



Wildlife in Managed Forests: Observations and Future Directions

David C. Gwynn, Jr.

*Arkansas Forest Resources
Distinguished Lecture*

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David Guynn is a professor of forest resources at Clemson University with research and teaching emphasis in forest wildlife management. He received B.S., M.S. and Ph.D. degrees from Virginia Polytechnic Institute and State University. Prior to joining the faculty at Clemson University in 1980, he served six years as a faculty member in the Department of Wildlife and Fisheries at Mississippi State University.

He has authored over 100 technical publications and numerous public service and popular articles focusing on management of white-tailed deer, forestry-wildlife habitat interactions, and the human dimensions of wildlife management. He has received three awards from the Southeastern Section of The Wildlife Society (SETWS) recognizing the value of his research. Collective efforts addressing management on private lands and population management of white-tailed deer have contributed significantly to the management of the species in the southeastern United States. He received the Deer Management Career Achievement Award from the Deer Committee, SETWS. Since joining the faculty at Clemson University, he has directed over 50 graduate students. He has been active in The Wildlife Society (TWS) for many years and has served as president of the Southeastern Section and as Southeastern Section representative to TWS council.

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Recent public polls and surveys indicate that natural resources, especially wildlife, are important to the people of the United States (Hodgdon 1999). Increasingly, more people rank wildlife and natural resources as important with 90% of Americans seeking enjoyment out-of-doors. The environmental ethic is gaining strength as two-thirds of the public are prepared to choose conservation and the environment over uncontrolled development and nearly three-fourths of the public believe that government should make environmental protection a high priority, even if it means slower economic growth. Even private forest landowners who depend on management of the lands for economic returns often rank wildlife and aesthetics above timber and investment income (Yarrow et al. 1996). These sentiments have drawn increasing public scrutiny to forest management and timber harvesting practices and their impacts on wildlife. Society is changing as demographic trends suggest that the general public will be increasingly isolated from traditional uses of wildlife and natural resources (Patterson et al. 2000, Hodgdon 1999). An increasing segment of the population is living in urban areas (35% in 1990 to 85% in 2000), and about 25% of households now contain only one parent, up from 9% in 1960. The population is aging and the number of people older than 60 years is expected to double in the next century. Ethnic and cultural diversity is increasing. Hispanics, Asian Americans, and African Americans are increasing as a proportion of the total population and will become the majority in some states by the year 2020. The United States population is redistributing itself from the Northeast and Midwest to the South and West. These trends are important as minorities, urbanites, and older individuals historically have not participated in wildlife-related outdoor recreation and may not understand natural resources issues in the same way as other segments of the population.

The goal of this lecture is to examine trends in public sentiment, how changing societal views affect management of forest resources, and the resulting impacts on wildlife habitats. Managers must ask themselves: For whom do we manage natural resources, for what purpose do we manage natural resources, and how do we manage natural resources? I will attempt to answer these questions and discuss the implications for the forestry and wildlife professions.

Changes in Management Institutions

As society has changed, so have the institutions charged with stewardship of natural resources. Most agencies were formed between 1900 and 1950 when government programs were viewed as a good way to serve the needs of the people (Maser 1994). The inception of an agency was based on a perceived need that was in the public interest. State game and fish agencies were formed to protect and replenish wildlife primarily to provide recreational opportunities due to concerns of sportsmen and others interested in protection of wildlife. Their initial goals were to regulate harvest and restore populations to suitable habitats. The Progressive Era (1900-1970) was a period when such agencies had clear goals, and sustainable use was an almost unanimous management paradigm. The agencies grew and matured with a growing body of scientific information and techniques that all but assured desired outcomes. With undisputed support and trust, professional judgement was sufficient for management decisions. The restoration of large mammals across the United States is testimony to the success of the agencies during this era.

The Modern Era (1970 - Present) brought an expansion of wildlife agency mandates, broadened interest in agency programs by various stakeholders other than traditional clients, and brought into the profession people who were not influenced by hunting or fishing (Muth 1991, Decker et al. 1996, Organ et al. 1998). In the period 1969-1970, several environmental laws were enacted which combined to dramatically increase the influence of actions to favor wildlife in forested landscapes. These laws included the National Environmental Policy Act, Endangered Species Act, National Forest Management Act, Multiple-Use Sustained -Yield Act, and Wilderness Act. These laws mandated public input which had the effect of eroding public confidence. Management actions previously accepted by the public are now routinely challenged in the courts, especially on federal lands (Thomas 2001). The influence of nongovernmental conservation organizations has increased dramatically. For example, the Rocky Mountain Elk Foundation has been instrumental in restoration of elk populations in the eastern United States and the Forest Stewardship Council provides

for third party verification and certification of sustainable forest management practices.

We are currently in the midst of a paradigm shift that allows the public and patrons to make decisions rather than relying on natural resources professionals to control management through agency regulation and law. Agency priorities have shifted from formulation of regulations based on science and professional judgement to building relationships and gaining the trust of various stakeholders. Natural resources agency goals have expanded from sustainable use to protecting biodiversity, enhancing aesthetics, and providing a multitude of recreational opportunities with decreasing emphasis on hunting and fishing. Management emphasis has shifted from sustainability of timber and game to concerns for nature preserves and parks, nongame and endangered species, high use recreation, and ecotourism.

This paradigm shift has politicized management agencies (Organ and Fritzell 2000). Many fish and wildlife agencies have been merged into Departments of Natural Resources. The number of stand-alone agencies decreased from 30 to 25 during 1976 to 1997. Priorities are increasingly being set by the governor or cabinet: 20 (1968) to 34 (1997) and fewer agencies can use dedicated funds without legislative approval: 11 (1987) to 9 (1997). These events have shifted agency focus from management of resources to management of perceptions and actions to counter the lack of public trust.

As Americans become further removed from direct contact with the land, many idolize nature as something that should be free from human intervention. Media coverage of controversial management issues such as endangered species, clearcutting and roadless areas has promoted the perceptions that there is little concern for disturbance-adapted, early successional, or game species but urgent concern for endangered, forest interior, and nongame species as well as preservation of old-growth forests. Policy implications are that forests on public lands should be protected, management on private lands provide habitats for disturbance-adapted/early successional species, and that private property rights should be restricted to protect endangered species and conserve biological diversity.

Changes in Natural Resources Education and Professional Philosophy

University programs and students in natural resources programs have changed in response to societal trends and opportunities for employment. Prior to 1980 most graduates entering professional employment were grounded in the sustainable use tradition. During the 1980s, conservation biology emerged as a discipline due to the need for an interdisciplinary approach to prevent the seri-

ous loss of biological diversity (Soule 1985). It differed from resource management oriented fields by focusing on the preservation of biological diversity across landscapes, rather than sustainable use of natural resources (Organ and Fritzell 2000). Conservation biology became an alternative for students interested in wildlife conservation but whose primary influence was not hunting or commodity related.

Organ and Fritzell (2000) surveyed 14 major fisheries and wildlife programs in the United States. Undergraduates were characterized as 75% urban (range 25-100%, urban = cities with population > 50,000), with 25% participating in hunting (range: < 10% - 75%) and 40% participating in fishing (range: <10% - 75%). Nine programs indicated that < 10% of their students were "anti-hunters," three felt that 10-24% were opposed to hunting. Wildlife curriculum and course content changes over the past 10-20 years reflect more conservation biology and human dimensions with less emphasis on species harvest management. Similar changes in forest management programs were reflected in more emphasis on social issues and policy with less emphasis on field experience as provided by summer camp programs.

Yarrow et al. (1996) surveyed forest stewardship landowners (PFL), elected public officials with natural resources committee appointments, members of The Wildlife Society (TWS) and the Society of American Foresters (SAF), and readers of *Urban Forests* magazine. They identified five basic attitudes of respondents that were defined as:

1. Utilitarian: Value useful products that forests provide. Conservation of endangered species is not as important as economic opportunities or improved standard of living. The needs of people take precedence over possible disruption of ecological processes.
2. Scientific: Interest in understanding the biology and function of species within a forest.
3. Cathedralistic: Forests provide a sanctuary for spiritual rejuvenation, a place to think and reflect. Being surrounded by trees and wildlife provides a comfortable feeling of being part of the earth.
4. Negativistic: Forests are dirty, threatening and dangerous. Prefer to view forest settings in a controlled environment such as television or a botanical garden rather than in an unpredictable wildland.
5. Aesthetic: Value the management of trees to create pleasing visual enhancement or the removal of trees to create landscapes or objects of beauty.

Attitude affiliations of respondent groups were markedly different (Table 1). Members of SAF were predominantly utilitarian while members of TWS and PFL were most strongly associated with the cathedralistic attitude. This difference in basic values might explain many of the conflicts between forest managers, wildlife managers, and private landowners. It is interesting to note that affiliations with the scientific attitude were negative, i.e. respondents showed little interest in understanding the biology or functioning of the forests. This attitude may reflect a lack of trust in science or management institutions that are supposedly based in science. Readers of *Urban Forests* had the greatest affiliation with the negativistic and aesthetic attitudes. Differences in attitude affiliations offer insight into the differing perspectives from which various stakeholders view natural resource issues.

TABLE 1. Attitude affiliation (% of respondents) of respondent groups. (Adopted from Yarrow 1998).

Group	ATTITUDE				
	Utilitarian	Scientific	Cathedralistic	Negativistic	Aesthetic
Urban Forests (n = 136)	10	20	20	27	22
SAF (n = 184)	43	11	9	18	18
TWS (n = 205)	15	19	35	12	20
Elected Officials (n = 64)	11	41	11	19	19
PFL (n = 345)	16	25	23	20	16
TOTAL	20	21	22	19	18

Implications for Forest Management

By the 1990s, compliance with the Endangered Species Act and other environmental laws was forcing dramatic changes in forest management on public lands. For example, concerns for threatened species in the northwestern United States dropped the timber cut per year from 4.5 billion board feet to some 250

million board feet by the year 2000 (Thomas 2001). Some 4.7 million acres of old-growth forests and highly productive timberlands were placed in reserve to maintain old-growth forest habitats.

Private forest lands were likewise being managed with greater attention to wildlife. By the 1950s, many landowners were managing their lands to produce game for their own consumption or for the sale of hunting privileges. By the 1980's, private landowners were increasingly subject to the constraints of the Endangered Species Act and state equivalents manifested in government-imposed constraints on management practices. Many landowners felt these constraints represented a "taking" by the government, violating basic private property rights guaranteed under the Constitution. So far, the federal courts have not agreed, and resentment continues to build in rural communities as more landowners feel threatened (Thomas 2001).

Lands owned by the forest industry have also been greatly impacted by society's concerns for biodiversity and wildlife habitats. The American Forest and Paper Association (AF&PA) adopted the Sustainable Forestry Initiative (SFI) in 1994 to create "a system that integrates the growing and harvesting of trees with the protection of wildlife, plants, soil, and water quality." (AF&PA 2001). AF&PA members include manufacturers of over 80% of the forest, paper, and forest products produced in the United States. Compliance with the SFI is required for membership in AF&PA and sixteen member companies have been expelled from the Association for failure to comply with SFI standards. SFI Objectives 4 and 6 are directed at biodiversity and wildlife habitats.

SFI Objective 4: Manage the quality and distribution of wildlife habitats and contribute to the conservation of biological diversity by developing and implementing stand and landscape-level measures that promote habitat diversity and conservation of forest plants and animals.

SFI Objective 6: Manage program participant lands of ecological, geological, or historic significance in a manner that recognizes their special qualities.

AF&PA members may have a third party audit to insure that their management practices are in compliance with the SFI. Standards for the audit process are set by a Sustainable Forestry Board (SFB) comprised of 15 members, 60% from various stakeholder groups and 40% from industry representation. The

mission of the SFB is to monitor, evaluate, and upgrade SFI standards and verification procedures; assume consistency of application; and work with the SF&PA Board to monitor and resolve non-compliance issues. Challenges of defining standards for the SFI audit process include definition and measurement of biodiversity, stand vs. landscape issues, landscape complexities due to landownership mosaics, and the scientific basis on which standards are based. Certification of managing resources in a sustainable manner will likely be required within the next few years for most wood products to be accepted in the marketplace.

The scientific basis for definition of SFI standards is perhaps the most perplexing challenge. Consider for example the definition of streamside management zone (SMZ) width and the impacts of clearcut size. Many states have defined best management practices to minimize the impacts of timber management on water quality. Generally a SMZ of 40-50 ft. on each side of perennial streams is sufficient to protect water quality. For wildlife, width recommendations for riparian areas depend on wildlife species or group of species to be favored. For example, Hodges and Kremetz (1966) recommended a riparian width of 100m for Neotropical migratory bird breeding communities. Wider widths up to 500 m may be necessary to maintain complete avian communities in bottomland hardwoods systems (Kilgo et al. 1997). Parmley (1997) found that narrow riparian widths negatively affected the taxonomic diversity of small mammals, but failed to recommend an optimum width for managers. Thus, definition of SMZ widths for broadscale application will be contentious due to local and regional differences in topography, wildlife species distribution and land ownership patterns, and the economic opportunity costs of excluding or modifying timber management in SMZs.

The effects of timber harvest on bird populations has received considerable attention by the scientific community. Sallabanks et al. (2000) reviewed 95 studies (published in referred outlets from 1972 to 1997) that examined relationships between timber harvest and populations of song birds and cavity-nesting birds. More studies (32%) have occurred in the northeastern United States than elsewhere and most examined the impacts of clearcutting (53%). Data were typically collected on all bird species, especially songbirds (78%) using point-census surveys, line transects, and spot mapping techniques to assess relative avian abundance (55%) and density (32%). Few studies (13%) measured avian demographic parameters such as nest success or survivorship. Most studies lasted only 1-2 years (68%) and only 7 (7%) lasted longer than 4 years. Most studies (27%) had only one replicate/treatment. Most projects were correlational (84%) and

did not address cause-and-effect relationships. Incorporation of experimental designs to provide such pre-and post-timber-harvest requirements were rare (16%). The authors stated “To our knowledge, there is yet to be a single manipulative experiment that tests for treatment effects and measures direct changes in passerine nesting success in relation to timber harvest.” As with SMZ’s, derivation of SFI standards relating to the impacts of harvesting practices on birds will have to be based more on speculation and opinion than scientific rigor. Rather than documenting observed patterns, future research needs to focus on identifying causal mechanisms that can be translated into meaningful management recommendations to enhance the conservation of forest wildlife.

Implications for the Professions

Management of forests for wood products will continue to be basic to the American and world economies. However, changes in the demographics and values of society will place increasing scrutiny on forest management actions to insure that wildlife habitats are maintained and biological diversity is protected. The management of forest resources for commodity production on public lands will likely continue to diminish unless there is a national crisis. This trend will shift demands to private lands where the concerns for wildlife habitats and biological diversity will be less constricting. However, these lands will have to be managed in an acceptable manner for products to be accepted in the marketplace.

Members of the natural resources professions should recognize the different value systems of various stakeholder groups and appreciate the perspectives from which they view various issues. As professionals, they provide services and expertise to the public good that can be provided by no other group. The forestry and wildlife professionals are serving a society that has decreasing contact with and knowledge concerning natural resources. The urbanism of society has created the illusion that we can live in a world rich in material wealth without affecting wild lands. This denial of our individual role in the use of, and thus the need for understanding and managing, natural resources is an evolving cartoon of contemporary civilization. The forestry and wildlife profession are faced with serving a society that understands less about natural resource systems, displays less confidence in management institutions and science, and demands more in natural wealth with each passing day.

Education and training of those entering the forestry and wildlife professions will be critical to meeting the needs of society and conserving forest resources. Just as the demographics and values of society have changed, so have those of

graduates entering the professions. Recent graduates may be better suited than those advanced in their careers to understanding various stakeholder groups, but they are less appreciative of consumptive values and the management actions that have created the current natural resources base. The role of natural and man-caused disturbance in the maintenance of ecological systems is an example of a subject area that could be enhanced by a mentoring or apprenticeship program between young and mature professionals.

The success of programs such as the SFI will depend not only on scientific understanding of how forest management impacts wildlife habitat and biodiversity. The ability to build relationships with various stakeholder groups, negotiation skills and conflict resolution skills will be needed. As with all relationships, success will depend on competence, image, and exposure. We need to improve our understanding of forest systems and the stakeholders and public whom we serve. The scientific basis for such programs as the SFI must be improved by long-term (10 years or longer) studies based on pre- and post-treatment experimental designs that address cause-and-effect relationships. The results must be communicated in a manner that can be understood by all stakeholders. Partnerships and community involvement can help increase the credibility of such projects and greatly enhance the image of professionals.

The challenges for accommodating wildlife in managed forests in a society that has little understanding of the biological functioning of forests or the management practices that can enhance sustainable production of commodities are great. Our success in meeting these challenges is dependent upon many factors—from gaining the needed scientific understanding of the biology to improving our abilities to communicate with and relate to the public we serve. Challenges bring opportunities, and I believe the forestry and wildlife professions will flourish if they are open-minded and respect the values of their membership and society.

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