

Michigan Bovine Tuberculosis Eradication Project

2007 Activities Report

ANIMAL INDUSTRY ACT
Act 416 of 1918

An act to authorize and require the appointment of a state veterinarian within the department of agriculture, to protect the human food chain and the livestock and aquaculture industries of the state through prevention, control, and eradication of infectious, contagious, or zoonotic diseases of livestock and other animals; to prevent the importation of certain zoonotic animals under control of the act.

ARTICLE 4 – MUTUAL AGREEMENT

It is mutually agreed that the cattle, bison, and cervid rules and regulations of the National Tuberculosis Eradication Program will be followed, including pertinent parts of the Code of Federal Regulations; the Uniform Methods and Rules, January 1, 2005, including any future revisions; and the Cervidae Uniform Methods and Rules, January, 1999, including any future revisions.

ARTICLE 5 – COOPERATOR RESPONSIBILITIES

MDA is responsible for the following provisions:

Establish methods to regulate and monitor cattle and bison movements between zones. These methods include the following:

1. Requiring electronic identification for any cattle and bison moved from premises in the Modified Accredited Zone and the ability to retrieve information concerning animal movements within 48 hours. Electronic records of movement would be preferred over paper records.
2. Effective August 15, 2007, MDA will implement and enforce a uniform, state wide certificate system to track all interstate or interzone cattle and bison movements from farm of origin to final destination. This certificate system shall be substantially the same as CFR (77.3) requirements for interstate movements. One hundred percent of cattle and bison moved interstate or interzone from the same area required to receive a movement certificate. In addition, all cattle and bison that the animals to be moved except 1) cattle and bison that are marketed to Eastern Region, Feb. 4

Tuberculosis Program Review

Review conducted November 5-9, 2007

USDA

MICHIGAN UNITED CONSERVATION CLUBS
Wildlife Chapter for Commercial Farm & Ranch
Animals and Products Under Jurisdiction

VS
Veterinary Services
Supporting Animal Health

MICHIGAN FARM BUREAU

2073 W. 8th
P.O. Box 30
Lansing, MI

State of Michigan
Department of Community Health
Bureau of Epidemiology

Matt Ankinley
Coordinator
Bovine Tuberculosis Eradication Project

Phone: (517) 335-8165
Fax: (517) 335-8163
www.michigan.gov/michdeph



USDA #	Task	Champion (Resource People)	USDA Deadline	Status	Comments
1	Strengthen wildlife risk mitigation in MAZ.				
2	Regular communications and updates with field		10/1/2007	Done	
3	Senior management involvement.		10/1/2007	Done	
4	USDA VS Reporting structure changes.		10/1/2007	Done	
5	Utilize available resources.		10/1/2007	Done	
6	Cooperative Agreement closeout reports.		10/1/2007	Done	
7	Update TB Management Plan.		10/1/2007	Green	
8	Verify test status before issuing permits – FAIR. Protocol for admin staff		6/29/2007	Done	Work on audit
9	Issue clarification of interzonal vs. interstate movements.		8/17/2007	Done	
10	Summary of August MCs from Maaz and Free with enforcement action date.		8/30/2007	Done	
11	Statewide implementation of FAIR.		7/17/2007	Red	
12	Traceability of animals tagged at market.		7/17/2007	Green	Traceback and traceforward
13	Test status verification prior to movement from markets.		7/17/2007	Green	
14	Collection/correlation of critical ID from slaughter plants.		11/7/2007	Done	
15	Ensure quarterly visits to FSIS slaughter plants.		10/1/2007	Done	
16	Reporting slaughter data back to States of origin.		8/17/2007	Done	Assigned to start. Monitoring 2 September
17	Reporting slaughter data back to States of origin.		8/17/2007	Done	

Michigan Department of Agriculture
Michigan Department of Community Health
Michigan Department of Natural Resources
Michigan State University

Michigan's Bovine Tuberculosis Eradication Project

INTRODUCTION

Bovine tuberculosis (TB) is an infectious disease that is close to being eradicated in the United States, but still poses a significant risk to domestic livestock, wildlife, companion animals, and humans throughout the world. The Michigan Bovine TB Eradication Project involves a multi-agency team of experts from the Michigan departments of Agriculture, Natural Resources and Community Health, Michigan State University, and the US Department of Agriculture.

Matt Ankney

Coordinator, Bovine TB Eradication Project
Michigan Department of Community Health
5th Floor Capitol View Building
Lansing, MI 48913

e-mail: ankneym1@michigan.gov
Office: 517-335-9970
Cell: 517-930-3206

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Michigan Department of Agriculture

Bovine TB Program Progress

Dr. Steven Halstead

State Veterinarian and Animal Industry Division Director

The Bovine Tuberculosis Eradication Program continues to be a top priority for the Michigan Department of Agriculture (MDA). Highlights throughout this report demonstrate continued success in containing the disease in cattle to the northern portion of the Lower Peninsula. Stringent testing and movement requirements have controlled cattle-to-cattle transmission of the disease. While this would lead to quick eradication of the disease in most other situations, the sporadic transmission of bovine TB from a reservoir of infected wildlife continues to present a significant hurdle to our cattle industry.

Recognizing this challenge, MDA has developed and maintained strong relationships with agency partners to further eradication efforts. In addition to our government partners, we work with key agricultural industry stakeholders and individual producers who are experiencing the bovine TB difficulties firsthand, which increases producer leadership and ownership of the bovine TB program.

The March 2007 federal program review provided an outside perspective that has helped MDA refocus our objectives, refine management action plans, and reorganize our workforce for improved efficiency and effectiveness. While many of these changes in the program are multi-year developments, they align our efforts with national program objectives and help us move toward our goal of advancement through the stages of the state/federal program.

The application for bovine TB Free status for the Southern Lower Peninsula (current Modified Accredited Advanced Zone) was submitted to USDA in 2007. While a formal response is not anticipated for at least one year, we are optimistic our recent rededication of resources and refined eradication strategy will help all of the project partners take a very large step forward in the future to meet our ultimate goal of reaching TB Free status.

Michigan Department of Agriculture

Federal Program Review and Response

Dr. John Tilden

Bovine TB Program Director

The following summarizes MDA's specific requirements under the USDA Veterinary Services (VS) Memorandum of Understanding (MOU) with MDA and the Michigan Department of Natural Resources (DNR), as well as past Bovine TB Program reviews.

More than 10 years into the disease eradication program, MDA has:

1. Conducted extensive, statewide surveillance in cattle.
2. Found no disease in the cattle herds outside of the designated TB zone.
3. Found no indication of infected cattle moving out of the TB zone.
4. Received TB-free status for the Upper Peninsula.

However, the USDA reviews in 2006 and 2007 indicated MDA did not meet some MOU requirements and these findings could jeopardize Michigan's current split-state status.

These reviews identified two overarching themes:

1. There must be increased prevention of bovine TB transmission from wildlife into cattle.
2. There must be increased control and monitoring of animal movements between zones.

The fate of livestock and wildlife TB eradication programs are linked, and Michigan's status is predicated on controlling both infection in cattle and the risk of deer-to-cattle transmission. To implement these additional programs, we must seek support from the industry, the state's Agriculture and Natural Resources Commissions, Congress, the Michigan legislature, and other partners. The following outline highlights the commitments made by both MDA and USDA, the impacts on producers and the public (both positive and negative), the changes that must occur, and the consequences if these commitments are not implemented. The source of each commitment is in brackets.

Other state department partners are willing to institute policies that complement the USDA-VS and MDA programs. These agencies, however, do not fall under the jurisdiction or requirements of USDA-VS and were recognized in the program review for their assistance and participation in the disease eradication effort. Ultimately, all agencies and partners have the end goal of achieving bovine TB eradication.

Michigan Department of Agriculture

Commitment

Increase the emphasis on Wildlife Risk Mitigation Plans (WRMP) for cattle herds in the Modified Accredited Zone (MAZ). [MOU]

Required change:

Producers will be expected to adopt farm management practices to prevent disease spillover from free-ranging wildlife. MDA must contact and inform all MAZ producers of the need for developing WRMPs and USDA-Wildlife Services (WS) will provide wildlife risk reduction consultation to producers. MDA is seeking funding from Congress for USDA-WS to ensure the availability of wildlife experts to consult with producers.

Impact:

Effective prevention will result in:

1. Fewer infected herds.
2. Lower future indemnity costs.
3. Producer consent.
4. Greater market confidence.
5. Increased support from government funding sources.

Consequences if not implemented:

Experts believe there will continue to be bovine TB positive herds unless these plans are implemented. The lack of WRMPs in the MAZ threatens current split-state status and delays advancement in status.

Commitment

Introduce legislation to tie repopulation herd plans to indemnity in the MAZ. [Legislative Initiative]

Required change:

Herd plans for once-infected farms are tied to indemnity at the federal level, and MDA would like to follow suit on the state level. Cattle management practices that may play a part in the transmission of bovine TB must change. Producers need to be responsible for protecting their cattle by preventing transmission from wildlife. Michigan herd plans, like the federally required herd plans, would include wildlife risk reduction measures.

Impact:

Increased time and effort on the part of MDA's executive office and legislative liaison. MDA's Director will have the ability to limit indemnity based on compliance with herd plans for reinfected herds, use of risk mitigation tools, and overall producer cooperation. A change in livestock management practices will require time and money.

Consequences if not implemented:

Continued transmission of bovine TB from wildlife threatens the current status level and future taxpayer funding. Increased difficulties obtaining indemnity payments for depopulation.

Michigan Department of Agriculture

Commitment

Tougher restrictions on agricultural management practices that may play a part in the transmission of bovine TB. [MOU]

Required change:

Review normal agricultural practices in a disease/infected zone and make changes to limit free-ranging deer access to cull commodities consistent with the DNR feeding and baiting regulations.

Impact:

Set the precedent for restrictions on agricultural management practices within infected zones when wildlife are present. Begins the process of better aligning agriculture and wildlife management practices within the MAZ.

Consequences if not implemented:

Creates the perception the agricultural community is unwilling to limit practices contributing to wildlife congregation. Erosion of ability to expect wildlife management officials to enact increasingly stringent feed bans on their community.

Commitment

Efficient enforcement strategies to increase movement certificate compliance. [Program Review]

Required:

MDA must monitor movements of MAZ cattle and bison at all livestock markets within the state and at the Mackinac Bridge. MDA need the authority to stop livestock vehicles approaching and leaving the MAZ and request movement certificates to confirm all test-eligible cattle have been tested. Increase monitoring of livestock haulers to check for movement certificates.

Impact:

MDA must either obtain additional law enforcement authorities or contract with other law enforcement agencies. Producers will need to plan animal movements in advance and obtain hard copies of movement certificates prior to moving animals between zones. Additionally, Modified Accredited Advanced Zone (MAAZ) producers now face costs associated with moving cattle across zones.

Consequences if not implemented:

The actions of a few non-compliant individuals could threaten current split-state status.

Commitment

Ensure effective MAAZ and bovine TB-free Zone Surveillance. [MOU]

Required change:

Meet existing random surveillance testing requirements of 775 herds in the MAAZ and 25 herds in the Upper Peninsula, or move to a more targeted form of surveillance (risk-based). Approval of new plan by USDA epidemiologists will be required.

Michigan Department of Agriculture

Impact:

Positive impact: More efficient and understandable surveillance testing requirements.

Potential negative impact: MAZ producers may find it increasingly difficult to market cattle to other producers.

Consequences if not implemented:

Continued erosion of producer support in the MAZ and inefficient use of government resources.

Commitment

Expanded movement certificate requirements. [Program Review]

Required change:

Tighter statewide control of cattle movements. Producers must obtain certificates for interzonal and interstate cattle movement. Government must provide a mechanism for producers to obtain these certificates online.

Impact:

Government must develop and manage a new animal health and movement tracking database supported by the Michigan Department of Information Technology and this will take a tremendous investment in infrastructure. Producers must retrieve MAZ movement information within 48 hours. Producers need to plan ahead, document animal movements, and have a government issued movement certificate in hand before animals are moved.

Consequences if not implemented:

Spread of bovine TB within, and beyond, the MAZ.

Commitment

Reconciliation of herd inventories in the MAZ. [MOU, US Office of Inspector General Report]

Required change:

MAZ producers must provide documentation for changes in cattle inventories each year, usually during the annual whole-herd herd test.

Impact:

More time will be needed to test each herd in the MAZ, potentially resulting in friction between regulatory personnel and farmers. Reconciliation should help prevent illegal movement from MAZ farms and will improve epidemiological investigations. Increased on-farm record keeping.

Consequences if not implemented:

Erosion of long-term funding support from the federal government.

Michigan Department of Agriculture

Commitment

Radio Frequency Identification (RFID) use is required for Michigan cattle and bison movement and is the official identification used for bovine TB testing. [MOU]

Required change:

Require RFID for all interzonal movements and maintain the ability to obtain movement information within 48 hours if trace testing is needed. MDA policy is to use RFID as the official ID when cattle are bovine TB-tested. Information technology systems linking farms, markets, and slaughter establishments are evolving.

Impact:

MDA must make significant investments in databases and field equipment, as well as technical support for market and slaughter facilities. MDA currently provides and coordinates the distribution of RFID tags in the MAZ. Producers have to purchase RFID tags in the Upper Peninsula and MAAZ.

Collective benefits of universal RFID use include:

- Information technology systems providing information on carcass data to producers
- Country of Origin Labeling
- Source verification
- Increased efficiency in testing and tracking Michigan cattle.

Consequences if not implemented:

Loss of initial investment in the RFID program. Loss of TB status for the entire state.

Commitment

Develop and maintain a TB Management Plan in accordance with U.S. Code of Federal Regulations. [MOU]

Required change:

MDA must increase management accountability with measurable outcomes. The Animal Industry Division must also provide timelines for change and write Standard Operating Procedures (SOPs) for MDA's Bovine TB Eradication Program. Industry and opinion leaders should expect to provide input to MDA on priorities and policy development.

Impact:

Plans with measurable outcomes and timelines will make MDA more accountable. However, adhering to strict procedures may make MDA less flexible for the producer. A management plan, with SOPs, will provide a better understanding of the MDA Bovine TB Program.

Consequences if not implemented:

Continued difficulty in predicting objectives, timelines, and milestones.

Herd Reconciliation and Expanded Testing in the MAZ

Dr. Dan Graham

Atlanta Office Supervisor

MAZ Herd Reconciliation

Each herd tested for bovine TB by state or federal personnel in the MAZ will undergo annual inventory reconciliation. The reconciliation will be completed within 30 days following the whole herd test. Each herd tested by accredited fee-basis veterinarians in the MAZ will undergo annual inventory reconciliation and this will be performed by state or federal personnel within 60 days following the whole herd test. Herds classified as freezer beef will undergo annual inventory verification as well.

Inventory reconciliation will be implemented with herds tested beginning July 1, 2007. It is the responsibility of the state or federal veterinarian assigned to test the herd to complete the reconciliation process. Any herds undergoing a first-time whole herd test after July 1, 2007 (previously exempted terminal operations or freezer beef herds) will undergo inventory reconciliation beginning with the second annual whole herd test.

Expanded TB testing in the MAZ

In the fall of 2006, the annual TB testing surveillance program in the MAZ was expanded to include feedlot premises which had previously been exempted from the annual whole herd test. The process of including these feedlots in the annual WHT surveillance was completed by December 2007, and they will be tested annually.

Registered terminal operations had also previously been exempted from annual whole herd TB testing. Beginning July 2007, these terminal operations in the MAZ are whole herd tested annually.

Premises in the MAZ which raise six head or less of beef for home/family use only had also been previously exempted from annual whole herd TB testing and from annual inspection. Beginning in July 2007, these "freezer beef" herds will undergo either an annual whole herd TB test or an annual inventory inspection and they will have an inventory reconciliation each year beginning with their second annual inspection.

Michigan Department of Agriculture

Surveillance Testing and Movement Certificates

Dr. Michael VanderKlok

Bovine TB Program Coordinator

More than 115,630 TB tests were conducted in 1,671 Michigan cattle herds during fiscal year (FY) 2007. This included 63,136 negative TB tests in the MAAZ of Lower Michigan and 3,553 negative TB tests in the TB Free Zone (Upper Peninsula). This testing disclosed no cases of bovine TB in either zone.

Bovine TB testing in the MAZ of the Lower Peninsula included 48,941 tests in 968 herds. TB testing in this area disclosed one TB infected herd in January 2007, of a 120 head dairy herd in Montmorency County. The herd was depopulated with three TB infected cattle found. There was no spread of the disease from this herd uncovered upon completion of the herd investigation.

A comprehensive movement certificate program has been in effect for movement of cattle from herds in the MAZ since 2004. In compliance with USDA requirements, the movement certificate program was expanded to include movements from the MAAZ and TB Free Zone through changes to the Zoning Order in March 2007. Additional updates to the movement certificate program, including removal of the requirement for movement certificates for cattle from the TB Free Zone (Upper Peninsula) were included in a revised Zoning Order August 2007. These updates are in compliance with recommendations from the USDA TB Review.

During FY 2007, 4,291 movement certificates were issued from herds in the MAZ. Movement certificates are required for moving within this zone or to other zones in Michigan.

During FY 2007, 528 movement certificates were issued from herds in the MAAZ, and 52 movement certificates were issued from herds in the bovine TB Free Zone (Upper Peninsula; the requirement for movement certificates from the TB Free Zone has been removed in accordance with USDA requirements effective August 15, 2007). There are no requirements for movement certificates for moving within the MAAZ or TB Free Zone, only if the movement is to another zone in Michigan.

Michigan Department of Agriculture

Compliance Report

Al Rodriquez

Regulations Manager

The 2007 MOU between USDA, MDA, and DNR has placed an increased emphasis on surveillance of interzonal cattle movements. The Mackinac Bridge provides a single entry/exit point for the Modified Accredited and Accredited Free Zones. Any livestock transportation equipment heading north across the bridge is required to stop for inspection by state officials. Cattle going north across the bridge must be accompanied by movement certificates issued by MDA that verify negative TB tests have been conducted within 60 days of the movement.

To assist with enforcement and further demonstrate producer compliance, a Memorandum of Understanding has been signed with the Michigan State Police (MSP), Motor Carrier Division. Beginning in January 2008, MSP has allotted 24 hours per week for this activity, 16 hours for patrols in the MAZ and MAAZ, and eight hours per week for the Mackinac Bridge.

The following data details MDA inspection activities for FY 2007.

BRIDGE DETAIL FISCAL YEAR 2007

October 2006 – September 2007

INSPECTION REPORTS

Total Reports Taken:	2,086
Bovine Reports:	1,164
Equine Reports:	800
Swine Reports:	48
Sheep Reports:	18
Goat Reports:	12
Avian Reports:	10
Cervidae:	12
Other Reports:	22

HEAD COUNT

Total Bovine Reported:	33,316
Bovine for Slaughter:	29,029
Bovine owner Transport::	4,287
<u>Other species head count:</u>	
Equine head count:	1,734
Swine head count:	1,060
Sheep head count:	290
Goat head count:	89
Avian head count:	3,007
Cervid head count:	81
Other:	104

INVESTIGATIVE TALLY

- 121 - No Paperwork/Improper Paperwork
- 5 - possible Coggins investigations/ Forgery of Coggins Certificate
- 24 - movement investigations
- 2 - Cervid TB investigations

Radio Frequency Identification (RFID)

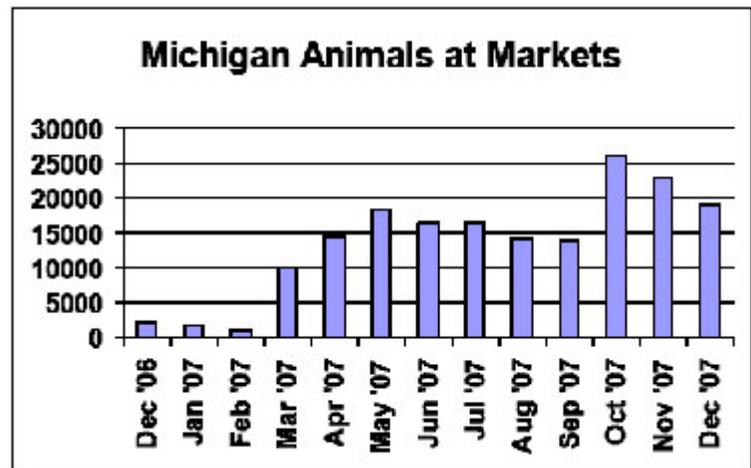
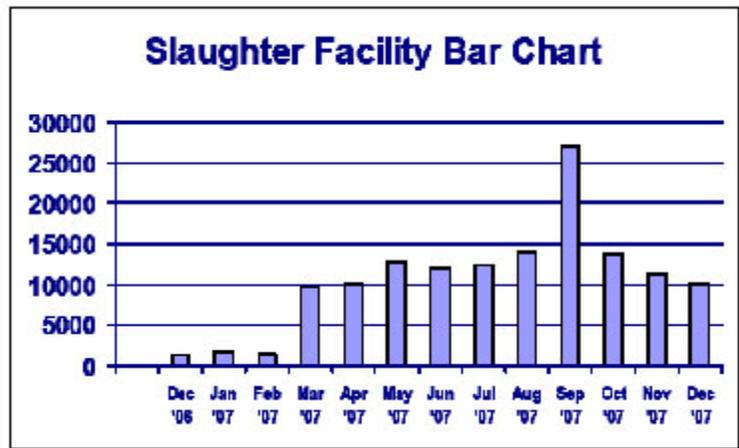
Kevin Kirk

Special Assistant to the AID Director

Mandatory RFID for all cattle leaving the farm was implemented on March 1, 2007. RFID greatly improves the accuracy and efficiency of the state's animal tracking program as it relates to cattle diseases, specifically bovine TB. Each RFID tag is linked to a producer's registered premises (farm location) number. The tag information is recorded in a secure database as cattle move through the market systems. In the event of a TB positive herd, the tracing of individual animal contacts and potential exposure risks to TB have been dramatically enhanced.

MDA is also working with the cattle industry to find increased marketing opportunities for Michigan cattle producers given this comprehensive tracking information and the potential security and benefits it can provide to consumers.

As of January 14, 2008, there are 19,732 unique premises registered within Michigan. These premises are owned by 12,073 livestock producers and have collectively purchased 1,154,620 tags. These charts indicate the number of tags scanned into the database at different points in the marketing chain.



Communications Update

Bridget Kavanagh Patrick (MDA)
Risk Communications Specialist

Matt Ankney (MDCH)
Bovine TB Project Coordinator

Educational activities include meetings, developing materials for distribution, media announcements, and other activities to assure livestock producers and veterinarians are aware of bovine TB eradication program activities, comply with requirements, and are aware of any upcoming changes or modifications.

In 2007, funding supported these education and outreach projects:

- Printing and mailing of meeting announcements and materials associated with changes to the Michigan zoning order. These changes included mandatory RFID electronic ear tags for all cattle movements, and increased tuberculosis testing requirements to remain in compliance with changes in the national TB eradication program.
- Development, recording, and distribution of a public service announcement (PSA) on the Michigan Farm Radio Network regarding requirements of the amended zoning order. The PSAs ran at the noon hour across the state for six weeks in January and February, and again in August on major radio stations along the MAAZ and MAZ border.
- Distribution of mailings to all Michigan cattle producers regarding the metal eartag recall, official identification, herd testing requirements, and clarification of certain program requirements as recommended in the March 2007 USDA TB program review report.
- Saleyard signage was developed to inform producers of the requirements when moving cattle between zones.
- A “freezer beef” brochure, that discusses identifying and reporting disease, was developed and distributed to custom/exempt processors and small cattle production farms where home butchering takes place.
- A booklet, based on the 2007 USDA Program Review, outlining the program enhancements required for Michigan was shared throughout the last quarter of the year at interagency, industry, and MAZ stakeholder meetings.
- The annual Bovine Tuberculosis Conference was not held in Michigan in 2007. The \$10,000 budgeted for the conference was used to offset the costs to place signs at the Mackinac Bridge and on major highways leading to the bridge.

Michigan Departments of Agriculture and Community Health

Michigan Farm Bureau and the Michigan State Extension Service partnered with state and federal agencies to provide a series of meetings that helped beef and dairy producers in northeast Michigan learn more about Wildlife Risk Mitigation (WRM) Plans. The meetings featured state and federal presenters who outlined what WRM plans should look like, provided direction developing plans, and answered producers' questions. The meetings were all held in December 2007 as follows:

- Dec. 10, 7-9 p.m. at Miller Feeds in Spruce
- Dec. 11, 1-3 p.m. at the MDA office in Atlanta
- Dec. 11, 7-9 p.m. at the Emmet County Fairground Community Building in Petoskey
- Dec. 12, 1-3 p.m. at the Alpine Center in Gaylord

On November 7, 2007, MDA had four signs placed at the major travelways approaching the Mackinac Bridge from the south. These signs alert livestock vehicle drivers to stop at the Agriculture Inspection Station across the Mackinac Bridge. This inspection station is open 24-hours a day and located at the only land bridge connecting the Modified Accredited and TB Free zones of Michigan. These signs were posted at the following locations:

1. I-75 NB, south of exit 337, in Mackinaw City
2. US-31 NB just before entering I-75 NB, south of exit 36 in Mackinaw City
3. US-23 NB at junction with I-75 and M-108 in Mackinac City
4. On the Mackinac Bridge North Bound - 1/2 mile before toll booths

Cooperative agreement funding has also been used to partially support a joint Bovine TB/ Emerald Ash Borer billboard on the approaching highway to the Mackinac Bridge. This billboard notifies livestock vehicles and vehicles carrying firewood or Ash products that they must stop for inspection.

The importance of developing realistic, quick, and simple messages regarding the risk of bovine TB transmission from deer to livestock requires the input of producers, hunters, wildlife biologists, and veterinarians. Messages were developed by contracting with an expert in Zoonotic diseases with an understanding of what producers are going through (i.e., a medical doctor, a veterinarian, and/or a cattle producer). The contractor attended public meetings and interviewed program experts involved in disease management and developed these basic public messages:

- Preventing disease spread between cattle, deer, and humans
- Preventing disease spread through scientific knowledge, grassroots education and public communications

Public and stakeholder education and outreach are important components of the overall Michigan bovine TB eradication program. The 2007 Bovine TB Wildlife Risk Mitigation Message Development Plan supports a major programmatic change identified by the USDA-VS review team. This approach will assist Michigan in maintaining current TB split-state status and will hopefully help advance the state's status to bovine TB-free.

Michigan Department of Natural Resources

Disease Control Permits

Dr. Steve Schmitt
State Wildlife Veterinarian

At the beginning of January 2008, all cattle producers in Alpena, Alcona, Oscoda, Montmorency, and Presque Isle counties were mailed five active Disease Control Permits (DCP). These permits allow producers to remove deer from their farms at any time during the year. The producers are also able to assign additional persons as listed shooters. If producers choose, they can contact USDA Wildlife Services for shooting assistance.

Carcasses harvested from these permits are retained by the property owner and may be used at their discretion. Submission of the heads for bovine TB testing is required by the DNR. The permits include a carcass tag for identification, a TB tag for testing identification, and a return postal card for usage tracking.

These permits are an initial distribution and producers will be able to call the DNR for additional permits at no cost. Likewise, all livestock producers outside of these five counties, but within the MAZ, can call the DNR and may be issued Disease Control Permits.

These permits will be issued automatically to the approximately 600 producers in the five counties at the beginning of 2009 and 2010. After this three-year trial, the DNR will review usage patterns to determine if automated mailings are the most efficient method of permit distribution.

Non-agricultural landowners in the five county area that would like to request DCP's should contact their local DNR biologist.

Bovine TB Surveillance in Free-Ranging Cervidae

Dr. Dan O'Brien
Wildlife Veterinarian and Epidemiologist

The 2006 apparent prevalence rate of bovine TB in wild white-tailed deer in Deer Management Unit (DMU) 452 was announced at the Joint Commission Meeting (Agriculture and Natural Resources) on April 12, 2007. The total deer tested for 2007 in Michigan was 7,924, with 41 confirmed positive by bacterial culture. All 41 positive deer, and one infected elk, came from the four counties that surround DMU 452. The 2006 apparent prevalence rate for DMU 452 is 2.3 percent, up from 1.2 percent in 2005. However, analysis of multi-year data indicates the prevalence rate is still following a significant downward trend. This increase in prevalence is a sobering reminder that the TB outbreak is far from over, and sustained, long-term public support is needed in order for eradication efforts to succeed.

Year	Inside DMU452	5-County Outside DMU452
2006	2.3%	0.3%
2005	1.2%	0.1%
2004	1.7%	0.2%
2003	1.7%	0.2%
2002	2.6%	0.5%
2001	2.3%*	0.5%
2000	2.5%	0.4%
1999	2.4%	0.2%
1998	2.7%	0.3%
1997	4.7%	0.4%
1996	2.5%	0.2%
1995	4.9%	(no testing)

Michigan Department of Natural Resources

Feeding and Baiting Regulations

Doug Reeves

Wildlife Division Acting Chief

The hunting community continues to be a vital partner in the eradication of bovine Tuberculosis from free-ranging white-tailed deer. Recent history has shown the local economic impact of bovine TB can be devastating. In an effort to prevent the disease from becoming established in additional areas, we have set a policy in the MOU with Department of Agriculture that includes a trigger point for action. Feeding and baiting regulations will be reviewed in any surveillance area surrounding the seven-county area where three or more TB positive free-ranging deer are found. The DNR will recommend that the Natural Resources Commission ban feeding and baiting in surveillance

areas where three or more positive deer are found. The surveillance areas are defined as follows: the southern sampling population will consist of deer taken from Crawford, Iosco, Ogemaw, and Roscommon counties, and the western sampling population will consist of deer taken from Antrim, Charlevoix, Cheboygan, Emmet, and Otsego counties. The remainder of the Lower Peninsula will be included as the outer zone.



2006 Hunter Harvest Report

Brian J. Frawley

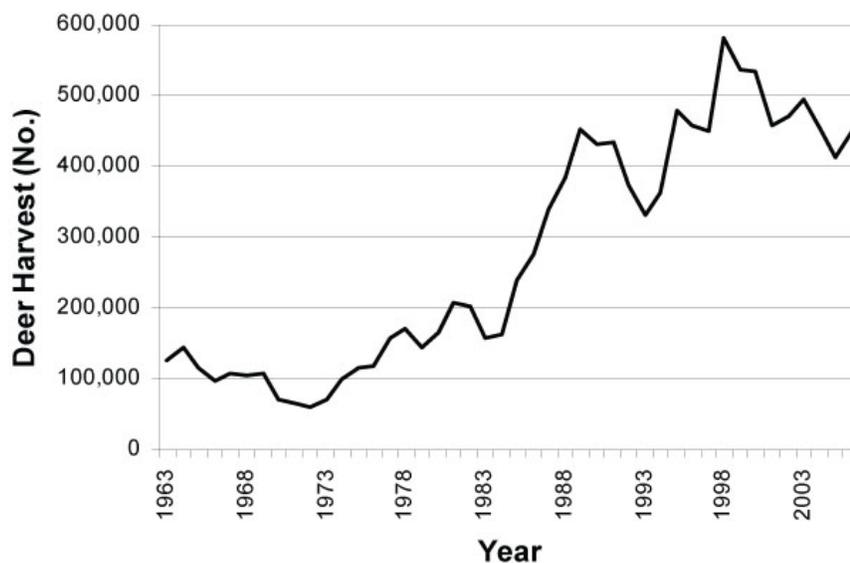
Wildlife Research Biologist

A survey of deer hunters was conducted following the 2006 hunting seasons to estimate hunter participation, harvest, and overall hunting effort. In 2006, an estimated 691,000 hunters spent 10.1 million days afield. Statewide, the number of people hunting deer increased about three percent, but hunting effort was virtually unchanged between 2005 and 2006. Hunters harvested nearly 456,000 deer, an increase of nearly nine percent from the number taken in 2005. Statewide, 46 percent of hunters harvested a deer, about 22 percent of the hunters took an antlerless deer and 34 percent took an antlered buck, and about 15 percent of deer hunters harvested two or more deer.

In DMU 452, the available quota of antlerless permits was 8,600 (600 public land, 8,000 for private land). 497 public land and 5,611 private land antlerless permits were sold in DMU 452. With these permits, hunters harvested 2,184 antlerless deer and 3,683 antlered bucks for a total harvest of 5,867 deer, up 29% from the 2005 harvest of 4,536 (2,139 antlerless, 2,396 antlered bucks).

The total number of deer hunters in DMU 452 also increased from 10,747 in 2005 to 11,070 in 2006.

The complete harvest report may be accessed online at http://www.michigan.gov/documents/dnr/deer_06harvest_198710_7.pdf.



Number of deer harvested in Michigan's hunting seasons, 1963-2006. Harvest from all seasons and for all deer sexes combined.

Evaluating Acceptance of Free-Ranging White-Tailed Deer Bovine Tuberculosis Management Strategies

Brent Rudolph

Wildlife Research Specialist

Managers have identified the need to develop publicly acceptable control policies to maintain or improve efforts to eradicate an infection of bovine tuberculosis (TB) from white-tailed deer (*Odocoileus virginianus*) in Michigan (O'Brien et al. 2006). The DNR established two management strategies to address the TB infection.

Liberalized harvest regulations were implemented in an effort to substantially reduce deer densities, and feeding and baiting restrictions were adopted to reduce congregation of deer (Rudolph et al. 2006). Management strategies have apparently constrained, but not eliminated, the infection (Hickling, 2002, O'Brien et al. 2002) and have been controversial (O'Brien et al. 2006, Rudolph et al. 2006). It is unclear to what extent public resistance, compared to challenges inherent to disrupting the cycle of infection, has prevented TB eradication.

Poor compliance with bait restrictions has been observed, however (Gwizdz, 2004) and documentation of opposition to the goal to reduce deer populations (Dorn and Mertig, 2005) suggests that harvest may be constrained by poor cooperation with population management strategies. A better understanding of factors influencing hunter compliance with baiting regulations and decisions to harvest deer has been identified as a critical knowledge gap challenging efforts to maintain and enhance TB control strategies.

Research collaboration between the DNR and Michigan State University (MSU) has been initiated to examine these factors. The Michigan Department of Agriculture (MDA) will provide funding support to gain initial insights for this evaluation and will provide a point of contact to DNR who will be responsible for coordinating communications related to this portion of the project. DNR and MSU will conduct one or more workshops and meetings with wildlife managers, law enforcement personnel, agriculture and recreation industry professionals, and small groups of stakeholders to gather data as part of this assessment.

Modeling efforts will also be conducted to characterize the degree to which past modifications to deer hunting regulations have influenced harvest levels, while controlling for factors that influence hunting access and deer distribution, such as habitat, land ownership, and development patterns.

This effort represents a unique and exciting multi-agency and university collaboration to engage the public to better understand factors limiting the support for and effectiveness of TB management strategies.

Michigan Department of Natural Resources

Dorn, M. L., and A. G. Mertig. 2005. Bovine tuberculosis in Michigan: stakeholder attitudes and implications for eradication efforts. *Wildlife Society Bulletin* 33:539–552.

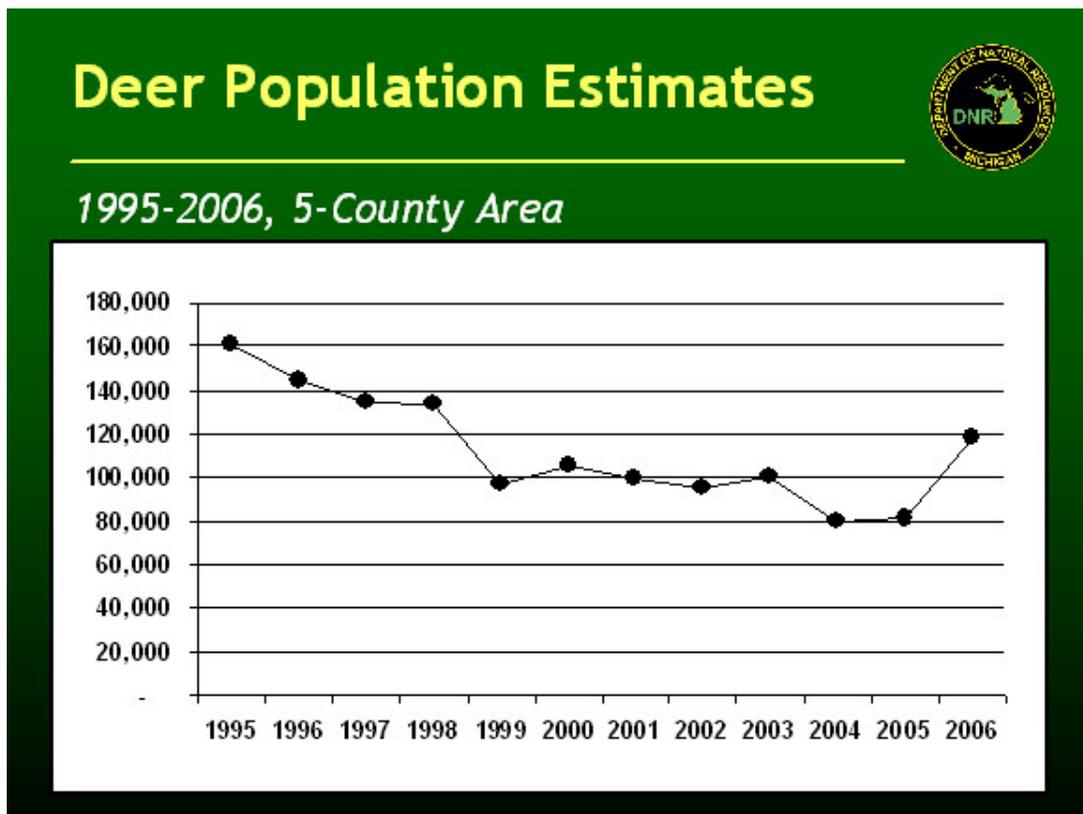
Gwizdz, B. 2004. NRC needs to have courage with bait ban. *The Grand Rapids Press*. 13 March 2004; section D:1.

Hickling, G. J. 2002. Dynamics of bovine tuberculosis in wild white-tailed deer in Michigan. Michigan Department of Natural Resources, Wildlife Division Report 3363, Lansing, Michigan, USA.

O'Brien, D. J., S. M. Schmitt, J. S. Fierke, S. A. Hogle, S. R. Winterstein, T. M. Cooley, W. E. Moritz, K. L. Diegel, S. D. Fitzgerald, D. E. Berry, and J. B. Kaneene. 2002. Epidemiology of *Mycobacterium bovis* in free-ranging white-tailed deer, Michigan, USA, 1995-2000. *Preventive Veterinary Medicine* 54:47–63.

O'Brien, D. J., S. M. Schmitt, S. D. Fitzgerald, D. E. Berry, and G. J. Hickling. 2006. Managing the wildlife reservoir of *Mycobacterium bovis*: the Michigan, USA, experience. *Veterinary Microbiology* 112:313–323.

Rudolph, B. A., S. J. Riley, G. H. Hickling, B. J. Frawley, M. S. Garner, and S. R. Winterstein. 2006. Regulating hunter baiting for white-tailed deer in Michigan: biological and social considerations. *Wildlife Society Bulletin* 34:314–321.



Rapid Test and Pilot Project Developments

Melinda Cosgrove

Wildlife Technician

In January 2004, the DNR initiated a pilot study for a new strategy to combat bovine TB in white-tailed deer. The trap/test/cull project was aimed at trapping deer on two properties in townships with relatively high TB prevalence in DMU 452. Blood was collected from the trapped deer and radio-collared, ear-tagged, and released. The collected blood was sent to Michigan State University's Diagnostic Lab. The cervigam test, one that was the most available at the time, was used to test the blood samples for the presence of TB antibodies. Deer identified as positive for TB with this blood test were then tracked and culled using radio telemetry with the assistance of the United States Department of Agriculture (USDA) Wildlife Services (WS). The culled deer were then necropsied by the DNR and the lymph nodes were removed to be cultured at the Michigan Department of Community Health Tuberculosis Laboratory for the presence of *Mycobacterium bovis*, the causative agent of TB. This blood test proved to be an unreliable predictor of TB status for white-tailed deer.

In the fall of 2004 and 2005, efforts were aimed at developing a more reliable blood test. Blood samples and the heads from hunter-harvested deer were collected by the DNR. The blood samples were sent to the USDA, National Animal Disease Center (NADC) in Ames, Iowa and a private lab, Chembio Diagnostic Systems, in Medford, New York. Each lab ran the blood samples on a couple of different tests for TB. The results of the blood tests were compared to the culture results. One test, the Cervid TB STAT-PAK[®], seemed promising because it performed relatively well in detecting positive animals and was able to be done in the field in less than 20 minutes.

In January 2007, the trap/test/cull project was reinstated. Trapping was conducted by the USDA-WS with assistance from the DNR. All collected data were archived and analyzed by the DNR. This time the trapped deer were ear-tagged and a small sample of blood was taken to be tested with the Cervid TB STAT-PAK[®] at the site of the trap. Deer that tested negative on the blood test were released while deer that tested positive were euthanized on the spot and sent to the DNR for necropsy. Over the course of two months, 429 unique deer (247 of which were adult animals) were trapped and tested. Three of the 429 deer tested positive with the blood test, two of which cultured positive, indicating they were infected with TB. The two deer that cultured positive had extensive lesions in the chest cavity, demonstrating the test is able to detect TB in the most highly infectious animals. The results were encouraging, showing that a relatively high number of deer could be trapped and tested and positive animals could be detected and removed.

In January 2008, the project began again and is being conducted under the same protocol as in 2007. This will allow us to determine if the project can be repeated with continued success and to assess the cost effectiveness of the strategy. After the first two weeks of trapping, over 160 deer (new and recaptures) have already been trapped and tested. One positive deer has already been detected with the blood test. The next step in this new strategy for combating TB

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will be to look at the possibility of implementing the use of vaccination. The USDA-NADC has been conducting research on the efficacy of such a vaccine. In their study, groups of captive deer were vaccinated and later euthanized, necropsied, and cultured for TB. Preliminary results show that the vaccinated deer developed significantly less severe TB lesions and when given a second dose of the vaccine, developed significantly fewer visible TB lesions. Although approval for the use of a vaccine is still likely to be several years away, it does give hope for combating the disease. Research is ongoing to assess the impact that implementing such a vaccine may have on TB prevalence in DMU 452.

In summary, new methods to combat TB are being researched and developed, but current strategies should not be abandoned. These new approaches should be used to compliment our current ones, not as replacements. Continued diligence at working to control TB is needed if we hope to eventually eradicate the disease from Michigan.

TB Positive Herds in Calendar Year 2007

Dr. Jim Earl

Assistant Area Veterinarian in Charge

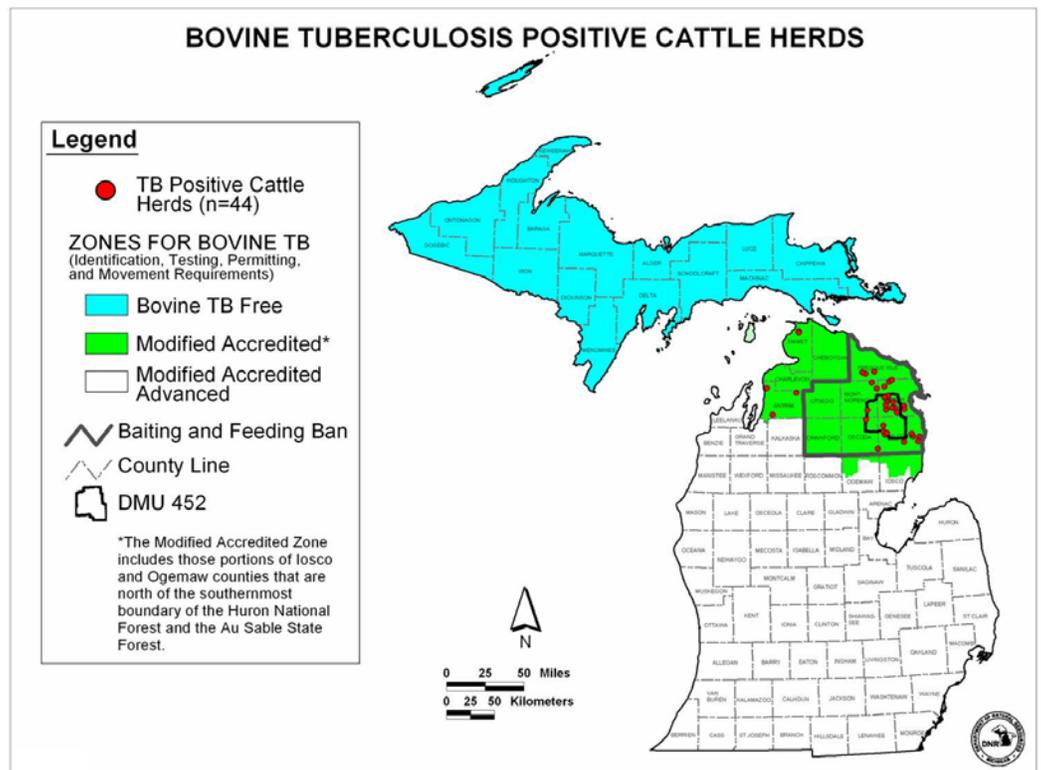
Four cattle herds in the five county area (Montmorency, Alpena, Alcona, Oscoda, and Presque Isle) of the Modified Accredited Zone were confirmed to be bovine TB infected during calendar year 2007. This brings the total number of cattle herds infected in Michigan to 44 since 1998.

1. Montmorency County dairy herd - approximately 120 head, (January)
2. Alcona County beef herd - approximately 170 head, (October)
3. Montmorency County beef herd - approximately 80 head, (November)
4. Oscoda County beef herd - approximately 70 head, (December)

All affected herds were quarantined, appraised, and orders for destruction were issued. Investigations to determine the source(s) of infection, to identify herds providing animals to these herds, and to identify herds receiving potentially exposed animals are ongoing. The most likely source of infection is, at this point, expected to be from wildlife.

The Alcona County beef herd was the fifth herd that has become reaffected. Following the initial infection and subsequent depopulation, all regulatory actions were enforced prior to repopulation of the premise.

In addition to these 44 cattle herds, there have also been two cervid facilities infected, one in Presque Isle County in 1997(260 deer) and another in Montmorency County in 2006 (330 deer).



Wildlife Risk Mitigation Plans

Pete Butchko

State Director (Michigan WS)

In accordance with the 2007 MOU between USDA, MDA, and DNR, a strategy to implement WRMP's for all producers in the MAZ has been developed. The development team for this strategy was a multi-departmental group, consisting of members from USDA VS, USDA WS, MDA, DNR, MDCH, MSU, and individual producers from the MAZ.

The strategy has two components, a basic plan that is feasible, given current funding conditions, and meets the minimum requirements of the MOU. A second, more advanced strategy, contingent upon increased funding, would provide more rapid WRMP implementation and would exceed the requirements set in the MOU. Both strategies are founded on the principle that these plans, while mutually beneficial, are voluntary and non-regulatory at this time.

With the assistance of Michigan Farm Bureau and MSU Extension, preliminary informational meetings have been held in multiple sites in the northeast Lower Peninsula. These initial meetings helped to refine our educational materials and methods. Future meetings are currently under development to further assist in enhancing our strategy.

The MOU also requires that information be given to all MAZ cattle producers by October 2008. The previously mentioned group has addressed this requirement with a mass mailing of informational documents and developed more documents that will be distributed by the USDA VS and MDA testing teams as they visit each farm for their annual whole herd test.

The main focus of wildlife risk mitigation plans for producers are: limiting deer access to stored cattle feed and water sources, using multiple methods to minimize direct contact between deer and cattle, and feeding cattle in locations that will limit deer access to active feed sources.

A Summary of Depopulation Activities from Captive Cervid Facility

Tim Wilson

Wildlife Biologist

Bovine Tuberculosis was detected at a 590-acre privately-owned captive cervid facility in northeast Lower Michigan in October 2006. USDA-WS entered into a cooperative agreement with the Michigan Department of Agriculture (MDA) and was tasked with conducting the depopulation activities. The herd size at this facility was large and activities to address the situation were administered by the Incident Command System, with the State Veterinarian of Michigan and the U.S. Department of Agriculture (Veterinary Services) Area Veterinarian In Charge as incident commanders. The depopulation effort began on December 12, 2006; a total of 342 deer were removed by January 16, 2007, and the final verification of depopulation was completed on February 1, 2007. In addition to testing all deer for TB and Chronic Wasting Disease (CWD), blood samples were collected by the DNR to provide validation data for the newly-developed rapid blood test that is now being used in the capture, test, and cull project on private land in northeast lower Michigan. Of the 342 deer removed, four were culture positive for bTB and all were negative for CWD.



Melinda Cosgrove from the DNR processes blood samples using the Rapid Test (see page 23)

Research Updates

Evaluate risk factors associated with possible transmission of bovine tuberculosis from white-tailed deer to cattle by interaction of deer with cattle farms in northern Michigan.

Mike R. Dunbar, Are Berentsen, and Regina Ebersole
USDA/Wildlife Services, National Wildlife Research Center, Ft. Collins, CO

There are two objectives in this ongoing study: 1) Identify daily and seasonal deer movements and locations on and near selected cattle farms in northern Michigan, and 2) determine and, if possible, quantify risk factors associated with possible transmission of bovine TB from white-tailed deer to cattle by interaction of white-tailed deer with cattle farms in northern Michigan.

In 1994, a hunter-killed white-tailed deer (*Odocoileus virginianus*) in Alpena County, Michigan was found infected with TB. Bovine TB had not been found in a Michigan deer since 1975, when a hunter-killed deer in Alcona County was diagnosed with the disease. Between 1975 and 1997, TB was documented in Michigan white-tailed deer with increasing numbers of deer found to be positive and evidence suggested that deer had transmitted the disease to cattle (Palmer et al. 2004). Livestock and members of the deer family can get TB from saliva or airway secretions transferred directly from one animal to another. They can also get the disease indirectly from eating contaminated feed (Palmer et al. 2004). The disease apparently spreads more rapidly when livestock and deer are in frequent contact, such as feeding on the same hay bales.

Although management actions initiated by the DNR, MDA, and USDA/Veterinary Services have apparently reduced prevalence of infection in both cattle and deer, Michigan deer remain infected. Without further reductions in deer density and other measures to reduce local deer concentrations, the disease may remain enzootic. Therefore, if the disease remains in the deer population, additional measures must be sought to prevent contact, either direct or indirect, between deer and livestock.

Potential risk factors that should be addressed include deer habitat on or adjacent to farms, livestock management practices on farms (types of feed, feed storage, present fencing or other possible barriers, etc.), and deer movements on and near farms by season. Guidelines concerning these factors have been developed (Kaneene et al. 2002), however, they need refinement. This study will attempt to identify possible risk factors associated with white-tailed deer and their interaction with cattle farms, particularly deer movement in relation to cattle feed sources.

At the conclusion of the study, hopefully, recommendations can be made to further reduce risks associated with deer and their interaction with cattle farms. These recommendations will be used to further refine a set of guidelines than currently exist and be used by MDA and APHIS/Veterinary Services to assist them in conducting risk analysis on individual farms and recommend a set of mitigating factors that would be as cost-effective as possible for farmers.

Research Updates

Determining the effectiveness of using coyotes as a sentinel species to detect the presence of bovine tuberculosis infection in select areas of Michigan and evaluating if infected, free-ranging coyotes are shedding *Mycobacterium bovis*.

Mike R. Dunbar, Are Berentsen, and Tim Riley

USDA/Wildlife Services, National Wildlife Research Center Ft. Collins, CO

This ongoing study has three objectives: 1) evaluating the use of coyotes as a sentinel species to detect the presence of bovine TB infection in select areas of Michigan not presently known to harbor bTB infected animals, 2) determine if TB infected coyotes in northern Michigan are shedding *Mycobacterium bovis* in feces and body fluids, and 3) examine if the prevalence of TB in coyotes in an endemic area for TB in deer has changed from previous years.

The difficulty with surveillance methods used to detect the prevalence of TB in an area in northern Michigan is that much of the property is under private ownership, greatly restricting access. Additionally, to detect a low prevalence, as is found in deer in Michigan, large sample sizes are needed. A sample size of at least 149 is needed to be within the 95 percent confidence interval of detecting one infected individual at a two percent prevalence based on a hypergeometric probability. (Venette et al. 2002, Dr. Gregg Phillips, NWRC, personal communication). Besides the expenses and resources needed to collect the samples, resources are also needed to test all the samples. A more efficient approach may to use a sentinel species such as the coyote.

A sentinel species should possess three characteristics to be effective: 1) prevalence of the disease in the sentinel species should be detectable with reasonable sample size; 2) the primary route of infection for individuals of the sentinel species is through contact with host species; and 3) individuals of the sentinel species should maintain a sufficiently small home range size and dispersal distance so that the correlation between the incidence of the disease in the sentinel animal and host species is high. Research at NWRC has found these elements to be true for the coyote.

Since the coyote has been identified as a potential species for use as a sentinel species, the next step in this process is to conduct field studies using the species. Field studies are essential to determining the usefulness of using the coyote as a sentinel species. If these efforts prove valuable, earlier detection of the disease in an area, by use of coyotes, could save money and other resources aimed at preventing the spread of TB.

Besides the research evaluating the coyote as a sentinel species, NWRC has been conducting studies in Michigan since 2001. Although other studies have found many wild species infected with TB (Bruning-Fann et al. 2001), NWRC studies have shown that at least four wildlife species in Michigan, other than deer, are infected with TB: raccoons (*Procyon lotor*), opossums (*Didelphis marsupialis*), gray fox (*Urocyon cinereogenteus*), and coyotes (*Canis latrans*).

Research Updates

Each of these species could potentially spread bovine TB in the environment through their contact with cattle food and water sources. The identification of which of these species are able to spread the disease through shedding of *M. bovis* is limited. Research on captive raccoons (Palmer et al. 2002) and captive opossums (Fitzgerald et al. 2003) indicates that shedding may be possible for both these species. Research by scientists at NWRC (QA-1292) is in the final stages aimed to evaluate the shedding of *M. bovis* in captive coyotes.

This study will provide data on using the coyote to monitor for TB in six non-infected (deer) and two infected (deer) counties in Michigan while also identifying whether infected wild coyotes shed *M. bovis*. This research will be a step in creating efficient surveillance methods and identifying whether the coyote is a high-risk species for spreading the disease.

Research Updates

Processing Plant/Feedlot Feasibility Study

Bill Knudson

Product Center for Agriculture and Natural Resources, Michigan State University

In response to the reduced access to markets resulting from the existence of TB in the northern Lower Peninsula, MDA funded a study on the feasibility of a small processing plant or a feedlot in that part of the state. The study was conducted by researchers at the Michigan State University Product Center. The study assessed the feasibility of a processing plant or feedlot from an economic, market, technical, financial, and a management perspective. The focus of the study was beef, although sheep and goats were also analyzed.

Briefly stated, a processing plant is not feasible fundamentally due to the lack of animals in the area to support a plant. There are not sufficient numbers of animals to support a processing plant and producers may not be willing to expand livestock production unless there is access to a processor. A processing plant does not appear to be feasible from a financial point of view either. Internal resources are not likely to be sufficient for a processing plant to be financially feasible.

A processing plant is not feasible from a marketing perspective for two primary reasons. This is due to excess capacity of beef production in the state and the difficulty of finding a market for the entire carcass. Finding a market for steaks and ground beef is relatively easy, finding a market for roasts and other cuts is difficult, and finding a market for organs, hides and other beef products is extremely difficult. The smaller the processing plant, the greater these challenges become.

From a technical and management perspective, a processing plant is feasible. The technology is well understood. An ownership structure of a cooperative, Limited Liability Company is the most feasible.

A feedlot is feasible from economic, marketing, financial, technical, and management perspectives, provided the regulatory environment is not too restrictive. However, a feedlot located in Northern Michigan is not recommended. The feed costs of locating a facility in that part of the state is too high relative to feed costs in other parts of the state. The growth of the ethanol industry will only make this cost disadvantage worse. Another issue facing a feedlot in this part of the state is proper manure management.

One way to minimize costs and also provide a benefit to an ethanol plant is to locate a feedlot near an ethanol plant or enter into an agreement with an ethanol plant for the use of wet distiller's grain solubles (WDGS). This would provide a good feed source to the feedlot while reducing the operating costs of the ethanol plant.

Given the rising costs of feed and the level of competition, a feedlot that focuses on the commodity market will face difficulties. While feasible, a commodity market feedlot is not recommended. One strategy that shows the most promise is to enter into an agreement with a processor and marketer of specialty beef products.

