Carolina, Tennessee, Texas, Wisconsin, and Wyoming.

Some Diseases of Interest

Avian influenza, Bovine tuberculosis Chronic wasting disease, Classical swine fever, Plague, Pseudorabies, Rabies, Swine brucellosis, Tularemia, West Nile virus

Additional Information

You may obtain more information about wildlife diseases by contacting Dr. Joe Caudell at 765-496-3913.

Source: USDA

Indiana Wildlife Disease News

A joint project between:

Indiana DNR
Division of Fish and Wildlife

and

USDA APHIS Wildlife Services
National Wildlife Disease Surveillance and Emergency Response Program

to provide information on wildlife diseases in Indiana and surrounding states.

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The Indiana Wildlife Disease News is only published in electronic format. To add or remove you name from the mailing list, please send an e-mail to jcaudell@aphis.usda.gov

Submissions or Participation
If you would like to submit a wildlife disease related article, ideas, comments, or other information, please contact one of the editors.

We welcome individuals or agency representatives to act as reviewers or to provide assistance in the production of this newsletter. To assist, please contact one of the editors.

Providing information on wildlife diseases in Indiana and surrounding states

Indiana Department of Natural Resources Division of Fish and Wildlife

The mission of the Division of Fish and Wildlife is to professionally manage Indiana's fish and wildlife for present and future generations, balancing ecological, recreational, and economic benefits. Professional management is essential to the long term welfare of fish and wildlife resources, and providing for human health and safety. Communication between agency professionals and educating the public are important aspects of professional management.

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USDA APHIS Wildlife Services

NATIONAL WILDLIFE DISEASE SURVEILLANCE AND EMERGENCY RESPONSE PROGRAM

The mission of the National Wildlife Disease Surveillance and Emergency Response Program is to provide Federal leadership in managing wildlife disease threats to agriculture, human health and safety, and natural resources by assisting Federal, State, Tribal, and Local governments, private industry, and citizens with management of zoonotic and other wildlife diseases of concern.

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Midwest Wildlife Disease Update (Continued from pg. 5)

Disease (CWD). Lead author Laura Manuelidis, a professor of neurobiology at Yale University, stated that although the finding does not disprove the prion theory, it provides evidence of a "very strong alternative." Judd Aiken, a prion researcher at the Univ. of Wisconsin, suggests that if the "prion diseases" are caused by a virus, it would have enormous implications. Testing for the disorders such as mad cow or CWD would be much simpler and reliable.

Indiana BVD Testing- In November 2006 biologists and Purdue vet students collected 700 samples from white-tailed deer at DNR deer check stations around the state. Lymph glands and ear notches were collected to test for a relatively common viral disease of ruminants called Bovine Viral Diarrhea (BVD). Dr. Roman Pogranichniy, a diagnostic virologist at Purdue Animal Disease Diagnostic Lab, coordinated the effort and reports that only two positive samples were collected, one from lymph tissue and one from ear tissue. With so few positives, one could conclude that BVD is rare in our wild deer herd, and that deer are a minimal risk factor in spreading the disease to domestic ruminants.

TB Update from Michigan
Michigan Department of Agriculture and Department of Natural Resources continues to work toward eradication of tuberculosis from free-ranging white-tailed deer. In December 2006, a privately-owned cervid facility in the northern Lower Peninsula was depopulation due to several deer testing positive for TB.

In January and February 2007, Michigan DNR field tested a method for detecting TB in free-ranging deer. Deer are captured and a sample of blood is tested. Deer that test negative for TB are released in approximately 15 minutes. Positive deer are euthanized and transported to a lab for further testing. More about this project can be found at http://www.thealpenanews.com/stories/articles.asp?articleID=3814#

Column by D. Zimmerman, IDNR