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What are the research needs and skills of the future?

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Abstract: One can be a student of Tom Peters, management visionary and futurist, or Gary San Julian, a leader in the academics of wildlife damage management (WDM), but that is not necessary to be impressed and excited by the rapid trends and unpredictable events that are altering how we think about and attempt to manage the nation's precious wildlife resources. Because of the boundless propensity of mankind to develop, inhabit, and alter the landscape, wildlife managers of today and the future require different strategies, tools, and skills than those who did such a fine job of conservation and management in past decades. Research is and will be the source of these new, alternative strategies and tools. As a very wise past Director of the historic Denver Wildlife Research Center professed, "Solutions to problems depend on knowledge which only research can provide."

Key words: wildlife damage management, wildlife damage policy, wildlife professionals

Background

For those of us who are becoming long-in-the-tooth, and have been attentive to the gradual shifts in emphasis in wildlife management research during the period between the 1960's and today, each decade can be replayed mentally, with visions of associated research priorities and projects. The chronology might run, starting even before the 1960' s, as a search for more efficient mortality factors and modes of delivery, with an awareness and acceptance of some undesirable consequences, such as nontarget mortality. Accompanying these earlier lines of research and development were limited quests for understanding population and landscape-level forces and resulting population dynamics of predators and their prey, migratory birds (particularly those considered as detrimental to human interests), and an assortment of mammals known to damage agriculture, property and human health. As the chronology moves into the 1970's and 1980's, evolving societal values about natural resources and environmental quality in general warranted or forced recognition among wildlife and other natural resource managers that many constituents of their efforts were different from those of previous decades. Dramatic shifts in U.S. demographics and economic forces were causing uncommon viewpoints to enter the decision processes. These viewpoints gained in volume and political prominence as evidenced by tighter regulatory standards for pesticides, enforced compliance with the National Environmental Policy Act, and demands for nonlethal, nonintrusive wildlife management alternatives. The chronology of shifting wildlife management research needs continues at an increasingly rapid pace. New problems and dilemmas have appeared during the 1990's and the first year of the new millennium that require new and different strategies and management tools for the contemporary wildlife manager and specialist. The professionals in government, academic and the private sectors of wildlife damage management (WDM) has taken on a new form. Our role as wildlife professionals, or

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soon-to-be-professionals, is not as simple and straightforward as in the past. We are not adequately equipped with only the biological and technical skills. A keen understanding of social and economic aspects of WDM has become essential for the successful professional.

My discussion today will provide some personal insights and input from many current practitioners in the wildlife management profession about wildlife damage management research needs and the professional skills necessary in the future.

The approach I have taken to cover such a broad and dynamic subject is to summarize information and advice solicited from 83 leaders in wildlife damage management research and education. Among the 26 respondents, 42 % were from APHIS-Wildlife Services, 19 % from university faculty, 31 % from scientists at the APHIS/National Wildlife Research Center, and 8 % from other State and Federal wildlife agencies. Comments from respondents are summarized below for the four questions I posed regarding (1) trends or changes that have occurred in WDM research, (2) new, emerging research needs, (3) future strategies and tools needed in WDM, and (4) knowledge areas and skills wildlife professionals should possess to be effective in the future. Also, I reviewed the National Research Needs Assessments conducted by APHIS Wildlife Services every 5 years. Three have been conducted since 1986 and another national assessment will be done in 2001.

To set the stage for discussing future research needs and skills, a backdrop of social influences on contemporary wildlife management is helpful (Figure 1). Relevant points to keep in mind are: (1) less than 2 % of Americans are involved in production agriculture, (2) rural areas are being transformed from agrarian uses by such forces as decentralization of communities and suburban growth, (3) the U.S. population is growing by 2.6 million people/year, or a new Ohio every three years, (4) increasing interaction between people and wildlife, *(5)* fragmentation of wildlife habitats, (6) increasing intolerance for lethal wildlife management and some traditional wildlife management tools — such as leg-hold traps, and (7) a growing public interest in wildlife resources.

Results

Trends and changes in research needs

Among the comments provided, those most often given regarding observed trends were: (1) research needs evolving away from agricultural to urban/suburban areas; (2) increasing frequency of urban WDM problems; (3) increasing focus on nonlethal methods with increasing disfavor for lethal methods; (4) human dimensions considerations entering into WDM research; (5) increased need for WDM research as human/wildlife conflicts increase; (6) growing need for evaluation and monitoring methods for wildlife populations and management; (7) an increase in human health and safety concerns; (8) and an increase in invasive species management issues.

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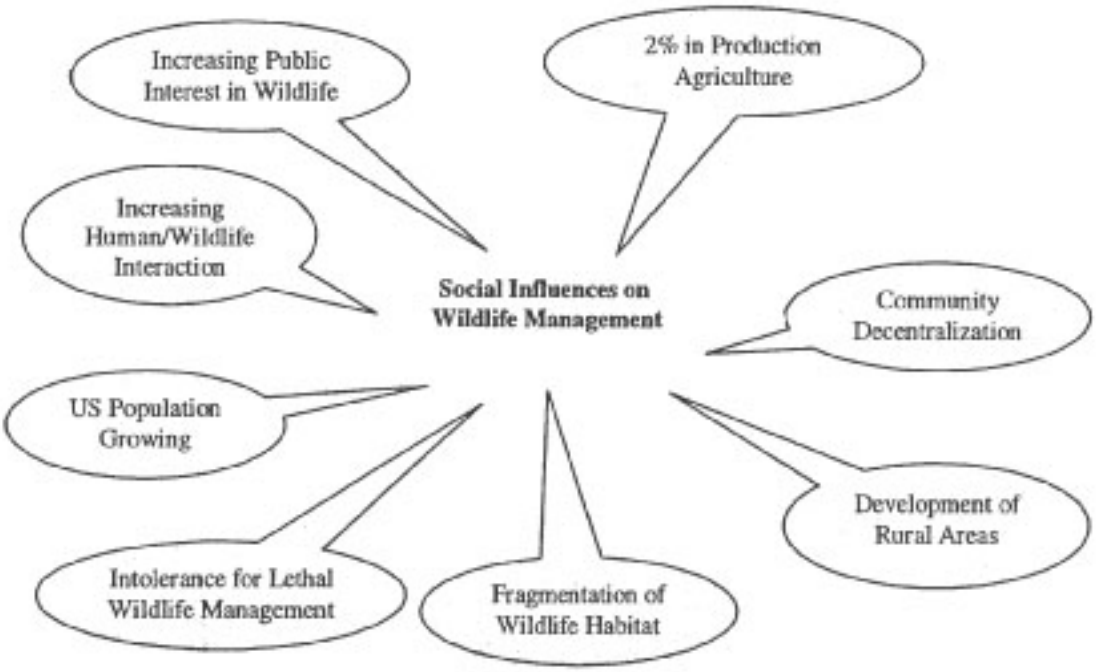

Figure 1. Social influences on wildlife management.

Emerging wildlife damage management research needs

Respondents provided a wealth of information based on their perspectives of both broad and more specific emerging and future research needs. Some of these needs are being addressed in university, State and Federal research efforts. Because adequate solutions have not yet resulted, respondents emphasized research attention in these problem areas: (1) effective delivery systems; (2) damage and population assessment techniques; (3) economic analysis methodology — damage assessment and WDM benefits; (4) zoonotic and wildlife vectored diseases strategies; (5) management methods for species of special interest (Invasives, T&E); (6) overabundant/eruptive populations; (7) human health/safety — aviation, disease; (8) wildlife reproduction management; (9) repellents/deterrents; and (10) integrated WDM programs at population! landscape level.

Future strategies and tools needed to manage human-wildlife conflicts

The tone of responses to this question reflected the past trends and changes seen in WDM research and the social influences on wildlife management discussed above. The summary presented below includes the need for broad strategies to integrate human

dimensions and wildlife biology, as well as more specific technical needs for researchers to address. Several respondents emphasized the need for new effective, acceptable lethal methods as part of integrated WDM programs. The concluding element in the strategy summary was provided by several respondents in reference to the high standards wildlife damage managers/specialists should exhibit to the public and to the profession.

Recommended strategies for the future are: (1) improved coordination among agencies and universities to educate public; (2) implement WDM on landscape scale; (3) collaboration of landowners/agencies; (4) user-friendly tools for landowners and managers; (5) electronic and engineering sciences in WDM methods ("high tech"); (6) extremely high standard of professionalism.

Recommended tools for achieving these strategies are: (1) more effective nonlethal methods; (2) more humane, effective lethal techniques; (3) quantitative damage and population assessment methods; (4) reproductive management techniques; (5) deterrents including exclusion systems, repellents, lasers, and integrated systems.

Knowledge and skills needed in future

The respondents expressed most agreement among the four questions on what core skills and knowledge professionals would need in the future. One individual pointed out that current wildlife professionals probably were not trained and educated adequately to deal with many wildlife damage/conflict situations faced in urban/suburban settings, or those associated with human safety issues. Training for these biologists was in the context of managing wildlife habitats to increase populations and the opportunities for recreational uses far from the suburban/habitat interface. Another respondent stated that WDM in the future will occur predominantly in the suburban interface with adjacent fragmented habitats, thus calling for a different set of skills for the wildlife professional. Respondents were in agreement that improved communication skills, both verbal and written, were essential for the successful, effective professional of the future. Other non-traditional, new skills relate to sociological aspects of human/wildlife conflict resolution. In brief, respondents stated that wildlife professionals of the future will need: (1) improved communications skills; (2) human dimensions understanding; (3) integration of the technical and human aspects of the profession; (4) conflict resolution/interpersonal skills; (5) collaboration/ partnerships in WDM; (6) adaptive impact management vs. adaptive harvest management; (7) population dynamics, assessment, monitoring; (8) "e-tools" = GIS, GPS, Lasers, Radar, Sensors; (9) urban/suburban WDM; (10) landscape ecology; (11) genetic analysis; and (12) economics of WDM.

Conclusion

The science and practice of WDM in future will be remarkably different from that of the recent decades. Human/wildlife conflicts inevitably will increase as global transportation and commerce grows, the interface with wildlife habitats and suburban/urban development expands, interactions with predators increase at this interface, and populations of certain species, such as resident Canada geese, gulls, white-tailed deer, beaver, and double crested cormorants, surge past our most visionary

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dream of sustainable levels. Because of the locations and public involvement in these emerging issues, in addition to historic wildlife damage situations, wildlife managers and WDM specialists will need new strategies and tools, as well as new skills and technical knowledge.

Research must address and succeed in providing integrated solutions based on science. Integration of human dimensions, wildlife biology, and landscape ecology will be more important than ever before. Improvement in current technology and new, effective discoveries will result. Skills of professionals working to resolve wildlife damage situations must be strengthened in areas of communication and information transfer. The communication gap that has persisted between managers, landowners, and scientists, must be bridged — not just with more statements of needs and subsequent piles of technical data. Effective partnerships will be required among those with strong interests in solving wildlife damage and conflict problems while promoting the diversity and conservation of wildlife as a sustainable natural resource.

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