Bioethics@ Iowa State University
Responding to the Risks Presented by the Presence of Bovine Tuberculosis in Wild Deer: A Case Study

At the 1997 MSU Bioethics Institute

Instructional Objectives:
Students will improve their abilities to apply a model of issue analysis to identify inadequacies of science and technology, and critical belief and value conflicts among stakeholders.

Students will improve their skills at recognizing and clearly stating important issue questions with ethical and moral implications.

Students will share their experience in moral reasoning to improve their capabilities to recognize the role that ethical components play in natural resource policy making processes.

The Case:
Tuberculosis (TB) is a serious disease caused by several bacteria that mainly affect the respiratory system. Three main types are Mycobacterium tuberculosis, M. avian, and M. bovis. The first of these infects primarily humans, the second infects birds, but the third can infect many warm blooded animals, including humans.

TB was once relatively common in cattle in the U.S., but most states (including Michigan) are now certified "TB free" by the U.S. Dept. of Ag. (USDA). This provides important economic benefits to agriculture producers who can avoid costly quarantine and testing of livestock and ship their livestock freely to markets in and out of their home state. The value of this certification to Michigan has been estimated in the millions of dollars annually.

TB has historically been a rare disease in wild, free ranging deer. Prior to 1994, only 8 wild white-tailed or mule deer have been reported with TB in North America. One of those was a deer taken by a hunter in Michigan in 1975. In 1994, another infected male deer was shot by a hunter in Alpena County, MI. The 1994 finding caused the Michigan Department of Natural Resources (MDNR) to examine over 3000 deer killed by hunters in a 4 county area from 1995 through 1996. It appears that 2% of the deer herd in the center of that 4 county area may be infected with M. bovis. Deer killed by automobiles and by hunters in the rest of the state were also examined and it appears the disease is currently restricted to the 4 counties, although 1 infected deer was found just outside the 4 county area.
The USDA did a risk assessment of the situation with the limited data available. If nothing is done, the risk of transmission to either livestock or humans is low, but increases substantially over 25 years. For example, their report estimated the probability of a cow becoming infected sometime over the next 25 years to be 5%. If the number of deer could be reduced by 10% and the probability of transmission among deer by 50%, the probability of spreading to cattle drops to .001 or .1%.

Some risk to humans also exists. Hunters and meat processors who handle deer could become infected with the disease. However, the risk is probably low. The USDA report concluded that "...the likelihood of active disease and other long-term outcomes from human infection with M. bovis is very difficult to predict."

A statewide committee was established to investigate the situation and make recommendations to the Directors of the state’s Departments of Public Health, Agriculture and Natural Resources regarding a response to the problem. Representatives are included from each of the state agencies, including experts in veterinarian medicine, public health and wildlife science. Public stakeholders include recreational landowners and farm producers from the 4 county area. A wildlife specialist from the Michigan United Conservation Clubs (MUCC) represents hunters statewide. The Committee had no way of knowing where the TB originally got into the wild deer population. Two possibilities are (1) from infected cattle over 40 years ago before TB free certification was achieved by the livestock industry, or (2) from a deer released by one of the hunt clubs to improve genetic stock in the wild herd. However it originated, given that TB is extremely rare and has never been documented as an endemic infection in any free ranging wild deer herd in North America, the Committee investigated what unique features of the 4 county area might be maintaining and spreading the disease in this deer population.

Although the area supports agriculture - both livestock and grain production - soil quality varies widely in the area and many of the regions with poor soils were purchased as recreational hunting lands. Many of these purchases created large land holdings of several thousand acres which were used as hunt clubs, primarily deer hunting. Land values have increased in the area because of its reputation as a desirable region for deer hunting. To supplement natural habitat and help deer through difficult winters, a tradition evolved to feed deer artificially during the winter. This has two effects. First, for years it has maintained an artificially high deer density (perhaps 60 deer/sq. mi). However, as a result of the past two very severe winters and a very liberal hunting season in 1996, the population has dropped to about 30 deer/ sq. mi. Deer hunters, tourist-related business owners and recreational landowners in the region are already unhappy about this significant drop in deer numbers. Second, winter feeding concentrated the deer in large numbers during the winter for extended periods of time while they fed. The Committee has hypothesized that this combination of factors has created the opportunity for TB to be maintained and spread in the population.

Although the presence of TB in deer presents a risk to humans who may handle the deer and to the livestock industry in the state, it doesn't seem to be a major cause of mortality among deer. Thus far, deer have not been found dying of advanced stages of the disease. Of course, this could be for many reasons. Sick deer and dead deer may be quickly consumed by coyotes and other predators and scavengers in the area. Still, no precipitous decline in deer numbers seems associated with the presence of the TB so far. One dead coyote which had bovine TB was found in winter of 1997, but it has not been found in any other species so far. It does not appear that there is a "reservoir host" of wildlife which would keep reinfecting wild deer in the region, although that has not been conclusively established. Monitoring of wildlife to look for spillover into other wildlife species is continuing.
The MDNR has entered into a very expensive monitoring of deer killed by hunters and automobiles to determine the extent of the disease among deer. Cost of the testing for 1996 was several hundred thousand dollars and consumed a substantial portion of the Wildlife Division budget for the year. A complete testing program of all livestock in the infected area has also been initiated by the Mi Dept of Agriculture (MDA). The testing is "free" for farmers, but they must incur the considerable cost in time and effort of handling each of their animals on two different days for injection of serum and observation of reactions.

Spread of the disease outside the four county area might have been restricted by the public lands which surround the infected region. Winter feeding doesn't occur on those lands and the hunting pressure is much higher so that deer densities have traditionally been lower. So far, the 4 county area might be somewhat of an "island". However, a wild elk herd range extends into the infected region. If elk were to pick up the disease, not only would another valuable wildlife resource be threatened, but the risk to livestock would be increased. Elk travel further and are more likely to mingle and feed with cattle. The travel patterns might escalate the risk of TB moving outside the four county area into other regions where winter feeding and deer baiting during hunting season might maintain the disease in other regions of the state.

Based on its deliberations, the Committee has drafted a set of recommendations to the directors of the three state agencies that the deer numbers not be allowed to increase in the four county area and that legislative authority be sought to prohibit artificial feeding of deer by private landowners and homeowners in the region. It was also recommended that baiting as a hunting technique be halted, something the MDNR already has authority to do without seeking legislation. The hunt club representatives voted against the recommendations. Among their arguments were:

- a number of deer would starve each winter,
- TB would continue to exist no matter how low the deer population density got,
- it is possible to feed deer in the winter so that they are not concentrated nose to nose,
- the state should not be able to tell a landowner what they can do on their own land regarding feeding of wildlife
- residents would voluntarily stop feeding deer - or feed them "correctly" - if they understood the situation; it didn't have to be regulated.

The farmers also voted against the recommendations and surprisingly gave some of the same arguments although their greatest concern was apparently the loss of individual property that they found represented in the law restricting winter feeding on private lands. The farm producers and hunt club representatives wrote and submitted a minority report expressing their objection to the recommendations of the committee. Public meetings were held around the state for input. Although opinions of the public outside the four county area varied widely, a majority were concerned about the risks to their own recreation, economic well being, etc. if the disease were not eradicated or at least contained in the four county area.

**Phase 1: Analysis of the issues (Individual effort)**

As individual citizens of the state, consider the situation which has been described and assess the following four components of this issue:

1. **Stakeholders** Who are stakeholders (persons, groups or other entities) who have interests in and could be impacted by the outcomes of this situation?
2. **Adequacy of the Science and Technology Available** Is there sufficient scientific or technological knowledge to provide clear direction and answers to critical questions in the issues? In writing, state those important areas for which we seem adequately prepared to provide a basis for decisions. Further, identify the
uncertainties (e.g., outcomes which are uncertain and cannot be predicted with clarity) and anticipate the role these uncertainties may play in the decision making.

3. **Belief Conflicts Among the Stakeholders** For our purposes, we will define beliefs as that which stakeholders perceive to be true and so these are essentially disagreements over "facts". Several explicit beliefs can be found among the arguments of the hunt club representatives. Write these and other contentious beliefs you suspect might be expressed and identify which stakeholder group(s) would probably hold the belief and which would likely disagree.

4. **Value Conflicts Among the Stakeholders** For our purposes, values reflect the relative importance stakeholders place on various attributes being considered. In the discussion above, values are less explicit and you must imply what values are being or would be advocated by each stakeholder group you identify. For each stakeholder group, list the values which would probably be held by that group in order of importance. I.E., what is your best estimate of not only what the values of each group might be, but what the priorities of each group might be?

**Phase II: Considering the ethical issues. (In small groups)**

Working in groups of 3, pool your individual thoughts on the analysis of the issue so far and identify specific ethical or moral questions in this issue. These are very specific and clear debates over right and wrong. State each ethical question beginning with the word "Should...".

**Phase III: What should the Directors decide? (In small groups)**

In the same groups of 3, now take on the role of the directors of the 3 state agencies. You have been given the recommendations of the Committee and you must reach a consensus regarding what you should do regarding the implementation of those recommendations. This means you must arrive at some solution for the ethical questions you identified in Phase II. Although, you must fulfill your obligation to represent the interests of your constituents, focus on what you should do, not necessarily on what you would do.

**Probe questions for the instructor:**

During the small group sessions, you should circulate and be prepared to ask probe questions which either guide the group to consider elements they have omitted or cause them to test their logic thus far. Examples of the former type of probe question follow:

1. Should property rights be taken from private landowners by mandating that deer not be fed artificially?
2. Should winter feeding be stopped if it will cause starvation to a large number of deer each winter, primarily fawns of the preceding year?
3. Should the decision be made to provide the greatest number with the greatest good?
4. Should one group be asked to give up an actual value to reduce the risk that another group might have? (e.g., should hunt club owners give up their property rights to feed deer in order to reduce a 5% risk to agriculture that livestock might become infected?)
5. Should one of the ethical positions (e.g., utilitarian) be given precedence over - trump - all others (e.g., animal welfare, private property rights)?