

**Part V. Deer Management Policy and Institutional Structures
Necessary for Carrying Out Deer Management
from an Ecosystem Perspective**

Chapter 13. Deer Management Policy and Administration in Pennsylvania

Chapter 14. Toward Management Solutions

Chapter 15. Hunter Satisfaction

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Development*

Chapter 17. Planning for the Long Term

Chapter 13. Deer Management Policy and Administration in Pennsylvania

In this chapter, which is more Pennsylvania-specific than most of the earlier chapters, we explore who has authority to regulate deer numbers, who is ultimately responsible for deer policy in the state, and the recent history of deer management in Pennsylvania.

Introduction

There is a broad consensus that deer densities in Pennsylvania are too high from the forest ecosystem perspective, a position accepted by some members of the Pennsylvania Game Commission (P.G.C.) staff,¹ at times by P.G.C. commissioners themselves,² and by much of the public at large.³ A statewide survey of randomly selected Pennsylvania households conducted in December 2003⁴ indicates that 74% of respondents are at least somewhat familiar with P.G.C. and 64% are aware of Pennsylvania's deer program. Approximately 19% of respondents indicated that they hunt and 81% supported or did not disapprove of hunting. This level of support for hunting agrees with a 1996⁵ survey conducted by Responsive Management (Harrisonburg, Virginia) on behalf of P.G.C. in which 84% of Pennsylvania respondents supported or did not disapprove of hunting activities. When asked to rate their level of agreement with potential goals on a 10-point scale (with 10 signifying complete agreement with the goal),⁶ respondents' top-ranked goals were "manage deer herd numbers to promote healthy and sustainable forests" (average score 7.5) followed by "manage deer herd numbers making minimum conflicts with humans" (6.4). In the same survey, "manage deer herd numbers making hunting activities the priority" was ranked as lowest in priority (5.9). Predictably, hunters and anglers placed higher importance (7.1) on promoting hunting activities than respondents who did not hunt or fish, but they also gave a higher rank to promoting forest health and sustainability (7.8).

P.G.C. over the years has set goals to reduce deer densities and implemented programs to achieve those ends (e.g., "bonus tags"). However, recently the agency has apparently abandoned the idea of being bound by the goals that it had established and announced in public documents (which we discuss later in this chapter). As a result, deer densities are now 40% to 120% higher than the goals set in 1979,⁷ when target numbers were set for geographical units "at the maximum number of deer that the forest can support over winter without adversely affecting tree regeneration."⁸ This departure of actual deer numbers from science-based goals has occurred while P.G.C. policy decisions have deviated sharply from the recommendations of staff biologists.⁹

We discuss in this chapter two distinct types of target numbers for deer densities (see box on next page for a description of how deer densities are estimated). The first type of target is based

Estimating deer densities

Numerical harvests and the sex and age composition of the harvest are the primary sets of data used in population models or formulas to estimate deer densities in Pennsylvania.¹¹

Model estimates are supported by independently derived field indicators,¹² including deer-vehicle collisions, estimated at 80,000 to 100,000 per year in Pennsylvania,¹³ and agricultural damages for the average farmer exceeding \$9,000 per year.¹⁴

on the sustainability of the deer herd and commercial timber trees; an example is the set of numbers prescribed in 1979 for individual deer management units,¹⁰ which are not based on wider ecological

concerns such as those that would be addressed by the A.R.M. program presented in earlier chapters. We refer to these as the “1979 deer-density targets.” These historical targets have never been met in practice, and in fact the trend has been opposite to the direction desired, with deer numbers increasing rather than falling. However, the 1979 targets do represent a near consensus, notwithstanding the difficulty that was experienced in reaching agreement on them. In our view, deer densities should be reduced to the 1979 targets even though they are not ecosystem-based and irrespective of any decision to manage deer from an ecosystem perspective. If P.G.C. cannot achieve the consensus targets, then there is little hope of implementing a system of managing deer from an ecosystem perspective.

The second set of deer-density targets — discussed implicitly in earlier chapters — are hypothetical; they are to be based on ecosystem considerations that take into account the restoration and preservation of forest structure and function. Should P.G.C. adopt such an ecosystem approach, these targets might be estimated at the start of an A.R.M. process and updated based on subsequent experience as described in earlier chapters. Thus, there are two distinct, but related, questions that are posed in this chapter and addressed in Chapter 14: (1) What needs to be done to help P.G.C. meet the 1979 targets, which were based on considerations of deer health and tree regeneration? (2) What would need to be done if P.G.C. wanted to move toward managing deer from an ecosystem perspective?

The obstacles to meeting deer-density targets appear to be sociopolitical. A majority of sportsmen have never fully understood the relationship between deer population and habitat condition,¹⁵ despite education efforts initiated in the 1950s¹⁶ and intensified in recent years.¹⁷ Even though recommendations for deer management (e.g., seasons and bag limits) presented to administrators by P.G.C. staff members have been science-based and formulated with respect to established policy, management decisions have deviated from both scientific recommendations and established policy.¹⁸

The inability of P.G.C. and Pennsylvania’s leaders to reduce deer densities, despite repeated attempts to do so, dates from well before 1979. Within 20 years after the agency was created, deer densities in north-central Pennsylvania were above what agency biologists considered

acceptable given habitat conditions.¹⁹ Articles in *Pennsylvania Game News* over the past 70 years have pointed out the problem of high deer densities and resulting habitat degradation.²⁰ It is clear that, in Pennsylvania, we have been unable to take control of the deer population for the last 70 years.

Over the past few years, P.G.C. has implemented a highly successful education campaign among hunters that, along with demographic shifts, has helped produce the change in hunter attitudes revealed in survey data (which we review later in this chapter). Measures enacted in recent years by P.G.C. appear to have brought about a plateau in deer numbers, which previously had always been rising, and staff biologists projected a 5% decline in most wildlife management units (W.M.U.s) in 2004.²¹ These measures include increased antlerless deer harvest permits, a concurrent buck and doe season, an October hunting season for seniors and juniors, and the Deer Management Assistance Program (DMAP), a program to increase the number of tags allocated on specific land units at the owner's request (see Table 10 on next page for additional details).

These measures, taken at a time when there is a critical need for scientific leadership and a strong focus on wildlife management, do not represent fundamental changes in a structure that functions largely as a law enforcement agency (a crucial point discussed later in this chapter). However, the fact that relevant action has been taken at all indicates that deer management in Pennsylvania is at a historic transition point. These recent developments either could blossom into a shift to managing deer from an ecosystem perspective taking into account a range of stakeholder views, or they could be rescinded, with the agency falling back into a business-as-usual mode, letting concerns about hunters' reactions to change lead to management paralysis and the continuation of high, forest-damaging densities of deer.

The challenge for P.G.C. and the oversight levels of government — the General Assembly and the Governor's office — is to manage the perceived conflict between those hunters who want to continue seeing as many deer as are now in the woods and other stakeholders who have an interest in lower deer densities. Another issue P.G.C. has to deal with while lowering deer densities is the inherent fiscal quandary associated with any reduction in hunter satisfaction. Deer management in Pennsylvania has focused on deer numbers, deer condition, and hunter satisfaction rather than on broader ecological goals. P.G.C.'s organization is similar to that of a recreation commission designed to address the recreational needs, desires, and wants of its service base, consisting of deer hunters. The agency is administered by hunters, staffed by hunters, and funded by hunters, and views its mission as protecting the interests and traditions of hunters. Nearly 95% of those hunters hunt deer as their primary game species. Nearly 95% of P.G.C.'s funding comes from hunting license sales, taxes on hunting equipment, and timber sales on lands purchased with hunter dollars. Any program changes that might reduce deer hunter satisfaction and participation threatens the organization's funding base. The end result is that one

of the prime considerations in reaching deer management decisions is how a decision may affect recreational user fees.

One option is to use techniques of negotiated conflict resolution to manage potential conflicts that may arise, once deer numbers begin to come down. Ultimately, however, if such techniques are not successful, government leaders are going to have to make some tough choices, recognizing that the forests of Pennsylvania belong to a broad constituency and that hunters unsympathetic to ecosystem management represent only 11% of Pennsylvania hunters.²²

Table 10. Changes in Pennsylvania's deer management program most pertinent to the ability to achieve density goals.²³

1957	Antlerless seasons offered annually
1979	Deer density goals established based on forage availability
1987	Bonus and surplus licenses
1990	Deer-damage farm program
1992	Archers added to the antlerless allocation system
1993	Archery seasons extended two weeks in the fall
1994	Community/urban deer program
1995	Agricultural depredation permit program
1997	Bonus licenses eliminated
1998	Formed the Deer Management Work Group
1999	Accepted recommendations of the Work Group
	Established new Deer Management Section, headed by Dr. Gary Alt
	Conducted a series of public open houses on deer management
2000	Implemented concurrent buck/doe season for youth and senior hunters
	Approved three-day October muzzleloader antlerless season
	Opened antlerless season on the last day of buck season
	Initiated conception and survival studies of fawns
2001	Implemented two-week concurrent buck/doe season
	Implemented one-week October muzzleloader antlerless season
	Implemented three-day October antlerless hunt for youth and senior hunters
	Completed antler measurement and fawn survival studies

	Cooperated with a study of hunter movements on public lands
2002	Produced educational video and distributed over 30,000 free copies
	Adopted higher minimum antler-size restrictions
	Increased antlerless deer harvest license allocations to one million tags
	Began buck survival, harvest rate, and dispersal research
	Conducted stakeholder session on goals and objectives
	Proposed new deer management units
	Proposed Deer Management Assistance Program
2003	Implemented a limited Deer Management Assistance Program (DMAP) for landowners enrolled in P.G.C. public access programs
	Changed geographical units for administration and planning to 21 ecologically based wildlife management units
	Continued buck field research
2004	DMAP expanded to include most private lands in Pennsylvania
	Crossbow use expanded, particularly in urban W.M.U.s

Currently, the foundation of P.G.C.'s Bureau of Wildlife Management rests on a species-specific management approach, rather than one that focuses on managing habitats or ecosystems. Adopting a program of managing deer from an ecosystem perspective is an alternative that would provide both advantages and challenges for P.G.C. Ecosystem considerations would likely lead to recommendations that deer densities in some parts of the state should be reduced below 1979-target levels — targets that have never come close to being reached. Reaction among some hunters would be quite negative even if other hunters were part of the stakeholder process for working out the details. On the positive side for P.G.C., adoption of a policy of managing deer from an ecosystem perspective would make a reality of the senior staff's vision of being a "leader in conservation."²⁴ Such a policy would also provide a new set of arguments for encouraging landowners to allow hunter access, perhaps helping to slow the increasing tendency of landowners to post their lands, which has been a growing concern for hunters and P.G.C.

A program of A.R.M. could fill major gaps in the efforts of P.G.C. staff members to bring deer densities more in line with biological (deer health and condition) and ecosystem targets. A.R.M. could be especially helpful in resolving the argument about the relevance of acid rain in causing forest damage, which some in P.G.C. believe is a major obstacle to hunter acceptance of the need to reduce deer densities. It could help in setting targets for deer density based on ecosystem biology. A.R.M. could also help to resolve differences that may arise in future

stakeholder dialogues and negotiations. This report itself could provide part of the background material used by stakeholders. However, it would be wholly inappropriate to let a program of A.R.M. or stakeholder negotiations end up delaying efforts now planned or in progress that have already been scientifically justified.

Despite the signs of change that we have mentioned, there are sociopolitical and bureaucratic obstacles in the way of P.G.C. moving significantly away from single-species management to a policy grounded in ecosystem considerations. Senior P.G.C. staff members argue that they have done all that is possible in the current political climate. While we find there are many more measures that the P.G.C. staff could and should implement (discussed in Chapter 14), we do not minimize the sociopolitical constraints under which P.G.C. staff members must operate. Nor do we doubt that it took leadership to implement the recent staff-initiated changes to hunting seasons, permit allocations, and the fledgling Deer Management Assistance Program. The obstacles are so great that it is not even clear that these measures will last. No one to whom we have talked is optimistic, given the current management structure and commissioner appointment system, that the measures that have brought deer populations to a plateau will survive the counter-pressures that are likely to build when deer numbers start to come down.

Therefore it is not likely that P.G.C. on its own, without persistent pressure and support from the Governor's office and the General Assembly, can finalize the shift from a law-enforcement agency to a resource conservation agency — a long overdue change that has shown signs of beginning under the current leadership. It would be naïve, in light of the long history of failure to bring deer numbers under control, to think that such changes can be made without major reallocation of agency resources to the biology section and without staff retraining. It would be equally naïve to believe that necessary changes can be made without a majority of the P.G.C. commissioners viewing their constituency as all of the citizens of Pennsylvania and without the appointment of commissioners who feel a strong responsibility for protecting Pennsylvania's forests.

Management of deer from an ecosystem perspective cannot become policy without cooperation between government leaders, external stakeholders, and P.G.C. commission and staff. The need for change is so great and the obstacles so formidable that radical options need to be on the table. Guidance should be sought from the experiences of other states. Likely “counterrevolutionary” reactions need to be anticipated and effective responses considered. Totally new approaches need to be explored, including those that may come out of facilitated negotiations among hunters, forest conservationists, and other stakeholders. In order for this document to contribute to finding ways of overcoming past stumbling blocks, it is necessary to explore in depth the possible causes for the failure to control deer densities and potential solutions. To this end, in the sections that follow we present background information on

the regulatory structure in Pennsylvania, the regulatory authority under which deer are managed, and the past and present policies established by P.G.C. to manage deer. We also discuss the successes and failures of efforts by P.G.C. both to control deer numbers and to move away from single-species management. We analyze the key lessons from past reviews of P.G.C. that have identified structural problems with deer management in Pennsylvania.²⁵ We also explore the extent to which P.G.C. has responded to, and corrected, problems identified in past reviews. Finally, we explore changes to decision making, legislation, staffing, and regulation that might assist P.G.C. in moving away from single-species management towards implementing ecosystem-based management of deer.

Background information on regulatory structure and authority

Regulatory structure in Pennsylvania

Unlike any other state, Pennsylvania's management of wild animal species (by statute, including all vertebrate and aquatic invertebrate species) is divided between two agencies, the Pennsylvania Game Commission (P.G.C.) and the Pennsylvania Fish and Boat Commission (P.F.B.C.), with neither agency having direct-line reporting to the Governor or a cabinet-level secretary.²⁶ Wildlife management rules and regulations for animal species are approved by P.G.C.'s Board of Commissioners, members of which are appointed by the Governor with approval by two-thirds of the state Senate required for confirmation. The commissioners, not the staff, set seasons, bag limits, and antlerless deer harvest permit allocations. The Governor can replace commissioners. There are no eligibility qualifications specifically regarding education or experience in natural resource management to be a commissioner. Without such backgrounds represented among the majority of commissioners, it may be difficult for the Board to interact productively with staff biologists and to communicate to the public at large about the need for, and scientific basis of, ecosystem considerations for deer management.

The management of state parks and state forests is the responsibility of the cabinet-level secretary of the Department of Conservation and Natural Resources (D.C.N.R.) appointed by the Governor. No state agency has jurisdictional responsibility for terrestrial invertebrates, and the Pennsylvania database on the status and known locations of endangered and threatened species is housed within D.C.N.R., an agency with no regulatory authority over wildlife. The Wild Resource Conservation Fund, a state government entity created to fund wildlife education, research, and protection efforts, with an emphasis on endangered and threatened species, is separate from P.G.C. and P.F.B.C. and is housed within D.C.N.R.

P.G.C. and P.F.B.C. are self-supporting through hunting and fishing license sales and other self-generated revenue; they do not receive any funding from state tax revenues. The Wild

Resource Conservation Fund is funded from D.C.N.R. Growing Greener appropriations, vehicle license plate sales, and a voluntary income tax contribution. D.C.N.R. is funded by legislative appropriations from the general fund, fees, royalties, and lease payments.

How does this situation compare to other states? There are two basic types of fish and wildlife agencies in the United States: independent agencies, which would be similar to a combined P.G.C. and P.F.B.C, and fish and wildlife departments that are part of a broader natural resource agency, similar to a bureau within D.C.N.R.²⁷ A recent review of independent state wildlife agencies indicated that the chief administrator typically reports to a commission or board instead of the governor.²⁸ While there is a broad assumption that they are independent, in practice these agencies have strong policy and funding linkages to the governors and legislatures of their respective states.

P.G.C. is independent only in that the Board of Commissioners sets seasons and bag limits without approval from the General Assembly or the Governor. In Pennsylvania, the Governor approves the annual P.G.C. budget, often imposing limits on the staff complement and spending. Also, the Pennsylvania Commonwealth Court recently ruled that the Governor has authority to remove commissioners from the P.G.C. board.²⁹ In 10 of 24 states with an independent wildlife agency, the governor or legislature prepares the agency's budget and 13 independent agencies receive annual or biennial appropriations from their state's legislature.

As in other states, politics can influence wildlife management policy in Pennsylvania. The General Assembly and Governor must authorize increases in hunter license fees, which are the primary source of funding for P.G.C. In addition, the Legislative Budget and Finance Committee (L.B.F.C.), consisting of members from the House and Senate, is charged with periodic performance audits of P.G.C. The L.B.F.C. audits consist of reviewing revenues, expenses, and financial condition and assessing how well P.G.C. is performing in accordance with its strategic plan.

Regulatory authority to manage deer

Although there are myriad government agencies and non-governmental organizations interested in wildlife management issues, state governments are ultimately responsible for regulating the harvest of game animals and the protection of wildlife.³⁰ The federal government can establish authority over state governments through the commerce, treaty, or property clauses of the U.S. Constitution,³¹ but state governments are responsible for setting and implementing policy for the taking and protection of wildlife in nearly all situations.³²

The context for managing wildlife in Pennsylvania is defined by the state constitution and by P.G.C.'s enabling legislation. Pennsylvania's constitution states:

*The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people.*³³

It is the responsibility of the executive branch, ultimately the Governor, to ensure that the state constitution is upheld and that the commonly held resources are conserved and maintained now and for future generations.

The Game and Wildlife Code (Pennsylvania Consolidated Statutes, Title 34) is the enabling legislation for P.G.C. Section 103 states:

(a) General rule. — The ownership, jurisdiction over and control of game or wildlife is vested in the Commission as an independent agency of the Commonwealth in its sovereign capacity to be controlled, regulated and disposed of in accordance with this title.

(b) Method of management. — The Commission shall utilize hunting and trapping as methods of effecting necessary management of game, furbearer and wildlife populations.

The enabling legislation provides the foundation for the policies established by P.G.C. for managing and conserving wildlife. We note that the legislature does not give guidance to P.G.C. on two of the major issues, namely conflicts between humans and wildlife and damage to forests, that have arisen since deer populations rebounded early in the twentieth century. It would be useful for the legislature to modify the enabling legislation to specifically expand P.G.C.'s responsibilities to include resolving wildlife-human conflicts and helping D.C.N.R. and other landowners to protect forest vegetation.

Deer management policy established by P.G.C.

In this report, *policy* refers to a course of action adopted by an organization, either in writing or by public verbal affirmation, as distinguished from the administration or implementation of policy. The distinction is important because it is possible for a policy to be developed but fail to be implemented. For the purposes of this report, policy includes all mission statements, goals, rules, regulations, statutes, and laws that affect the conservation of wildlife and other natural resources in Pennsylvania. Laws are developed through the legislative branch of government (e.g., no Sunday hunting in Pennsylvania), whereas rules and regulations are developed by agencies, commissions, boards, or other regulatory groups in the executive branches of state government (e.g., seasons and bag limits).

In this section we focus on agency policy. Statements about policy that are meant to guide the adoption of rules and regulations at P.G.C. appear in various documents, which are updated or rescinded from time to time. Such documents include explicit policies or policy manuals adopted by the Board of Commissioners. There are also statements of management policy that appear as part of strategic plans and species population management plans.

In 1976, P.G.C. established a deer management policy (see Appendix F, page 339) that remained on the books until June 2003 when a new policy manual was adopted by the Board of Commissions as a routine matter, not needing a vote at a public meeting.³⁴ The new document is missing language present in the earlier policy that pledged P.G.C. explicitly to manage deer in a way that is compatible with other land uses. It is also missing (appropriately) language that committed P.G.C. to a method of management, maximum sustainable harvest, that is no longer considered scientifically valid or appropriate. In 1976, “Policy 5101 — Deer Management” stated:

- *The Commission recognizes that deer belong to all citizens of the Commonwealth and that recreational hunting is a privilege, not a right.*
- *The Commission recognizes that recreational hunting is the major use of deer. Consistent with its responsibilities to the resource and the people, the Commission will endeavor to manage deer on the basis of:*
 - (a) compatibility with other land uses,*
 - (b) maximum overall recreational opportunity,*
 - (c) maximum sustained harvest and,*
 - (d) maximum aesthetic appeal.*
- *The Commission recognizes that responsible deer management must be based on sound information obtained through continuous research and inventory.*
- *The Commission recognizes that an informed public is an enlightened public; therefore, it will continue to pursue its educational efforts concerning deer and deer management.*

The idea of managing deer for maximum sustained yield (M.S.Y.) is typical of deer management thinking in the mid-1970s when the older P.G.C. policy was enacted. We note that deer management based on M.S.Y. is actually inconsistent with managing deer in “compatibility with other land uses,” which is the first item on the above list. In fact, the deer population density compatible with many land uses in Pennsylvania is much lower than that of a population managed for maximum harvest and hunting opportunity³⁵ (see Chapter 11).

In the mid- to late 1970s, scientists recognized that maximum sustained harvest was a management objective that could not be implemented in practice.³⁶ The concept of maximum sustained yield starts from a simplifying assumption that a habitat has a limited, relatively stable

carrying capacity for each animal population, and applies basic principles of population biology to conclude that population numbers maintained at about one-half M.S.Y. will provide the greatest number of animals available for annual harvest. Although the part of the theory that deals with population dynamics has a solid quantitative foundation that has been well studied³⁷ (see Chapter 11), M.S.Y. has not proven to be applicable to real-world situations because a habitat's carrying capacity for a population cannot be measured and is rarely, if ever, stable. For instance, when deer or other herbivores increase in abundance their effect on the habitat (e.g., increased browsing of vegetation) can change its carrying capacity (see box on page 16). There are many examples where attempts to manage populations at M.S.Y. have not succeeded.³⁸

The new policy manual approved by the Board of Commissioners in 2003 gives no guidance on the paradigm that should replace maximum sustained harvest. Forum members believe that in Pennsylvania managing deer from an ecosystem perspective should replace maximizing sustained yield, because there is scientific consensus that M.S.Y. management has allowed deer to have significant negative impacts on Pennsylvania's natural resources.

The M.S.Y. approach adopted by P.G.C. in 1976 is similar to an agricultural paradigm that strives to produce the maximum annual surplus, in this case deer for hunters to harvest.³⁹ Deer density goals were derived from studies that estimated how many deer the forest could support during the winter without overbrowsing important commercial tree species.⁴⁰ There was no ecological foundation identified in this policy that considered other wildlife species, habitats, or biodiversity even though many studies have demonstrated the adverse effects deer can have on forest structure, species diversity of other animals and of plants, and ecological processes⁴¹ (see Chapter 5).

Because the new policy manual is devoid of guidance on how to manage wildlife, we must turn to staff documents to get an idea of current management ideas within the agency, in particular to strategic plans and deer population management plans.

The most recent strategic management plan (2003-2008)⁴² has the following mission statement:

To manage all wild birds, mammals and their habitats for current and future generations.

In this statement, there is an implicit recognition of the importance of diversity of wildlife and their habitats; also the need to protect and conserve them. The inclusion of "habitats" as targets of management action appears to be a nod to the idea that single-species management plans are too limiting. This statement replaces a longer statement in the previous strategic plan, adopted in 1998, which explicitly mentioned protecting and conserving the diversity of wildlife and their habitats.⁴³

As the agency charged as steward of the Commonwealth's wild birds and wild mammals for the benefit of present and future generations, the Pennsylvania Game Commission will:

- *Protect, conserve and manage the diversity of wildlife and their habitats,*
- *Provide wildlife related education, services and recreational opportunities for both consumptive and non-consumptive uses of wildlife, and*
- *Maintain and promote Pennsylvania's hunting and trapping heritage.*

A major strength of the 1998 strategic plan was the establishment of an objective to reduce and maintain deer population densities to within 20% of the management unit goal approved by the Commission in the late 1970s.⁴⁴ Unfortunately, as discussed earlier, this policy was not implemented; in fact, the statewide deer herd has increased by more than 20% since 1998.⁴⁵ The current strategic plan (2003-2008) only mentions deer in relation to diseases and improving the deer and elk fencing program.⁴⁶ P.G.C.'s current deer population management plan, which is a subdocument of the strategic plan, does not contain any numerical targets either.⁴⁷ So, even though deer numbers have increased above levels long considered to be too high, there is no deer density target in the new strategic plan to which P.G.C. can be held accountable.

It is not that P.G.C. has said that past targets were scientifically wrong. In fact, the current population management plan states that "there are approximately twice the number of deer in Pennsylvania than can be supported during the winter without overbrowsing forested habitats." It appears that the omission of numerical goals is a result of political considerations, not scientific ones. A recent review of deer management concluded that P.G.C.'s inability to achieve deer density goals was because of sociopolitical factors rather than a lack of scientific knowledge.⁴⁸

Thus, based on explicit policy guidance in public documents alone, the situation today is alarming. Currently P.G.C. is no longer explicitly committed to reducing deer numbers, despite the 20% increase over levels that were already too high in 1998 when they ranged from approximately 50% to 100% over targets set in 1979.⁴⁹ The main strategic planning document of P.G.C., developed by senior staff members, does not acknowledge that high wildlife populations can be a problem for ecosystems nor concede that the agency has failed to bring the deer population in line with past targets.⁵⁰ When senior staff members focus only on successes and fail to publicly acknowledge past problems, the agency risks losing credibility with its staff, the public, and its stakeholders. In contrast, the deer population management plan⁵¹ and the P.G.C. web site do discuss the negative impact of deer on forest vegetation. This divergence in acknowledgment of deer problems sends a mixed message about the need for ecosystem considerations in managing deer, possibly because of an ongoing debate within the staff and Board of Commissioners about the future of the agency. It appears that P.G.C. is in the midst of

establishing a new paradigm for managing deer and ambiguities and omissions in the planning documents still need to be reworked.

Removing explicit deer density targets from strategic plans is not the answer to an inability to meet previously established targets. Doing so only serves to mask the urgency of the situation and deflate the pressure to take significant action. It hides from frank consideration a historical failure to protect habitats and silvicultural resources — a nonachievement so long-running and consistent that it suggests a compelling need for creative changes to the regulatory system. We hope that the strategic planning document will be revised to endorse specific numerical targets and to mention the goal of moving towards consideration of ecosystem factors. However, we strongly recommend that P.G.C. first bring deer densities in line with its own goals established in 1979⁵² and then refine the management model to embrace ecosystem management concepts.

A key source of information about how the agency currently proposes to manage deer is its “Population management plan for white-tailed deer in Pennsylvania (2003-2007).”⁵³ P.G.C. developed this new plan with input from stakeholders, which represents a first step in moving beyond single-species management. Stakeholders involved in providing recommendations and prioritizing goals and objectives for the deer population management plan suggested that P.G.C.’s number-one goal should be “to improve the health and sustainability of the ecosystem.” This recommendation from the stakeholder group agrees with findings from a statewide survey of randomly selected Pennsylvania households conducted in December 2003.⁵⁴ Respondents’ top-ranked goals were “manage deer herd numbers to promote healthy and sustainable forests” followed by “manage deer herd numbers for minimum conflicts with humans.” In the same survey, “manage deer herd numbers making hunting activities the priority” was ranked as lowest in priority on average across all respondents. Hunters and anglers placed more importance on promoting hunting activities than respondents who did not hunt or fish, but they also ranked their top priority, promoting healthy and sustainable forests, higher than did the general population. It is noteworthy that P.G.C. reprioritized the goals in the deer population management plan, placing managing deer to promote ecosystem health at the bottom of the list.

The deer population management plan stated:

*Deer affect and impact people in countless ways, both positively and negatively. This is the fundamental dilemma that overshadows a majority of Pennsylvania's deer management decisions. Our goal is to do what's best for the resource and the Pennsylvanians who seek them, unintentionally interact with them, or suffer damage from them. The need to balance these important considerations is the primary reason for developing a deer management plan.*⁵⁵

There is no explicit recognition in this statement of the value of other species and P.G.C.’s responsibility for them, but because there are stakeholders with an interest in biological diversity,

there is implicit recognition, at least, of the need to consider the impacts of deer on ecosystems in any balancing exercise.

Under P.G.C.'s Deer Management Assistance Program (DMAP), which gives landowners extra permits, the balancing could be done by the individual landowner. In fact, one of the 2003-2007 objectives in the population management plan is to "revise the Deer Management Assistance Program ... to allow all landowners to achieve their land-use objectives." Turning over more decision-making authority to landowners concerning deer densities on private property is a major recent shift in P.G.C. policy. The purpose of DMAP is to provide landowners with the potential to keep deer populations in balance with their land-use goals. The concept was endorsed by the Deer Management Work Group, which called for deer management based on landowner goals and values, as well as P.G.C.'s Deer Stakeholder Group, which stated that P.G.C. should "provide public and private landowners with the deer management tools they need to achieve their land use objectives."⁵⁶

DMAP would not affect lands where landowners do not wish to take on the administrative burdens of DMAP or where landowners allow hunting to take place under P.G.C.'s default regulations but are uninterested in DMAP. Furthermore, research has shown that the majority of hunters do not hunt beyond about one-third mile from a road,⁵⁷ which means that roadless areas are also out of DMAP's reach. P.G.C. staff members are exploring a new option to deal with non-DMAP lands, namely, taking guidance from a citizen task force in setting deer population goals in each management unit.⁵⁸ If adopted, this approach might turn out to be P.G.C.'s alternative to the agency setting target goals on its own as it did in 1979 and 1998. However, it is not clear at this point whether a broad and balanced set of stakeholders could be found for every W.M.U. or how P.G.C. would deal with local community values and goals as they relate to state and federal public lands. The only other management principle we could identify in the 2003-2007 deer population management plan involves the role of hunting and P.G.C.'s willingness to go beyond regular hunting seasons to manage deer herds:

We will continue to use hunting as the principal method for controlling deer numbers and deer impacts in the Commonwealth. (p. 21)

At times, when regular hunting seasons prove insufficient or ineffective in adequately managing deer herd numbers, special laws, regulations and programs will be used to facilitate the taking of additional deer. (p. 22)

At the end of the document, three goals and a number of objectives related to the goals for the 2003-2007 period are listed, two of which we have already discussed. Several are consistent with recommendations in our report. In fact, information presented in this report (e.g., on indicators and A.R.M.) should be helpful to P.G.C. in reaching some of the stated objectives. In the following paragraphs we list the three goals with our comments.

GOAL 1: MANAGE FOR A HEALTHY DEER HERD

Objective 1.1: Identify a suite of population condition indices that will evaluate the health of deer populations and monitor trends in indices in each Wildlife Management Unit through 2007.

Objective 1.2: Implement management programs to control disease risks and surveillance programs to detect diseases that potentially could threaten the health of statewide deer populations, humans, or livestock in Pennsylvania and implement strategies to minimize disease transmission by 2004.

Goal 1 reinforces the concern that the focus of the P.G.C. deer management program may continue to reflect a single-species management approach based on a “density-dependent theory” (see Chapter 11), which uses deer health as a reflection of ecosystem condition rather than more direct measures of deer impact.

GOAL 2: REDUCE DEER-HUMAN CONFLICTS

Objective 2.1: Develop seasons, bag limits, and hunting methods that enable landowners to achieve their deer management and/or land-use objectives through 2007.

Objective 2.2: Provide direct technical assistance for administering deer management programs to interested landowners by 2003.

Objective 2.3: Evaluate the feasibility by June 30, 2004 and, if deemed feasible, implement a citizen task force (CTF) approach to setting deer population goals in each management unit.

The first objective could play a major role in bringing deer numbers down on millions of acres within the state where such reductions are desired by landowners. DMAP is one component of implementing this objective.

Regarding the third objective, the failure to commit to targets for reduction of statewide deer densities is an indication that citizen task forces, even if found to be feasible and implemented, would not result in a change from the status quo. Ultimately, the Commissioners have to sign off on any final deer density targets. Will they do so if a citizen task force comes forward with recommendations that numbers of deer be reduced? P.G.C. did not accept the recommendation from the Deer Management Plan stakeholder group to make managing deer to promote healthy forests a high priority. Will the P.G.C. staff spend another 20 years trying to perform a balancing act in each W.M.U. between biological and sociopolitical factors, only to throw up its hands in frustration yet again? If the past is any guide to the future, this is a likely scenario. Even if P.G.C. were to shift to a policy of gathering guidance on setting deer density targets from citizen task forces, there should be target levels proposed for each W.M.U. that would give each task force a starting point. However, at this point there are no such citizen task forces and it is unknown

whether they ever will exist, let alone produce useful input to P.G.C. Therefore, P.G.C. should set target levels now, without waiting for the formation of citizen task forces; targets could be modified later based on public input.

*GOAL 3: MANAGE DEER TO MAINTAIN, AND WHERE APPROPRIATE,
RESTORE THE HEALTH OF THE ECOSYSTEM*

Objective 3.1. Identify a suite of plant and animal species to serve as feedback loops for evaluating the impact white-tailed deer have on wildlife communities and establish achievable goals for the suite of species for each Wildlife Management Unit by 2007.

Objective 3.2. Inform and educate all interested Pennsylvanian's about deer management issues, the role deer have in Pennsylvania ecosystems, and the importance of regulated hunting in managing deer herds throughout the Commonwealth.

Although the first objective has similarities to recommendations in our report about indicators, there are major differences. We do not think there is a need to evaluate the impact white-tailed deer have on wildlife again from scratch. As the discussion in this report makes clear, there already is an overwhelming amount of evidence that white-tailed deer adversely affect forest communities in many ways and, in some cases, severely. This objective could lead to P.G.C. trying to re-invent the wheel, potentially resulting in decades of lost time. It is our view that indicator suites are useful for resolving disputes over management policies in an adaptive resource management program. As written, the objective does not indicate that management steps will be taken, based on existing knowledge, in an adaptive framework. That may have been implied in the objective by the use of the phrase “feedback loop,” but it should be made explicit.

We also note that it is very difficult to assign goals for a suite of species (see Chapter 9). We have concluded that the best one can do at this time in most cases is specify the direction of the change that is desired, leaving the actual target level to subsequent study groups.

We are also concerned that the failure to reduce deer densities in the past makes it hard to believe that Goal 3 can be achieved without major changes to the ways deer are managed and decisions are made about deer, including changes in the viewpoints of the majority of commissioners. If implemented, the Goal 3 objectives, even though they are important first steps, will not by themselves protect a single area. We also question whether P.G.C. has the in-house expertise at this time to make progress on this goal, with or without the use of consultants; progress may hinge on the agency expanding its skill mix by adding to its professional staff.

Although there is no explicit statement of the policy foundation on which the three goals are grounded, the language makes clear that the underlying policy commits the agency to deal with the issues that affect stakeholders, including non-hunters. As has already been mentioned, it may

be useful for the legislature to modify the relevant enabling legislation, expanding P.G.C.'s responsibility to include resolving wildlife-human conflicts and controlling deer damage to trees, other vegetation, and biodiversity. Without such a legislative mandate, it may be difficult to keep many of these goals operational. Although it is not explicitly stated in policy documents, based on our discussions with staff members and commissioners it appears that increasing the buck/antlerless deer ratio from its present low point appears to be the crux of P.G.C. efforts to bring deer densities in line with deer health and condition goals. Increasing the buck/antlerless deer ratio draws strong support in surveys of hunters,⁵⁹ although whether new regulations result in a sufficient increase in the deer harvest to reduce deer densities and whether the willingness of hunters to trade an increased proportion of antlered deer for fewer deer overall is not known.

Of all the new measures initiated in recent years by P.G.C. the most intricate is DMAP, which shifts some responsibilities away from P.G.C. for choosing deer densities, transferring it to landowners who can apply for additional permits for use solely on their properties. If it were to work effectively, DMAP might allow P.G.C. to satisfy those landowners clamoring for reduced deer densities on their properties while freeing the P.G.C. commissioners every year from the unpleasant task of deciding on permit numbers. Several obstacles stand in the way, however. First, most of Pennsylvania's land is privately owned and the vast majority of landowners do not understand the ecological impacts of overabundant deer. Thus, most of Pennsylvania's land will not benefit from any science-based application of DMAP. Further, the current program is administratively complex. Even if improved, it is unlikely that anyone but large landowners will accept the administrative burdens and make use of it, leaving most of the state unaffected. DMAP will not eliminate the need to set seasons, bag limits and antlerless allocations. Few hunters are criticizing DMAP on private land but some sportsmen's groups oppose it on state lands. Political pressure to keep deer numbers high on state lands will not disappear under DMAP.

There are other more subtle concerns about DMAP. The existence of the program may ease pressure on the commissioners for more far-reaching and effective reforms. Even on the small proportion of the state's lands where DMAP is expected to be used, additional deer removals are likely to serve primarily to replace existing fencing on timberlands, reducing costs to the landowners but producing little net benefit to the overall state of the forests across Pennsylvania. DMAP is to some extent a policy of transferring decision-making responsibility from P.G.C. to landowners. The only way that the program will support ecosystem management is if P.G.C. develops a science-based ecosystem management program and provides advice to DMAP landowners on achieving and sustaining deer densities that are compatible with conserving forest structure, diversity of animal and plant species, ecological processes, and ecosystem function.

How P.G.C. deer management policy affects management of other natural resources: an example

D.C.N.R. is responsible for managing 2.1 million acres of state forests and 250,000 acres of state parks. In managing these lands, the agency is responsible for sustaining the species diversity of native flora and fauna and the integrity of ecological communities and processes. To help assure that management deliberations consistently take place within an ecosystem perspective, D.C.N.R. has established the Office of Conservation Science and the Ecosystem Management Advisory Committee to provide guidance to managers and planners within the department. This may signify a significant early step by D.C.N.R. toward ecosystem management, although it is too soon to evaluate its overall effectiveness.

In 1998, D.C.N.R.'s state forest system was evaluated by Scientific Certification Systems, an international certifier of sustainable forest management operations accredited by the Forest Stewardship Council. The resulting report noted that "B.O.F.'s [Bureau of Forestry's] silvicultural systems are dominated and severely limited by the challenges of overabundant deer" and that "the Bureau's operations are so focused on the immediate challenges of overabundant deer that they have failed to adequately address other potential long-term threats to forest health."⁶⁰ Again we note that the deer population in Pennsylvania has increased by more than 20% since 1998, when this report was released.

D.C.N.R. received Forest Stewardship Council certification in 1998, but with conditions to be met before becoming recertified in 2003. One condition was that:

*Steady and continuous progress will be made by the Commonwealth of Pennsylvania to develop and implement a deer management program that shifts from the current nutritional carrying capacity paradigm to one of diversity carrying capacity. This shift will view deer herbivory as a natural process to be managed within the parameters of sustainable forest management, biodiversity conservation, and forest economics.*⁶¹

In managing the state forest system D.C.N.R. faces a dilemma. A separate, independent agency (P.G.C.) has jurisdiction over one natural resource (deer) that has powerful repercussions for the management of other natural resources (forest communities and plant species) under D.C.N.R.'s authority. The Forest Certification Report acknowledged this situation: "The Evaluation Team ... is cognizant that the Bureau has no regulatory authority over the deer resource on its own lands and is dependent upon the Pennsylvania Game Commission for management decisions that balance deer numbers with forest health issues."⁶² Deer-browsing effects in the state forests today are even more severe than they were six years ago when the Scientific Certification Systems report was released.

D.C.N.R.'s state forest system was reevaluated by Scientific Certification Systems in 2004. The resulting report states that "[b]rowsing and grazing by an overabundant deer herd has resulted in reduced diversity (current and future) of herbaceous, shrub, and tree species seedlings that will result in reduced species composition and abundance of the next and succeeding floral communities. The current ubiquitous understory of hay-scented fern on the majority of the State forests bears testimony to this reality."⁶³ The report concludes:

It is doubtful that the political situation (influence of the majority of hunters, and majority of Commissioners on the Board of the P.G.C. against reductions of deer density) will change sufficiently in the future to assure that deer density will ever be reduced to ecologically sustainable levels within District [state] Forests if the mechanism for this reduction is deer harvest regulations as currently promulgated by the P.G.C. Therefore, impact by an overabundant deer herd will continue to decimate diversity and sustainability of flora and fauna on District Forestlands in spite of planning efforts by the B.O.F. unless regulations allowing more liberal harvest of antlerless deer on District Forestlands are provided to the B.O.F. Scenarios that would allow this to happen include: (1) enhancement of DMAP regulations, designed by independent, third-party scientists and natural resource managers, that allow more liberal harvest of antlerless deer on District Forestlands, and are granted to the B.O.F. on a continuing and contingency basis by the P.G.C. Commissioners; (2) legislative fiat, whereby administration and control of deer hunting regulations on District Forests are transferred from the P.G.C. to the B.O.F., or to its parent agency, the Pennsylvania Department of Conservation of Natural Resources (D.C.N.R.); or, (3) P.G.C. is merged with the D.C.N.R. in a combined natural resource agency and control of hunting regulations is overseen by a more balanced representation of natural resource interests, instead of the current situation where regulations are subject to the pressures exerted by the P.G.C.'s only paying constituents, hunters. It is understood that there will be a certain lag time between reduction in deer density and improvement in recovery of understory structure and diversity.⁶⁴

The objectives expressed in the 2003-2007 population management plan with respect to DMAP are consistent with the first scenario, redesign of DMAP regulations by independent scientists and natural resource managers to allow sufficient harvest of antlerless deer on state forest lands to achieve and sustain desired deer population levels. Some revisions to DMAP have already been made, which P.G.C. staff members believe are sufficient to solve D.C.N.R.'s problems. For instance, allowable permits per contiguous tract of land in a single ownership have been increased. However, the new change does not allow D.C.N.R. to concentrate hunting effort on the specific areas where it is most needed by moving its most effective hunters from area to

area to take multiple deer. The Scientific Certification Systems report concludes that the current DMAP structure likely will result in little to no net decrease in deer density or impact within state forests. For DMAP to have a chance at bringing about a meaningful reduction of deer density and impact in state forests, according to the report, three things must happen: (1) the convoluted process by which hunters apply for and receive licenses to harvest antlerless deer within DMAP units must be streamlined, as it is for example in New York;⁶⁵ (2) hunters must be able to apply for and receive multiple licenses for individual DMAP units (current Pennsylvania regulations permit only one license per hunter; other programs such as New York's allow more than one); and (3) hunters must somehow gain access to areas remote from roads.⁶⁶ Failing any one of these conditions will likely result in failure of DMAP to reduce deer density and impact sufficiently to protect biodiversity and forest regeneration on state forest lands.

As we have stated several times, despite the numerous changes made in deer management over the years, the statewide deer population is now over 20% larger than in 1998,⁶⁷ which even then was far too high from the perspective of deer health and condition, let alone ecosystem considerations. What are the roots of this 70-yearlong failure to control deer numbers? As part of our effort to explore this question, we turn to outside reviews of P.G.C.

Lessons to be learned from external reviews of P.G.C.

The Legislative Budget and Finance Committee audits the P.G.C. budget every three years. The audit focuses on the agency's progress in achieving goals as well as reviewing the budget and finances. The 2000 audit reported that P.G.C. had not made a systematic and concerted effort to implement its 1998 strategic plan, and that the plan itself had "numerous deficiencies."⁶⁸ In another review issued in February 2003, L.B.F.C. noted that "strategic planning is not yet a significant factor in guiding Game Commission operations, programming, and fiscal decision making."⁶⁹ The report also noted that one of the plan's objectives called for providing seasons and bag limits that provide "socially desirable recreational opportunities, but are commensurate with sustainable wild game populations," but that there were no measures in place to gauge attainment of this objective.

Another objective stated in P.G.C.'s 1998 strategic plan was to maintain deer population densities within 20% of the management unit goal established by the Game Commission in the late 1970s. L.B.F.C. found that over 77% of the management units (52 of 67 counties) had deer densities more than 20% above the population goal, and 21% (14 of 67 counties) had deer densities exceeding 200% of their goal. In addition, the report indicated that the hunting season framework and harvest regulations were in direct conflict with the population goals established in P.G.C.'s strategic plan.

Since all of the documents that the L.B.F.C. cited as evidence that P.G.C. was not meeting its goals have been rescinded, a cynic might conclude that P.G.C. is dealing with its inability to make progress by backing away from its previous commitments. The 2003-2007 population management plan is the only document left with explicit and measurable goals on which the agency's performance can be judged in future audits. A more positive view is that the 2003-2007 population management plan has replaced unattainable objectives with those that have a better chance of being reached. In our view, the previous deer density targets should have been kept until a replacement was in place and used as a starting point for future discussions, say, among the proposed citizen advisory task forces if they are one day implemented.

Furthermore, the previous deer-density objectives have been unrealized, it seems, because the P.G.C. commissioners have not been willing to do any "balancing" of non-hunter needs. Is it plausible that citizen advisory task forces will make the commissioners significantly more inclined to make decisions likely to be unpopular with the segment of the hunting community who thinks there are not enough deer on the landscape? Another problem P.G.C. will have to deal with is local community values and goals as they relate to state and federal public lands. We are skeptical that commissioners will break with past performance and heed other public-land stakeholders over those hunters who believe that public lands should be managed to maximize the production of deer hunting opportunities. At the next two legislative audits, the L.B.F.C. may well find the agency failing to make progress on its 2003-2007 population management plan. Will that plan then be scrapped and another put in its place, rather than support the measures that outside reviewers and others have advocated (discussed later in this section) such as a transition from a law-enforcement agency to a natural resource conservation agency and the allocation of some places on the Board of Commissioners to those representing broader constituencies?

The preponderance of scientific evidence argues that the forests of Pennsylvania are in a seriously degraded ecological condition as a result of high deer densities (see Chapter 5). Yet P.G.C. continues to restrain the potential of hunters to solve the problem, treating deer as a fragile resource that is easily overharvested. At a time when managers on the ground question whether hunters can kill sufficient deer to control deer populations and the negative impacts of high deer densities,⁷⁰ P.G.C. continues to restrict harvest numbers, maintain the shortest season lengths among all of the Northeastern states,⁷¹ and hold on to equitable-distribution and public-access approaches long abandoned by other states. The fact that Pennsylvania's wildlife management agency holds a position that diverges widely from its counterparts in other states within the core range of white-tailed deer⁷² raises a question as to whether the differences are based on a lack of information or on differing values.

One set of values leads to the conclusion that the greatest overall benefit to the widest range of stakeholders would be served by allowing hunters, through increased deer harvests, to restore

forest structure, diversity, ecological processes, and ecosystem function to a state similar to the conditions that prevailed in the relatively recent past, while also reducing deer vehicle collisions, agricultural damage, and other deer-human conflicts. Another value is that the current level of deer impact is acceptable, a fair price for facilitating hunter satisfaction and participation.

In 1998, with a goal of improving the agency's effectiveness and efficiency, P.G.C. contracted with the Management Assistance Team (MAT) of the U.S. Department of the Interior, Fish and Wildlife Service to conduct a comprehensive review of the agency. MAT reviewed P.G.C.'s structure, personnel, culture, and programs and provided its client with a set of recommendations.⁷³ To its credit, in the face of a report that was highly critical, P.G.C. issued a press release, stating:

*The report is not meant to be complimentary of the Game Commission. We requested the MAT review to point out our weaknesses and to provide recommendations on how we may improve in those areas and thereby improve the Commission's overall effectiveness.*⁷⁴

Members of the P.G.C. staff maintain that since the report was released the agency has responded to the critiques of the MAT review that they believe were valid. The report listed eight systemic management and operational deficiencies and gave detailed plans for remediation.⁷⁵ One fundamental problem identified in the report was the dichotomous culture within the agency, described as "law enforcement and everyone else." The domination of law enforcement personnel has created a unique culture in the organization resulting in a state government wildlife agency that has a "committed workforce" and "has maintained a strong enforcement orientation, but has not achieved concurrently strong orientation for professional wildlife biology." The report summarized the dichotomy issue within the agency by posing the question "Is the P.G.C. a wildlife management agency that uses law enforcement as a tool, or a law enforcement agency that does some wildlife management?"

The MAT review of the P.G.C. budget, current staffing, job descriptions, and job requirements supports the conclusion that the agency is more poised to function as a law enforcement agency than as a science-based natural resource management organization. Its organizational structure isolates the limited number of wildlife biologists the agency employs by having them work out of their homes (18 of 21 biologists on staff),⁷⁶ while the regional and Harrisburg offices are staffed mainly by law enforcement-trained personnel. At present there are no wildlife biologists working out of any of the six regional offices, although plans are moving forward to fill such positions in each of the six regions. The isolation inherent in the current arrangement challenges P.G.C.'s biologists to maintain professional contacts or keep up with the current scientific literature (P.G.C. does not purchase scientific journals or provide funding for their employees to obtain them).

Most state wildlife agencies focused more on science-based natural resource management rather than law enforcement after the Pittman-Robertson Act passed in 1937.⁷⁷ The federal monies generated by the Pittman-Robertson program provided wildlife agencies with the necessary funds to hire professional biologists to carry out broader responsibilities. The influx of professional biologists allowed most wildlife agencies throughout the United States to make the transition from law enforcement agencies designed to protect game animals to wildlife management agencies designed to preserve, protect, and enhance natural resources.⁷⁸ The Pittman-Robertson program is used extensively by state agencies to improve wildlife management practices through applied research. Pennsylvania and Minnesota were the only two states that did not use Pittman-Robertson monies to fund wildlife research projects in 1997.⁷⁹ In that same year, there were 1.86 staff members employed as wildlife biologists and technicians for every conservation officer employed by the Minnesota Department of Natural Resources. This contrasts with 0.15 wildlife biologists and technicians for every conservation officer employed by P.G.C.⁸⁰ Presumably, the Minnesota Department of Natural Resources used their Pittman-Robertson monies toward funding wildlife biologists and field technicians performing duties other than research.

With resources historically directed mainly at law enforcement, P.G.C. is struggling with making the transition from a law enforcement agency to a natural resource agency — a transition that most state agencies made many years ago. It is not clear that the transition can be made without continued and increased outside pressure.

There is strong evidence of public support for a broader approach to species management. The 2003 public survey⁸¹ showed that 71% of the respondents agree that a greater proportion of resource agency budgets should go toward non-game wildlife and threatened and endangered species (11% disagreed). Sportsmen support this concept also, with 70% of hunter and anglers agreeing and 11% disagreeing.

If ecosystem management is to be implemented successfully, P.G.C. must become more focused on natural resource conservation issues and shift away from dominance by law enforcement. P.G.C. staff members have told us that they think they can do both, that is, be an effective natural resource conservation agency while maintaining the dominance of law enforcement without having to make major reallocation of resources, including shifts in hiring practices and staff retraining in forest ecology and wildlife biology. While we admire the “can do” attitude of the staff, the lack of success in bringing deer numbers down, coupled with the lack of a coherent plan to do more than “improve trends,” makes us very skeptical. Until evidence of success is demonstrated under the current system, groups like ours and outside evaluation committees will call for change at P.G.C., including a major increase in the number of internal personnel supporting ecosystem management.

Certainly, the existing P.G.C. staff is well-qualified to protect the deer resource; they have a solid track record in this regard. Agency staff members are accomplished experts in deer biology and they run an effective law enforcement agency. It is in the conservation of non-deer species, including forest vegetation, where the agency needs to bolster its capabilities and focus. Given the historical failure of P.G.C. to bring down deer densities that have climbed over time, we think the burden is on P.G.C. to prove to outside observers that they can do the job without major staff reorganization. Until such time, it should be presumed that the dilution of resource management resources in the agency by the emphasis on law enforcement is a contributing cause of the agency's inability to bring deer density down and a reason to be pessimistic that any new initiatives will reverse the trend.

The counterargument is that the problem is not with how agency staff is allocated, but with commissioners who cannot sign off on measures brought before it because of political pressures. However, until staff training and job responsibilities are focused on hunter and public education, especially about deer impacts and opportunities for change through adjustment of buck/antlerless deer harvest ratios, outside observers are going to criticize the agency for its predominantly law-enforcement culture.

The MAT report highlighted other problems that existed at the time, stating that “the current commissioners lack credibility with the public and with the P.G.C. employees,” and warned, “this is an area clearly identified as extremely serious for the P.G.C.” The only rule about who may become a member of the Board of Commissioners is that commissioners are appointed by the Governor and need approval by two-thirds of the Senate. There are no qualifications or specific requirements regarding natural resource management education or experience. The MAT report indicated that the commissioners “are problematic to P.G.C. effectiveness” and stated:

*Commissioners would profit from training in governance, meeting process and facilitation skills, clear decision-making processes, public relations, diversity awareness, and conflict management. However, while such training would be effective, it would not be sufficient. All P.G.C. commissioners need to fully commit to any reinventing process and back such commitment with actions.*⁸²

Since the 1998 MAT report, the makeup of the Board of Commissioners has changed with turnover in several positions. Some commissioners have participated in stakeholder discussions, which is an excellent way to get ideas on how to move away from single-species management. Nevertheless, P.G.C. commissioners are all still selected to represent sportsmen and hunting and trapping groups, which make up less than 8% of the population in the state.⁸³ As long as the chief policy makers represent only sportsmen and not all of the people of Pennsylvania, are not required to have natural resource management expertise, and can routinely overrule the scientific

recommendations of staff biologists, ecosystem management stands little chance of success. We do not mean to imply that the current set of commissioners as a group does not want to see progress. The problem is the message that is sent when all commissioners are selected to represent a small set of stakeholders. Only when the Board of Commissioners is required to include members selected to represent a broader range of stakeholders (which does not bar them from also being hunters), will the Governor and the General Assembly make it clear to everyone that P.G.C. has responsibilities beyond hunters and trappers.

The MAT report was completed in 1999. The annual benchmarking reports issued thereafter by MAT were critical of P.G.C. for addressing only the minor problems identified in the original report, while acknowledging that “it is not uncommon for organizational changes such as these to require from three to five years to implement fully.”⁸⁴ The 2001 benchmarking report, issued by MAT in April, 2002,⁸⁵ reported that there had been numerous improvements since 1999. However, the report stated that P.G.C. still remained focused on addressing only the minor issues while ignoring the more substantial problems identified in the initial report, including the dichotomous culture issue. The benchmarking report stated that overall P.G.C. “is in a much better position today than it was two years ago to make substantive, enduring change for improvement.”

In its 2003 audit report, L.B.F.C. noted that “despite noteworthy changes having been made, several key core areas identified by the MAT team are still in need of improvement.” The report recommended that “P.G.C. should continue to implement the recommendations from the 1999 Management Assistance Team reports with particular emphasis on addressing the ‘core areas’ of agency operations identified by the benchmarking review as still needing improvement.”⁸⁶

In a letter of response that L.B.F.C. included in the 2003 report, P.G.C. Executive Director Vern Ross stated, “As for those recommendations directed at key ‘core areas,’ I want to assure the members that I am committed to moving forward on several of those items.” In the same letter he wrote that “not all MAT recommendations will be implemented as written, and some may never be implemented.”

One of the core-area recommendations was that positions such as regional director and land manager should be open to all qualified applicants. L.B.F.C. noted that in 2003 these positions still required graduation from the Ross Leffler School of Conservation, P.G.C.’s law-enforcement training facility. In January 2003, P.G.C. informed L.B.F.C. that rather than remove this requirement, they were considering establishment of a course that would allow all interested parties to attend the Ross Leffler School for a short program that will “prepare them to move into supervisory roles.”⁸⁷ Since that time, however, five of the six regional directors have retired and all were replaced by Ross Leffler School graduates. Apparently, no one other than Ross Leffler

School graduates applied,⁸⁸ which suggests the need for some active recruiting as well as making good on the promise to develop a Ross Leffler School short course.

Although the major concern of the MAT report about the dichotomous culture has not been addressed, there have been significant changes made by the agency's leadership. Those changes have not yet led to any declines in total deer numbers, although statewide population estimates have been essentially flat for three years. One of the most significant changes has been the establishment of a dialogue with stakeholders. Some commissioners have participated in these sessions. Other changes, mentioned earlier in this chapter, include improved outreach to hunters on conservation issues, especially with the hiring of Dr. Gary Alt as chief biologist and hunter communicator for the deer management program, in the position of Supervisor of the Deer Management Section.

Many agency staff members and some of the commissioners appear committed to a philosophy of reducing deer numbers through increased doe harvests. Staff members have recommended and the commissioners have accepted increased numbers of antlerless deer harvest permits. The Deer Management Assistance Program for landowners has been introduced and modified in the face of critiques. If the latest population management plan survives, the agency will be able to say that it has undergone a shift in management philosophy and has developed a practical plan, focused on landowners and stakeholders, that may be able to break through some of the political roadblocks. However, until these ideas are internalized throughout the agency, the weaknesses in the plan corrected, and internal resources brought to bear on carrying out the difficult objectives set out in the 2003-2007 plan, we do not see how the plan can succeed, let alone survive for very long in the face of the inevitable partisan criticism that it will engender if it starts to make a difference.

Another recent report regarding natural resource management agencies titled "Recommendations to the Rendell Administration on Environmental and Natural Resources Priorities"⁸⁹ was written and distributed in July 2003 by Robert McKinstry, Maurice K. Goddard Professor of Forestry and Environmental Resources Conservation at Pennsylvania State University. The report stated:

The deficits in appropriate training and allocation of resources to wildlife management, as opposed to law enforcement, and the focus on the concerns of one narrow interest group have, in the past, produced significant problems in deer management, one of the most critical functions of P.G.C.

Advice to D.C.N.R. on agency cooperation has been given by its Conservation and Natural Resources Advisory Council. This group reviewed D.C.N.R.'s forest management plan in 2003 and had several recommendations for deer management in Pennsylvania:

- (1) *D.C.N.R. should continue to work with P.G.C. to promote effective and strategic management of the deer herd and to reduce their numbers in order to promote forest regeneration.*
- (2) *D.C.N.R. should support P.G.C.'s Deer Management Assistance Program but should advocate for expansion of the program's availability to private landowners and simplification of the application process in order to promote landowner participation in the program.*
- (3) *D.C.N.R. should advocate and support educational outreach concerning forest regeneration issues as they relate to Pennsylvania's deer population.*
- (4) *The Secretary should request the Governor's office to convene an interdepartmental Deer Management Task Force consisting of leadership at the secretary level from, at a minimum, D.C.N.R., Department of Environmental Protection, Department of Agriculture, and P.G.C., in order to address deer population and deer-related impact issues.*
- (5) *If P.G.C. programs do not effectively reduce deer populations, then D.C.N.R. and other landowners should consider necessary legal and legislative action to protect the resources.*⁹⁰

A few of these recommendations have been addressed. For instance, P.G.C. staff members believe that, with their latest revisions to DMAP, they have given D.C.N.R. everything it needs to meet its deer management goals. (However, as noted elsewhere, the new change does not allow D.C.N.R. to target specific problem areas by requiring hunters with DMAP permits to move from area to area to take multiple deer.) Consistent with the third recommendation of the Conservation and Natural Resources Advisory Council, P.G.C. staff members expressed surprise that D.C.N.R. has not publicly stated that there are too many deer on state lands. D.C.N.R. has subsequently begun to be more public on this issue.⁹¹

Summary of contributing causes to the current high populations of white-tailed deer

There appear to be multiple, interacting causes for the failure to control deer numbers and for the widespread pessimism that exists concerning the prospects for long-term improvement under the current management system:

- (1) P.G.C. commissioners are currently selected to represent a narrow range of constituencies (sportsmen and hunting and trapping groups), rather than the full set of stakeholders affected by deer populations. Concerned about perceived hunter reaction, the Board of Commissioners has routinely overruled the scientific recommendations of staff biologists.

(2) There is an unusual three-way resource management structure in Pennsylvania with responsibility given by the legislature to P.G.C. for mammals and birds, to P.F.B.C. for aquatic animals, and to D.C.N.R. for forests. This situation tends to reinforce single-species management at P.G.C.

(3) State agencies that are responsible for, affect, or have a stake in the management of natural resources in Pennsylvania are not collaborating to ensure that policies by one agency do not adversely affect another's ability to carry out its mission.

(4) Although the P.G.C. staff is strong in the areas of deer biology and in implementing and enforcing regulations to make hunting safe, the staff is very thin in the field of general ecology. External reviews have found that P.G.C. operates primarily as a law enforcement agency. This situation continues to this day as far as we can tell, with the changes that have been made in response to outside critiques failing to solve the identified problems.

(5) The source of funding for P.G.C. serves to perpetuate the idea that P.G.C. is a bastion unto itself, with responsibilities only to hunters.

(6) Even though a few conservation organizations in Pennsylvania have been voicing concern for many years, until recently most such organizations did not make overbrowsing of forest vegetation by deer a priority. As a result, the conservation voice was muted in debates over deer numbers.

(7) Until recently, there has been a widespread belief in and out of government that because hunters paid license fees and were supposedly the only stakeholder strongly interested in deer, they should have dominant influence over deer management. The appearance in the public arena of more and more stakeholders concerned about deer-human conflicts is helping to change that view.

(8) Disputes over causes of forest damage (e.g., acid rain vs. deer overbrowsing) have slowed the adoption of measures that would bring deer numbers down.

Issues that must be addressed by any proposal that relies on recreational hunting to manage deer populations

Anyone making proposals to rely on recreational hunting to manage deer must consider P.G.C.'s current revenue sources, trends in license sales, and factors that may influence hunter participation.

Revenues and decline in hunter numbers

Like all of the other states, Pennsylvania uses recreational hunting as the primary means of manipulating deer population size⁹² and harvesting females is the sole basis for affecting deer population growth rates.⁹³ Therefore, the number of antlerless deer harvest permits required to

increase, stabilize, or decrease the deer herd can be calculated based on the estimated population size relative to the population goal and the assumed efficiency of hunters in shooting deer (deer harvested per permit issued). However, such a calculation assumes there are enough hunters wanting to purchase the permits. Although Pennsylvania deer populations have increased dramatically over the past 20 years, the number of licensed hunters has continued to decline (Figure 10). From 1955 through 2001, the growth in hunter numbers throughout the United States lagged behind the rate of population growth, resulting in a net 23% decline in hunters as a percentage of the total population.⁹⁴ Forecasts based on trends in license sales, the aging hunter population, and declining rates of new-hunter recruitment strongly suggest that the number of hunters in Pennsylvania and adjacent states is likely to continue falling.⁹⁵ The preferred method to reduce deer population size, and one of the most cost-effective and efficient, is recreational hunting,⁹⁶ so factors that influence hunter participation are a major concern. The decline in hunter numbers affects P.G.C. not only because it relies on hunters to regulate deer populations but also because hunter license fees are the primary source of revenue for the agency.

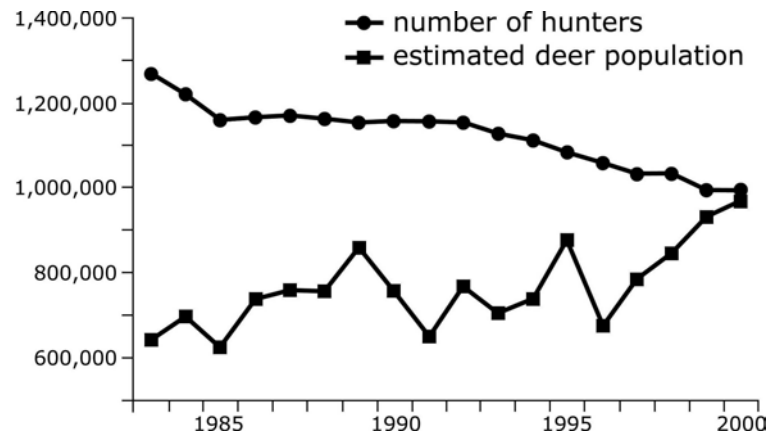


Figure 10. Number of Pennsylvania hunting licenses purchased and statewide post-hunt deer population estimates based on a sex-age-kill model, 1983-2000.⁹⁷ In this graph, “number of hunters” is the total number of hunting licenses of all types issued by P.G.C. (Figure 11C, page 213, shows the 20-year trend in sales of resident adult hunting licenses, the principal source of revenue for P.G.C.).

Seasons and bag limits

The continuing decline in hunter numbers suggests that seasons and bag limits will likely need to be very liberal in future years to provide hunters ample opportunity to harvest multiple deer. For example, if there were only 387,000 Pennsylvania deer hunters in 2030 (a linear projection from recent trends), each hunter would need to harvest 1.3 antlerless deer on average

if a harvest of 500,000 does was required to stabilize population growth, which was the case in 2002.⁹⁸ A recent study conducted of Pennsylvania hunters indicated that participants, on average, are willing to harvest only 1.7 deer.⁹⁹ At first glance, this looks sufficient to stabilize population growth. However, not all hunters are successful and most hunters prefer to harvest at least one buck, which has a negligible effect on the population growth rate. In 2002, P.G.C. issued more than 1,000,000 antlerless deer harvest permits but less than 400,000 antlerless deer were harvested. It is not known how many hunters purchased these permits but the harvest rate of less than 0.4 deer per license strongly suggests that hunters are falling short of the success rate required in our 2030 scenario merely to keep the population stable.

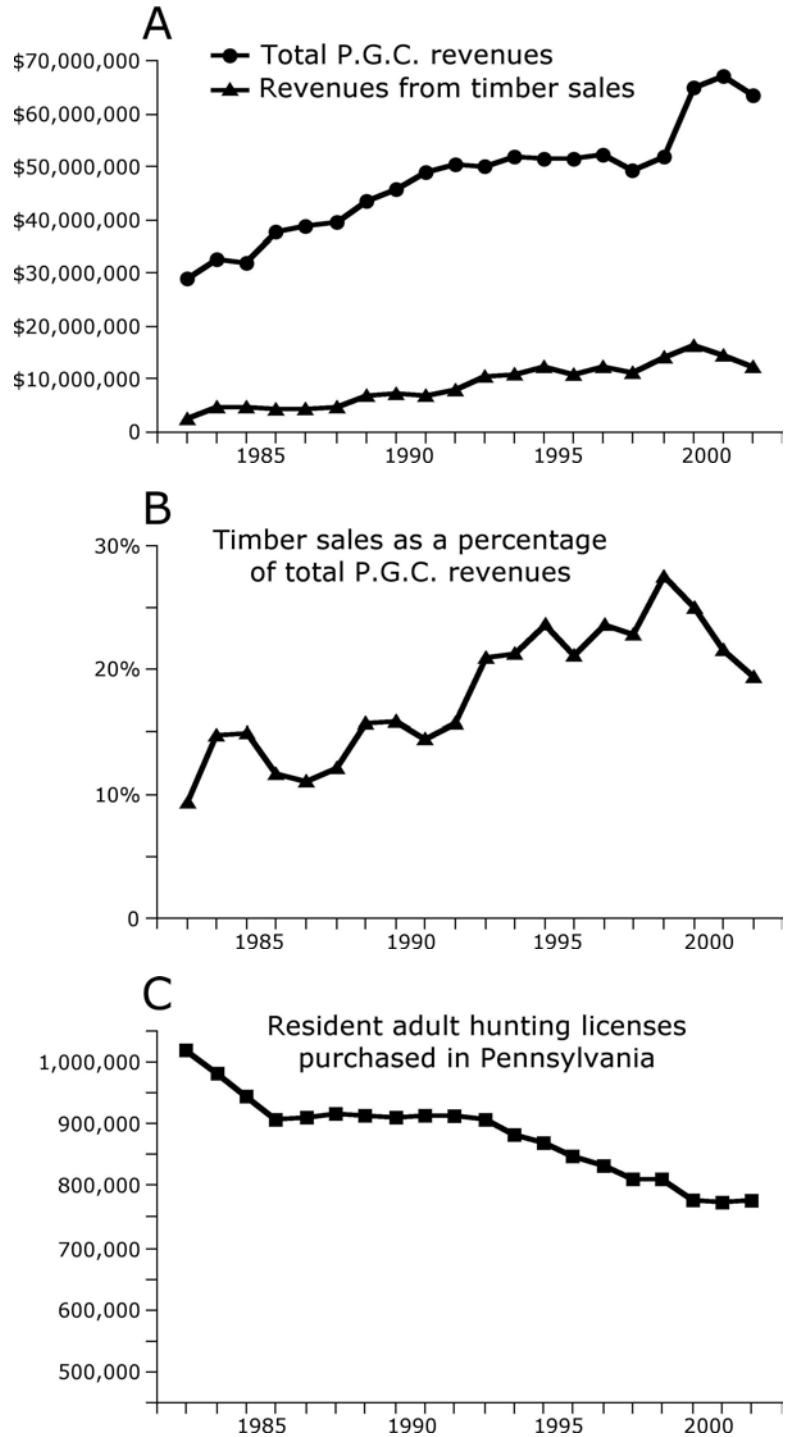
P.G.C. should manage this problem proactively, because a future deer herd comparable in size to the present-day deer population will probably not be manageable with recreational hunting if the current relationship between hunter numbers and necessary harvests continues. One way to be proactive is to use the current crop of hunters to reduce the deer herd to a level that would be feasible for future hunters, even though reduced in numbers, to keep under control. Such a management strategy would be based on the development of a methodology to estimate future trends in hunter numbers.

The trend of declining hunter numbers is likely to result in increasing pressure to supplement recreational hunting with additional means of controlling deer. Immunocontraception almost certainly will remain impractical for many years to come except perhaps in very small areas with extraordinarily large budgets (see page 161). The use of sharpshooters or permanent fences is also cost-prohibitive except in very small areas where special circumstances justify the expense. Increasing attention is being paid by scientists¹⁰⁰ and others to large-predator reintroduction, although in a state with as large a human population as Pennsylvania's, only a fraction of the area, if any, may be remote enough for large predators to sustain numbers capable of affecting deer populations. However, it is premature to focus on alternatives to recreational hunting until hunters are given adequate tools to control deer numbers.

Non-license revenues

In response to revenue concerns, it appears that P.G.C. has increased its timber harvest operations to compensate for the loss in hunter license sales over the past 20 years (Figure 11). If revenue needs by the agency follow the historical trend (Figure 11A), P.G.C. would need to increase its timber operations substantially. The McKinstry report indicates that P.G.C. has no forest inventory data and no forest management plans,¹⁰¹ therefore, it cannot be determined whether the current timber harvesting levels or projected future harvest levels are sustainable or attainable. If the projected loss in license sales were to continue and P.G.C. were to choose not to increase timber harvests, the only alternative under current law would be to increase the cost of

Figure 11. Twenty-year trends in Pennsylvania Game Commission revenues (A, B) and resident adult hunting license sales (C). Data from P.G.C. annual reports,¹⁰² fiscal years 1982-1983 through 2001-2002.



individual hunting licenses. Assuming hunters were to fund the remaining part of the budget (excluding timber sales), each hunter would need to pay considerably more in the next 10 years for licenses.

In its 2003 performance audit of P.G.C., L.B.F.C. looked into the funding issue, concluding that “while further license increases may provide temporary relief, other revenue enhancements and alternative revenue sources need to be identified.”¹⁰³ The report noted that the resident hunting population has declined by 15% in the past 10 year, and predicted that this trend will be compounded as the licensee base grows older.

According to L.B.F.C., P.G.C. has acknowledged that wildlife agencies forced to rely on license sales with no general fund monies will increasingly experience serious financial difficulties and, accordingly, has considered several alternative funding sources.¹⁰⁴ For instance, in its current strategic plan, P.G.C. proposes seeking revenues from the Commonwealth’s general fund.

The 2003 public survey shows support for a broader funding structure.¹⁰⁵ When asked about supplementing agency budgets with existing public funds to increase the proportion used for non-game species management, 58% agreed and 23% were opposed. Hunters and anglers agreed 60% to 25%. This support declined when the question tied funding to a new dedicated tax. The survey shows that the public, including sportsmen, will support a change in agency funding in order to broaden the scope beyond single-species management.

Given declining revenues from license sales, and until such alternative revenue sources are enacted, there will remain a potential for timber harvesting and mineral extraction on game lands to be driven by the need for revenues despite adverse affects on the integrity of the affected ecosystems. We note that P.G.C. did not put any game lands into DMAP this year even though exclosures on game lands, particularly in north-central Pennsylvania, demonstrate that many are overbrowsed.

In this chapter, we reviewed some of the problems identified by other agencies and by external reviewers and we highlighted issues that need to be considered in developing solutions. In the next chapter, we propose measures that we believe will contribute to improvement.

Findings on deer management policy and administration in Pennsylvania

- (1) With the exception of a vocal minority of hunters, there is a broad consensus that deer densities in Pennsylvania are too high from an ecosystem perspective. In a 2003 survey of Pennsylvanians, the general public ranked managing deer to promote healthy and sustainable forests highest among potential goals (average 7.5 of 10) and hunters and anglers ranked it even higher (7.8 of 10). Pennsylvania hunters and anglers ranked managing deer to promote healthy and sustainable forests higher than managing deer to promote hunting opportunities (7.8 vs. 7.1 of 10). The stakeholder group P.G.C. convened to recommend goals and objectives for its statewide deer management plan also ranked managing deer to promote healthy forests and ecosystems as its top goal.
- (2) In a reevaluation of D.C.N.R.'s state forest system in 2004, Scientific Certification Systems predicted that overabundant deer will continue to decimate the flora and fauna in Pennsylvania's state forests without:
 - (a) enhanced DMAP regulations that allow more liberal harvest of antlerless deer on state forest lands and are granted to the D.C.N.R. Bureau of Forestry on a continuing and contingency basis by the P.G.C. commissioners; or
 - (b) legislative fiat, whereby administration and control of deer hunting regulations on District Forests are transferred from P.G.C. to D.C.N.R.; or
 - (c) merger of P.G.C. with D.C.N.R. in a combined natural resource agency resulting in oversight of hunting regulations by a more balanced representation of natural resource

- interests. Note: both agencies are on record in opposition to such a merger and there appears to be no real political will to pursue it at this time.
- (3) The P.G.C. commissioners, in response to proposals by staff to bring the deer herd more in line with its habitat and to protect commercially valuable trees, set targets for lower deer densities in Pennsylvania in 1979; however, those goals have never been met. In a renewed effort to reduce deer population levels, numerous changes were made in the deer management program from 1998 through 2003. However, the deer herd has not decreased and has, in fact, increased more than 20% since 1998.
 - (4) With the reorganization in 1999 of the Wildlife Management Bureau (with Dr. Gary Alt named chief of the newly formed Deer Management Section) and the support of agency policy makers, P.G.C. is poised to pursue a more aggressive deer management program that, in theory, can effectively reduce deer densities in many parts of Pennsylvania. Its success depends critically on whether the changes are formalized in a way that enables them to last through the turnover of personnel on the staff and Board of Commissioners.
 - (5) Although the P.G.C. staff is strong in the areas of deer biology and in implementing and enforcing regulations to make hunting safe, the current staff has limited expertise in the field of general ecology. External reviews have found that P.G.C. operates primarily as a law enforcement agency, with its limited number of biologists isolated and, with few exceptions, not engaged in the core functions of the agency. With resources historically directed mainly at law enforcement, P.G.C. is struggling with making the transition from a law enforcement agency to a natural resource agency — a transition that most state agencies made many years ago.
 - (6) P.G.C. senior staff members argue that they have done all that is possible to manage deer under the current sociopolitical environment. While we find there are many more measures that the P.G.C. staff could and should implement, we do not minimize the sociopolitical constraints under which P.G.C. staff members must operate. Nor do we doubt that it took substantial effort to implement the staff-initiated changes on hunting seasons, permit allocations, and the fledgling Deer Management Assistance Program that have been made in recent years.
 - (7) P.G.C. gives mixed messages about the need for ecosystem considerations. This reflects a mix of *internal* stakeholders with differing views and is evidence of an ongoing debate within the staff and Board of Commissioners about the future of the agency. For instance, P.G.C.'s web site discusses forest damage caused by high deer populations, as does the current deer population management plan. However, P.G.C.'s main strategic planning document, developed by senior staff members, does not acknowledge that high wildlife

populations can be a problem for ecosystems nor does it concede that the agency has failed to bring the deer population in line with past targets.

- (8) Adopting a program of managing deer from an ecosystem perspective would provide both advantages and challenges for P.G.C. Ecosystem considerations would lead to the conclusion that deer densities in some parts of the state should be reduced below levels that would be set solely by considerations of deer health and condition. This would require targets even lower than those P.G.C. has been unable to reach in the past. The reaction of some hunters to lower densities may be negative but the 2003 survey results indicate that the majority of hunters would support the goal of managing deer to promote healthy and sustainable forests.
- (9) There is an unusual three-way resource management structure in Pennsylvania with responsibility given by the legislature to P.G.C. for mammals and birds, to P.F.B.C. for aquatic animals, and to D.C.N.R. for forests. This situation tends to reinforce single-species management at P.G.C.
- (10) State agencies that are responsible for, affect, or have a stake in the management of natural resources in Pennsylvania are not collaborating to ensure that policies by one agency do not adversely affect another's ability to carry out its mission. For instance, at present D.C.N.R. cannot fully implement ecosystem management on its lands because it does not have the necessary authority to manage deer populations in state forests and state parks, even with the latest version of P.G.C.'s Deer Management Assistance Program. As a result, deer populations continue to adversely affect forest ecosystems on state lands. Based on conditions placed on Forest Stewardship Council certification, this could present challenges to continued recertification of D.C.N.R. land. High deer densities also acutely affect the domains of responsibility of the Departments of Agriculture and Transportation.
- (11) P.G.C.'s mandate, "To manage all wild birds, mammals and their habitats for current and future generations," is consistent with the goal of managing deer from an ecosystem perspective, but is not adequately reflected in the agency's current policies or skill mix. Neither is the mission fulfilled in practice due to P.G.C.'s primary focus on single-species management.
- (12) Wildlife management rules and regulations for animal species are set by P.G.C.'s Board of Commissioners, members of which are appointed by the Governor with approval by two-thirds of the state Senate required for confirmation. The commissioners, not the staff, set seasons, bag limits and antlerless deer harvest permit allocations. The Governor can replace commissioners. There are no eligibility qualifications specifically regarding education or experience in natural resource management to be a commissioner.
- (13) Commissioners are currently selected to represent sportsmen and hunting and trapping groups without representation of other constituencies affected by deer populations.

- (14) There is sufficient authority under the state constitution for P.G.C. to introduce management of deer from an ecosystem perspective. However, neither P.G.C.'s enabling legislation nor the staff-written mission statement explicitly charges the agency with resolving wildlife-human conflicts and protecting forest ecosystems from artificially high densities of wildlife.
- (15) The management of deer is a service provided to all citizens of Pennsylvania, yet P.G.C. is currently funded primarily by license dollars and timber-harvest revenues from state game lands. Neither source is predicted to be sustainable in the long term. A more stable and equitable funding base is required if deer management is to meet broader conservation goals.
- (16) Although the chief executive of Pennsylvania's wildlife agency does not report directly to the Governor, the administrative and legislative branches of state government have direct and indirect influence over the management of deer and other wildlife.
- (17) The goal of keeping deer densities within 20% of targets set for W.M.U.s by past Boards of Commissioners has been rescinded with publication of the latest set of strategic planning documents. The staff-approved deer population management plan calls only for "improvement" in indicators of deer impact, rather than specific targets.
- (18) The total number of deer in Pennsylvania, after decades of growth, appears to have reached a plateau at around 1.6 million deer in the fall population. Staff biologists projected a 5% decline in most wildlife management units in 2004. The seasonal framework and hunting regulations adopted over the past 5 years made this projected decline possible. So far these measures have not resulted in any observable decrease in deer densities, but some P.G.C. senior staff members expect that their effect will soon become evident. However, no one outside P.G.C. with whom we have talked is optimistic, given the current management structure and commissioner appointment system, that such measures will survive the sociopolitical counter-pressures that will build if deer numbers should start to come down.
- (19) No target density or A.R.M. protocol has been established to guide management decisions over the long term. The current deer management goal is to adjust seasons, bag limits, and antlerless deer harvest license allocations to improve trends in deer density and other indicators such as body weights, percent yearling males in the buck harvest, pregnancy rate in females, multiple fetus rate in females, and fawn/doe harvest ratios.
- (20) Of all the new measures initiated in recent years by P.G.C., the most intricate is DMAP, which shifts some responsibilities away from P.G.C. for choosing deer densities, transferring it to landowners who can apply for additional permits for use solely on their properties. If it were to work effectively, DMAP might allow P.G.C. to satisfy those landowners clamoring for reduced deer densities on their properties while freeing the P.G.C. commissioners from the unpleasant yearly task of deciding on permit numbers. However,

most of Pennsylvania's land is privately owned and the vast majority of landowners do not understand the ecological impacts of deer overbrowsing. Thus, most of Pennsylvania's land will not benefit from any science-based application of DMAP.

- (21) Without forest inventory data and forest management plans, it cannot be determined whether the current timber harvesting levels or projected future harvest levels on state game lands are sustainable or attainable. Given declining revenues from hunting license sales, there is a potential for timber harvesting and mineral extraction on game lands to be driven by the need for revenues despite adverse affects on the integrity of the affected ecosystems.
- (22) Declining hunter numbers have led some scientists to conclude that hunters eventually will be unable to keep the deer herd under control and that other methods will be needed. Until hunters are given adequate tools, however, it would be premature to conclude that recreational hunting cannot do the job.
- (23) A program of A.R.M. could fill major gaps in the efforts of P.G.C. staff members to bring deer densities more in line with deer health and ecosystem targets. A.R.M. could be especially helpful in resolving the argument about the relevance of acid rain to forest damage, a controversy that some P.G.C. staff members believe is a major obstacle to hunter acceptance of the need to reduce deer densities.

Recommendations on deer management policy and administration

Recommendations to the Pennsylvania Game Commission

- (1) Members of the staff should recommend and the commissioners approve goals that go beyond those in the population management plan that call for "improving indicators." Members of the staff and commissioners should establish intermediate, quantitative deer-density goals, such as those that were dropped from the strategic plan in 2003 — targets that were based on deer health and condition and the protection of commercial timberlands. If the measures enacted in recent years, such as the October hunting season, do not produce a detectable and significant change in deer densities over the next year, staff members should recommend and the commissioners should take action on adopting seasons, bag limits, and numbers of antlerless deer harvest licenses that will achieve the targets.
- (2) P.G.C. should ensure sustainability of forests on state game lands by developing and implementing an ecologically based forest inventory and forest management plan. When necessary, sections of state game lands should be entered into DMAP.
- (3) P.G.C. should formalize the recent organizational changes that have enabled its Wildlife Management Bureau to pursue a more aggressive deer management program, to insure that

crucial structures will remain intact as key players come and go with routine personnel turnover.

- (4) P.G.C. should adopt a revised mission statement that reflects its responsibility to a broad range of stakeholders. Staff members and commissioners must make it clear in the drafting of the mission statement, as well as in regular communications at meetings, that their prime responsibility is to the citizens of Pennsylvania rather than to any particular stakeholder group. Resolving wildlife-human conflicts should be stated as one of P.G.C.'s major responsibilities. Protecting Pennsylvania's forests should be acknowledged as another responsibility.

Recommendations to the Governor, the Governor's Advisory Council on Hunting, Fishing and Conservation, the Department of Conservation and Natural Resources, and the General Assembly

- (1) The Governor and the General Assembly, in collaboration with P.G.C., should identify a funding base that is more stable and equitable than funding derived exclusively from license dollars and timber sales on game lands, in order to facilitate the shift from single-species management to ecosystem management.
- (2) The General Assembly should modify P.G.C.'s enabling legislation to make it unambiguously clear that part of the agency's mission is to resolve wildlife-human conflicts and protect forest ecosystems. The enabling legislation should say that commissioners should be chosen to represent all Pennsylvanians.
- (3) All efforts should be made to forge, through negotiation with stakeholders, a mutually acceptable approach to balancing the number of deer in the forest. However, if an impasse arises and progress appears unlikely, the various levels of government will have to step in and make sure that ecosystem-based management of deer is not lost in attempts to balance biological and sociopolitical factors when decisions are made in connection with seasons, bag limits, and antlerless deer harvest licenses.
- (4) P.G.C., in conjunction with D.C.N.R. and with assistance from the Governor, should address the conditions that must be met to maintain continued certification of the state forest system, particularly regarding the adverse effects of deer. D.C.N.R. should continue to expand its use of a broad range of tools to reduce the deer herd on state forest and state park lands including DMAP, special hunts, and others that may become available as regulations are amended or refined.
- (5) DMAP should be thought of as an add-on to an overall program to meet these goals, not a substitute, particularly because DMAP does not realistically apply to all Pennsylvania lands. At the same time a program of adaptive resource management, such as is described in this report, should be designed and implemented to further adjust deer-density targets based on

overall ecosystem concerns. The aim should be to provide all property owners whose goals include restoring forest structure, diversity, ecological processes, and ecosystem function the ability to manage deer in ways that will enable them to achieve those goals. It is vital that both be undertaken concurrently; planning and developing an A.R.M. program must not become an excuse for further postponing action to meet longstanding deer density goals.

Endnotes

- ¹ Diefenbach and Palmer 1997; Pennsylvania Game Commission 2003b
- ² R. S. Palone, in Audubon Pennsylvania 2004a, 2004b
- ³ There is a vocal, but minority (Reed Haldy McIntosh & Associates 2003) subgroup of hunters who believe and actively promote the idea that deer numbers are overestimated and that the deer herd in Pennsylvania is threatened, particularly by antlerless licenses. They also maintain that acid rain is the cause of the damage on state lands. They do apparently concede that deer may be contributing to damage on private lands (www.usp.cc, accessed 2004-10-13).
- ⁴ Reed Haldy McIntosh & Associates 2003
- ⁵ Responsive Management 1996
- ⁶ Reed Haldy McIntosh & Associates 2003
- ⁷ Legislative Budget and Finance Committee 2000
- ⁸ DuBrock 1999
- ⁹ Diefenbach and Palmer 1997
- ¹⁰ DuBrock 1999
- ¹¹ Diefenbach et al. 1997
- ¹² Wallingford 2000
- ¹³ Pennsylvania Game Commission 2003a
- ¹⁴ Michael Pechart, Director of Local Government Programs, Farm Bureau, Pennsylvania Department of Agriculture, personal communication, 2003
- ¹⁵ Diefenbach et al. 1997; Diefenbach and Palmer 1997
- ¹⁶ Wingard 1964
- ¹⁷ Anonymous 2001b
- ¹⁸ Diefenbach and Palmer 1997
- ¹⁹ Kosack 1995
- ²⁰ E.g., Luttringer 1931; Phillips 1940; Latham 1950; Dzemyan 1994
- ²¹ Dr. Gary L. Alt, Supervisor, Deer Management Section, Bureau of Wildlife Management, Pennsylvania Game Commission, personal communication, 2004
- ²² Responsive Management 2001: p. 9
- ²³ DuBrock 1999; Pennsylvania Game Commission 2004

Endnotes

- ²⁴ Pennsylvania Game Commission 2003b
- ²⁵ Inclusion of material critical of P.G.C. in this chapter was deemed controversial by some readers of draft versions of this report.
- ²⁶ Wildlife Management Institute 1997: Fig. X1
- ²⁷ Bolen and Robinson 2003
- ²⁸ 19 of 24 states; Wildlife Management Institute 1997
- ²⁹ Colins 2002
- ³⁰ Matthews 1986
- ³¹ E.g., Migratory Bird Treaty Act (1918), Endangered Species Act (1973), Lacey Act (1905); Matthews 1986
- ³² E.g., the Pennsylvania Digest of Hunting and Trapping Regulations is issued by P.G.C.
- ³³ Pennsylvania Constitution, Article 1, Section 27
- ³⁴ Pennsylvania Game Commission 2003d; C. W. DuBrock, Wildlife Management Director, Pennsylvania Game Commission, personal communication, 2004
- ³⁵ Roseberry and Woolf 1991
- ³⁶ Larkin 1977; Holt and Talbot 1978
- ³⁷ E.g., Caughley 1977
- ³⁸ Caughley 1985
- ³⁹ Dasmann 1981
- ⁴⁰ More recent studies of this type include Drake et al. 1985; Drake and Palmer 1986, 1991; Tzilkowski et al. 1994
- ⁴¹ E.g., Curtis and Rushmore 1958; Beals et al. 1960; Anderson and Loucks 1979; Euller and Lloyd 1980; Frelich and Lorimer 1985; Tilghman 1989; Anderson and Katz 1993; Anderson 1994; deCalesta 1994; Horsley et al. 2003
- ⁴² Pennsylvania Game Commission 2003b
- ⁴³ Pennsylvania Game Commission 1998b
- ⁴⁴ Pennsylvania Game Commission 1998b
- ⁴⁵ M. Grund, unpublished data, 2003
- ⁴⁶ Pennsylvania Game Commission 2003b
- ⁴⁷ Pennsylvania Game Commission 2003e
- ⁴⁸ Diefenbach and Palmer 1997
- ⁴⁹ Legislative Budget and Finance Committee 2000
- ⁵⁰ Pennsylvania Game Commission 2003b
- ⁵¹ Pennsylvania Game Commission 2003e
- ⁵² DuBrock 1999
- ⁵³ Pennsylvania Game Commission 2003e

Endnotes

- ⁵⁴ Reed Haldy McIntosh & Associates 2003
- ⁵⁵ Pennsylvania Game Commission 2003e
- ⁵⁶ Pennsylvania Game Commission 2002a
- ⁵⁷ Diefenbach et al. 2005
- ⁵⁸ Pennsylvania Game Commission 2003e: Goal 2, p. 43
- ⁵⁹ Responsive Management 2001
- ⁶⁰ Shissler et al. 1998
- ⁶¹ Shissler et al. 1998
- ⁶² Shissler et al. 1998
- ⁶³ Wager et al. 2003
- ⁶⁴ Wager et al. 2003
- ⁶⁵ M. Grund, in Wager et al. 2003
- ⁶⁶ We note that this doesn't mean we need more roads. Rather, regulations need to be developed that provide incentives for hunters to be willing to walk farther from roads, for instance, special seasons in October, January, or February when the only places where hunters can legally harvest deer in Pennsylvania are in these remote areas. A working definition of "remote" is more than 0.3 mile from any road; recent research (Diefenbach et al. 2005) indicates that the majority of deer hunters in the state do not hunt beyond this zone.
- ⁶⁷ M. Grund, unpublished data, 2003
- ⁶⁸ Legislative Budget and Finance Committee 2000
- ⁶⁹ Legislative Budget and Finance Committee 2003a
- ⁷⁰ Brown et al. 2000
- ⁷¹ M. Grund, unpublished data, 2003
- ⁷² M. Grund, unpublished data, 2003
- ⁷³ Angus Guynn and Guynn 1999
- ⁷⁴ Pennsylvania Game Commission 1999
- ⁷⁵ Angus Guynn and Guynn 1999
- ⁷⁶ Robert C. Boyd, Assistant Bureau Director and Research Division Chief, Pennsylvania Game Commission, personal communication, 2004
- ⁷⁷ Angus Guynn and Guynn 1999
- ⁷⁸ Angus Guynn and Guynn 1999
- ⁷⁹ Wildlife Management Institute 1997
- ⁸⁰ Wildlife Management Institute 1997
- ⁸¹ Reed Haldy McIntosh & Associates 2003
- ⁸² Angus Guynn and Guynn 1999

Endnotes

- ⁸³ Wildlife Management Institute 1997
- ⁸⁴ Angus Guynn and Guynn 2002
- ⁸⁵ Angus Guynn and Guynn 2002
- ⁸⁶ Legislative Budget and Finance Committee 2003a
- ⁸⁷ Legislative Budget and Finance Committee 2003a
- ⁸⁸ C. W. DuBrock, Wildlife Management Director, Pennsylvania Game Commission, personal communication, 2004
- ⁸⁹ McKinstry 2003
- ⁹⁰ Conservation and Natural Resources Advisory Council 2003
- ⁹¹ DiBerardinis 2004
- ⁹² Woolf and Roseberry 1998
- ⁹³ Caughley 1977; McCullough 1979
- ⁹⁴ U.S. Fish and Wildlife Service and U.S. Census Bureau 2002
- ⁹⁵ Brown et al. 2000; Enck et al. 2000; Riley et al. 2003
- ⁹⁶ Pennsylvania Consolidated Statutes 1996; Woolf and Roseberry 1998. However, if adequate tools are not provided to hunters or hunter numbers fall too far, it would be necessary to implement more expensive measures to regulate deer herds.
- ⁹⁷ Pennsylvania Game Commission 2002a
- ⁹⁸ M. Grund, unpublished data, 2003
- ⁹⁹ Enck and Brown 2001
- ¹⁰⁰ Soulé and Terborgh 1999; Miller et al. 2001
- ¹⁰¹ McKinstry 2003: page 16
- ¹⁰² Anonymous 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001a, 2002, 2003
- ¹⁰³ Legislative Budget and Finance Committee 2003a
- ¹⁰⁴ Legislative Budget and Finance Committee 2003a
- ¹⁰⁵ Reed Haldy McIntosh & Associates 2003

Chapter 14. Toward Management Solutions

Having discussed some of the problems identified by external reviewers and others as well as issues that must be considered in developing solutions, we turn now to various proposals for improvement. The recommendations at the end of this chapter are supported by findings in both Chapter 13 and Chapter 14.

Proposal for changes to the appointment process for P.G.C. commissioners

Members of the Board of Commissioners are currently selected to represent a narrow range of constituencies (sportsmen and hunting and trapping groups) rather than the full set of stakeholders affected by deer populations. The commissioners routinely overrule the scientific recommendations of staff biologists. This narrow focus on sportsmen makes it difficult to replace single-species management with the broader approach of ecosystem management. Of all the obstacles facing ecosystem management, this may be the simplest to address, because the Governor appoints commissioners (subject to confirmation by a two-thirds vote of the Senate).

The Governor's Advisory Council on Hunting, Fishing and Conservation plays a significant role in the commissioner appointment process. If the council were to recommend candidates to the Governor who strongly support managing deer from an ecosystem perspective, who have training or experience in natural resource management, and who see their responsibilities to the entire citizenry of Pennsylvania, not just hunters and trappers, then the prospects for P.G.C. ultimately deciding to adopt a program of managing deer from an ecosystem perspective would be vastly improved. The latest council includes members who are sympathetic to ecosystem management. However, it is not clear that there are sufficient votes on the council to limit candidate recommendations to those who strongly support managing deer from an ecosystem perspective. If not, then the Governor would need to send back the recommendations, giving explicit guidance on the type of candidates desired.

Proposals for structural change

A proposal to investigate combining P.G.C. and the Pennsylvania Fish and Boat Commission (P.F.B.C.), introduced as Pennsylvania House Resolution 15 by Representative Bruce Smith, Chairman of the House Game and Fisheries Committee, was adopted by the full House of Representatives in February 2003. The committee heard testimony from a variety of organizations and individuals at five public hearings. The resolution was amended to "explore a broad range of options" to structure Pennsylvania's wildlife agencies. The amendment directed L.B.F.C. to update its 1989 report on merging the agencies.

L.B.F.C.'s updated report, released in November 2003, stopped short of directly recommending merged agencies but proposed a structure for a combined "Fish and Wildlife Commission" and showed related cost savings of \$5 million annually.¹ The report stated that, in addition to streamlining by eliminating redundant positions, a merger "would also provide a better balance between the Commission's law enforcement functions and wildlife conservation functions, and would better position the combined Commission to request general fund or other state funding to meet its infrastructure needs."² As a step toward ecosystem-based management, the report called for "creation of a new Bureau of Non-Game Species to address the perceived lack of focus on biodiversity and non-game species."

Additionally, Representative Ed Staback introduced House Resolution 222, which directed the Joint State Government Commission to study the feasibility of transferring the law-enforcement functions of P.G.C. and P.F.B.C. to a new Bureau of Law Enforcement within D.C.N.R. The House amended H.R. 222 in June 2003 to add "or other Department." The resulting report stated that "[c]onsolidating the conservation law enforcement personnel and functions currently performed by the P.G.C., the P.F.B.C., and D.C.N.R. into a single conservation law enforcement unit is feasible." However, the first-year costs to operate such a bureau were estimated at \$33.8 million, about \$5.8 million more than under the existing structure. All three agencies are on record in opposition to such a merger and there appears to be no real political will to pursue it at this time.

In 2003, the McKinstry report recommended reorganizing "... D.C.N.R., Fish and Boat Commission, and P.G.C. to increase integration of land, water and biological resource management while assuring independence of voices."³ The report discussed staffing, coordination, allocation of resources, and other issues relating to the current governmental structure and recommended a broad legislative and public process to examine a potential merger of the resource agencies.

When D.C.N.R. underwent forest recertification in 2003, one of the potential remedies ("scenarios") suggested in the recertification report to overbrowsing by abundant deer was: "P.G.C. is merged with the D.C.N.R. in a combined natural resource agency and control of hunting regulations is overseen by a more balanced representation of natural resource interests, instead of the current situation where regulations are subject to the pressures exerted by the P.G.C.'s only paying constituency, hunters."⁴ The U.S. Fish and Wildlife Service's Management Assistance Team had come to a similar conclusion in their 1998 study of P.G.C., commissioned by the agency itself.⁵

There is a perception by some Pennsylvania residents that maintaining separation between the state agencies managing Pennsylvania's natural resources is strongly supported by the public at large. However, the statewide survey of randomly selected Pennsylvania households

conducted in December 2003 indicated that 75% of respondents were in favor of combining P.G.C., P.F.B.C., and D.C.N.R. into a single agency provided that the single agency would result in a more efficient or cost-effective system for managing natural resources; 14% of the respondents were opposed to the idea and only 9% of the respondents had no opinion. Later in the same survey respondents were asked whether they were in favor or opposed to merging the natural resource agencies even if there was no impact on the efficiency or cost-effectiveness of managing natural resources in Pennsylvania; 64% of the respondents were either in favor of or had no opinion and 33% were opposed. Interestingly, hunters and anglers responded to this question at approximately the same rate (37% opposed) as the overall set of respondents.

The prospects for structural change are highly uncertain. In the current political climate, reorganization at the scale described by the House of Representatives, L.B.F.C., the McKinstry report, and others would require an enormous expenditure of political capital by a Governor and members of the General Assembly.

Proposal for better coordination between agencies through the Natural Resources Workgroup

Implementation of ecosystem-based management of deer will require substantial cooperation and communication among state agencies, most notably between D.C.N.R. and P.G.C. Although ecosystem management has been embraced in concept by D.C.N.R., we are unaware of any consideration for its implementation within P.G.C. other than indirect references in the 2003-2007 deer population management plan, the future of which is uncertain.

The relationship between D.C.N.R. and P.G.C. changes regularly and can be hard to track. For instance, early in 2004, the Secretary of D.C.N.R., Michael DiBerardinis, directed that D.C.N.R. grant funds not be used to help acquire game lands.⁶ This step apparently arose out of frustration on the part of the D.C.N.R. Secretary with the Game Commission's lack of action on D.C.N.R.'s recommendations to reduce the deer herd. Because D.C.N.R. lacks direct jurisdictional control of the deer on its own land, this move was intended to emphasize the depth of the agency's concern over P.G.C.'s failure to act on its recommendations.

On the other hand, in April 2004, D.C.N.R.'s Policy Director testified that D.C.N.R. was against the merger of P.G.C. and the Fish and Boat Commission into D.C.N.R., and that it was the Department's intention to pursue a collaborative approach to the management of wildlife and habitat.⁷ At the same time, D.C.N.R. emerged as a strong supporter of funding for both the Fish and Boat Commission and the Game Commission in the Governor's Growing Greener package and for the provision of the funds without a 50% match requirement.

The Secretary then began a direct discussion with the President of the Board of Commissioners in an effort to move forward on providing more tools for the agency to meet its

goals in sustainable forest management.⁸ Secretary DeBerardinis testified at the October meeting of the P.G.C. Board of Commissioners and announced that as a show of good faith in beginning serious discussions with the commissioners, he would lift the moratorium to buy lands for addition to the state game land system.⁹ He asked the Game Commission to extend the seasons and expand the tools to allow a greater reduction of the deer herd and to institute more flexibility and simplify the process for private forest landowners seeking to use DMAP. It will be interesting to see if these negotiations, which we encourage, bear fruit on the ground.

One possible vehicle for improving communication between P.G.C. and D.C.N.R., as well as other agencies, is greater use and expansion of the Natural Resources Workgroup. This interagency panel, formed in 1996, was organized to improve communication among various government entities. It is currently composed of representatives from D.C.N.R., P.G.C., P.F.B.C., the Conservation and Natural Resources Advisory Council (citizens' advisory group to D.C.N.R.), and the Governor's Sportsmen's Advisor. An initial task was to develop a vision statement regarding biodiversity. The statement, adopted by the agencies in 1998, declared:

*Biodiversity is the variety of species, their genetic make-up, and the natural communities in which they occur. Biodiversity is important to sustain healthy ecological systems, to provide resources for recreational opportunities and other beneficial uses, and to assure the long-term welfare of ourselves and future generations. The three resource agencies will work together to promote the conservation of Pennsylvania's biological diversity in the management of lands and waters through programs and services we provide to the public.*¹⁰

A series of meetings held by the Natural Resources Workgroup has provided the agencies opportunities to share information and work together more closely. One significant project undertaken by this group was the development of a status report on the condition of habitat for all wildlife in Pennsylvania, "Wildlife Habitat in Pennsylvania: Past, Present and Future."¹¹ This comprehensive report recognized the adverse effects of high deer density as a critical factor in the decline of habitat for many species of wildlife.

In late 2002, the Conservation and Natural Resources Advisory Council issued a transition report to the incoming Governor.¹² One of the recommendations was to identify and evaluate areas of conflict, inconsistency, and duplication within and among natural resource agencies and work toward their resolution. The Council recommended that D.C.N.R. continue to work with P.G.C. to implement science-based management of the state's deer herd.

The Natural Resources Workgroup could address additional issues and conflicts by expanding its membership to include other state agencies that affect, or are affected by, natural resource management either directly or indirectly. For example, deer management acutely affects the domains of responsibility of the Departments of Agriculture and Transportation. Other

agencies with a stake in natural resource management include the Departments of Education, Environmental Protection, and Health.

Proposal to focus on hunter education and dialogue

Hunting is the obvious first choice for practical landscape- and regional-scale deer management but declining hunter numbers have led some scientists to conclude that even hunters will not be able to bring the deer herd under control and that other methods will be needed.¹³ However, hunters and landowners have not been given the tools and opportunities that would allow them to meet ecosystem management targets. It is therefore premature to abandon recreational hunting as the primary tool for managing deer from an ecosystem perspective. For hunting to be effective, policies must encourage hunter participation and satisfaction. If an ecosystem approach to deer management is to be achieved, declining hunter numbers make it urgent that we balance deer numbers with habitat conditions now and build lasting bridges between wildlife managers and landowners. Landowners ultimately make the decisions that determine whether hunting can be an effective tool for managing deer in broad landscapes. It is imperative that Pennsylvania's wildlife agency develop policies and programs to match members of the public who own the land with members of the public who desire to hunt (see box on next page).

In the past, conventional wisdom was that hunters would never accept adding ecosystem concerns to deer management and that hunters were the major obstacles to bringing deer numbers in line with biologically based deer targets. For example, it was widely believed that hunters would not support the 1998 modifications to the framework of Pennsylvania's traditional deer hunting season. This belief had some validity, at least initially. Consider, for instance, the early response among hunters to P.G.C.'s proposal for a concurrent buck and doe season. In a survey conducted prior to efforts by agency staff members to educate the public about the proposal, 50% of hunters opposed it and 43% supported it.¹⁴ The head of P.G.C.'s Deer Management Section, Dr. Gary Alt, launched an education campaign in January 2001 to explain the reasons why a concurrent buck and doe season was necessary. Dr. Alt gained support among hunters during public meetings as well as the support of P.G.C. commissioners. The commissioners adopted the two-week concurrent buck and doe season in April 2001, a clear sign that hunter opinion had shifted as a result of a solid education effort.

Although some polling data support the idea that hunters react first with opposition to proposals to control the deer herd, this is not always the case. For example, members of the P.G.C. staff assumed there was little support among hunters to raise the minimum antler-size regulations and that a massive education campaign would again be necessary before its proposed implementation in 2002. Dr. Alt conducted 70 public meetings in January through April 2002 to

Linking hunters and landowners

P.G.C. must attempt to match the general population, who are the owners of public and private land, with those who hunt in a way that is beneficial to both and mutually agreeable. This is likely to depend on the willingness of P.G.C. to:

- enforce trespass laws on private land
- surrender the traditional value of equitable distribution (the concept that all hunters should harvest an equal number of animals)
- adopt more liberal season and bag limits that would allow hunters to be effective in resolving landowners' problems with deer overbrowsing

explain the rationale behind the proposed new regulations to Pennsylvania deer hunters. However, a survey conducted by Pennsylvania State University in December 2001, prior to the education campaign but not reported until afterward, estimated that

only 36% of hunters were opposed to the change.¹⁵ Today there is widespread support among Pennsylvania deer hunters to hold concurrent buck and doe seasons and there seems to be overwhelming support for the new, larger antler-size restriction.¹⁶ Surveys of hunters reveal very high support for “managing game populations to promote healthy habitats for all species.”¹⁷ In fact, the statewide survey of randomly selected Pennsylvania households conducted in December 2003 indicated that hunters rank forest health and sustainability higher than hunting activities as rationales for managing deer population densities. When asked to rate agreement with potential goals on a 10-point scale (10 signifying complete agreement with the goal), hunters rated managing deer herd numbers to promote healthy and sustainable forests the top priority (average score 7.8) followed by management to promote hunting activities (7.1).¹⁸

The perception that hunters are not willing to tolerate changes to the deer program is incorrect. There is, therefore, considerable political freedom for P.G.C. to implement a policy of managing deer in Pennsylvania from an ecosystem perspective. Whether the commissioners under the current agency structure could maintain such a policy, if implemented, in the face of declining deer numbers is another question. In this regard, continued efforts on hunter education and dialogue seem essential, perhaps with expanded multi-stakeholder communication and introduction of programs on negotiated conflict resolution.

Proposal to focus on stakeholders

P.G.C. has begun to experiment with stakeholder consultation. For instance, a draft deer management plan released by P.G.C. in 2002 included many elements that could be used to manage deer from an ecosystem perspective.¹⁹ The draft plan included input from a workshop of stakeholders selected by P.G.C. to represent a broad spectrum of the public on deer management (see Chapter 16). These stakeholders, like both hunters and non-hunters in the 2003 statewide survey,²⁰ ranked ecosystem management as the highest priority. However, in its final version of

the plan P.G.C. subsequently put ecosystem-based management of deer at the bottom of the list.²¹ Nevertheless, consultation with a broad range of stakeholders is one way to move away from single-species management. Creative interaction among stakeholders can lead to identification of “least painful” and “win-win” solutions to deer-human conflicts. There is a large body of literature dealing with negotiated conflict management and resolution that could be brought to bear on stakeholder consultation. Professional facilitators could be especially helpful; they could be drawn from the many organizations that have experience in this field.

Proposal for augmentation of P.G.C. staff expertise

Implementing ecosystem-based management and moving beyond the traditional species-specific approach to wildlife management will require access to a broader range of expertise than is now present within the P.G.C. staff. Tasks required for successful ecosystem management will include inventory and monitoring of plant and indicator invertebrate populations, forest restoration experimental design, analyzing and interpreting ecosystem research data, managing field research staff, interacting with private and public landowners, and publishing research results in peer-reviewed scientific journals.

Of 705 salaried positions filled at P.G.C. (of 732 authorized),²² only 19 (less than 3%) are currently filled by staff members employed as wildlife biologists, who are required to have post-graduate degrees in wildlife-related disciplines.²³ Pennsylvania has one of the fewest in number and lowest percentages of staff members employed as biologists among all of the states’ natural resource agencies.²⁴ For example, the number of staff members employed as biologists by agencies in New York, Indiana, Montana, Virginia, West Virginia, and Florida in a recent survey ranged from 47 (West Virginia) to 566 (Florida), representing 16 to 43% of agency personnel.²⁵

The staff of the Allegheny National Forest, which manages 500,000 acres in Pennsylvania compared to P.G.C.’s 1,400,000 acres, includes foresters, silviculturists, wildlife biologists, a botanist, a hydrologist, a soil scientist, a fisheries scientist, a geologist, an archeologist, a forest ecologist, and a fire ecologist.²⁶ The biologists currently on P.G.C.’s staff are specialists in administration (two biologists), Allegheny wood rat, American woodcock, bats (two), black bear, biometrics, bobcat (two), white-tailed deer (four), elk, fisher, furbearers, grassland birds, ring-necked pheasant (several), protected birds, river otter, ruffed grouse, small game, waterfowl (three), wild turkey, and wildlife grant proposals (these sum to more than the total number of biologists because some staff members have multiple specialties).²⁷ At present there are no wildlife biologists working out of any of the regional offices; however, plans are moving forward to fill such positions in each of the six regions. P.G.C. has no forest ecologists, community ecologists, soil scientists, aquatic ecologists, or botanists.

To its credit, P.G.C. has taken advantage of outside funding sources such as the Wild Resource Conservation Fund and the federal Conservation Reserve Enhancement Program to pursue efforts that benefit non-game species. For example, under the federal Landowner Incentive Program, biologist positions have been established in each region to assist landowners with plans to conserve species of special concern. These Wildlife Diversity Biologists will provide technical assistance and help develop habitat management plans related to landowner objectives. The positions are funded by annual federal appropriations, and are full time but “limited term,” meaning the positions would disappear if funding were discontinued.

One note of caution: Even if its small staff of wildlife biologists were to be augmented with new staff positions, outside consultants, or both, the sum of recent external reviews strongly suggests that P.G.C. — with its present culture weighted heavily toward law enforcement and its constituency overwhelmingly dominated by sportsmen — may not currently have the will to implement A.R.M. or introduce ecosystem management principles into deer management.

Proposal for D.C.N.R. to be more publicly visible on the deer issue

Although D.C.N.R. has been very active in making the case within government that deer numbers are too high on state forests, it has not been equally active among hunters and the general public in calling for reduced deer densities on state forests. In fact, nothing appears on the D.C.N.R. web site (as of January 2005) indicating that there are too many deer on state-owned lands. This contrasts with the P.G.C. web site, where the argument is made in many places that deer numbers are too high.

D.C.N.R. has an effective Forest Stewardship Program in which staff members work with various forest landowner groups. The program focuses on the impact of overabundant deer and options for landowners to use DMAP. However, this program has not been publicized beyond personal contacts.

Proposal to increase hunter access to land

Hunter distribution and access to land is another major concern if hunting is to remain a deer-management tool.²⁸ Hunting will fail to be a regulating force on deer populations if the harvest of antlerless deer does not occur where it is needed, even if hunter numbers were to remain constant or increase. Land ownership continues to be divided into ever-smaller parcels, which creates a landscape where, either because of safety concerns or landowner preferences, the proportion of land that is hunted is declining. Because 74% of Pennsylvania’s forestland is privately owned, any plan to conserve the diversity of wildlife and habitats must take landowner values and goals into consideration.

A survey of Pennsylvania private landowners, conducted in 2002 by Pennsylvania State University researchers, was presented at the January 2003, meeting of the P.G.C. Board of Commissioners.²⁹ Several key findings from the survey included:

- Almost 70% of properties in Pennsylvania were posted. However, hunting by the landowners, their friends, or other assignees occurred on 75% of posted land; 18.5% of properties are posted and entirely closed to hunting.
- Property owners had a tendency to allow friends, family, and neighbors, but not strangers, to hunt on their land.
- Property owners who purchased their properties more recently were more likely to post their land, suggesting that the trend of increasing posting is not likely to reverse.
- External factors such as regulation changes or incentives were unlikely to influence landowners' decisions to post their properties.

Given these trends, there is the possibility that a program of managing deer from an ecosystem perspective — one that emphasized the ecological value of hunting deer in Pennsylvania — might induce some reluctant landowners to allow hunting, particularly those with an environmental and conservation sensibility.

One model for increasing hunter access to private property already exists in Pennsylvania, the “red tag” program developed for agricultural lands. It allows farmers to receive extra antlerless deer harvest permits as in DMAP, but at no cost. One permit is issued for each 5 acres of cultivated ground. Farmers distribute the permits as they wish. Hunters may approach farmers to request red tag hunting privileges. If crop losses are still a problem after a farmer's allocation for the year is exhausted, P.G.C. will issue more permits on request. Under this program, deer are taken from 1 February through 28 September, not during the regular seasons; most are harvested in late winter and spring. Appropriate modifications would be required to adapt the program to ecosystem management of deer, for instance, restrictions on hunting seasons for small properties.

Findings on making progress toward solutions

- (1) The prevailing wisdom about what the public will support is not always right. For example, there is a perception by some Pennsylvania residents that maintaining the separation between the state agencies managing Pennsylvania's natural resources is strongly supported by the general public. However, the statewide survey of randomly selected Pennsylvania households conducted in December 2003 indicated that 75% of respondents were in favor of combining P.G.C., P.F.B.C., and D.C.N.R. into a single agency provided that the single agency would result in a more efficient or cost-effective system for managing natural resources. Nonetheless the three agencies are on record in opposition to such a merger and, in any case,

achieving a change of this magnitude would require an improbably large expenditure of political capital.

- (2) The perception that hunters are unwilling to tolerate changes to the deer program is incorrect. When the reasons for management changes are explained effectively to hunters there is considerable political latitude for P.G.C. to implement a policy of managing deer from an ecosystem perspective.
- (3) P.G.C. has begun to experiment with stakeholder consultation but has not formalized stakeholder input into its planning processes.
- (4) The Governor's Advisory Council on Hunting, Fishing and Conservation plays a significant role in the commissioner appointment process. Council members who are sympathetic to ecosystem management could improve the likelihood of its adoption by P.G.C. by recommending candidates who strongly support managing deer from an ecosystem perspective, have training or experience in natural resource management, and shoulder responsibility to the entire citizenry of Pennsylvania, not just hunters and trappers.
- (5) D.C.N.R. has become more involved in the deer issue recently, announcing its intention to collaborate more closely with P.G.C. in the management of wildlife and habitat on state park and state forest lands, but it has not been active in outreach to hunters and the general public.

Recommendations on making progress toward solutions

Findings in Chapter 13 and in this chapter support the following recommendations.

Recommendations to the Pennsylvania Game Commission

- (1) P.G.C. should formally review its staffing capabilities and in-house training. The management of wildlife in Pennsylvania from an ecosystem perspective requires P.G.C. and perhaps other natural resource agencies to employ more wildlife biologists, ecologists, and other scientifically trained staff members in key positions within central and regional office structures. P.G.C. should also improve training of all staff members on ecosystem issues. To facilitate effective dialogue with hunters, P.G.C. should bring into core positions more people with both strong biological backgrounds and good communication skills. Employment of staff members with backgrounds in disciplines such as resource economics, ecological economics, and sociology should also be considered.
- (2) To move away from single-species management, P.G.C. should continue to involve a broad range of stakeholders in discussions with an emphasis on the exploration of desirable deer densities. P.G.C. should hire persons trained in techniques of negotiated conflict resolution and make use of experienced facilitators in its stakeholder work.

Recommendations to the Governor, the Governor's Advisory Council on Hunting, Fishing and Conservation, the Department of Conservation and Natural Resources, and the General Assembly

- (1) To identify the most effective way for P.G.C. to achieve its mission, the commissioner system should be reviewed by the Governor and the General Assembly. If the system is retained, it should be changed to ensure that the commissioners represent all the citizens of Pennsylvania, not just those who hunt.
- (2) The Governor's Advisory Council on Hunting, Fishing and Conservation should recommend candidates for P.G.C.'s Board of Commissioners who have a strong commitment to ecosystem management. If the council is not able to do so, the Governor needs to fill council vacancies with more supportive members and must be prepared to look beyond the recommendations of the council in the near term for commissioner candidates.
- (3) The Governor and the General Assembly should regularly declare their full support for ecosystem-based management and take appropriate action. The Governor, for instance, should appoint persons to P.G.C.'s Board of Commissioners who are sympathetic to such a view and have basic training or expertise in natural resource or ecosystem management.
- (4) Until such time as P.G.C. can successfully bring deer densities down to previously approved targets and be well on its way to implementing ecosystem management, an annual review of P.G.C.'s mission, organization, skill mix, policies, funding adequacy, funding sources, and priorities, along with the sociopolitical obstacles it faces, should be conducted by an independent entity appointed by the Governor and the General Assembly. These reviews would build on past reports by the Management Assistance Team, Legislative Budget and Finance Committee, and others, together with input from P.G.C. staff members on recent changes and difficulties. The review process could help all parties understand why P.G.C. has not been able to bring deer numbers under control and help build consensus on how the agency can reach its previously approved goals. Without consensus among members of the General Assembly and the Governor, it will be very difficult to overcome the sociopolitical obstacles that P.G.C. staff members believe are holding them back. Appropriate recommendations should accompany the findings of the annual review.
- (5) The Natural Resources Workgroup should be expanded to include other state agencies and departments with major concerns about the effects of high deer densities on the environment and human health and safety, for example, the Departments of Agriculture, Education, Environmental Protection, Health, and Transportation. The Workgroup should compile a list of conflicts among agency policies and bring them to the attention of the Governor, along with recommendations for resolution.

- (6) D.C.N.R. should launch a far-reaching education and outreach program to inform the general public about the impacts of current deer population levels on ecosystems and biodiversity and to train hunters and the general public on how to recognize habitat indicators of deer overbrowsing. In addition, D.C.N.R. should increase access to D.C.N.R. lands and more thoroughly advertise the availability of its lands for hunters.
- (7) P.G.C. should expand policies well beyond the limited measures currently proposed for DMAP to allow landowners to manage deer to meet their land-management objectives, including those landowners who wish to preserve biological diversity and restore full and healthy ecosystem function. The red tag program developed for agricultural lands provides a possible model, albeit with appropriate modifications such as restrictions on hunting seasons for small properties. If legislative changes are needed to enable such a program to be effective, P.G.C. should request the necessary modifications and the legislature should enact them.

Endnotes

- ¹ Legislative Budget and Finance Committee 2003b
- ² Legislative Budget and Finance Committee 2003b; P.G.C. expressed disagreement with many of the findings of this report (Pennsylvania Game Commission 2003a)
- ³ McKinstry 2003
- ⁴ Wager et al. 2003
- ⁵ Angus Gynn and Gynn 2002
- ⁶ DiBerardinis 2004
- ⁷ Carlson 2004
- ⁸ DiBerardinis 2004
- ⁹ DiBerardinis 2004
- ¹⁰ Pennsylvania Game Commission 1998a
- ¹¹ Goodrich et al. 2002
- ¹² Conservation and Natural Resources Advisory Council 2002
- ¹³ Riley et al. 2003; Giles and Findlay 2004
- ¹⁴ Enck and Brown 2001
- ¹⁵ Luloff et al. 2002
- ¹⁶ Dr. Gary L. Alt, Supervisor, Deer Management Section, Bureau of Wildlife Management, Pennsylvania Game Commission, personal communication, 2003
- ¹⁷ Responsive Management 2001
- ¹⁸ Reed Haldy McIntosh & Associates 2003

Endnotes

¹⁹ Pennsylvania Game Commission 2002a

²⁰ Reed Haldy McIntosh & Associates 2003

²¹ Pennsylvania Game Commission 2003e

²² Legislative Budget and Finance Committee 2003b

²³ Pennsylvania Game Commission 2003c; Robert C. Boyd, Assistant Bureau Director and Research Division Chief, Pennsylvania Game Commission, personal communication, 2004

²⁴ Angus Guynn and Guynn 1999: page 50; some members of the P.G.C. law-enforcement staff have undergraduate training in biology and related fields.

²⁵ Angus Guynn and Guynn 1999: page 50

²⁶ Brad Nelson, Wildlife Biologist, Allegheny National Forest, personal communication, 2003

²⁷ Pennsylvania Game Commission 2003c; Robert C. Boyd, Assistant Bureau Director and Research Division Chief, Pennsylvania Game Commission, personal communication, 2004

²⁸ Brown et al. 2000

²⁹ Steele et al. 2003

Chapter 15. Hunter Satisfaction and Adaptive Resource Management

Managing deer under an A.R.M. paradigm will require adjusting deer density levels with the help of recreational hunters. Yet, hunters are the major constituency that may experience a decline in satisfaction resulting from management of deer populations from an ecosystem perspective: there will be fewer deer to see in the woods and studies have shown hunters derive satisfaction from seeing many deer as well as harvesting a deer.¹ However, hunters benefit from managing deer under an ecosystem management paradigm because (1) with reduced deer densities there should be more food resources available per deer, which should result in larger body sizes and larger antlers, (2) due to the fact that current deer populations are likely greater than M.S.Y. (Chapter 11) throughout much of the state, hunters will be able to harvest more deer even though populations are reduced, and (3) hunters should be perceived more favorably by society because of their instrumental role in ecosystem management. Hunters should be acknowledged as our first line of defense in regulating deer numbers.

The greatest changes to hunting that will result when deer are managed from an ecosystem perspective involve shifting the focus from recreational buck hunting to antlerless deer hunting as a population regulation tool. This paradigm shift is necessary to reduce deer populations, which, in turn, is necessary if we are to restore forest habitats as well as demonstrate that hunting not only provides recreation but also serves the needs of society. That does not mean, however, that hunters must sacrifice their personal enjoyment of hunting in general, and buck hunting in particular. For example, managing deer under A.R.M. does not preclude the use of antler restriction regulations such as those that have recently been enacted in Pennsylvania to increase the average antler size of bucks. In addition, if antlerless harvests are to increase it will require a greater diversity of hunting opportunities be available to hunters. This, in turn, will likely result in improved quality of the hunting experience as well as greater flexibility in when hunters may pursue deer.

Also, the increased hunting opportunities required to attain greater harvest rates could be used to strengthen the hunting tradition in Pennsylvania: (1) More hunting opportunities should allow hunters to further develop their skills and greater proficiency should enhance enjoyment from hunting. (2) Additional antlerless permits could be used to improve recruitment and retention rates of youth hunters. (3) Greater opportunities to harvest an antlerless deer should allow hunters to be more selective when buck hunting because they will have other opportunities to harvest a deer for venison. (4) Reduced deer populations with a greater buck:doe ratio should provide more exciting hunting experiences because there should be larger-sized deer, a more intensive rut, and higher reproductive rates.

If A.R.M. is to be effective, not only must decision makers embrace it, but hunters must understand the objectives and benefits of A.R.M. even if they will not be involved in the details of evaluating models and setting harvest quotas. Therefore, an A.R.M. program must be carefully designed with flexibility to adapt to changes in hunters over time. Also, the program must have a wide range of management options available to landowners and hunters to achieve desired deer harvests. Those opposed to hunting may be distressed by the methods needed to control deer populations. However, farmers, forest-products companies, environmentalists, owners of land harmed by deer browsing, motorists, and society as a whole would benefit from a reduction in deer densities carried out as part of ecosystem management. In some parts of the state, conventional recreational hunting may be insufficient to reduce deer densities as much as is needed. In such areas, it may be necessary to provide incentives to recreational hunters to remove excess deer. Innovative programs, such as those that deliver venison to organizations that provide meals, should be given due consideration.

Findings on hunter satisfaction

- (1) Hunters are critical to the success of deer population management because hunting is currently the only feasible method of regulating deer populations on a large scale.
- (2) Hunters are a major constituency that risks a decline in satisfaction from management of deer populations from an ecosystem perspective. However, hunters do stand to gain from A.R.M.
- (3) Under A.R.M., hunters should benefit from more opportunities to harvest deer and greater flexibility in when they can hunt resulting from more seasons, longer seasons, and higher bag limits.
- (4) Hunters should be perceived more favorably by society because under A.R.M. they will have a key role in protecting the environment.
- (5) Those opposed to hunting may be distressed at the methods needed to control deer populations. However, farmers, forest-products companies, environmentalists, owners of land harmed by deer browsing, motorists, and society as a whole would benefit from a reduction in deer densities carried out as part of ecosystem management.

Recommendations on hunter satisfaction

- (1) The Pennsylvania Game Commission (P.G.C.) should launch an aggressive campaign to educate and inform hunters about the objectives of A.R.M. and its benefits to them, including increased hunting opportunities and ways in which it may strengthen the hunting tradition.
- (2) P.G.C. should experiment with programs to increase hunter success, satisfaction, recruitment, and retention, possibly within the framework of A.R.M. itself. For example, if two different

methods of harvesting deer are equally effective but may result in different levels of hunter satisfaction, hunter satisfaction can be included as a constraint under A.R.M.

- (3) P.G.C. should actively promote deer as a high-quality food, and teach (or re-teach) hunters the skills required to process, preserve, and prepare venison for the home table, maximizing its appeal and nutritional benefits.

Endnote

¹ Applegate 1973; Langenan 1979

Chapter 16. Stakeholder Participation in Deer Management Policy Development

Many external stakeholder groups have invested considerable effort over the past 30 or more years to move deer management in Pennsylvania towards a more scientific or ecologically sensitive mode of operation. These efforts have included research and demonstration projects, educational programs, written and oral testimony, and input to the Pennsylvania Game Commission (P.G.C.).

The list of involved stakeholder groups includes, but is not limited to:

Audubon Pennsylvania

Deer/Forest/Farms Committee (Society of American Foresters and the Pennsylvania Farm Bureau)

Pennsylvania Biological Survey

Pennsylvania D.C.N.R., Bureau of Forestry

Pennsylvania Deer Association

Pennsylvania Farm Bureau

Pennsylvania Forestry Association

Pennsylvania Federation of Sportsmen's Clubs

Pennsylvania Habitat Alliance

Pennsylvania Organization for Watersheds and Rivers

Pennsylvania Society for Ornithology

Pennsylvania Vegetable Growers Association

Pennsylvania Wildlife Society

Quality Deer Management Association

Sand County Foundation

The Nature Conservancy

United Bowhunters of Pennsylvania

Western Pennsylvania Conservancy

In addition to involvement by individual organizations, there have been several coordinated efforts by coalitions of groups, some of which were convened by government agencies:

Deer Management Working Group. P.G.C. convened this group of stakeholders in September, 1998, to provide a forum for discussion about management of deer. Facilitated by the Wildlife Management Institute, the groups represented included D.C.N.R., the Governor's Sportsmen's Advisor, Pennsylvania Department. of Agriculture, Pennsylvania Forestry Association, Pennsylvania Federation of Sportsmen's Clubs, Unified Sportsmen, Ruffed Grouse Society, Safari Club, Quality Deer Management Association, Audubon, Pennsylvania Farm

Bureau, Pennsylvania Hardwood Association, Allegheny National Forest, Western Pennsylvania Conservancy, Vegetable Growers Association, Association of Conservation Districts, Penn State University, Pennsylvania Sportsman magazine, and others. The working group met over a 2-year period and presented its findings and recommendations at meetings of P.G.C.'s Board of Commissioners in January, 1999, and January, 2000. The group presented eight findings and six recommendations, plus a proposal for large landowner permits.¹ Fundamental to this group's recommendations were the principles that management of deer should be based on landowner values and that quality of habitat should be the primary driver of such management.

Conference on Deer Impacts. In September, 1999, a group of organizations including Audubon Pennsylvania, the Pennsylvania Chapter of the Sierra Club, the Western Pennsylvania Watershed Protection Program, the Western Pennsylvania Conservancy, and the University of Pittsburgh convened a conference on the impacts of deer. This conference brought together a series of presenters representing a variety of deer management stakeholders, including government agencies and non-governmental organizations, farming and timber industries, sportsmen and academics. The resulting proceedings (*The Impacts of Deer on the Biodiversity and Economy of the State of Pennsylvania*) are available on the Audubon web site.²

Pennsylvania Biodiversity Partnership. In March, 2000, the Pennsylvania Biodiversity Partnership was launched "to conserve biodiversity statewide by promoting communication and cooperation among a broad spectrum of stakeholders." This public-private partnership was formed in response to the *Report of the Pennsylvania 21st Century Environment Commission*,³ which recommended the creation of a broad-based partnership focused on biodiversity conservation issues in Pennsylvania. Members include conservation and environmental organizations, government agencies, businesses, industries, scientists, academic institutions, and individuals. The Partnership is governed by a board of directors that acts on recommendations from seven task forces (Bioinformatics, Education, Funding, Policy, Public Relations, Science, and Stewardship).

One of the first actions by the Partnership was to send a letter to P.G.C. Executive Director Vern Ross about the deer issue, stating:

The impacts of white-tailed deer must be addressed as a critical component of any comprehensive strategy for biodiversity conservation in Pennsylvania. We view deer as a keystone species that, if not managed appropriately, will:

- *significantly reduce or eliminate natural forest regeneration;*
- *dramatically alter forest structure and composition;*
- *negatively affect other wildlife and plants, including songbirds and wildflowers*
- *threaten forest sustainability.*

The Partnership encouraged the Commission to “fully support the efforts of its staff biologists and to give favorable consideration to their recommendations for bringing Pennsylvania’s deer herd into proper balance.” The primary project of the Partnership is a Pennsylvania biodiversity conservation plan. The initial phase, completed in 2002, is a literature-based report that describes the present status of Pennsylvania’s biodiversity, including wildlife and their habitats, laws, policies, funding mechanisms, and educational resources relevant to biodiversity. The report, released in December, 2002,⁴ states:

*Deer represent a major threat to biodiversity because of their present over-abundance in many areas of the state. ... Their increasing numbers and broad dietary preferences have reduced forest understory plants and retarded forest regeneration. ... In areas of high deer density, hay-scented fern dominates the forest floor vegetation, forming a nearly impenetrable layer that chokes out other herbs as well as young shrubs and tree seedlings ... [deer] therefore are changing the composition of Pennsylvania’s forests.*⁵

Deer Management Stakeholder Meeting. In July, 2002, P.G.C. convened another group of stakeholders to provide input to a new deer management plan that was under development. The group developed the following vision statement for deer management:

We will manage deer to restore and provide healthy and sustainable ecosystems with a healthy, viewable, huntable deer herd throughout the Commonwealth for the benefit of our citizens and natural resources compatible with other species and land uses.

The group also developed six goals, with associated objectives, to drive the deer management plan.⁶ The goals, as prioritized by the group, are as follows:

- (1) To improve the health and sustainability of the ecosystem
- (2) To provide public and private landowners with the deer management tools they need to achieve their land use objectives
- (3) To improve and maintain a healthy deer herd
- (4) To increase recreational opportunities involving deer
- (5) To increase citizen understanding of healthy ecosystems and healthy deer herds
- (6) To reduce human-deer conflicts

Second Deer Conference — “The Challenge of Overabundant Deer in Pennsylvania: a Call for Partnerships.” In January, 2004, over 80 organizations representing a wide range of interests came together to cosponsor a conference to review the status of deer management and seek ways to work together for further progress. Nearly 500 people attended, hearing presentations by a member of the Board of Game Commissioners, the secretaries of D.C.N.R. and the Department of Agriculture, deputy secretary of the Department of Transportation, co-directors of P.G.C.’s Deer Management Section, regional director of the Quality Deer Management Association, and other leaders in deer management from across the state. Breakout

sessions provided an opportunity for attendees to present input regarding deer management in big-woods, urban/suburban and rural mosaic settings, and partnership opportunities among government agencies and private, for-profit and nonprofit concerns. A summary of the conference was presented to the Board of Game Commissioners at its January, 2004, meeting.

Findings on deer management stakeholders

- (1) There has been significant increase in efforts by citizens and organizations in Pennsylvania with a stake in deer management to influence management planning in recent years.
- (2) Citizens and organizations in Pennsylvania with a stake in deer management have overwhelmingly urged P.G.C. to adopt an ecosystem management approach.

Recommendation on deer management stakeholders

P.G.C. should continue to use and improve upon the stakeholder outreach process to gather input on managing deer from an ecosystem perspective and to assist in performing some of the critical tasks of ecosystem-based adaptive management, including inventory, monitoring, and research.

Endnotes

¹ Williamson 2000

² Gibbon 2000

³ Pennsylvania 21st Century Environment Commission 1998

⁴ Thompson 2002

⁵ Thompson 2002

⁶ Pennsylvania Game Commission 2002a

Chapter 17. Planning for the Long Term

Based on the preponderance of scientific evidence that has been collected in Pennsylvania to date, the Deer Management Forum has concluded that it can anticipate the broad outcome, at least, of an A.R.M. program. The probability is high that the results of A.R.M. will demonstrate that recovery of forest structure, diversity, ecological processes, and ecosystem function requires significant deer-density reductions. After such reductions, time alone will be enough to allow recovery to occur in most of the state's forestlands. For areas where accelerated recovery is desired to enhance commercial tree species, we do not yet have enough information to anticipate the mix of herbiciding, liming, seeding, and fencing that will be appropriate in various parts of the state to speed up recovery. Neither can we anticipate the actual deer-density numbers that will be needed for ecosystem recovery in all forests in the state. Whatever level of deer density reduction may be necessary, achieving such reductions will be difficult and will require hard work at building a new consensus on forests in Pennsylvania.

To this end, it is desirable to begin a consensus-building process that attempts to minimize the "pain" to parties who might feel negatively affected by significant reduction in deer densities. One possibility would be to adjust the pace of change by region or by smaller, multi-county units based on research and stakeholder concerns. No doubt there are other and better compromise proposals waiting to be discovered, if the affected parties can be induced to deal with each other. A consensus process can be convened by stakeholders themselves or by government leaders with the power to take action on their own, such as the Governor or agency heads.

Finding on long-term planning

Successfully applying lessons learned from a small-scale A.R.M. process to all of the degraded, unproductive, and diversity-stripped forests in Pennsylvania will require a significant degree of consensus among stakeholders.

Recommendation on long-term planning

Possibilities for convening groups of stakeholders to build consensus on how to address the deer problem statewide need to be explored.

Major Findings and Recommendations

Major findings regarding science and management of forests and wildlife

- (1) Pennsylvania's forested ecosystems have been severely altered. Virtually all of the published literature on forest damage in Pennsylvania suggests a major role for high densities of white-tailed deer.
- (2) In the areas that have been affected the longest by high deer densities, the diversity of canopy tree species has decreased. Even in some areas that have sustained high deer densities for just a few decades or less, understory tree and shrub layers have been diminished in species diversity, height, and density or completely eliminated, and the formerly diverse ground layer has been reduced to ferns and a few other species that are either not preferred by deer or resilient to repeated browsing.
- (3) As a result of the elimination of large predators in the 1700s and 1800s, humans are the only species still present in Pennsylvania capable of maintaining the population density of white-tailed deer in balance with its habitat. Active intervention by humans to keep deer populations below levels that severely alter the composition and diversity of forests will have to be sustained forever, assuming that it is impractical to restore the full complement of predators across the entire range of white-tailed deer in the state. Hunters are critical to the success of deer population management because hunting is currently the only feasible method of regulating deer populations on a large scale.
- (4) Adaptive resource management (A.R.M.) is a science-based methodology that is well suited to managing deer from an ecosystem perspective while accommodating disagreements over models of forest dynamics or causes of forest alteration. The A.R.M. approach provides for testing competing scientific models or hypotheses about how forests and wildlife populations function while, at the same time, providing a framework for regular management decisions to be made and implemented based on the best available information.
- (5) Two major challenges exist in implementing A.R.M. for deer in Pennsylvania. First, management objectives must be determined in the political arena before A.R.M. can proceed. Second, recovery of the structure, diversity, and function of forest ecosystems may take years or decades. Evaluating progress over a multi-year time frame presents difficulties when deer harvest goals need to be set annually.
- (6) The initial commitments involved in preparing A.R.M. alternatives could be made within existing budget authorizations, provided agencies are willing to assign staff to the process. However, because of the great damage that has already been done to the structure of forests

and the depletion of the seed supply in many parts of the state, a long-term commitment to the A.R.M. process is needed.

- (7) The sooner effective treatments are implemented, the sooner further deterioration will be prevented, saving larger areas of forested land in Pennsylvania from slipping below the threshold for fast recovery.

Major findings regarding policy and administration

- (1) The goal of bringing back the understory vegetation and ensuring the continuation of a self-renewing and diverse forest overstory into the future is not a scientific choice but, instead, a values choice.
- (2) With the exception of a vocal minority of hunters, there is a broad consensus that deer densities in Pennsylvania are too high from an ecosystem perspective. In a 2003 survey of Pennsylvanians, the general public ranked managing deer to promote healthy and sustainable forests highest among potential goals (average 7.5 of 10, with 10 meaning complete agreement) and hunters and anglers ranked it even higher (7.8 of 10). Pennsylvania hunters and anglers ranked managing deer to promote healthy and sustainable forests higher than managing deer to promote hunting opportunities (7.8 vs. 7.1 of 10). The stakeholder group P.G.C. convened to recommend goals and objectives for its statewide deer management plan also ranked managing deer to promote healthy forests and ecosystems as its top goal.
- (3) P.G.C.'s Deer Management Assistance Program (DMAP) provides for increasing the number of deer harvest permits allocated on specific land units at the owner's request. It is intended as a tool for landowners to manage deer on their own property in line with their values.
- (4) In a reevaluation of D.C.N.R.'s state forest system in 2004, Scientific Certification Systems predicted that overabundant deer will continue to decimate the flora and fauna in Pennsylvania's state forests without:
 - (a) enhanced DMAP regulations that allow more liberal harvest of antlerless deer on state forest lands and are granted to the D.C.N.R. Bureau of Forestry on a continuing and contingency basis by the P.G.C. commissioners; or
 - (b) legislative fiat, whereby administration and control of deer hunting regulations on District Forests are transferred from P.G.C. to D.C.N.R.; or
 - (c) merger of P.G.C. with D.C.N.R. in a combined natural resource agency resulting in oversight of hunting regulations by a more balanced representation of natural resource interests. Note: both agencies are on record in opposition to such a merger and there appears to be no real political will to pursue it at this time.
- (5) The P.G.C. commissioners, in response to proposals by staff to bring the deer herd more in line with its habitat and to protect commercially valuable trees, set targets for lower deer

densities in Pennsylvania in 1979; however, those goals have never been met. In a renewed effort to reduce deer population levels, numerous changes were made in the deer management program from 1998 through 2003. However, the deer herd continued to increase and remains today at 20% above the 1998 level.

- (6) Adopting a program of managing deer from an ecosystem perspective would provide both advantages and challenges for P.G.C. Ecosystem considerations would lead to the conclusion that deer densities in some parts of the state should be reduced below levels that would be set solely by considerations of deer health and condition. This would require targets even lower than those P.G.C. has been unable to reach in the past. The reaction of some hunters to lower densities may be negative but the 2003 survey results indicate that the majority of hunters would support the goal of managing deer to promote healthy and sustainable forests.
- (7) With the reorganization in 1999 of the Wildlife Management Bureau (with Dr. Gary Alt named chief of the newly formed Deer Management Section) and the support of agency policy makers, P.G.C. is poised to pursue a more aggressive deer management program that, in theory, can effectively reduce deer densities in many parts of Pennsylvania. Its success depends critically on whether the changes are formalized in a way that enables them to last through the turnover of personnel on the staff and Board of Commissioners.
- (8) P.G.C. senior staff members argue that they have done all that is possible to manage deer under the current sociopolitical environment. While we find there are many more measures that the P.G.C. staff could and should implement, we do not minimize the sociopolitical constraints under which P.G.C. staff members must operate.
- (9) The management of deer is a service provided to all citizens of Pennsylvania, yet P.G.C. is currently funded primarily by license dollars and timber-harvest revenues from game lands. Neither source is predicted to be sustainable in the long term. In the results of a 2003 survey of Pennsylvania residents, 71% of the respondents agreed that a greater proportion of resource agency budgets should go toward non-game wildlife and threatened and endangered species (11% disagreed). Sportsmen supported this concept also, with 70% of hunters and anglers agreeing and 11% disagreeing. A more stable and equitable funding base is required if P.G.C. is to meet broader conservation goals.
- (10) Of all the new measures initiated in recent years by P.G.C., the most intricate is DMAP, which shifts some responsibilities away from P.G.C. for choosing deer densities, transferring it to landowners who can apply for additional permits for use solely on their properties. However, most of Pennsylvania's land is privately owned and the vast majority of landowners do not understand the ecological impacts of deer overbrowsing. Thus, most of Pennsylvania's land will not benefit from any science-based application of DMAP.

- (11) P.G.C. gives mixed messages about the need for ecosystem considerations. This reflects a mix of *internal* stakeholders with differing views and is evidence of an ongoing debate within the staff and Board of Commissioners about the future of the agency. For instance, P.G.C.'s web site discusses forest damage caused by high deer populations, as does the current deer population management plan. However, P.G.C.'s main strategic planning document, developed by senior staff members, does not acknowledge that high wildlife populations can be a problem for ecosystems nor does it concede that the agency has failed to bring the deer population in line with past targets.
- (12) Although the P.G.C. staff is strong in the areas of deer biology and in implementing and enforcing regulations to make hunting safe, the current staff has limited expertise in the field of general ecology. External reviews have found that P.G.C. operates primarily as a law enforcement agency, with its limited number of biologists isolated and, with few exceptions, not engaged in the core functions of the agency. With resources historically directed mainly at law enforcement, P.G.C. is struggling with making the transition from a law enforcement agency to a natural resource agency — a transition that most state agencies made many years ago.
- (13) There is an unusual three-way resource management structure in Pennsylvania with responsibility given by the legislature to P.G.C. for mammals and birds, to the Pennsylvania Fish and Boat Commission (P.F.B.C.) for aquatic animals, and to D.C.N.R. for forests. This situation tends to reinforce single-species management at P.G.C.
- (14) State agencies that are responsible for, affect, or have a stake in the management of natural resources in Pennsylvania are not collaborating to ensure that policies by one agency do not adversely affect another's ability to carry out its mission. For instance, at present D.C.N.R. cannot fully implement ecosystem management on its lands because it does not have the necessary authority to manage deer populations in state forests and state parks.
- (15) The prevailing wisdom about what the public will support is not always right. For example, there is a perception by some Pennsylvania residents that maintaining the separation between the state agencies managing Pennsylvania's natural resources is strongly supported by the general public. However, the statewide survey of randomly selected Pennsylvania households conducted in December 2003 indicated that 75% of respondents were in favor of combining P.G.C., P.F.B.C., and D.C.N.R. into a single agency provided that the single agency would result in a more efficient or cost-effective system for managing natural resources. Nonetheless the three agencies are on record in opposition to such a merger and, in any case, achieving a change of this magnitude would require an improbably large expenditure of political capital.

Major recommendations regarding science and management of forests and wildlife

- (1) Until proven otherwise, policy makers should assume that the consensus view on the impacts of the current high densities of white-tailed deer on forest ecosystems is correct.
- (2) Deer management should focus on managing the ecosystems of which deer are a part. Deer densities in Pennsylvania's major forested areas should be brought down to levels that will allow the restoration of full forest structure, diversity, ecological processes, and ecosystem function.
- (3) Adaptive resource management (A.R.M.) should be chosen as the framework for implementing management of deer from an ecosystem perspective. The science-based approach of A.R.M. will allow agencies to begin applying remedies based on the best available information while updating their operational theories as new data become available.
- (4) Forum members propose a two-tiered A.R.M. program. The first tier would apply to the state as a whole. Its initial treatments would take into account factors that go beyond ecosystem management, for example, budgetary constraints and local traditions. The second tier would apply A.R.M. at a smaller scale, to multiple 10-square-mile forest treatment and comparison areas in all of the major forest regions of the state. In contrast to the first tier, treatments on these forest recovery-monitoring tracts would include a range of deer densities, as well as tests of alternative theories on causes of forest degradation and recovery. The focus would be exclusively on ecosystem management. Lessons learned from these smaller-scale manipulations could be applied to forested areas across the state as a whole in subsequent years.

Major recommendations regarding policy and administration

- (1) The Governor and the General Assembly, in collaboration with P.G.C., should identify a funding base that is more stable and equitable than funding derived exclusively from sources such as license dollars and timber sales on game lands, in order to facilitate the shift from single-species management to ecosystem management.
- (2) To identify the most effective way for P.G.C. to achieve its mission, the commissioner system should be reviewed by the Governor and the General Assembly. If the system is retained, it should be changed to ensure that the commissioners represent all the citizens of Pennsylvania, not just those who hunt. Although the Governor now has the power to do this through the appointment process, the General Assembly also should give its approval to broad representation on the Board of Commissioners.

- (3) The General Assembly should modify P.G.C.'s enabling legislation to make it unambiguously clear that part of the agency's mission is to resolve wildlife-human conflicts and protect forest ecosystems.
- (4) P.G.C. should formally review its staffing capabilities and in-house training. The management of wildlife in Pennsylvania from an ecosystem perspective requires P.G.C. and perhaps other natural resource agencies to employ more wildlife biologists, ecologists, and other scientifically trained staff members in key positions within central and regional office structures. P.G.C. should also improve training of all staff members on ecosystem issues. To facilitate effective dialogue with hunters, P.G.C. should bring into core positions more people with both strong biological backgrounds and good communication skills.
- (5) Until such time as P.G.C. can successfully bring deer densities down to previously approved targets and be well on its way to implementing ecosystem management, an annual review of P.G.C.'s mission, organization, skill mix, policies, funding adequacy, funding sources, and priorities, along with the sociopolitical obstacles it faces, should be conducted by an independent entity appointed by the Governor and the General Assembly. These reviews would build on past reports by the Management Assistance Team, Legislative Budget and Finance Committee, and others, together with input from P.G.C. staff members on recent changes and difficulties.
- (6) Public agencies need to lead by example in managing forestlands. P.G.C., in conjunction with D.C.N.R. and with assistance from the Governor, should address the conditions that must be met to maintain continued certification of the state forest system, particularly regarding the adverse effects of deer. In addition, P.G.C. should ensure sustainability of forests on state game lands by developing and implementing an ecologically based forest inventory and forest management plan. When necessary, sections of state game lands should be entered into DMAP.