

**A PROPOSAL FOR CONDUCTING**

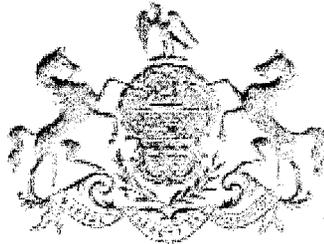
**AN EXAMINATION OF**

**THE PENNSYLVANIA GAME COMMISSION'S**

**DEER MANAGEMENT PROGRAM**

**An Independent Scientific Study By**  
**John Eveland**  
**Project Director and Principal Investigator**

**June 30, 2008**



**Presented to**  
**Pennsylvania Legislative Budget and Finance Committee**  
**In Response to RFP #2008-3**

**A Science Initiative of The Terra Cor Institution**



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# **TABLE OF CONTENTS**

## **CONTACT INFORMATION**

## **1.0 INTRODUCTION / NEED FOR PROJECT**

## **2.0 AT ISSUE**

## **3.0 PROJECT DESCRIPTION**

### **3.1 Objective**

### **3.2 Procedure**

**3.2.1 Meeting the Requirements of RFP #2008-3**

**3.2.2 Scientific Parameters**

**3.2.3 Scientific Method**

**3.2.4 Duration**

## **4.0 ORGANIZATIONAL STRUCTURE AND PERSONNEL**

## **5.0 SCIENTIFIC CAPABILITIES AND EXPERIENCE**

### **5.1 As A University Research Scientist**

**5.1.1 Black Bear Research**

**5.1.2 Elk Research**

**5.1.3 Otter and Bobcat Research**

### **5.2 As an Industry Ecologist**

**5.2.1 Energy and Environment**

**5.2.2 Representation of Major Projects**

### **5.3 Other Related Qualifications**

**5.3.1 Education**

**5.3.2 Knowledge of the Issue**

## **6.0 SUMMARY AND CONCLUSION**

## **7.0 STATEMENT OF QUALIFICATION**

## **1.0 INTRODUCTION / NEED FOR PROJECT**

Around the year 2000, the Pennsylvania Game Commission instituted a new statewide deer management policy that was intended to depart from traditional "maximum-sustained-yield" management of white-tailed deer -- a long-held policy with principally single-purpose intent to benefit sport hunting. In contrast, the new policy is focused on the continuing incremental statewide reduction of deer numbers until a more 'forest friendly' population may be achieved and maintained. Under this new policy, statewide deer numbers will continue to be reduced annually until the Game Commission is satisfied that it has reached a population level that is conducive to the new deer management objectives of the agency.

Although many sportsmen have accepted the concept of a lower deer population and overall reduction in hunter success that has resulted from the agency's new deer management policy, many others have not. As a result, the scientific credibility of the agency and its mission have been questioned by sportsmen fervently enough to incite legal action toward halting the new deer management policy.

There are more than just the roughly 1,000,000 sportsmen and their associated millions of family members and friends that are affected by the new policy, with factions mounted on both sides of the issue. For example, fewer sportsmen will annually bag a deer, and segments of the outdoor sporting and hospitality industries seem to be adversely impacted by reductions in deer numbers; while others, such as the agriculture and lumber industries, auto insurance companies, and residential landscape and garden enthusiasts may hail the effects of a decreased herd. This is a problem that does not seem to be dissipating, and, in fact, appears to be increasing as factions polarize in support of their ideals. It is a problem that has affected the credibility of the Pennsylvania Game Commission as perceived by many sportsmen, and intends to exacerbate a currently declining trust by the citizens of the Commonwealth in state government. It is, therefore, an image problem that extends beyond the Game Commission, and is possible and even likely to affect public confidence in other state agencies as well as the legislature and office of the governor.

Although the Game Commission has presented scientific evidence to support its new management policy, and, therefore, has assured the sportsmen that the policy is based upon a sound scientific foundation that is in the long-term best interest of sportsmen; many sportsmen do not accept the new deer management policy as being rooted in sound scientific principle nor in the best interest of sportsmen and the sport of hunting. And so the conflict continues -- and heightens!

In response to the Legislative Budget and Finance Committee's request for proposal (RFP #2008-3), proposed, herein, is the implementation of an independent, unbiased, thorough, scientific examination of the Pennsylvania Game Commission's deer management program. It is proposed to be conducted by a proven and respected wildlife ecologist and operated as a project of The Terra Cor Institution -- a private nonprofit 501(c)(3) organization dedicated to science, education, and environment. A one-year scientific investigation and final report entitled "An Examination of the Pennsylvania Game Commission's Deer Management Program" would provide independent scientific documentation toward solving the above-cited serious and growing statewide problem. The, herein, proposed scientific investigation is further designed to provide over 1,000,000 sportsmen and possibly millions of additional concerned citizens with unbiased scientific recourse to their questions and concerns, to halt hostilities between sportsmen and the Game Commission, and to end a deteriorating public trust in the Game Commission and state government.

This proposal is designed to satisfy the requirements of House Resolution 642 as presented in LBFC's RFP #2008-3, and to provide an independent, unbiased, thorough, scientific examination of the PGC's deer management program.

## 2.0 AT ISSUE

White-tailed deer are the flagship of Pennsylvania wildlife, and so are acknowledged as the official state mammal. For decades, most citizens have accepted with pride Pennsylvania's recognition as having had one of the nation's largest deer herds. In fact, in accordance with traditional game management teachings the case might be made that it is the charge of the Game Commission to maintain the highest deer population possible -- to provide the "maximum sustained yield of deer" for the sportsman.

AT ISSUE, however, is not only an understanding of the size of the herd and the number of deer that are annually harvested. AT ISSUE is the Game Commission's management policy that has been designed to reduce the herd toward achieving three stated goals:

1. to create healthier forests,
2. to produce healthier deer, and
3. to reduce deer / human conflicts.

However, reduction in the herd has resulted in associated impacts that are not deemed acceptable by many stakeholders. Therefore, in addition to an analysis of the Game Commission's three goals (the philosophy behind them, the science that supports them, and the management policy that was developed to achieve them), impact analyses and a cost/benefit analysis are needed to thoroughly assess and compare the benefits of the current deer management policy as well as the costs -- to the forests and the herd, to wildlife communities and sportsmen, and possibly to social and economic criteria affecting agriculture and lumber industries on one side and outdoor hospitality and sporting goods industries on the other.

AT STAKE is the credibility of the state's conservation agencies, the public's confidence in government, and possibly the long-term viability of the sport of hunting in Pennsylvania. At this critical time, it is vitally important that an independent, unbiased, and thorough scientific assessment be made by an experienced investigator, a proven scientist, and a person savvy to the fundamental environmental and social factors that are AT ISSUE.

Regarding the proposed study, at issue is:

- A determination of the validity of the methods, techniques, and practices employed by the PGC toward attaining the three (3) stated goals of its deer management program (a focus of HR 642 and addressed in Part One of this proposal's Research Outline).
- A determination as to whether the PGC is achieving the three (3) stated goals (a focus of HR 642 and addressed in Part One of this proposal's Research Outline).
- A determination as to whether the three (3) stated goals are scientifically justified (the focus of Part Two of this proposal's Research Outline).

In summary, AT ISSUE are these questions:

- What has been the impact of the Game Commission's new management policy to the deer herd and society?
- What have been the actual environmental and social impacts of Pennsylvania's traditionally-high deer herd?
- Is the Game Commission's policy based on 'sound science', and if so, is sound science alone sufficient to warrant the new deer management policy?
- Does achieving the three goals of the Commission policy warrant its impacts? Is the policy justified?

### **3.0 PROJECT DESCRIPTION**

The successful management of Pennsylvania's deer herd is a complex issue that involves knowledge and application of varied disciplines and concerns (see figure). Proposed, herein, is a multidisciplinary scientific investigation to analyze significant ecological relationships of white-tailed deer in Pennsylvania and to evaluate the deer management policy of the Pennsylvania Game Commission. Ecology, herein, is defined as the relationship of deer with their environment, both natural and human parts of the environment. It includes, therefore, the effects of the deer herd upon forests (regeneration and overall forest health), and impacts to agriculture, the driving public, gardeners and backyard enthusiasts; as well as impacts to the deer herd and hunting community that result from the management program.

#### **3.1 Objective**

This proposal includes (but is not limited to) a scientific evaluation of the three stated goals of the Pennsylvania Game Commission's new deer management policy:

- to create healthier forests.
- to produce healthier deer.
- to reduce deer/human conflicts.

The goal of this scientific study, therefore, is to satisfy the legislative requirements of HR 642 as depicted in LBFC's RFP #2008-3, and to conduct an examination of the Pennsylvania Game Commission's deer management program.

#### **3.2 Procedure**

Toward accomplishing the above-cited objective, this proposal is designed to address two major areas of research as identified in the following Research Outline (see table). Part One of this proposal's research effort addresses the requirements of the Legislative Budget and Finance Committee's RFP #2008-3, specifically:

- HR 642, which is depicted in the Background and Objectives subsections (pages 2 and 3) of the RFP's Project Description section; and
- Study tasks, which are listed in the Scope of Work subsection (pages 3 and 4) of the RFP's Project Description section.

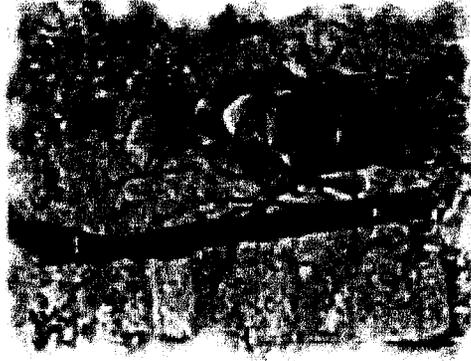
The research issues as listed in LBFC's RFP #2008-3 and addressed in Part One of the Research Outline are, in general, designed to determine if the methods used by the PGC toward achieving its three (3) deer management goals are based on accepted scientific principle, and if the three goals are being achieved. To determine if the PGC's three (3) deer management goals, and thus the deer management program, are justified based on scientific criteria, an unsolicited area of research -- Part Two in the following Research Outline -- has been added by this proposal to the research criteria of RFP #2008-3. These added research topics within Part Two are intended to provide the most thorough scientific examination of this most significant deer management program, and to assure the highest quality product toward resolving the current deer management conflict. They are, herein, recommended to become a part of LBFC's research effort.

In addition, as an optional focus of study, a SocioEconomic Impact Analysis is made available to LBFC (as listed in Part Three of the following Research Outline). This analysis would include an assessment of socioeconomic impacts that result from both a high deer population (as has been the case prior to about the year 2000), as well as a reduced deer population (occurring since the year 2000). Impacts investigated would include the lumber industry, agricultural industry, outdoor sporting and hospitality industries, automobile insurance industry, and the Pennsylvania Game Commission, itself. The analysis would be conducted by a nationally-known sociologist with

# DEER MANAGEMENT: A COMPLEX ISSUE

## ENVIRONMENTAL IMPACT

- Deer Herd
- Wildlife Habitat
- Wildlife Populations
- Forest Regeneration
- Forest Composition
- Forest Replacement



## SOCIOECONOMIC IMPACT

- Jobs & Economy
- Outdoor Sporting Industry
- Agriculture
- Lumber Industry
- Auto Insurance Industry
- Backyard Gardeners
- Sportsmen
- Game Commission

## SCIENCE

- Forest Ecology
- Natural Succession
- Old Growth Forests
- Vegetation Types
- Communities & Ecosystems
- Wildlife Ecology

## PHILOSOPHY

- Sound Science vs Common Sense
- Hunting vs Non-Hunting
- Gun Control vs 2nd Amendment
- Human Element vs Natural Element
- Conservation vs Preservation
- Tradition vs Change
- Multiple-Use Management
- Maximum Sustained Yield

Wildlife Management is not a Science, but a Practice -- the Application of Science.  
However, the Foundation of Management is based on Philosophy.

# AN EXAMINATION OF THE PENNSYLVANIA GAME COMMISSION'S DEER MANAGEMENT PROGRAM

-- RESEARCH AND REPORT OUTLINE --

**I. OBJECTIVE:** To examine the Pennsylvania Game Commission's deer management program.

**II. METHODS:** Primary and Secondary Research

**III. RESEARCH PARAMETERS** (include but are not limited to):

## PART ONE

### PENNSYLVANIA LEGISLATIVE BUDGET AND FINANCE COMMITTEE'S REQUEST FOR PROPOSAL

**Purpose:** To determine if the methods used by the PGC toward achieving its three (3) deer management goals are based on accepted scientific principle, and if the three goals are being achieved.

- A. HR 642: Background and Objectives of RFP #2008-3 (pages 2& 3)**
1. Determination of Deer Population and Trends
  2. Circumstances Leading to New Deer Management Program
  3. Examination of PGC's Modeling, Techniques, and Decision-Making
    - a. Are they based on sound science?
    - b. Is the management plan accomplishing its three goals?
  4. Comparison of Management Practices with Other States
  5. Consideration of Smaller WMU's
  6. Develop Recommendations
- B. RFP Tasks: Scope of Work of RFP #2008-3 (pages 3 & 4)**
1. Population Estimates (Issues 1-3)
  2. Healthy Deer (Issues 4-7)
  3. Habitat Health (Issues 8-10)
  4. Reducing Deer-Human Conflict (Issues 11 & 12)
  5. Smaller Wildlife Management Units (Issues 13 & 14)
  6. Comparison to Other States (Issue 15)

(RESEARCH OUTLINE: Page 1 of 3)

## **PART TWO**

### **AN EVALUATION OF PENNSYLVANIA'S WHITE-TAILED DEER MANAGEMENT POLICY**

**Purpose: To determine if the PGC's three (3) deer management goals, and thus the deer management program, are justified based on scientific and (optionally) socioeconomic criteria.**

#### **A. Liaison / Secondary Data Acquisition (including)**

1. Legislative Budget and Finance Committee (LBFC)
2. House Game and Fisheries Committee (HGFC)
3. Senate Game and Fisheries Committee (SGFC)
4. Pennsylvania Game Commission (PGC) / Board of Commissioners
5. Department of Conservation and Natural Resources (DCNR)
6. Pennsylvania Department of Agriculture
7. Governor's Council for Hunting, Fishing, and Conservation
8. Unified Sportsmen of Pennsylvania (USP)
9. Allegheny County Sportsmen's League
10. Pennsylvania Federation of Sportsmen's Clubs
11. Audubon Pennsylvania
12. PA Chapter of National Wild Turkey Federation
13. Pennsylvania Farm Bureau
14. PA Landscape and Nursery Association
15. Pennsylvania Rifle and Pistol Association
16. United Bowhunters of Pennsylvania
17. Other Stakeholders

#### **B. PGC Policy and Analysis**

1. Forest Management Policy
2. Deer Management Policy (Description)
3. Assessment of Three Game Commission Goals
  - a. Healthier Forests
  - b. Healthier Deer
  - c. Reduce Deer/Human Conflicts
4. Annual Deer Harvest Analysis
  - a. Historic Assessment
  - b. Current Results
5. Deer Processor Survey
6. Timber Policy and Analysis
7. Hunting License Sales Assessment

#### **C. DCNR Policy and Analysis**

1. State Park and State Forest Objectives
2. Deer Management Policy
3. Browse Survey
4. Old Growth Forest Plan
5. Role of the Department of Conservation and Natural Resources

## **D. Population Dynamics of the Statewide Deer Herd**

1. Compare Historical Status (Pre-2000) with Current Status (2000 to Present)
  - a. Herd Size
  - b. Sex Structure
  - c. Age Structure
2. Management Program Impact to the Herd

## **E. Scientific Assessment of Pennsylvania Forests**

1. Forest Health Analysis
  - a. Regarding the Current Statewide Forest
    - Forest Cover Types Identification
    - Forest Stand Analysis
    - Condition of Existing Stands
  - b. Regarding the Future Statewide Forest
    - Regeneration Analysis (Projected Succession)
    - Stand Restocking Analysis (Actual Succession)
    - Assessment of Natural Forest Succession
2. Understory Analysis
  - a. Density
  - b. Diversity
3. Forest Impact Analysis (An analysis of major causal vectors that could affect the health of the forest.)
  - Identify the causal vector(s) that are responsible for forest degradation, including but not limited to: acid deposition, deer browsing, insects and disease, climate change, particulate (trace element) deposition.
  - Cursory assessment of vector degrees of impact.
4. DCNR 'Browsing Report for the Pennsylvania State Forests (2006)' and other DCNR-Related Documents and Initiatives
5. USFS Forest Inventory
6. Silvicultural Assessment
  - Practices and Reforestation on Timbered Lands
  - Timbering Practices on Public Lands

## **F. Environmental Impact Caused by the Deer Herd**

1. Forest Regeneration, Restocking, Composition, and Succession Assessment
2. Effects upon Wildlife Habitat
3. Effects upon Wildlife Populations and Associations

## **G. Research and Discussion of Pennsylvania's Colonial Old Growth Forests and Wildlife**

### **PART THREE**

#### **OPTIONAL SOCIOECONOMIC IMPACT STUDY**

**Purpose:** To determine the socioeconomic impacts to the lumber industry, agricultural industry, outdoor sporting and hospitality industries, auto insurance industry, suburban landscapes, sportsmen, and the Pennsylvania Game Commission, itself, resulting from the deer herd and management policies of the Game Commission.

#### **IV. COST / BENEFIT ANALYSIS**

#### **V. DISCUSSION / CONCLUSION / RECOMMENDATIONS**

extensive academic and research experience regarding the socioeconomic impacts of large projects - such as the statewide socioeconomic impact resulting from the PGC's deer management program. This optional course of action would be coordinated by the project director, John Eveland, and conducted as a subcontract initiative.

**3.2.1 Meeting the Requirements of RFP #2008-3.** This proposal, therefore, is designed to meet all legislative requirements as depicted in LBFC's RFP #2008-3 (Part One of this proposal's Research Outline), as well as extensive additional research topics (Part Two in the following Research Outline and Part Three as an option). The topics as listed in Parts One and Two will be conducted concurrently over the course of one year. As depicted in the Research Outline, this study approach represents a diverse multidisciplinary array of wildlife management, forest ecology, and social and economic parameters.

**3.2.2 Scientific Parameters.** In general, the principal parameters that will be scientifically investigated include:

- population dynamics of the Pennsylvania deer herd.
- management impacts to the deer herd.
- forest analysis, especially the effects of deer upon Pennsylvania forest regeneration, composition, and replacement.
- environmental impacts caused by the herd.
- socioeconomic impacts (as an optional project addition).

Population dynamics will assess deer numbers, age structure, and gender structure. In addition to this determination of the existing condition, an analysis of population trends, and the rate of change if population numbers are not static, is important in understanding the population dynamics of the herd. Population numbers will be presented in age classes (such as fawns, yearlings, and adults) so that an accurate assessment of the breeding and nonbreeding portions of the population can emerge. A determination of sex classes will complete the picture of the existing condition and aid in assessing the viability of the new deer management (hunting) policy. Comparisons will be made between the existing population and the historical dynamics of the herd prior to year 2000. Annual harvest records for at least the last two decades will be used during this assessment.

Of special interest to sportsmen will be the impacts to the deer herd that are occurring from the new deer management policy, and an analysis of how the current impacts compare to those effects that resulted from traditional management policies of the recent past. The degree of impacts and the success of the Game Commission in attaining the principal goals of the new deer management policy (such as improving deer health and forest health, and reducing deer/human conflicts) will be investigated.

An extensive ecological study will survey Pennsylvania forests from three principal perspectives: (1) as habitat for deer and other wildlife; (2) as a natural resource toward promoting non-consumptive outdoor activities, such as hiking, camping, horseback riding, and bird watching; and (3) as a producer of lumber and commercial forest products. Pennsylvania is a vegetatively diverse ecosystem that is comprised of the many forest types that occur within two major natural forest regions. There are many variables besides the deer herd that influence natural forest regeneration and the successful development of forest systems over time. Therefore, the principles of forest ecology must be fully considered in conducting an assessment of the condition of Pennsylvania's forests and the impact of the deer herd upon forest restocking and succession.

Environmental impacts will investigate and discuss the theoretical and measured effects of high deer numbers on such environmental parameters as forest health and regeneration, restocking, composition, and natural succession. The effects upon wildlife habitat, populations and communities will be addressed.

In addition to biological parameters, an optional socioeconomic impact study may be conducted to determine the effects of the herd -- as well as the management policy -- upon related social and economic criteria within the Commonwealth. On one side of the issue, emphasis would focus on the economic impacts of the management policy to outdoor sporting and hospitality industries and the social relevance to sportsmen and the sport of hunting. On the counter side of the issue, socioeconomic impacts of the herd to agriculture, lumber, and automobile insurance industries would be analyzed.

The project's general research and report presentation format is listed in the previous outline.

**3.2.3 Scientific Method.** Principal scientific investigations will be conducted by John Eveland -- forester, wildlife biologist, and ecologist by education and profession. His experience is summarized later in this document in the Capabilities and Experience section. Investigations will include both primary and secondary research techniques -- conducting primary research where needed to answer key questions or confirm secondary data of great significance to the outcome of the study; and conducting secondary research through interviews with deer managers and stakeholders, and through the collection of existing data. Every attempt will be made to consider the information and viewpoints of as many stakeholders as possible. When needed, expert scientific consulting services may be sought for certain portions of the overall investigation.

Research will be conducted in four phases: (1) liaison, (2) agency data acquisition, (3) literature review and other non-agency secondary data acquisition, and (4) primary field research. All primary and secondary research will be either conducted by or directly coordinated and supervised by the project director.

Phase I (liaison) is necessary as an initial step in the study. Because of the degree of polarization that exists between the factions, it is important for the project director to assure stakeholders that an unbiased examination is deemed paramount toward resolving the deer management issue, to guarantee that the concerns of each stakeholder are considered, and to identify for stakeholders the scientific approach that is being taken. Liaison will be handled personally by the project director.

Phase II (agency data acquisition) will be conducted exclusively by the project director, and will focus on the current and archival data and policies of the PGC and DCNR. It is assumed that LBFC sponsorship and resolution by the House of Representatives will facilitate cooperation and access to important agency information.

Phase III (other secondary research) will include extensive literature review, interviews, cyber search, and other means of data collection. The assistance of in-house personnel as well as the expert subcontract services of professional scientists may be used as needed in the research and acquisition of secondary data.

Phase IV (primary field research) will represent the principal means toward determining the health of Pennsylvania forests. Although extensive secondary data exists in DCNR and USFS files and reports, this matter is deemed by the project director to be paramount in completing the most thorough scientific examination of the deer management program and toward resolving this nationally-significant conflict between sportsmen and the Pennsylvania Game Commission. Its importance is of central concern, and the results of this facet of the study are so critical that they could, alone, resolve this dilemma. Answering the questions as to whether the forest is, in fact, in poor health -- or not -- will require an exhaustive effort over a long period that will cover the statewide forest system. This effort will be organized and conducted solely by the project director, and will involve the expert assistance of other qualified field biologists.

In addition to these four research phases, four additional project phases will follow: (5) data reduction and analysis, (6) report production, (7) report presentation, and (8) meetings with

legislative sponsors and stakeholders. Phases V and VI (data analysis and report production) will engage the technical and professional services of in-house and other support services. Word processing, tabulation, and professional graphic design and artistic complements will assure the production of a final product that is of the highest professional appearance. Following presentation of the final report, the project director will be available to answer all questions of the LBFC and HGFC, and secondarily the concerns of involved agencies and stakeholders regarding the results and recommendations of the study.

**3.2.4 Duration.** The study will be conducted over approximately one year. The precise project timeline will be discussed in the attached cover letter and cost analysis report.

## **4.0 ORGANIZATIONAL STRUCTURE AND PERSONNEL**

As previously mentioned, John Eveland will serve as project director and principal scientific investigator. All research will be conducted by, or directly coordinated by, the project director. The study would be conducted as a project of The Terra Cor Institution -- a nonprofit 501(c)(3) organization. Research and operational funds would be housed and administered as an earmarked Terra Cor budget.

Personnel are divided into four categories: (1) project director, (2) technical and professional in-house services, (3) professional subcontractor services, and (4) field assistance of hired field biologists. Man-days of service will be presented under separate cover.

## **5.0 SCIENTIFIC CAPABILITIES AND EXPERIENCE**

Of the three big game mammals in Pennsylvania (white-tailed deer, black bear, and elk), John Eveland conducted the first statewide research, wrote the original state management plans, and is directly responsible for the recovery and success of two of these species -- black bears and elk. He is by profession a forester, wildlife biologist, and ecologist. His scientific experience includes studies for the U.S. Forest Service and the U.S. Fish and Wildlife Service, and for university, state agencies, and private concerns throughout North America. John Eveland is one of the most experienced wildlife ecologists in the state, and is a national specialist in the ecology of North America for having conducted scientific research on wildlife, forest ecology, and natural systems within over 30 states and provinces of North America -- from the northern hardwood forests of Pennsylvania and rocky coasts of New England to the southern pine forests and sandy shores of the Carolinas and Louisiana; from the mixed oak forests of mid-America to southwest deserts and canyonlands of Arizona, Nevada, Utah, and New Mexico; and from the Rocky Mountain states of Wyoming, Colorado, and Montana to the boreal forests of Canada and Alaska.

### **5.1 As a University Research Scientist**

**5.1.1 Black Bear Research.** As a biologist at The Pennsylvania State University, John conducted the first statewide scientific bear research program ever in Pennsylvania. The study included live-trapping, tagging, and radio-telemetry tracking of bears in order to scientifically determine the status of the statewide bear population, and to answer critical ecological questions. He determined that there were less than 2,000 black bears in the entire state, and that the population was declining. As a result, John wrote the first statewide bear management plan for the Pennsylvania Game Commission, which was immediately implemented in 1970 by the closing of the state bear hunting season in two separate years, subsequent reductions in the length of the season from one week (with interim one-day and, then, two-day seasons) to a maximum three-day season, the issuance of bear licenses for hunters, the classification of state bear management zones, and the statewide system of bear check stations during hunting seasons. To accurately age bears, he developed the

Pennsylvania microscopic method of annular (tooth-ring) analysis using premolar teeth from living bears. Dr. Gary Alt (a later black bear ecologist with the Pennsylvania Game Commission) said of John in a published Focus feature article of the Pittsburgh Tribune Review:

*Alt became interested in bears when he was in high school and Eveland came to the area for field studies. "He was the bear man," Alt said of Eveland. "He was a legend, and he was bigger than life as far as I was concerned."*

Because of John's first research and statewide bear management plan (which remains virtually in effect to this day), Pennsylvania's bear population has experienced a remarkable recovery, and today is estimated at about 17,000 bears -- and increasing.

**5.1.2 Elk Research.** Because of his success with bear research, John was asked to conduct the first scientific investigation of Pennsylvania's elk herd as a member of the Penn State faculty. Elk had been native to the state until 1867, when the last eastern elk was killed. Only 46 years later in 1913, elk were reintroduced into the state. No research had been conducted from this period until John's first research in the early 1970's, which focused on population dynamics, range and movements, and basic ecology of the herd. After six months, he had determined a total range size of 200 square miles, a primary range size of 90 square miles (where about 90% of the herd resided for about 90% of the time), and a total herd size of only 63 elk. Two years later he discovered the nationally-significant brainworm disease that had cut the herd by 70%, from 115 elk to only 35 animals within a 10-week period -- explaining why the elk population had not increased nor prospered for three-quarters of a century. John created a multidisciplinary team of parasitologists, immunologists, and veterinarians at Penn State to fully understand the dynamics of the brainworm disease and to develop a preventative serum and method of inoculation. He wrote the first state elk management plan for the Pennsylvania Department of Environmental Resources and the Pennsylvania Game Commission, and today the population is about 700 animals -- and increasing.

Ralph Harrison, respected retired forester with the Pennsylvania Department of Environmental Resources and Pennsylvania elk historian, worked and lived in the 'elk area' during the period of John's research. He wrote in his publication The Elk of Pennsylvania (published by The Pennsylvania Forestry Association in cooperation with the USDA Forest Service and PADER Bureau of Forestry):

*"John and Nick Hunter ( Penn State graduate student assisting John) were two of the most dedicated wildlifers I had ever known. When they left, it created a void (in elk management) that exists to this day."*

**5.1.3 Otter and Bobcat Research.** In addition to black bear and elk research, John designed Pennsylvania's first official population analyses and ecological research for otters and bobcats. The otter research was implemented by his brother, Dr. Thomas Eveland, through a newly-created wildlife degree program at East Stroudsburg University that John helped design as a consultant to the university. The bobcat program was implemented by his friend, Dr. David Forney, through Bloomsburg University as the first wildlife-oriented graduate degree program at that institution.

## **5.2 As An Industry Ecologist**

**5.2.1 Energy and Environment.** John left Penn State to accept a position with Westinghouse Electric Corporation in Pittsburgh as a senior scientist, ecologist, and project manager. During the next six years, John organized, conducted, and directed scientific research on ecology, environmental systems, and energy development throughout North America. Disciplines included wildlife and plant communities, geology, hydrology, aquatic ecology, water quality, endangered species, and fossil fuels and alternative fuels development (including mining and reclamation, generating station siting and construction, resource transportation, power production, and energy

