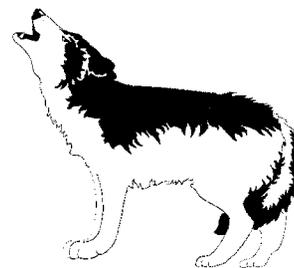


In My Opinion



Enhancing sport-hunting opportunities for urbanites

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Abstract Recent declines in recreational sport-hunting participation rates result from a variety of societal and cultural changes as well as extensive changes in the distribution of the United States population. Concurrently, natural-resource agencies are undergoing broad changes in focus and goals, with holistic ecosystem management competing with traditional game management for limited financial resources. We believe that recreational hunting is an important cultural element that should remain a mainstream recreational activity and should continue to have a significant place in natural-resource agencies. Given the transition of the United States population to a more urbanized society, new innovative programs need to be developed to recruit and retain recreational sport hunters from urban population centers that provide “successful” hunting experiences. We identify several components that will be essential to the success of these programs, such as providing a reasonable expectation of success or accomplishment (e.g., harvesting an animal), providing sport-hunting opportunities near urban population centers, and providing opportunities that are sensitive to the needs of diverse groups (e.g., minority, gender). We propose 2 solutions for providing recreational hunting opportunities to residents of urban areas: 1) establishing crop fields to attract mourning doves (*Zenaida macroura*) and 2) implementing put-and-take hunting under certain restrictions. We recognize many possible problems with these suggested programs. Natural-resource professionals have strong opinions about these issues, but we believe discussions are needed if hunting is to remain a mainstream recreational activity. These dialogues need to 1) address the role of recreational hunting in resource agency policies and programs, 2) identify innovative programs to educate, introduce, and retain urban residents in recreational hunting, and 3) identify innovative programs to provide urban hunters with experiences similar to those we have proposed. If we fail to recognize the emerging societal, cultural, and professional changes impacting sport-hunting participation rates, this activity likely will become an anachronism.

Key words hunter recruitment, hunter retention, hunting, hunting opportunities, mourning doves, pen-raised birds, recreation, sport hunting, urban centers, *Zenaida macroura*

North American sport hunting once was viewed as complementary to natural-resource management, if not the very economic engine that provided dollars to manage all wildlife resources. Today, however, a growing number of resource professionals see a disjunct between sport hunting and

wildlife management, and confusion exists among professional biologists and students about how wildlife management and hunting are compatible. Today's challenge for wildlife biologists is to remain responsive to traditional hunting constituencies while simultaneously embracing a broader ecosystem paradigm. The difficulty is magnified when scarce financial resources must be stretched farther to provide more diverse and numerous conservation programs.

In addition to our profession's changing view of hunting, sport hunting itself is changing. Participation rates peaked in 1975 (17.1 million hunters) and declined to 14.0 million in 1996 (United States Fish and Wildlife Service and United States Department of Commerce, Bureau of the Census 1997), and it appears the decline likely will continue (Brown et al. 2000). During the period when hunter participation rates were declining, many upland game-bird populations were also experiencing long-term and range-wide population declines. In Missouri, for example, the harvest of northern bobwhite quail (*Colinus virginianus*, used as a relative index of population size) declined from 4.0 million in 1969 to 300,000 in 2001 (92.5% decline; Missouri Department of Conservation, unpublished data). Similar to declines in quail indices (Guthery 2002), dramatic population index declines in ring-necked pheasants (*Phasianus colchicus*) during the 1940s-1990s in the Midwest have been attributed to habitat loss and predation (Riley and Schulz 2001). We believe that small-game-hunter declines and game-bird population declines are more causally linked than had been previously believed (i.e., the primary causes of the declines in small-game hunting are decreased availability of upland birds and the lack of opportunity to hunt and predictably harvest game animals close to home). Thus, our objective is to provide a rationale for management activities that provide predictable hunting experiences close to where urban constituents live. We also suggest that these options, in the proper context, can provide more cost-effective hunting opportunities compared to existing habitat-management programs.

History of wildlife science and the habitat paradigm

Since the birth of modern wildlife conservation in the 1930s, biologists have been exposed to a variety of shifting management paradigms (Kuhn



Mourning doves concentrate around managed "lure" crops (e.g., sunflowers, wheat), which can provide greater hunting opportunities for urban residents and generate more shooting compared to the traditional habitat-management paradigm. Photo by Missouri Dept. of Conservation.

1996). Before the existence of game laws, commercialization of wildlife resources and associated market hunting were the catalysts for a general wildlife conservation paradigm, including the need for professional management. Many natural resources that had once been abundant were becoming scarce or nonexistent. Passenger pigeons (*Ectopistes migratorius*), Carolina parakeets (*Conuropsis carolinensis*), great auks (*Pinguinus impennis*), and ivory-billed woodpeckers (*Campephilus principalis*) became extinct and provided a motive to preserve the remnants of the remaining wildlife resources (Cokinos 2000). Bison (*Bison bison*) and other big-game species associated with wilderness landscapes became scarce because of overharvest and habitat alterations (Schmidt 1978).

In the face of diminishing natural resources, it was believed that refuges and closed hunting sea-

sons would provide a venue for future generations to appreciate once-abundant wildlife resources. This period also saw the beginning of wildlife research and the expenditure of money for scientific investigations addressing wildlife management questions. As the research process began to piece together the components and processes of natural systems, the idea of sustainable game management emerged (i.e., game populations could be increased through reasonable harvest and habitat management) (Weddell 2002).

Despite advancements in research and management, many native game-bird populations continued to decline (e.g., greater prairie-chicken [*Tympanuchus cupido*]). The introduction of exotics to bolster sagging native game populations became a popular concept—examples include ring-necked pheasants, gray partridge (*Perdix perdix*), and chukars (*Alectoris chukar*). The period 1930–1950 could be called the “propagation era,” when poultry “assembly lines” were established to provide a game crop in areas where natural reproduction could not keep up with hunters’ demand or the habitat’s carrying capacity (Allen 1954).

As the science of wildlife management matured, numerous university textbooks written for the new army of professionally trained biologists described the failure of artificial propagation programs and how those dollars could be better spent on time-tested methods (e.g., habitat management) (Leopold 1933, Trippensee 1948, Allen 1954). These texts laid the foundation for the upland habitat paradigm (i.e., problems associated with a lack of small game can be rectified primarily through “proper” habitat management). The paradigm of habitat management became well entrenched, not only among professional wildlife managers but also in the hunting public, as evidenced today by several nongovernmental organizations (NGOs) devoted to promoting habitat management for a specific species or suite of species (e.g., Ducks Unlimited, Pheasants Forever, Ruffed Grouse Society, Quail Unlimited).

The activities associated with natural-resource management began to expand beyond creating targets solely for hunters. The first Earth Day in 1970 signaled a new paradigm shift that encompassed a broader constituency group (Weddell 2002). Numerous state game and fish agencies around the country were reorganized into departments of natural resources to reflect this broader constituency (Belanger and Kinnane 2002). New programs were

established to manage animals that were not hunted (i.e., nongame). As managers of hunted and non-hunted groups of animals searched for validation within this changing resource paradigm, species-specific plans became a fashionable mechanism to justify and guide management activities. Entire genres of planning documents were generated by a planning process that evolved into an activity which became an end in itself. The species-based planning process quickly proved burdensome because a separate plan could not be written for every species. Along with this realization came a new idea focusing on multi-species management, or management geared toward an entire ecosystem. The concept of ecosystem management was attractively simple on the surface because it appeared to be the next logical expansion in professional resource management. Other emerging ideas (i.e., conservation biology) built upon the ecosystem concept, further expanding the scope of utilitarian and restoration resource management (Weddell 2002).

This brief historical review helps to explain why many biologists today have difficulty understanding the role of sport hunting in the context of emerging and shifting resource-management paradigms. The complexities of the problem are compounded with the interaction of professional paradigm shifts, cultural and societal changes, modifications of wildlife habitat, and changes in the distribution and abundance of upland game populations. Together these shifts negatively affect hunter-participation rates. Innovative solutions are needed if hunting is to survive as a mainstream recreational and cultural activity.



Hunting today must fit into the existing hectic urban lifestyle and provide a reasonable expectation of success. Our profession can no longer expect young hunters to remain interested in recreational hunting if they only have access to public land where game animals are often scarce. Photo John H. Schulz.

Habitat paradigm revisited

One of the unchallenged tenets of wildlife conservation is the habitat concept. Simply put, it states that *r*-selected small-game population densities are driven by habitat quality and quantity, and that harvest has limited impacts, given suitable habitat (Leopold 1931, Warner 1988). Implied herein are linkages that are believed to bring about a chain reaction of positive or negative outcomes. A positive example goes something like this: A new small-game habitat improvement initiative leads to increased landowner awareness of small-game habitat requirements, which leads to increased habitat quality and quantity, which leads to increased distribution and density of small-game populations, which leads to larger small-game harvests, which lead to hunters killing more birds/trip, which leads to an overall increase in hunter numbers, which makes hunters more satisfied, which leads to more small-game hunting licenses being sold, which leads finally to a utopian world where hunters, biologists, and administrators are simultaneously happy. The antithesis is a series of negative outcomes associated with declines in habitat, small-game populations, and finally hunters. Specifically for upland bird hunters, the quality or number of hunting opportunities is a product of the annual habitat quality and resulting nesting season. If prospects for the upcoming hunting season appear less than promising, a range of plausible causative factors are easily related back to the habitat paradigm.

Although the habitat paradigm is a valuable management tenet, it is not a cure-all for every small-game-related issue. We have become so entrenched in our thinking that the habitat factor has become unchallengeable professional dogma. All too often, wildlife biologists and administrators regard the outcome of many conservation programs as a foregone conclusion even though empirical data supporting a program's effectiveness are lacking (Weddell 2002). We have become so confident in our solutions that we perceive failure as only a matter of too little application of the patent remedy. We have become too comfortable in our problem-solving ability and forget that we sometimes need to change our perspective.

Given the declines in numbers of small-game hunters and the birds themselves, the authors of this study wanted to determine whether optimum application of the habitat paradigm on public lands

surrounding 3 urban population centers in Missouri could bring enough change to meet the demand for hunting opportunity. We present a best-case scenario by using conservative urban population estimates that excluded the outer metropolitan areas (United States Census Bureau 2000, unpublished data). We assumed that 20% of the urban population was potential or existing hunters and that almost every hectare on the 3 urban wildlife management areas could be managed as optimum quail habitat. Given optimum habitat, we assumed quail densities of 0.3-1.0 quail/ha and average annual harvest rates of 44% of the prehunt population (Roseberry and Klimstra 1984). Last, we defined a successful hunting trip as someone killing half the daily bag limit (i.e., 4 quail/trip). Our hypothetical example demonstrates that regardless of how many acres are developed into optimum northern bobwhite quail habitat on public hunting areas close to urban population centers, only a small number of hunters (31-285) can be accommodated among a potentially large number of available hunters (29,000-88,000) in and around the 3 urban population centers in Missouri (Table 1). Although our data and assumptions may be criticized, no amount of data massaging will change the ultimate conclusion: we cannot bring about enough habitat change to maintain large enough game-bird populations to meet the potential hunter demand close to urban centers. In other words, optimal habitat alone can no longer meet the potential demand for hunting opportunities close to where urban residents live.

As survey data have previously shown, the remaining diehard upland bird hunters travel farther and farther from home and make numerous trips out of state to find suitable hunting opportunities (Duda et al. 1998, Brown et al. 2000). For those who still hunt, Brown et al. (2000) reported increases in hunting-related expenditures for trip-related expenses (30.3%), equipment (46.2%), special clothing (72.7%), processing and taxidermy (74.4%), and NGO membership dues and contributions (55.3%). Those hunters who have neither the financial resources nor the recreational free time to make a large commitment stop buying permits and likely give up the sport of hunting (Duda et al. 1998, Adams et al. 2000). When asked why they hunted less than in previous years, 45% of hunters reported lack of time as a primary consideration (Duda et al. 1998).

Today, many state resource-management agencies operate fish hatcheries on the premise that

Table 1. Hypothetical northern bobwhite quail harvest and number of hunters accommodated on actual public conservation areas located near urban population centers in Missouri (a best-case scenario of habitat, population, and hunter management).

Conservation area (metro-area)	Human population ^a	Potential hunters ^b	Usable acres (hectares) ^c	Prehunt quail population ^d	Anticipated harvest ^e	Hunters accommodated ^f
Busch, CA (St. Louis)	333,960	66,792	6395 (2588)	776–2588	341–1139	85–285
Bois D'arc, CA (Springfield)	142,669	28,534	2882 (1166)	350–1166	154–513	39–128
J. A. Reed, WA (Kansas City)	437,764	87,553	2318 (938)	281–938	124–413	31–103

^a Estimated human population within the city limits, excluding the greater metropolitan area (United States Census Bureau 2000, unpublished data); minimum estimated metro population.

^b Potential number of new and existing hunters if 20% of population hunted.

^c Usable acres (ha) include all forest land, cropland, glades, grasslands, and old fields as potential quail habitat given optimum management.

^d Prehunt quail population given optimum habitat management and quail densities uniformly distributed at 0.3–1.0 quail/ha (Roseberry and Klimstra 1984).

^e Estimated quail harvest based on a 44% harvest rate (including crippling) of the fall prehunt population (Roseberry and Klimstra 1984).

^f Hypothetical number of successful quail hunters accommodated during the entire 76-day Missouri quail hunting season if a successful hunter is defined as someone who killed 4 quail (including cripples) (i.e., half the daily bag, but enough to make a family meal).

recreational demands for fish are so high in some areas that natural reproduction of wild fish populations cannot keep up with recreational demand; some state agencies (e.g., Illinois and Wisconsin) even maintain pen-reared put-and-take game-bird facilities based on the same premise. How much different is a fish hatchery from a game-bird hatchery? Let us take a quick look at the amount of fishing opportunity provided at Missouri's 4 managed trout parks. User-group survey data show that these 4 put-and-take fishing areas generated $\geq 450,000$ angler trips in 1998, with the number of trips showing a steady increase (Missouri Department of Conservation, unpublished data). Although each trout park has an adjacent natural stream designated as a special trophy-trout management area offering wild populations, 75% of the anglers reported they fished exclusively at put-and-take park facilities. Almost 80% of anglers reported that they started their trout fishing careers at the parks, with 70% saying that they fish mainly at the trout parks; some anglers fish the same holes year after year. During 2001 estimated attendance on opening day at the 4 parks was $\geq 8,900$ anglers; record attendance was 14,000 anglers in 1992, when opening day of the fishing season fell on a Saturday.

The key element in the act of hunting is the harvesting of an animal, and the act must occur with some regular frequency.

The "modern" hunting experience, however, is different from a "traditional" hunting experience (the terms "modern" and "traditional" being defined by an individual's perception of past and present personal realities as compared to a rigid epistemological definition). To illustrate how these modern and traditional views affect management decisions to potentially improve hunting opportunities, we constructed a simple conceptual model summarizing elements of hunter participation (Table 2). In this model, hunting participation = cultural acceptance (tradition) + desire (must be valued) + time + know-how (or want to learn) + reasonable expectation of success + social support system (external-friends) + social support system (internal-family) + financial resources. The model defines the economic, social, and cultural factors influencing hunters. Thus, what used to be a working solution to a management issue becomes irrelevant in our modern world.

Components essential to effective solutions

Programs designed to maintain recreational

What hunting is, what it is not

We propose that recreational hunting should be promoted first and foremost as a mainstream societal activity because of its cultural significance to our heritage. Hunting has helped to define us as a species (Ortega y Gasset 1985). At this point, it is useful to develop a definition of hunting based on ideas proposed by Ortega y Gasset (1985), who stated that hunting is the act of a predatory animal taking possession, dead or alive, of a prey species wherein the outcome of any hunt is uncertain but successful enough to warrant continued participation.

Table 2. Characteristics of modern and traditional hunting experiences contrasting today's culture with previous traditions.

Characteristic	Modern hunting experience	Traditional hunting experience
Expectation	Reasonable expectation to harvest game; success is tied to harvest	Hopeful to harvest game; success is not linked to whether game is harvested
Cost	Experience	Economical
Time commitment	Minimal; must fit into busy schedules	Open-ended
Purpose	Another recreational opportunity	Aesthetic; value-laden experience (e.g., spiritual renewal); spend time with family or friends
Recruitment	More opportunistic	Predominately passed on from generation to generation from father to sons
Accessibility	Limited access; available areas crowded and often overhunted	Hunting places more widely available and game animals plentiful

hunting as an important cultural activity during the next century must be innovative and incorporate the aforementioned broad societal and cultural changes presently occurring. To be effective, these programs need to focus on the expanding urban and suburban sectors of the United States population, targeting public lands near those centers (Cordell and Super 2000). Second, these programs must provide at least the perception of a reasonable chance of harvesting an animal. Without a moderate chance of success, individuals new to hunting likely will abandon the sport for other recreational opportunities (camping, backpacking, golf; Cordell and Betz 2000) that provide more gratification. This is especially true for younger generations of potential hunters who have grown up multi-tasking video and computer games, watching satellite television, listening to CDs or MP3s on wireless headsets, and talking to friends on a cellular phone (Witt and Crompton 2000). Hunting all day and finding few, if any, shooting opportunities can't compete for the attention of an urban youngster who can find realistic and limitless shooting and killing opportunities in cyberspace.

Given the limited amount of recreational time and money available in today's society, successful programs need to provide sport-hunting opportunities that are relatively inexpensive and close to home. Such programs must also be sensitive to the needs of minority and gender groups. To effectively improve hunter recruitment and maintain hunters in urban areas, new programs must move past the stereotypical rural, white-male-dominated

status quo (Duda et al. 1998) and offer hunting to everyone, in particular urban individuals who typically do not have the same opportunities as their rural counterparts. Individuals within a particular group most likely will participate in recreational hunting only if others in their peer group do so. For example, when American teenagers (ages 13-20 nationwide) were asked how much they were interested in hunting, 52% reported not being interested at all (Duda et al.

1998). When nonhunting teenagers were asked to give reasons they do not hunt, 23% said other interests take up too much of their time, 15% did not know how to hunt, 13% did not have anyone to hunt with, 13% did not want to kill animals, and 7% did not have anywhere to hunt (Duda et al. 1998).

Effective mechanisms for determining the products and services necessary to expose urban constituents to hunting likely will include management activities that provide the animals needed for harvest by the new hunters. Aldo Leopold (1933) provides today's resource managers with a paradox. On one hand, Leopold recognized that the denser the human population, the more intense the system of game management must become to supply the same proportion of people with hunting opportunities. On the other hand, he stated that the recreational value of game is inverse to its artificiality. The challenge facing today's resource manager is to find a balance between these 2 ideas—increasing the number of hunting opportunities and ensuring that these experiences have minimal artificiality.

Possible solutions

We propose 2 potential solutions that focus on creating at least the perception of a successful hunting experience, which in most cases will include the harvest of game. We believe these 2 options are a starting point to initiate discussions among resource professionals interested and involved in the recruitment and retention of hunters near urban areas.

One solution—improving and increasing the amount of habitat managed for game species on public lands near urban areas—surely will appeal to most wildlife managers. Although we recognize that habitat management has a role here, no amount of habitat management concentrated near urban centers can meet the potential demand for recreational hunting, as previously demonstrated (Table 1).

First, many wildlife managers today are focusing their efforts on providing feeding fields to increase shooting opportunities for mourning dove hunters (Baskett 1993). Mourning doves are primarily ground feeders (Lewis 1993), and their diet contains more than 90% grain-crop seeds (Korschgen 1958). Consequently, properly managed sunflower (*Helianthus* spp.) and wheat (*Triticum* spp.) fields may increase hunting opportunities by attracting feeding mourning doves. Emphasizing dove fields located on public lands near urban areas can both capitalize on the social aspects of traditional mourning dove hunting and accommodate a relatively higher density of hunters on the same amount of public area, compared to other types of hunting (e.g., for deer). For example, during the first 30 days of the 2001 mourning dove hunting season, 6 Missouri conservation areas near urban centers provided $\geq 24,000$ hours of recreation for 2,834 hunters who killed 10,209 doves (Missouri Department of Conservation, unpublished data). This option might be the most palatable to many wildlife professionals and the general public, given that wild birds are harvested instead of pen-reared birds. In addition to providing sport for a relatively large number of hunters, the production of lure crops also provides a high-energy food source for other surface-feeding granivorous birds (e.g., American goldfinches [*Carduelis tristis*]). Although we believe such programs have potential, a long-term decline in mourning dove populations (Dolton and Smith 2000) represents a significant area of concern. Thus, we would advocate a thorough evaluation of how the widespread implementation of such programs may affect mourning dove populations at both local and regional scales.

Put-and-take hunting programs on public lands near urban areas represent a second option for recruiting and retaining urban hunters (Lobdell and Giles 1972). If such programs are to be effective, however, they must have clearly defined goals, be implemented on specific public lands near populations centers, and be designed to maximize the

potential benefits (e.g., optimal timing of releases). Although many resource professionals may perceive this concept as morally objectionable because of their own ideologies, we believe it represents a potential solution worthy of serious dialogue. We want to emphasize that we are referring to programs in which pen-raised birds are released just prior to hunting. Such put-and-take programs would have the clearly defined goal of optimizing a hunter's chance to harvest an animal. This idea is in contrast to the traditional concept of annually stocking large numbers of pen-raised animals weeks to months before hunting season to bolster sagging or overharvested wild populations. The role of state fish and wildlife agencies could be variable, and adaptable to area-specific opportunities. For example, an agency could promote or subsidize put-and-take hunting on private shooting preserves near urban areas, or private concessionaires could be contracted to provide their services and release pen-raised upland birds (ring-necked pheasants or northern bobwhite quail) on public hunting areas.

Put-and-take programs designed to enhance recreational hunting on public lands are certainly not a new idea. Several states (including Illinois, Maine, New Jersey, New York, Ohio, Pennsylvania, and Wisconsin) currently have some form of agency-sponsored put-and-take hunting, primarily for ring-necked pheasants. These programs appear to be favorable to the general public and extremely popular with the hunting public (K. Warnke, Wisconsin Department of Natural Resources, personal communication). User surveys showed that 46% of Wisconsin hunters always or usually took advantage of additional hunting opportunities on public lands (Petchenik 1999).

Potential problems

The programs we have suggested certainly have potential for recruiting and retaining sport hunters near urban centers. However, we realize they present potential problems as well. In fact, these programs could provide new management challenges to resource agencies. For example, animal-rights groups could challenge the validity of such programs, claiming they promote recreational killing. Similarly, some resource professionals may object to such programs on moral grounds or because they believe that resource management, rather than recreation, should be the agency's primary concern.

Such concerns may be valid, but if sport hunting is to be preserved, extensive dialogue among natural resource professionals will be needed in the immediate future. A thorough exploration of all concerns and viewpoints will be essential to these discussions and any resulting recommendations. As a potential forum for such dialogue, The Wildlife Society (TWS) has Conservation Policy Statements on shooting preserves and hunting (<http://www.wildlife.org/policy/index.cfm?tname=policystatements>). We propose that these policy statements be re-evaluated, given the current trends in hunter participation and given that the policy statements were established in the 1970s (and recently reviewed in September 2002 by the TWS Council). We believe the current re-examination of the policy statements is an excellent opportunity to begin a serious dialogue about the current and future role of recreational hunting in natural-resource management. Furthermore, we hope such discussions would produce a series of possible solutions to the problem of declining hunter participation.

The proposed programs also raise monetary concerns. Cost estimates from current state-agency put-and-take programs range from \$6-14 per released bird (T. Musser, Illinois Department of Natural Resources; C. F. Rieger, Pennsylvania Game Commission; D. Risley, Ohio Division of Wildlife; K. Warnke, Wisconsin Department of Natural Resources, personal communication). In these days of tight and often shrinking budgets, such programs could be perceived as a waste of precious resource-agency dollars. Furthermore, their implementation is not a legitimate use of Federal Aid in Wildlife Restoration dollars. Activities ineligible under this program include "Stocking of game animals for the purposes of providing hunting of the animals stocked without objectives for restoration or establishment of self-sustaining populations" (Federal Aid Toolkit, 521 FW 1.8 (F)). Considering the current climate, in which resource agencies are evolving and new areas and issues (e.g., holistic, ecosystem-level management approaches, threatened and endangered species management) are competing for limited financial resources, sources of financial support for such programs are problematic.

Some will argue that put-and-take bird-hunting programs will just provide easier opportunities for existing hunters. However, a major component of the hunting experience is its social interactions and rituals. The presence of established, knowledgeable

hunters who can pass along the social benefits and camaraderie that are fundamental to the hunting experience is a valuable asset to such programs.

Acknowledgments. We wish to thank R. D. Applegate and J. A. Tantillo for constructive reviews of this manuscript.

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John H. Schulz (photo) is resource scientist for the Missouri Department of Conservation. At one time, John was an avid hunter and angler. Due to his modern urban and hectic lifestyle, however, he now spends much of his free time distance running and training for marathons. The photo shows John finishing his 10th, the inaugural 2002 Des Moines marathon. John received his B.S. and M.A. in biology from Minnesota State University (formerly Mankato State University). He is a member of The Wildlife Society (TWS), a past president



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