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February 1991

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(1991). *5 - Fifth Eastern Wildlife Damage Control Conference (1991)*. 16.
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INTERACTIONS BETWEEN PEOPLE AND WILDLIFE IN URBANIZING LANDSCAPES

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Abstract: In little more than 100 years, America has been transformed from a rural to an urban society in which 8 out of every 10 people live in cities or associated metropolitan areas. This change has affected the way that people interact with wildlife and has introduced new and unique situations in which human-wildlife conflicts arise and must be dealt with. Most urban wildlife problems occur in and around primary residences or nodes (e.g., airports, golf courses, lake fronts) and involve only a few species; This relationship may change as urban landscapes mature or expand through restoration efforts, or as more wildlife species develop the special tolerances necessary to adapt to urban environments. How urbanites interact and deal with wildlife in conflict situations affects their overall perception of wild animals in complex ways. Given the voter majority that the urban population now comprises, these perceptions will inevitably translate through the political process into decisions that influence how wildlife issues are dealt with everywhere.

Proc. East. Wilds. Damage Control Conf. 5:8-11.1992

The most recent census indicates that about 8 of every 10 Americans now live in standard metropolitan areas with at least 50,000 residents, and that half of us currently live in one of the 39 largest cities. The eastern seaboard continues to be a growing megalopolis, as first predicted almost 4 decades ago (Gottmann 1957). In the span of little more than 100 years, America has been transformed from an agrarian to an urban society. Coping with the rapid changes wrought by this transformation has clearly been difficult, but not surprising for a species that has lived at a hunting and gathering subsistence level for 99% of its history, and has been experimenting with urban living for only one-half of the remaining 1%.

The urban transformation has changed the way that most Americans now interact with an element of our past with which we have been most intimately connected—wildlife. These changing interactions have in turn influenced how such activities as hunting and trapping (Gentile 1987), nonconsumptive uses of wild animals (Shaw and Mangun, 1984), wildlife education (Adams et al. 1987), wildlife conservation (Hunter 1989), and wildlife damage control itself (Flyger et al. 1983) are viewed. With the overwhelming political majority now resting within urban populations, how urbanites perceive wildlife and the kinds of interactions they have with wild animals will increasingly translate through the political process into the legislative and regulatory authorities that will guide wildlife managers in the years to come.

I would like to thank Martha Hoopes, Larry VanDruff, Lowell Adams, and William Anderson for review and comment on this manuscript.

PERCEPTIONS OF WILDLIFE BY URBANITES

The attitudes, knowledge, and perception of animals held by Americans both now and in the past have been measured in a series of pioneering studies by Stephen Kellert of Yale University and his colleagues. Historically, the dominant attitude toward animals in the United States has been a 'utilitarian' one, meaning an orientation that focuses primarily on an animal's practical and material value (Kellert and Westervelt

1982). This view, however, has changed substantially in recent decades as urbanites have led the rise in attitude scores that reflect 'humanistic' feelings, as defined by a strong interest and affection for individual animals (Kellert 1980). In cities with > 1,000,000 residents, high 'moralistic' scores, characterized by a primary concern for the right or wrong treatment of animals, are also found (Kellert and Berry 1980).

While the generally positive attitude of urbanites toward wildlife is indicated by the highly favorable light in which certain animal groups (i.e., songbirds), are held (Dagg 1973, Szot 1975, Brown et al. 1979), it is also clear that the range of feelings held by today's urbanites toward wild animals runs the gamut from complete tolerance to complete intolerance (Flyger et al. 1983). This may help explain some apparent paradoxes within urban populations. For example, despite their sympathetic concern for wild animals, urbanites appear to be far less knowledgeable about wildlife than their rural counterparts (Kellert 1980). Urbanites score poorly on 'ecologicistic' scales that measure understanding of populations, communities, and their interactions; and have relatively higher 'negativistic' scores than other segments of the population, as measured by avoidance of animals due to dislike or fear (Kellert and Berry 1980). As might be expected, substantial differences exist between rural and urban populations regarding methods of animal damage control. For example, consistent with the prevailing humanistic attitude in urban areas, about two-thirds of individuals polled from metropolitan areas of > 1,000,000 residents opposed the trapping or shooting of coyotes, contrasting with the majority of those in areas of under 500 population who approved of this method of control (Kellert 1985).

HUMAN-WILDLIFE CONFLICTS IN URBAN AREAS

Conflicts with wildlife in urban areas are inevitable, although there appears to be a high degree of variability in the kind of problems urbanites perceive wildlife as causing. In one survey of the 6 metropolitan areas in New York, 20% of all respondents said they had wildlife problems (Brown et al. 1979). A survey in the metropolitan Syracuse area (O'Donnell and VanDruff 1983) found a slightly higher number (30%),

while another that focused on 3 metropolitan areas in Missouri indicated 13% of the respondents had wildlife problems (Witter et al. 1981).

The most frequently reported complaint regarding wildlife in urban and suburban areas in the eastern United States is for the general nuisance some animals create around a respondent's primary residence (Brown et al. 1979, Witter et al. 1981, O'Donnell and VanDruff 1983). There is considerable variation from one area to another in the number of respondents making nuisance claims (Brown et al. 1979, O'Donnell and VanDruff 1983), suggesting that the public's perception of what constitutes a nuisance animal is variable. Measurable damage by wildlife is reflected in complaints regarding yards, gardens, or buildings; and ranges from half to slightly less than 30% of the complaints reported (Brown et al. 1979, O'Donnell and VanDruff 1983). A survey of metropolitan Syracuse indicated the frequency of wildlife damage complaints varied among geographic areas, and suggested this variation was related to local habitat conditions, including residential lot size, being either favorable or unfavorable for individual species (O'Donnell and VanDruff 1983). Finally, a small number of complaints relate to situations where one wildlife species competes with another in a manner that respondents find undesirable (e.g., the taking of bird food from feeders).

PROBLEM SPECIES

While virtually all studies of public attitudes toward wildlife in eastern North America identify the gray squirrel (*Sciurus carolinensis*) as the most enjoyed and favored urban species, it is also a contender for the number one nuisance ranking as well (Dagg 1973, Brown et al. 1979, Gilbert 1982, O'Donnell and VanDruff 1983, Witter et al. 1981). Only in the west is the gray squirrel superseded by other species, most notably the striped skunk (*Mephitis mephitis*) (Maestrelli 1990), a condition that is undoubtedly brought on by a general dearth of tree squirrels. Skunks are a problem in the east as well, and surveys have them ranked second or at worst, third to the squirrels (Witter et al. 1981, O'Donnell and VanDruff 1983). Raccoons (*Procyon lotor*) are also prominently mentioned, and a survey by the Ontario Ministry of Natural Resources identified them as the primary nuisance animal in 26 of 60 jurisdictions in North America (Williams and McKegg 1987). Rabbits (*Sylvilagus floridanus*) round out the top 5 problem species, with pigeons and other nuisance birds causing problems on a much more localized basis. While absent from most surveys conducted to date, the white-tailed deer (*Odocoileus virginianus*) represents an emerging problem in urban areas (Wittam and Jones 1987, Decker and Gavin 1987, Horton 1991). There should be every reason to suspect that other species will become problems as urban habitats change or wildlife populations adjust to living in urban environments.

wildlife-related problems inflicted on National Park Service (NPS) managers in highly urbanized eastern parks. This statement is not meant to detract from the significance of the impacts caused by raccoons getting into trash, a white-tailed deer getting caught in a fence, or the beaver (*Castor canadensis*) that has taken upon itself the task of modifying the landscape plan for the Washington, D.C. tidal basin by debarking some of its famous blossoming cherry trees. These situations, however serious, still only involve individual animals. However, the Lafayette squirrels have forced us to deal with an entire population, and to learn what it means to interact with problem urban wildlife at that level.

Lafayette Park consists of 3 ha of formally landscaped and manicured grounds similar to hundreds of small parks in cities throughout the country. The park was actually intended as the front lawn of the White House, but President Jefferson rejected that plan, commenting that it would make the president's house appear too palatial. Today, Lafayette Park serves as a focal point for a variety of Americans interested in expressing their opinions on contemporary issues, mainly through the exercise of the tradition that has come to lend it the nickname "Protest Park." With all its human activity, the squirrels were always an afterthought and usually a welcome and pleasant diversion, especially for lunchtime users of the park. Some old-timers could recall problems with squirrels damaging flowers as far back as World War II, but when that happened, the park simply trapped a few squirrels and moved them far enough away to ensure they did not return. To facilitate trapping, nest boxes were constructed and hung throughout the park. In 1977, squirrels were said to be responsible for the destruction of about 2,000 flowering plants and 6 newly-planted trees (Manski et al. 1981), triggering another relocation. This time, however, complaints were lodged both by private citizens as well as the Washington Humane Society. This in turn led to adverse media coverage, and the management program suddenly became controversial. The basis of the complaints was that the National Park Service was engaging in animal damage control without having conducted sufficient monitoring or research to determine the basis or cause for the damage, and that it lacked an integrated plan that outlined alternative methods to mitigate the damage being caused.

This course of events resulted in a study to document the habits of squirrels of Lafayette Park, including suggestions for management alternatives and an appropriate public involvement process (Manski et al. 1981). Squirrel densities in the park were 4-5 times those reported elsewhere, even for animals in purportedly ideal habitat. Population levels were attributed to 2 influences. First, as many as 6 people were bringing an estimated 60 pounds of peanuts each week to feed park squirrels. Secondly, as a result of the earlier effort to provide for easier capture, the nearly 20 nest boxes that had been hung in the park now provided additional den sites to encourage high density residency. The study recommended an effort to reduce damage to park vegetation by seeking alternative plantings of

CASE HISTORY: LAFAYETTE PARK

Consistent with its rank as a premier urban nuisance animal, the gray squirrel has been responsible for many of the

materials that were not attractive to the squirrels, by reducing This justified the complete elimination of supplemental feedsurplus feeding, and should these prove ineffective, by direct ing, although squirrels still received handouts from people reductionofthesquirrelpopulationthroughtrappingand eutha- lunching in the park. nasia (Manski et al. 1981).

A period followed during which alternative plantings were sought and attempts were made to limit feeding. In late summer 1985, counts indicated that no change had occurred in population density. Damage tovegetationhadcontinuedandnowincluded some mature trees, many of which were deemed of historic significance. Discussions were held with both the Washington Humane Society and the Humane Society of the United States about possible solutions, and a plan was devised to conduct a single relocation in conjunction with the removal of a number of nest boxes, as well as some of the aging den trees.

In October 1985, 78 squirrels were captured and relocated to 32 other NPS sites in which suitable areas with mast-bearing trees had been surveyed. Six of the park's 18 nestboxes were removed, and the natural attrition of those remaining was allowed without replacement. By December 1986, 5 old trees that had provided dens had also been removed. The relocation was followed by repeated attempts to reduce feeding, but the 2 most active feeders were unwilling to do so, and actually increased distribution to approximately 75 pounds of peanuts each week. Rather than enforce existing regulations regarding feeding, a decision was made to continue working toward a voluntary reduction in feeding while monitoring the squirrel population.

Monitoring consisted of counting squirrels, which was initiated during August 1985, and continued monthly until July 1989. The monitoring suggested that an annual cycle occurred with population lows in the winter months and highs in spring and summer, superimposed on an annual average that reflected a net decline in the population between 1986 and 1988 purportedly the result of successful management practices. Among the causes of winter mortality in the first 2 years of the management program, were systemic poisonings from several pathogens that were being transmitted by bite wounds apparently resulting from competition for access to favored den sites (Hadidian et al. 1987). These mortalities were probably influenced by the removal of dens and a decision was made in February 1987 to capture as many of the severely injured squirrels as possible. Because there was little possibility that the animals would survive relocation, the 12 squirrels captured were placed with licensed wildlife rehabilitators until spring, at which time they were released in areas far from the park.

These events led to further discussions with the feeders. Control of squirrel feeding was relinquished to NPS personnel, and a gradual reduction from 75 to 10 pounds of peanuts per week occurred between February and June 1987. At that time, a study to determine the habitat suitability of the park for squirrels had been completed (Ingrain and Hadidian 1988), indicating that the existing shelter and food provided good-toexcellent urban squirrel habitat (McPherson and Nilon 1987).

Lafayette Park taught wildlife managers several lessons about human-wildlife interactions in urban areas. First, it forced us to develop assessment and management strategies at the population rather than the individual level. Secondly, we learned that not all acts of kindness directed toward individual animals were necessarily beneficial to the population. The major feeders of the Lafayette Park squirrels, while concerned about the welfare of individual animals, apparently gave little thought to the park's overall ability to support a dense squirrel population and the resulting serious negative consequences when it could not. Thirdly, effective action often will necessitate cooperation between groups and individuals with diverse interests and require compromise regarding the best course of action. Such compromise, however, can only go so far before it violates sound natural resources management practices that are based on a balance of population biology, community and ecosystems ecology, and human dimensions considerations. Where consensus cannot be achieved, a clear decision by one or more of the parties to proceed with action may be the only course to resolution.

PROGNOSIS FOR THE FUTURE

For the practitioners of animal damage control, the changing attitudes of Americans toward wild animals are resulting in new values for which it will be necessary to make professional and scientific adjustments (Wagner 1989). The divergent attitudes toward wildlife identified among urban and rural populaces by Stephen Kellert and his colleagues led to the prediction thatdealing with this issue wouldbe "one of the most difficult and important problems confronting wildlife managers in the 1980s" (Kellert and Berry 1980:89). This prognosis may well hold true for the 1990s and beyond.

A survey of 80 responding institutions offering wildlife curricula in 1985 found that only 5% of the funded projects were directed at urban wildlife, and that only 1 of every 5 of these was related to damage control (Adams et al. 1987). The complex issues associated with urban human-wildlife conflicts demand more attention. It is important that we achieve a better understanding of the biology and ecology of urban animals, and their potential conflicts with humans. In the Lafayette Park situation, we simply did not know enough about squirrel population dynamics, behavior, and ecology; the degree of variation in nuisance behaviors in the local population; or the subtle, and cumulative effects of nuisance problems (i.e., bark gnawing) to be able to predict the best management approach. Continuing research on attitudes and perceptions that urbanites hold toward animals is needed, especially because existing studies suggest attitudes may vary considerably. Add to this the diversity of the problems themselves, and the mercurial change occurring in the attitudes of many urbanites toward specific problem species, the need for continuing study becomes increasingly apparent.

Perhaps the most demanding task facing us is educating the urban populace, not only in regard to the cause and resolution of urban wildlife problems, but also in regard to the ecological basis of these as well. It is indicative of the scope of the effort required that almost 40% of the complaints about wildlife received by 2 suburban Maryland wildlife office resulted from a misunderstanding of wildlife activity and an unnecessary fear of wildlife itself (Hotton and McKegg 1984). Not only must the adult public be educated, but more importantly, young urbanites need to learn much more about the environment of which they are apart. Understandably, educators wish to portray rare, charismatic, or endangered species as pedagogical tools. The ecosystem of the rain forest may be more compelling and seem more relevant to resource conservation than the ecosystem of the greater metropolitan New York area. However, children live in a world in which immediate sensation and experience shapes their perceptions and attitudes, and the best way to teach them about that rain forest may actually be to teach them about the environment of which they are a part.

Our cities and suburbs are environments that have been designed and developed as habitats for one species—humans. Their evolution is far from complete, as are our thoughts about what we want them to be. The wildlife problems that occur within urban areas ultimately must be approached as ecosystem problems. Along with the goal of controlling animal damage, successful strategies will stress the development of harmonious relationships within which the needs of all species are properly balanced.

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