

STATE OF WEST VIRGINIA

PRELIMINARY PERFORMANCE REVIEW

OF THE

Division of Natural Resources

Negative Impacts
of
High Deer Population

OFFICE OF LEGISLATIVE AUDITOR
Performance Evaluation & Research Division
Building 1, Room W-314

CHARLESTON, WEST VIRGINIA 25305

PE94-04-04

WEST VIRGINIA LEGISLATURE
Performance Evaluation and Research Division

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Antonio E. Jones, Ph.D.
Director

January 6, 1995

The Honorable A. Keith Wagner
State Senate
Box 446
Iaeger, West Virginia 24844

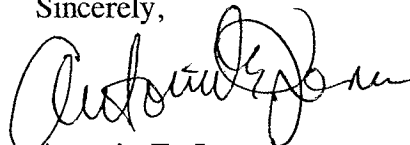
The Honorable Joe Martin
House of Delegates
Building 1, Room 213E
1900 Kanawha Blvd. East
Charleston, West Virginia 25305

Gentlemen:

This is to transmit a preliminary interim evaluation report of the Division of Natural Resources which we will report to the Joint Committee on Government Operations on Monday, January 9, 1995. The issue covered herein is the "Negative Impacts of High Deer Population". Also enclosed are responses to the report from Charles B. Felton, Jr., Director, Division of Natural Resources and William R. Maxey, Administrative Forester, Division of Forestry.

Let us know if you have questions.

Sincerely,



Antonio E. Jones

AEJ/wsc

Enclosure

ISSUE AREA 1: High deer populations are having a negative effect on the economy and environment of West Virginia.

It is declared to be the public policy of the state of West Virginia that the wildlife resources of this state shall be protected for the use and enjoyment of all the citizens of this State. All species of wildlife shall be maintained for values which may be either intrinsic or ecological or of benefit to man. Such benefits shall include (1) hunting, fishing and other diversified recreational uses; (2) economic contributions in the best interests of the people of this State; and (3) scientific and educational uses. (WVC 20-2-1)

The Division of Natural Resources (DNR) has successfully pursued a strategy of increasing hunting and fishing opportunities in West Virginia. In fact, when looking at the DNR's accomplishments over the past twenty years one is immediately impressed. The agency's achievements include the purchase of land dedicated to hunting and fishing and game management policies that have greatly increased game populations. As a result, there has been a dramatic increase in the hunting opportunities available to sportsmen. The white-tailed deer population, which had reached an estimated low of only 1,000 deer in 1910, is now between 700,000 and 1,000,000. The increase in the deer herd is attributable in part to the primary objectives of DNR: *increasing the deer population to a level that will support the harvesting of 183,000 per year by the year 2000.*¹ This will require a deer population of 40 deer per square mile.

However, it appears DNR policy was formulated by examining only the benefit of deer hunting, ignoring the increasingly negative impact of the growing deer population on the state's wood products industry, farm industry, automobile owners and ecological health of West Virginia's environment. For example, generally accepted scientific research has found that deer in populations over 20 deer per square mile harms forests saplings due to over browsing. As a result, a deer population of over 20 per square mile will slow or prevent the regeneration of hardwood forests.

Moreover, the economic impact of hunting in West Virginia, \$200 million annually, is dwarfed by the wood products industry, which is worth \$1.3 billion annually to the state's economy. Therefore, DNR's present policy to further increase the state's deer population to approximately 40 deer per square mile is not in the overall best interest of the citizens of West Virginia. Although increasing the deer population may in the near term have a positive economic impact on the state, since the greatest damage done by deer is to hardwood seedlings, in the long term increasing the deer population may severely harm West Virginia's forest economy.

¹ *White-tailed Deer Operational Plan 1990-1995.* Prepared by Wildlife Resources Section.

TABLE 1	
Comparison of the Annual Economic Impact of Deer Hunting & the Wood Products Industry	
Deer Hunting	Wood Products Industry
\$159 million	\$1.25 billion

Deer Population: A National Concern

Large deer populations have become a national problem in the United States. Recent news articles discussing the problem estimate the nation's white-tailed deer population at 25 million.² Estimates of the white-tailed population in West Virginia range from 700,000 to over 1 million or 2.8 percent of the nation's white-tail deer population. By comparison West Virginia has 1.7 million people or .8 percent of the nation's population and 24,087 square miles or 0.81 percent of the land area in the continental United States.³ West Virginia's deer population has increased from an estimated 133,990 in 1970 to around 837,770 in 1990, an increase of 525 percent. By comparison, the population of the United States increased 22 percent during this period. Large deer populations have been associated with the following problems:

- *collisions with automobiles
- *damage to forests and habitat
- *damage to crops
- *decreases in other game and non-game species

In an attempt to better understand the effect of "too high" deer populations, scholars have developed a typology of carrying capacities. Carrying capacity refers to the population level at which deer begin to negatively affect the environment.⁴ The typology is useful for understanding the progressive nature of the population problem. As shown in Table 2, large deer populations will first pose a problem to other species as they come to numerically dominate the environment. Second, increased contact with humans will occur, imposing costs on various sectors of society. Finally, the population reaches a point at which disease and "die offs" of the population become common. The typology is also useful for determining

² USA Today October 21st, 1994 *Deer population at proportions to pose problems.*

³ The DNR consider deer habitat to be 22,884 square miles in WV. The figure includes all land with the exception of land that is urban, industrial, streams, reservoirs and highways. *Operational Plan 1990-1995.* p.7.

⁴ Jones, Stephen B., David deCalesta and Shelby E. Chunko. 1993. "Whitetails are Changing Our Environment" *American Forests.* Nov./Dec: p.23.

where West Virginia's deer herd is in relation to an "ideal" herd size.

TABLE 2		
Typology of Carrying Capacity for Deer		
Carrying Capacity	Condition (Maximum number of deer ...)	Effects of exceeding capacity
Ecological (Biodiversity)	that can exist without hurting other plants and animals. Estimated to occur at 20 deer per sq. mile	Elimination of some species, reduction of others. Wildlife diversity declines.
Economic/ Sociological	that coexist compatibly with the local human population	Increased car collisions, extensive crop damage
Biological	the ecology can support in good physical condition over a period of time	Average size and weight of deer declines, increased level of parasitism, die offs

Source: Jones, et al, 1993.

Deer Densities In West Virginia

Deer populations in West Virginia are monitored annually through harvest data collected during hunting seasons and nonseasonal mortalities. The DNR measures deer population indirectly through the number of bucks killed per square mile during the *two week, buck only* season.⁵ Table 3 summarizes buck harvest from the 1993 season and the distribution among counties. The 1993 state average was 3.41 bucks per square mile which

⁵ Data is compiled for each county and the buck harvest numbers are compared to harvest objectives set every five years by the district biologists. These objectives are intended to represent the density of deer that a county can maintain without endangering the health of the herd or impinging on society. The former is measured by the DNR through monitoring deer parasite levels, animal weight, etc. The latter is seen in the number of crop damage reports and vehicle collisions. *Operational Plan 1990-1995*. p. 8.

was only .55 below the DNR's harvest objective of 3.96.⁶ However, examination of aggregate harvest data is deceptive. Examination of state level totals mask variation across regions and counties. For example, there were more bucks killed per square mile in the northern and west central counties (Districts I and VI) and comparatively lower harvest totals in the southern coal field counties (Districts IV and V). In the north, 4.98 bucks per square mile were taken as compared to 2.22 in the south.⁷

TABLE 3	
COUNTY DISTRIBUTION OF BUCK HARVEST (1993)	
Bucks Harvested Per Square Mile	Number of Counties
0.0-1.99	14
2.0-3.99	14
4.0-5.99	22
6.0-10.0	5
Note:	The 20 deer per square mile threshold is at 2.0 deer per square mile.
Source:	Information compiled from the <i>1993 Big Game Bulletin</i> .

The DNR estimates the deer population by equating the number of bucks taken with 10 percent of the entire deer population. Using DNR's data, Performance Evaluation and Research Division (PERD) conservatively estimates the deer density in West Virginia for 1993 at 34.1 deer per square mile. The density ranged from a high of 90 deer per square mile in Ohio County, to a low of 10.7 in Raleigh County.⁸ In the higher density northern and

⁶ This figure was calculated from an average of the six district harvest objectives. *Operational Plan 1990-1995*.

⁷ *1993 Big Game Bulletin*. DNR publication. p. 39.

⁸ The DNR's objective for Ohio County is 4.0 bucks per square mile or roughly 40 deer per square mile. Raleigh County's objective is 3.5 bucks or 35 deer per square mile. *Operational Plan 1990-1995*.

western counties, the estimate is 49.8 deer per square mile, as compared to 22.2 for the southern section of the state.⁹ The DNR's stated harvest objective would result in 39.6 deer per square mile.¹⁰

Cost To Land Owners And Automobile Owners

The General Assembly in neighboring Virginia, a state with a comparable sized white-tailed herd (800,000 to 900,000) but more land mass (39,598 square miles), responded to the perceived problem by empaneling a committee to study the issue. Given the proximity of Virginia and the comparable herd size, the Virginia Assembly's study provides a baseline for comparing the impact of West Virginia's deer management policy.

As shown in Table 4, West Virginia's large deer population costs farmers and automobile owners an estimated \$39 million per year due to crop damage and collisions. While not the cornerstone of the state's economy, agriculture is an important portion of the state's economic base. The gross farm income for West Virginia in 1993 was estimated to be \$512 million.¹¹ The \$35 million lost due to deer damage is roughly 6 percent of the industry.

Collisions between motor vehicles and deer impose direct costs on West Virginia motorists of an estimated \$4 million. However, the presence of deer on the highways represent an additional hazard on the state's narrow and winding roadways. The *10,000 deer carcasses found along the state's roads* suggests that a problem exists. An additional concern is at what deer density will there be a significant increase in the loss of human life due to deer collisions or from defensive driving to avoid a collision?

The significant difference in average deer per square mile shown in Table 4 may explain why West Virginians experience more auto accidents and crop damage compared to their neighbors in Virginia. Given this comparison, it is reasonable to assume that a rise in the deer population will increase costs to farmers and automobile owners. As the costs associated with a large deer population increases, the relative benefits derived from the hunting industry decreases.

⁹ The eastern counties (Districts II and III) averaged 2.96 buck per square mile or 29.6 deer per square mile for 1993. *Big Game Bulletin*. p.39.

¹⁰ According to DNR officials, harvest objective is 10 percent of estimated deer population per square mile.

¹¹ *West Virginia Agricultural Statistics 1994 Bulletin* no. 25. pp. 44.

TABLE 4		
COMPARISON OF DEER DENSITY AND RELATED IMPACT		
	WV	VA
LAND AREA (Sq. Miles)	24,087 Sq. Miles	39,598 Sq. Miles
DEER DENSITY (Ave. Deer per Sq Mile)	34.1¹	20.2
CROP DAMAGE (Millions of Dollars)	\$35²	\$10-20
AUTO ACCIDENTS (Number)³	2,140⁴	1,942
AUTO ACCIDENTS (Cost in Millions)	\$4.28⁵	\$3.3

NOTES:

- 1:** Populations vary throughout the state with the northwest portion being the most heavily populated. This will be discussed further in the section on the ecological impact of deer. Average calculated with DNR actual square miles of deer habitat.
- 2:** West Virginia Extension Service Publication 821.
- 3:** Data for Virginia auto accidents are from 1991.
- 4:** This figure may under estimate the number of collisions because it denotes only the reported number of accidents to the DOH. Actual numbers of deer found were 9,515 and were obviously killed by automobiles. Comparable figures for 1992 = 10,965 and 1993 = 10,308. If all carcasses found along roadways were counted, the dollar figure might be over \$19 million dollars.
- 5.** Computed from the number of accidents reported to DOH involving animals on WV highways multiplied by average cost of \$2,000 derived from West Virginia Extension Service Publication 821 and U.S. News and World Report, Nov. 21, 1994.

Potential Effects On The Wood Products Industry

Managing deer at high levels also has an impact on the future of the wood products industry in this state. Approximately 79 percent of West Virginia is forested, with approximately 64 percent of the land forested with saw timber. From this rich resource, the West Virginia wood products industry produces revenues of \$1.25 billion annually.¹² Scholarly research has shown that high deer densities adversely affect the regeneration of quality hardwoods.¹³ The following are excerpts from articles that illustrate the potentially severe impact of a large deer population on forest regeneration:

Where deer density exceeds 20 per square mile, preferred plants such as sugar

¹² *Economic Impact of the Wood Products Industry WV 1992*. pp. iii.

¹³ Although most of the research found by the PERD indicates that high deer densities severely impact forest regeneration, other articles suggest that much of the research is incomplete and needs further study.

*maple, white ash, yellow poplar, hemlock, pin cherry, oak, and aspen are eliminated.*¹⁴

*The damage deer do to crop and natural vegetation has been extensively studied and depends on deer density. High deer populations slow the regeneration of several commercial species causing significant economic losses.*¹⁵

Another article also discussed how high deer densities are causing damage to forest regeneration, suggesting that:

*The forest of the future (known as the third forest) does not look as promising.*¹⁶

The DNR has found evidence of similar damage to the state's forests through enclosure studies conducted over the last six years. The studies examined the effects of deer population on the regeneration of plant species. The following is an excerpt from the conclusions of that study concerning deer browsing on the understory:

*Deer impacts were notable on pared plots in high deer density areas. No detectable impacts were seen on low density sites.*¹⁷

The forest industry and the associated value added industries are often viewed as an integral part of the state's current and future economy. However, as pointed out by a US Forest Service biologist, "Estimating damage to forests is very difficult because trees are not an annual crop. In estimating damage to forests it is not what you lose next year, it is what you lose 80 years from now." While the economic loss of future forest production is difficult to determine, previous studies have estimated timber losses during the regeneration period to have averaged \$1,075 per acre or \$13 per year across the regeneration period. Similarly, research from the 1960's revealed that deer grazing could reduce the value of a beech, birch, or maple stand from \$200 per thousand board feet by 83 percent to \$35 per thousand board feet.¹⁸ Scientific research, preventive actions taken by the industry and anecdotal reports of

¹⁴Jones, et al. p. 23.

¹⁵ Alverson, William S., Donald M. Waller and Stephen L. Solheim. 1988. "Forests Too Deer: Edge Effects in Northern Wisconsin." *Conservation Biology* Vol. 2 No. 4.

¹⁶Grafton, William N., Edwin D. Michael, Robert L. Smith, and Art Selders. 1993. "Deer and Agriculture In West Virginia." *West Virginia Extension Service Publication 821*.

¹⁷Allen, Thomas J. *The Impact of Deer on Forest Vegetation in West Virginia- A Six Year Analyses*. West Virginia Division of Natural Resources, Wildlife Resources Section. Paper presented to the Northeast Deer Technical Committee.

¹⁸ Michael, Edwin D. "Effects of White-Tailed Deer on Appalachian Hardwood Regeneration." unpublished manuscript. p. 93.

damage make it clear that the state's forest industry is being harmed by the large deer population. Further, losing just a portion of the revenues the forest industry provides could seriously affect the economic future of this state. While it would appear that the DNR is aware of the potential effects the deer herd could have on the forests, its current plan is to expand the deer herd in some counties. Although hunting is an important component of the state's economy, increasing the deer population available for hunting simply cannot generate the level of economic activity provided by the wood products industry.

Ecological Impact of High Deer Densities

Research has shown that when deer exceed the ecological capacity (refer to Table 2) species richness, abundance and the composition of an affected area may decline.¹⁹ Safe density levels range from 2.48 deer per square mile to a maximum of 20 deer per square mile. While this variation may reflect the sensitivities of different species to deer density, it does provide a general baseline from which to assess the deer population in West Virginia and its potential for harming the greater ecology.

Biological diversity (biodiversity) is concerned with the variety of species and their interactions with the environment in a given area.²⁰ The biological diversity of wildlife and vegetation has been shown to be negatively affected by excessive deer browsing on forest understory plants. Research in Pennsylvania has shown that deer densities in excess of 20 deer per square mile, reduce understory plant species abundance and richness and indirectly affect other animals' habitat by reducing protective cover, food sources and nesting sites. Deer grazing has also been shown to "severely disturb" rare plant species even in areas where land has been set aside to protect these plants from the threats of human development.

The impact of high deer densities on other wildlife is most evident from the research on the decline of songbirds. Scholars have established the richness and abundance of forest songbirds is correlated with the abundance and composition of woody and herbaceous vegetation. A ten year enclosure study in Pennsylvania measured whether a relationship existed among deer density, songbird habitat and species richness and abundance. The results show the richness of intermediate canopy nesting songbirds declined 27 percent and abundance declined 37 percent between the lowest and highest deer densities. This study is evidence of how deer browsing at such high levels can alter another species habitat and jeopardize its survival.

An additional concern of high deer densities is the danger to the deer population itself. In areas of high concentrations there is a threat of increased levels of parasitism and the

¹⁹ Jones, et al. p.23.

²⁰ Biodiversity is measured at three levels: genetic variation within a species; the variety of species within an area; and the variety of species communities in an area. *The Biodiversity of Missouri*. 1992. Report of the Biodiversity Task Force. p. 1.

competition for food in these areas may contribute to smaller, less healthy animals that could be susceptible to die offs from starvation and disease.

DNR Does Not Adequately Assess Policy Outcomes

West Virginia deer are managed at levels compatible with sociological and biological conditions according to the DNR deer management plan. That is, West Virginia deer are managed so that hunting opportunities are maximized. However, the DNR has not set a threshold defining when deer populations have become too high. Current deer populations are estimated by the DNR at 10 to 90 deer per square mile, with an average of 34.1 deer per square mile. As stated previously, studies indicate that negative outcomes occur when deer populations exceed 20 deer per square mile. However, the goal of the DNR is to bring the state's herd to an average of 40 deer per square mile.

The DNR wildlife biologists are aware of the results of research cited, but they seem to deny the evidence presented. For example, DNR responded to a WVU article that was critical of the agency's deer management practices by defending its policy:

This agency has a thoughtful deer management plan which was completed with public input, founded on scientific principles and the best available data.

However, DNR's own exclosure studies support many of the conclusions reached by scholarly research. The following passage taken from the DNR's study concludes²¹:

Trout Run (exclosure) is a prime example of the effects of deer on forest vegetation over time. Deer do impact the composition of the understory which in turn may effect the resulting stand and numbers of various tree species....Herbaceous vegetation will undoubtedly be affected by high deer use and those species which are rare or low in number will be most sensitive to feeding behavior....The elimination of forest floor vegetation will have a pronounced effect on other users such as birds, small mammal and the like. A decrease in forest plants, decreased insects supplies as well as the feeding habitat for wild turkeys and other game birds. The older exclosures clearly illustrate this point (Trout Run).

DNR game biologists maintain that the results from these studies are not fully factored into deer management decisions. Instead, they are only used for showing the necessity of antlerless deer seasons. Thus, the DNR is aware of the potential effects of high deer densities on forested habitat and the resulting consequences for the state's flora and fauna.

If the DNR manages deer or other game populations to the detriment of other species

²¹ Allen. pp. 23-24.

of animals and plants then it will not meet its goals of enhancing the economic, scientific and educational contributions to the state. The DNR needs to have better information on the effects its management policies have on other species of animals, plants, society and the forest to ensure that it will meet the goals of its stated mission. The effect of high deer densities on associated wildlife must be evaluated alongside other factors that are changing forested habitat such as forest fragmentation, nest predation, parasitism, silvacultural practices and other effects of man. The DNR recognizes that deer can negatively impact vegetation, but contends that the impact is isolated to areas where its management practices are not in effect, such as state parks. They also caution about over generalization from findings in other states. *But why would high deer populations cause damage in other states and not in West Virginia?* One DNR response to a critical article of its deer management said in part:

We are aware that both observational and scientifically documented information exists about deer impacts in other states. We are also aware that a few site-specific, non-representative studies have been conducted in the state. We assert, however, that unsupported application of this information to West Virginia deer herds is unscientific and misleading.

Thomas Kuhn²² described the advance of science in a given field as having a majority opinion that has been derived through the application of scientific methods and a minority opinion that clings to older notions of the field or that is quite radical. While the minority places limits on the boundaries of prevailing thought, the majority opinion is widely held because it is the best explanation of the subject under study. In the context of studying the size of West Virginia's deer herd science says that large deer populations over 20 deer per square mile have detrimental effects on the rest of the ecology. It appears that the West Virginia DNR: maintains that science is wrong; or that this state's deer herd is so unique that mainstream biology, demography and economics do not apply; or they do not know the implications of having very high deer densities. The population and density figures suggest that deer population is high. Evidence exists that the deer herd is causing damage. However, DNR remains steadfast in its conclusions.

²² *The Structure of Scientific Revolution*. 2nd Edition.

THE DRIVING FORCE: FUNDING

The agency's single-minded pursuit of opportunities for sportsmen seems to stem from the agency's funding. Hunting and fishing license fees have traditionally provided a large portion of DNR's funding.²³ As a result, the agency has pursued policy goals that serve primarily that portion of its mission and constituency. A survey of DNR personnel indicated that DNR personnel felt that they were responsible for serving the outdoor sportsmen of the state.²⁴ This loyalty runs all the way from the top of the organization to the bottom and is understandable given the funding arrangement. However, the pursuit of hunting and fishing opportunities has been to the exclusion and detriment of other activities. Similar conclusions have been reached in study that examines wildlife management policy in other states:

*...funding for wildlife management is derived both directly and indirectly from the sale of fishing and hunting licenses, which naturally favors a game management approach.*²⁵

In addition, the conflicting goals seems to stem from the West Virginia Code. It states in part::

all species of wildlife shall be maintained for values which may be either intrinsic or of ecological benefit to man. (WVC 20-2-1)

This is a rather broad directive to the agency. On the other hand, the Code in section 34 of Chapter 20, Article 2, more narrowly directs that the money from license fees shall be spent for the benefit of hunters and fishermen. The policies of the agency go well beyond the narrow disposition of funds to maximizing the deer herd to a level that imposes costs on other segments of society and harming habitat and other species, both game and nongame. Alternatively, it is inequitable for the sporting community to bear such a heavy burden of the funding. Nongame activities, while minimized by the current deer management strategy, still exist in the state. However, it is the game community that bears a disproportionate financial burden for the state's wildlife management.

²³ For FY '93 the DNR's total funding was \$23,301,197.16. Of this, \$10,485,512 (45%) was generated from the sale of hunting and fishing licenses; \$4,305,367 (18%) were federal funds; \$7,778,813.16 (34%) was special revenue, other and \$731,505 (3%) came from General Revenue funds.

²⁴Division of Natural Resources Personnel Services Questionnaire.

²⁵ Mangun, William R. 1992. "An Intergovernmental Dilemma in Policy Implementation." *Public Policy Issues In Wildlife Management*. New York: Greenwood Press. p. 6.

Recommendations:

RECOMMENDATION 1: *The Joint Committee on Government Operations should consider requesting the Performance Evaluation Division to further study the impact of high deer populations on the state's forests, farmers, and insurance rates in conjunction with the Division of Natural Resources, the Division of Forestry, the Department of Agriculture, the Insurance Commissioner, and selected university forestry and wildlife management programs. If requested, PERD should provide the Joint Committee with a list of counties in which the deer population should be lowered by an extended hunting session., increased bag limit, a doe session, and/or other methods, by October 1, 1995.*

RECOMMENDATION 2: *The Director of DNR should develop a strategy for diversifying the agency's funding sources that is more compatible with its mission. Alternatives for consideration include, but should not be limited to: decreasing the hunting license fee; restoration of the nongame tax check-off; dedication of a small portion of the severance tax on timber; an excise tax on sporting equipment; entrance fees at state parks; dedication of a portion of the ATV privilege tax. The proposal should be revenue neutral and be developed with public input from all West Virginians through the Natural Resources Commission. The Director should prepare the proposal for consideration by the Legislature by the 1996 Regular Session.*

RECOMMENDATION 3: *The DNR should begin collecting and analyzing data at the county level on the effects of high deer population on the following indicators: crop damage quantity and costs; the number of automobile accidents involving deer; the costs of automobile accidents involving deer; the number of injuries and deaths in deer related accidents; the effects on forest regeneration; and effects on ecological diversity. The data should be reported in the agency's annual report. To assist in gathering and analyzing the data, the agency should enter into a consortium with other state agencies to develop a Geographical Information System. The DNR should replicate this analysis for each species managed by a featured species approach.*

RECOMMENDATION 4: *The DNR should set a baseline deer population level that includes ecological, sociological and biological considerations. These levels should be set at a point that allows West Virginians to enjoy the positive effects of deer hunting while minimizing the negative effects. The DNR should report the baseline population to the Joint Committee on Government Operations on June 30th of 1995. The report should also include its management plan for maintaining these population levels.*

RECOMMENDATION 5: *The DNR, working in conjunction with the Department of Highways, should examine the problem of accidents involving deer on interstate highways. The analysis should include a determination of whether vegetation that is less appealing to deer can be planted along highways. The DNR should report its findings to the Legislature by June 30, 1995.*

WEST VIRGINIA LEGISLATURE
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Antonio E. Jones, Ph.D.
Director

December 20, 1994

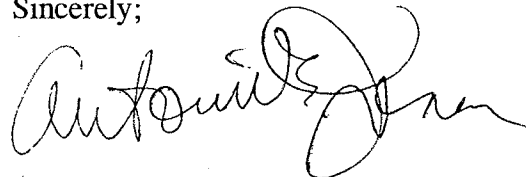
Director Charles B. Felton, Jr.
Building 3, Room 669
1900 Kanawha Blvd., E.
Charleston, WV 25305-0660

Dear Director Felton:

This is to transmit a draft copy of our report entitled "Negative Impacts of High Deer Population" to be presented to the Joint Committee on Government Operations on January 8, 1995. Please let us know if you wish to discuss any part of this finding, which will be included in the DNR Performance Evaluation Final Report.

If you decide to provide a written response to be distributed to the Committee at the January meeting, please do so by January 4, 1995.

Sincerely;



Antonio E. Jones, Ph. D.

mhm/AEJ



STATE OF WEST VIRGINIA
BUREAU OF COMMERCE
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GASTON CAPERTON
Governor

CHARLES B. FELTON, JR.
Director

January 5, 1995

Dr. Antonio Jones
Performance Evaluation and Research Division
West Virginia Legislature
Capitol Complex, Building 5, Room 751-A
Charleston, West Virginia 25305-0592

Dear Dr. Jones:

Thank you for the opportunity to review the Performance Evaluation and Research Division's report entitled *Negative Impacts of High Deer Populations*. We have carefully reviewed the report and have attached our comments.

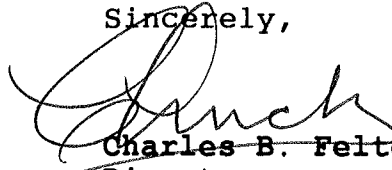
The Division of Natural Resources' first Deer Management Plan was written in 1979, and is in its fifth revision. Each revision reflects new data and prescribes new management actions for deer in West Virginia, as well as new scientific information concerning the management of white-tailed deer in the eastern United States. The DNR is confident that our white-tailed deer management program is solid and founded on sound principles of wildlife management which take into account the changing biological, sociological and economical aspects. For those reasons, we respectfully disagree with the allegation that we have not properly accounted for ecological and sociological impacts of deer. The deer program is driven by scientific data and is clearly not dictated by revenue needs.

I fully understand the time constraints that you are faced with when conducting a performance evaluation of this type. In the future, however, it would greatly benefit both of our agencies to have more lengthy discussions on issues of this complexity, thus allowing for a more researched, better prepared report.

Dr. Antonio Jones
Page 2
January 5, 1995

Should you have any questions after reviewing this correspondence or the report, please do not hesitate to call me.

Sincerely,



~~Charles B. Felton, Jr.~~
Director

CBF:grm

Enclosure

cc: The Honorable Joe Martin
Chairman, Government Organization Committee
West Virginia House of Delegates

The Honorable Keith Wagner
Chairman, Government Organization Committee
West Virginia Senate

Bernard Dowler, Chief
DNR - Wildlife Resources Section

**Written Response to the
Performance Evaluation and Research Division's Report Entitled
*Negative Impacts of High Deer Populations***

Prepared by
West Virginia Division of Natural Resource
Wildlife Resources Section
January 4, 1995

We are pleased to provide the Joint Committee on Government Operations with our written response to the Performance Evaluation and Research Division's (PERD's) report entitled *Negative Impacts of High Deer Populations*. Our comments have been developed to correct misinformation presented in the PERD report and to provide factual data to substantiate DNR's white-tailed deer management plan for the state. We welcome constructive evaluations of our programs, and encourage public involvement in and concern for issues related to the conservation, management and diverse use of the state's wildlife resources. Working in partnership with the legislature, other natural resource agencies, sportsmen, landowners and a concerned public, the Wildlife Resources Section will continue to improve the effectiveness of the state's white-tailed deer program and provide outstanding recreational opportunities for its citizens.

West Virginia offers some of the finest hunting, fishing and other wildlife-associated recreational opportunities in North America. We are particularly proud of our long tradition of sound white-tailed deer management, conservation and use. While it is important to reflect upon the past successes and major accomplishments that the Wildlife Resources Section has achieved through sound wildlife management, it is imperative that we conduct our business with an eye toward the future. Uncovering, understanding and responding to the challenges and opportunities that lie ahead enable us to more effectively manage the state's wildlife resources for the benefit of all its citizens.

Mission and Primary Responsibilities

The mission of the Wildlife Resources Section, West Virginia Division of Natural Resources, is set forth in Chapter 20 of the West Virginia Code:

"It is declared to be the public policy of the State of West Virginia that the wildlife resources of the State shall be protected for the use and enjoyment of all the citizens of this State. All species of wildlife shall be maintained for values which may be either intrinsic or ecological or of benefit to man. Such benefits shall include (1) hunting, fishing, and other diversified recreational uses; (2) economic contributions in the best interests of the people of this State; and (3) scientific and educational uses."

The agency's mission statement, as defined above, clearly delineates two major areas of responsibility for the Wildlife Resources Section. The first of these responsibilities addresses the conservation, protection and management of the state's wildlife resources and their associated habitats. The second major charge to the Wildlife Resources Section provides for the management of the public recreational opportunities that derive from the state's wildlife resources.

Operating within a framework of rapidly changing environmental, social, economic and political conditions, the Wildlife Resources Section faces a number of major challenges associated with managing the state's fish and wildlife resources and meeting its primary responsibilities. It is imperative that the public understand and appreciate the complex problems that affect our ability to conserve and wisely manage the state's natural resources.

Management of the state's white-tailed deer resource is a difficult and challenging task. Balancing conflicting biological, social and economic interests that often come to bear on our deer management decisions requires extensive technical expertise and a willingness to embrace public involvement in our programs. We continue to meet these challenges by implementing management programs supported by a highly trained, dedicated and professional staff. These individuals have a command of the principles, practices and techniques associated with scientific wildlife management.

White-tailed Deer Management Policy

Planning provides the cornerstone for effective fish and wildlife management, and the Wildlife Resources Section has established a long tradition of fish and wildlife planning. The state's white-tailed deer management program is guided by the long-term vision provided in the Wildlife Resources Section's strategic plan entitled *Today's Plan for Tomorrow's Wildlife*. This document establishes the following goal for the deer management program:

Maintain white-tailed deer populations at levels compatible with biological and sociological conditions; and meet projected use by providing a diversity of deer hunting and other wildlife-associated recreational opportunities.

Several key objectives have also been established for the white-tailed deer program. These include:

1. Increase deer populations in regions of the state currently below management objectives; maintain current deer populations in regions which have achieved management objectives; and reduce or stabilize deer populations in regions currently above or approaching management objectives.
2. By the year 2000, provide for an annual statewide deer harvest that shall include: 90,000 bucks during the firearms season; 32,000 deer during the

archery season; 16,000 deer during the muzzleloader season; and 65,000 deer during the antlerless season as part of the statewide herd stabilization effort.

3. By the year 2000, provide deer hunting opportunities for 300,000 buck hunters, 135,000 archery hunters, 90,000 muzzleloader hunters, and 195,000 antlerless hunters.

As the Wildlife Resources Section strives to accomplish these major objectives, a number of strategies have been identified and will be implemented. These include:

1. Monitor deer population growth and range expansion, and investigate the potential for developing population indices that accurately reflect herd status.
2. Monitor deer harvest and recreational use, and gather biological data required to make management decisions.
3. Continue to develop and implement appropriate deer harvest strategies designed to effectively distribute hunters and achieve management objectives in concert with biological and sociological conditions.
4. Continue coordination with the Law Enforcement Section to develop and implement appropriate deer hunting regulations, assist with criminal investigations, improve the effectiveness of the crop damage permit system, and maintain sportsmen and landowner contacts.
5. Continue to monitor the health of the deer population with assistance from the Southeastern Cooperative Wildlife Disease Study.
6. Monitor crop damage complaints, improve Division response rates to these complaints, liberalize the issuance of crop damage permits where needed, and provide technical assistance to landowners concerned with deer damage control.
7. Provide technical assistance to public agencies, corporate landowners, sportsmen's organizations, and private individuals interested in managing deer habitat and populations.
8. Purchase, lease or otherwise gain management authority of additional deer habitat, particularly in areas with limited public hunting access.
9. Develop programs designed to gain access to private land that might otherwise be leased or restricted to public hunting.

10. Provide technical assistance to State Parks to manage deer populations on their lands.
11. Expand information and education programs addressing the following concerns: crop damage, control of free-ranging canids, herd growth and stabilization, opportunities for hunting on private land, research and management activities, and hunter ethics.

Deer Damage in West Virginia

Damage to agriculture crops by deer is a problem that wildlife personnel have identified and addressed as far back as 1945, when the first crop damage law was passed by the West Virginia legislature. Since then, various measures using the harvest of female deer to regulate the population have been instituted. The Wildlife Resources Section has funded research studies to investigate the impact of deer on christmas tree growers (Jones 1984) and to determine the attitudes of rural landowners towards deer damage in West Virginia (Frame 1986). In addition, the Wildlife Resources Section has participated in numerous meetings with various state, federal, and private organizations to explain the deer management program, address the impacts of deer damage, and to better understand the view points presented by those agencies or organizations. Meetings and public hearings to explain the Wildlife Resources Section's deer management plan, goals, and objectives have been presented to landowners, sportsmen, and farmers throughout the state. At the recommendation of the West Virginia Farm Bureau and the Mountaineers for Rural Progress - Wildlife Committee, a pilot Sportsmen/Farmer/Landowner access program was initiated in 6 western counties to match hunters with landowners to increase the harvest of antlerless deer in counties exceeding the harvest objectives outlined in West Virginia's White-tailed Deer Operational Plan.

Deer damage is not evenly distributed over the state as implied from the PERD report. Deer damage is generally limited to agricultural areas and urban areas where hunting is restricted or prohibited. Despite efforts to increase the harvest of deer in some counties, access to the land poses the greatest challenge to the Wildlife Resources Section. The effectiveness of liberal hunting regulations is limited by access to private land. The Wildlife Resources Section has shown that deer can be harvested if hunters can obtain access. Public lands are good examples of successful deer population management. Many of the state's publicly accessible Wildlife Management Areas are currently under restricted antlerless deer hunting regulations that are designed to maintain desired population levels. Effective control of deer populations on private land can not be accomplished unless landowners are cooperative. Large timber companies that close land to hunting also create problems by restricting access and limiting the harvest of deer. The harvest of deer on these lands is important to achieve desired population levels in a county. The Wildlife Resources Section has liberalized the issuance of crop damage permits to allow landowners to remove depredating animals. This liberalization of crop damage permits, along with harvesting antlerless deer during the hunting season, does reduce the crop damage being experienced by landowners.

There are many theories on deer behavior and crop damage. Some believe that crop damage is related to deer density while others believe that individual or local deer herds can become habituated to crops. In either case, Hartman (1972) stated that as long as even a few deer remain there will be crop damage and its elimination requires that local deer be eradicated or effectively prevented access to crops. The amount of damage by deer can be reduced if landowners will increase the take of deer from their property. Table 3 of the PERD report lists the number of counties that fall within the various buck harvest/square mile categories for 1993. The table failed to show the number of counties reflecting a change in deer population between 1992 and 1994. As the table below indicates, the number of counties above deer population objectives has decreased, while the number of counties below deer population objectives has increased. The current buck harvest objectives, listed in the deer operational plan for each of the state's 55 counties, range from 2 to 5 bucks killed/square mile of deer habitat. Currently there are only 19 counties that exceed the desired buck harvest objectives.

	1992	1993	1994
Number of Counties At or Below Population Objectives	28	34	36
Number of Counties Above Population Objectives	27	21	19

The reduction in the number of counties above harvest objectives is also reflected in the amount of crop damage reported between 1992 and 1993. The number of deer damage reports declined from 3,406 in 1992 to 2,780 in 1993. This represents an 18% decline in crop damage permit requests over this period.

Between 1/3 and 1/2 of all deer related crop damage complaints in West Virginia are for gardens. Less than 10% of deer damage complaints received are for damage to trees. Despite impacts by deer, the agriculture industry continues to report an increase in gross farm income. The same is true for the wood products industry.

Deer vehicular collisions are a concern to the Wildlife Resources Section; however, the reality is that they will occur because of the rural nature of West Virginia. Interstate and corridor highways continue to be developed within prime deer habitat. The increased speed on these highways is also an influencing factor. The Wildlife Resources Section recognized the potential threat of deer vehicular collisions on interstate and corridor highways, and in 1974 conducted a 3-year study of deer killed along I-79 (Goetz and Butterfield, 1978). From that study, a recommendation to install an 8 foot fence was incorporated into the Corridor H (Buckhannon to Elkins) design plan. Where deer crossing is evident on primary and secondary roads, the Wildlife Resources Section has recommended that the West Virginia Department of Transportation erect deer warning signs to alert motorists. Deer are not the only animals found along our highways. The West Virginia Division of Highways in 1993 reported that "avoiding

animal/vehicle" accounts for 1.2 % of the contributing factor to accidents (WV DOH 1993 Crash Data). This percentage has not changed significantly since 1986 despite an increase in the deer population during this period.

The reported negative impact of our deer population on the wood products industry in West Virginia is grossly overstated. Over the past few years, the deer population in West Virginia has been the highest ever recorded. Despite high deer populations, the wood products industry continues to show growth. Isolated areas where regeneration has been slowed or where browse lines can be seen are most commonly found in areas that exceed deer population objectives because they are under-harvested, have limited access, or are not hunted (e.g., state parks). As the deer populations are reduced to the objectives outlined in the deer operational plan, problems of regeneration in selected areas will diminish. If future forest conditions in West Virginia fail to appear promising, it will not be a result of high deer populations. As accepted scientific research indicates, the forest of the future will be dictated by silvicultural practices, the influence of fire, insects and disease and to a lesser extent deer.

Ecological Impact of High Deer Densities

In peer reviewed scientific literature it is documented that deer can exceed their carrying capacity and have an adverse impact on themselves as well as other flora and fauna. It is, however, more difficult for the layman to assess and interpret the research of ecologists on this subject. When attempting to compare the work of researchers and apply their results to specific locations one must have a working knowledge of the types of research which apply, and understand the circumstances in which the research was conducted and the factors that may influence the outcome of the research project.

While the authors of the PERD report sought to draw valid conclusions concerning the impacts of deer on flora and fauna in West Virginia, they did not take into account basic information that allows for comparing the study they found with conditions in West Virginia habitats. For example, the premise of declining songbird populations being caused by an overpopulation of deer was drawn from a study conducted in the Allegheny hardwood region of northwest Pennsylvania (i.e., northern hardwoods composed of species of beech, birch, maple and cherry). The dominant forest cover in West Virginia is oak-hickory and occupies 77% of the state's forest land (U.S. For. Serv. 1990). The forest type in which the Pennsylvania study was conducted is similar to only 14% of all West Virginia forest land (U.S. For. Serv. 1990). Peer reviewed literature does recognize that some northeastern forests support higher than desired deer populations. However, the health of the northeastern forests is generally good, and deer rank low in a series of current and historical impacts affecting forest health (Miller-Weeks et al. 1994).

Similar errors may be made when seeking to apply deer density impacts to West Virginia from studies conducted outside the state, or from popular articles that have not been peer reviewed and withstood the test of scrutiny by professionals. For example, deer densities in areas of West Virginia may be similar but the impact may not be the same.

Finally, the definition of biodiversity is still being argued in professional circles. While generally accepted as the variety of organisms within a unit of area, there are many aspects to this term with which several sectors of the natural resources management community have not agreed.

Impacts of Managing Deer at the Population Levels of 20 Deer/Square Mile

If the assumption is made that for every buck killed during the buck gun season, there are 10 deer in the population (the actual expansion factor is 8-10 depending on the buck harvest rate), then the consequences of managing a deer herd at a population level of 20 deer/square mile can be assessed. In 1994, preliminary figures indicate the buck harvest was 74,151 (3.24 bucks/square mile). If the harvest were restricted to 2 bucks/square mile, as the report suggests, the state harvest would theoretically be 45,764. As the deer harvest in 12 counties is below 2 bucks/square mile, the actual harvest would be 39,750, about 1/2 of the current harvest and significantly less than the 92,355 bucks/year recommended by the White-tailed Deer Operational Plan. The deer herd would be reduced in half by this proposal. This would also significantly reduce the antlerless, bow and muzzleloading harvest.

Hunter success is currently about 30% in gun season and 25% in bow season. Reducing the deer herd by half would subsequently reduce hunter success by about the same proportion; therefore, significantly affecting hunter satisfaction. In 1991, 294,000 hunters hunted for 2.7 million days in West Virginia. Deer hunting produced over \$121 million in economic benefits (excluding license revenues) for West Virginia in 1991 and directly supported over 2,000 jobs. The expected number of recreation days and economic benefits would be significantly reduced by this proposal.

A major problem in managing deer herds in West Virginia is the posting of lands and the resulting reduction in hunter access. Private landowners, by controlling hunting pressure through hunter access, dictate the number of deer harvested on their land. To reduce the deer herd to 20 deer per square mile, as the report suggests, would initially necessitate very liberal seasons and bag limits. The resulting increase in hunters would certainly increase posting of land and limit hunter access. The outcome would be deer numbers controlled by: 1) posting on private lands, 2) localized higher populations of deer and 3) eventually, less hunter participation. Operating under the current seasons and bag limits, large landowners have the ability to determine hunting pressure and thus deer numbers on their properties.

At the January 1994 Natural Resources Commissioners' public meeting, the attending public overwhelmingly opposed any additional liberalization of the antlerless deer season for the fall of 1994 because of a drop in the buck kill in 1993. The reduction in the buck kill in 1993 was the result of increased antlerless harvest of deer in 1992 which lowered deer populations in certain counties. The increased harvest of antlerless deer brought many counties that exceeded the desired harvest objective in line with the deer plan. The plan's current deer management strategy is designed to progressively regulate county deer populations to achieve desired harvest objectives. Considerable progress has been made over the last two years to bring deer

populations down to desired levels. Achieving the desired harvest objectives statewide will not result in a net increase in the state's overall deer population but rather a more equitable and sustainable distribution of the population among all West Virginia counties.

A deer herd of 30-40 deer/square mile is very dynamic and able to recover from large reductions due to intensive hunting pressure. However, a deer herd of less than 10 deer/square mile is much more vulnerable and net recruitment in the population may be overcome by nonseasonal mortality factors such as predators and poaching.

Reduction of the deer population level to 20 deer/square mile is an unrealistic goal which historically has been demonstrated as unacceptable to the people of West Virginia. Throughout the United States, the biological carrying capacity for deer generally increases from north to south. The research on damage to forest regeneration, that is quoted in the PERD's report, was conducted in the northern hardwood forests of Pennsylvania and New York. The biological deer carrying capacity of most of West Virginia is much higher in our more productive oak-hickory forest. Incidents of significant deer damage to forest regeneration are isolated in West Virginia and occur mainly in areas where the deer population level has exceeded the buck harvest objective for several years. In most incidents this has occurred in areas not hunted or by landowners prohibiting or limiting hunter access.

West Virginia sportsmen and landowners have been very supportive of the Wildlife Resources Section's sound white-tailed deer management policies, but they have been quick to challenge a perceived danger to their hunting tradition. Deer management changes of the magnitude recommended in the PERD's report would not, in our experience, be supported by the majority of West Virginians.

The Wildlife Resources Section has a deer management plan that was completed with extensive public input. It is founded on scientific principles and the best available data, and the plan strives to maintain the resource while balancing the various desires and needs of the state's citizens.

Comments on Recommendation 1

The Division of Natural Resources (DNR) does not discourage the continued study of the impacts of deer populations on the state's citizens and natural resources. Our management goal for the deer program is to:

Maintain white-tailed deer populations at levels compatible with biological and sociological conditions; and meet projected use by providing a diversity of deer hunting and other wildlife-associated recreational opportunities.

This goal is compatible with the agency's mission as stated in Chapter 20 of the West Virginia Code. In view of our legislatively mandated mission and the legislature's obvious desire to conduct balanced studies of issues such as deer management, the DNR believes that any studies conducted as a result of the recommendations of the PERD audit should consider both the positive and negative effects of the state's deer population, rather than focusing entirely on the possible negative effects. Further, the DNR disagrees with the implication of this recommendation that the state's deer population is uniformly high. As the audit report and our own data document, our deer population varies considerably from county to county and the assessment that the population is high is a judgement that must consider a variety of sociological, ecological, and economic parameters.

Finally, the section of this recommendation that relates to the provision of recommended deer seasons by the PERD is, we believe, ill advised. While it is certainly within the purview of the Joint Committee on Government Operations to offer legislative alternatives to current deer seasons, the DNR respectfully submits that the legislature may not find comfort in placing itself at the intersection of competing public desires. In the past several years, this agency has implemented more liberal antlerless deer harvest regulations in response to some of the same concerns addressed in the audit report. As illustrated by recent press editorials, these actions have not proved universally popular with the public. Our assessment of statewide public opinion regarding deer populations is that prevailing public sentiment favors either current or increased deer population levels. The DNR has been willing and able to shoulder the burden of balancing public sentiment with economic and ecological considerations. DNR personnel have the professional expertise and the public input mechanisms to most efficiently deal with these natural resources issues.

Comments on Recommendation 2

The DNR has long recognized the need to diversify the agency's funding sources to provide for broader based financial support of our mission. We concur with the recommendation's basic notion of such diversification. We disagree with the specific recommendation that the diversification proposal should be revenue neutral. Continuing the Wildlife Resource Sections' programs at the current level will necessitate increased expenditures from revenues that are predicted to be under severe stress by FY 96-97. It thus seems unwise to reduce current hunting-related revenues. Reductions in hunting license fees are also

unwarranted, as West Virginia's hunting license fees remain among the lowest in the region. Sportsmen themselves lobbied extensively for increases in these fees in 1988. They supported license fee increases because they supported DNR's pledge to deliver tangible products and services. Such self-imposed fee increases are unprecedented in state government. Since that time, public support for activities funded by hunting and fishing license fees has continued to be very strong because the agency has delivered on its pledges to the public.

If the DNR is to implement the recommendations of this audit and of its own planning efforts, then we must diversify through the addition of funding, not subtraction and replacement. The Governor and the legislature have supported this approach by including \$400,000 in general revenue funding for the Nongame Wildlife Program in the FY 94-95. An additional appropriation may be included in the proposed budget for FY 95-96. The Joint Interim Committee on Finance is also investigating methods to fund management, research and educational projects for species of wildlife that are not hunted, trapped or fished. Regarding the other suggested alternatives for diversifying funding sources, the DNR is always open to public and legislative suggestions for new funding for new tasks. We would of course be willing to work with the PERD and the Joint Committee in this regard.

Comments on Recommendation 3

The DNR concurs with the basic thrust of this recommendation. We have been collecting crop damage and basic accident data for some time. That information was available to the PERD. We concur that having better information on crop damage, accidents, effects on forest regeneration, and effects on ecological diversity would enable us to do an even better job of appropriately managing the state's deer population. We are currently discussing the possibilities of cooperative research with WESVACO and other entities to investigate the impacts of wildlife and forest management on forest regeneration and ecological diversity. This and the other recommended data, however, will be costly information to obtain. We will not be able to effectively implement some of these recommendations without increased and diversified funding.

Further, the DNR vigorously supports the inclusion of such information in a geographic information system. We have recently hired a staff person and acquired equipment and software to implement a GIS that will interface with data from other state and federal agencies.

Comments on Recommendation 4

The DNR currently has a deer management plan that incorporates ecological, sociological, and economical considerations. As noted by the audit report, the plan does not utilize deer population estimates because of the cost and feasibility of obtaining reliable estimates. Instead, it uses harvest trend data which is more efficient to obtain. For these same reasons, other states use similar methods for monitoring their deer populations. In our opinion, neither this agency nor anyone else could provide more reliable deer population estimates to the Joint Committee by June 30, 1995. We can provide, and have provided, county and statewide population trend estimates to the PERD.

We have recently investigated the use of new infrared technology to estimate actual deer populations for linkage to harvest trend estimates. Although too costly for widespread application, this and other developing technologies hold promise for the type of actual population estimates requested by the recommendation, but only on small land areas.

Finally, refining the current deer management plan to incorporate more precise consideration of its biological, social, and economic consequences is an ongoing activity. Such refinement requires the constant acquisition of better information such as that being gained by our current and proposed research, as well as that of the type recommended by this audit. Again, the acquisition of such information will necessitate increased agency expenditures.

Comments on Recommendation 5

The DNR concurs with this recommendation. We have cooperated with the Division of Highways on previous research and recommendations to reduce deer-vehicle collisions. Most recently, we made acceptable recommendations in that regard for the completed section of Corridor H in Upshur and Randolph counties. The DNR supports further expansion of that cooperation as requested in the recommendation.

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WEST VIRGINIA LEGISLATURE
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(304) 558-1927 FAX

Antonio E. Jones
Director

December 21, 1994

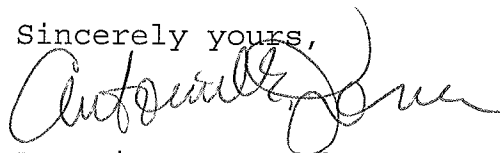
William R. Maxey, Administrator
Division of Forestry
1900 Kanawha Blvd., E.
Charleston, WV 25305-0180

Dear Mr. Maxey:

The Performance Evaluation and Research Division of the Joint Committee on Government Finance is requesting your assessment and reaction to the enclosed interim report of a performance evaluation of the Division of Natural Resources. This specific interim report contains a recommendation relating to the impact of deer population on the State's forestry and agricultural resources, and insurance rates. In addition to the Division of Natural Resources' review of our finding, we believe it is important to include your reaction in our report to the Joint Committee on Government Operations on January 8, 1995.

We invite your comments to be included in a draft to be distributed to the Committee on January 4, 1995. Should you be unable to provide written comments for distribution to the committee, we invite you to present your remarks at the committee meeting. We will contact you when the specific committee agenda is provided to us.

Sincerely yours,



Antonio Jones, Ph.D.



Gaston Caperton
Governor

DIVISION OF FORESTRY
1900 Kanawha Boulevard, East
Charleston, WV 25305-0180

William R. Maxey
Administrative Forester

December 29, 1994

Antonio Jones, Ph.D., Director
West Virginia Legislature Performance
Evaluation and Research Division
Building 5, Room 751A
1900 Kanawha Boulevard, East
Charleston, WV 25305-0592

Subject: Impacts of Large Deer Herds on West
Virginia Forestland

Dear Dr. Jones:

The West Virginia Division of Forestry (DOF) acknowledges that there are negative impacts on State forestland from overpopulation of deer. However, from our observations, it is not a statewide problem. The DOF District Foresters report significant problems in overbrowsing of forest tree and lesser vegetation in certain counties or portions thereof. Generally, the central, western, and northeastern counties are hardest hit.

As the Department of Natural Resources wildlife biologists become aware of these problems, they seem very cooperative in altering deer management programs to address the damage. One example was the significant deer damage to our forest tree nursery seedbeds in our Lakin nursery a couple of years ago. After DNR was told of the damage, they opened a doe season in Mason County. There was not a repeat of this damage this fall.

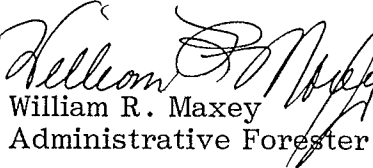
Overpopulation of deer causes persistent problems with Christmas tree growers. The deer are particularly attracted to nursery seedlings, most likely because of the fertilizer received by this planting stock applied in the nursery. Another area of concern, on both State-owned and private forestland, is the total conversion, through overbrowsing, of hardwood regeneration to heavy fern ground cover after harvest. The ferns are persistent, resistant to herbicides, and prevent hardwood seed from getting established. This is especially prevalent in the Elkins areas.

In summary, there are detrimental impacts to State Forests due to large concentrations of deer. However, scientific studies, not emotion or superficial reports, should dictate the deer herd management policy. I suggest district-level research--coordinated by DNR, but

Antonio E. Jones, Ph.D., Director
Page 2
December 29, 1994

conducted by West Virginia University and/or U.S. Forest Service researchers--to ascertain more precise populations and specific corrective management prescriptions. These prescriptions should then be applied to the locality where high populations exist.

Sincerely,


William R. Maxey
Administrative Forester

WRM:jah

cc: John Perdue
Jim Lawrence

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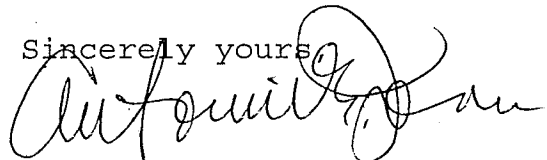
Gus R. Douglass, Commissioner
Departement of Agriculture
Building 1, Room M28
1900 Kanawha Blvd. E.
Charleston, WV 25305-0170

Dear Commissioner Douglass:

The Performance Evaluation and Research Division of the Joint Committee on Government Finance is requesting your assessment and reaction to the enclosed interim report of a performance evaluation of the Division of Natural Resources. This specific interim report contains a recommendation relating to the impact of deer population on the State's forestry and agricultural resources, and insurance rates. In addition to the Division of Natural Resources' review of our finding, we believe it is important to include your reaction in our report to the Joint Committee on Government Operations on January 8, 1995.

We invite your comments to be included in a draft to be distributed to the Committee on January 4, 1995. Should you be unable to provide written comments for distribution to the committee, we invite you to present your remarks at the committee meeting. We will contact you when the specific committee agenda is provided to us.

Sincerely yours,



Antonio Jones, Ph.D.

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December 21, 1994

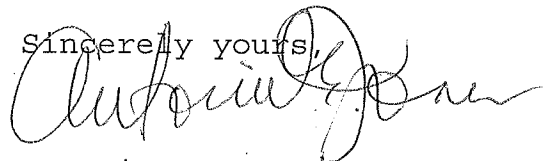
Hanley C. Clark, Commissioner
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2019 Washington Street, E.
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Charleston, WV 25305-0540

Dear Commissioner Clark:

The Performance Evaluation and Research Division of the Joint Committee on Government Finance is requesting your assessment and reaction to the enclosed interim report of a performance evaluation of the Division of Natural Resources. This specific interim report contains a recommendation relating to the impact of deer population on the State's forestry and agricultural resources, and insurance rates. In addition to the Division of Natural Resources' review of our finding, we believe it is important to include your reaction in our report to the Joint Committee on Government Operations on January 8, 1995.

We invite your comments to be included in a draft to be distributed to the Committee on January 4, 1995. Should you be unable to provide written comments for distribution to the committee, we invite you to present your remarks at the committee meeting. We will contact you when the specific committee agenda is provided to us.

Sincerely yours,



Antonio Jones, Ph.D.

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9 January 1995

Dr. Antonio Jones
Legislature of West Virginia
Charleston West Virginia

Dear Dr. Jones:

I find the legislative analysis of West Virginia's deer management problems to be very sound. This report reflects the current understanding of economic and environmental implications of high deer populations, and the points parallel those being raised in other states as well as in Canada and Scandinavia. It is most encouraging to see such a good political synthesis bringing together the environmental, economic, and recreational issues surrounding deer management.

The breadth of the review is quite impressive. I'm offering some minor comments, none of which detracts from the overriding validity of your analysis:

- a) If this document is for technical experts, then more of the sources, particularly from the technical literature, should be cited. You did list some references, but others are missing, e.g. the work in Pennsylvania, that we discussed over the phone.
- b) The material touches on every key issue that I can think of, with the possible exception of Lyme disease. However, this may not pose the same threat in your region as it does in ours and in the Northeast. Specialists generally believe that high deer densities increase the chance of infected ticks being present, but this has not been shown for sure. You mentioned disease, but not Lyme disease specifically.
- c) Confusion can arise from the term "carrying capacity." It means too many different things, even among ecologists. Conceptually, "carrying capacity" is easy to grasp and easy to communicate; it is quite useful in a general sense. However, for details on a given species in a given setting, "carrying capacity" can lead to ambiguity.

d) Offering a single density, e.g. $20/\text{mi}^2$, as a management objective may, on average, be reasonable. However, since habitats and citizens' problems vary from area to area, a single deer density may not be ideal for the whole state. There could be regions where forest regeneration needs greater protection, at least until tree reproduction recovers from past overuse. Or there may be farm regions where even low levels of damage are not acceptable. On the other hand, in some regions the demand for hunting may be the top priority.

For what it's worth, consider how game levels are decided in Sweden, where the main issue is moose. Density goals are set locally-- for land units smaller than our counties. Compromises are reached among the local forestry, farmer and hunter groups. The government almost always accepts these decisions. For you, maybe getting local interests to reach compromised agreements would not work, but at least local hearings can be the basis for the DNR setting local population objectives.

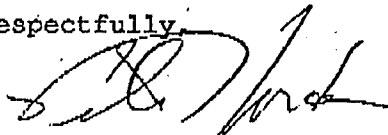
e) The rate of deer-car collisions reflects a combination of deer numbers, traffic volume, average speeds, and visibility along roads. Thus, other factors being fixed, more deer mean more accidents. Incidentally, you no doubt are aware that fatalities from deer accidents are quite high for motorcyclists.

f) Concerning the consequences of too many deer shown in your Table 2, with the widespread hunting in West Virginia, starvation should seldom occur as long as enough females are being taken. One exception might be in an extremely severe winter; but deer management cannot be based on unlikely or infrequent events. The point is, a deer herd in good condition and subject to some hunting can still cause more farm and forest damage and more highway accidents than society considers reasonable.

g) As for the DNR's claim that studies in other states do not apply to West Virginia, I can't judge that directly. One needs to know whether the studies elsewhere were in settings similar enough to yours. Good research applies beyond just where it was done; we can never afford separate studies for every new site. I'm relatively certain that a number of the studies you cite are close enough to your situation to justify using them for this deer-management analysis.

In conclusion, I again commend you for the comprehensive nature and the ecologically and economically valid content of your legislative analysis of deer management issues in West Virginia.

Respectfully,



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