April 2007

SUBURBAN COYOTE MANAGEMENT AND RESEARCH NEEDS: A NORTHEAST PERSPECTIVE

Paul D. Curtis
Cornell University

Daniel A. Bogan
Cornell University

Gordon Batcheller
New York State Department of Environmental Conservation

SUBURBAN COYOTE MANAGEMENT AND RESEARCH NEEDS: A NORTHEAST PERSPECTIVE

PAUL D. CURTIS, Department of Natural Resources, Cornell University, Ithaca, NY, USA
DANIEL A. BOGAN, Department of Natural Resources, Cornell University, Ithaca, NY, USA
GORDON BATCHELLER, New York State Department of Environmental Conservation, Albany, NY, USA

***Abstract*:** Several factors may be responsible for increasing predator abundance in suburbia. These include an enhanced forage base associated with residential sprawl, and protection of predator species that were once persecuted and suppressed by hunters, trappers, and landowners. In the Northeast, anecdotal reports of coyotes (*Canis latrans*) killing pets in backyards are on the rise. The bulk of coyote complaints, concerns, and questions received from the public by state wildlife agencies are from areas with high human populations. Scant research exists on coyote behavioral ecology in human-altered landscapes. Biologists and managers need to understand changes in the social structure and territorial behavior of coyotes. It is important to know when a predator is active and where it forages, especially in relation to human activity. The emerging picture of suburban coyotes is that they move quickly over long distances through human-dominated landscapes, foraging opportunistically. Data concerning birth rates and survivorship are needed to model future population growth. Reliable and cost-effective census techniques are currently lacking. The impact of growing and more visible coyote populations on deer abundance is a concern in some areas. Studying coyotes in residential areas will provide baseline data for public education programs to reduce human behaviors that may increase coyote conflicts.

Key words: *Canis latrans*, coyote, damage management, research needs, suburban wildlife

Proceedings of the 12th Wildlife Damage Management Conference (D.L. Nolte, W.M. Arjo, D.H. Stalman, Eds). 2007

INTRODUCTION

Several factors may be responsible for recent increases in predator attacks on, and aggression towards, humans in North America. These include human population growth, suburban sprawl, and changes in behavior of protected predator species that were once persecuted (Kitchen and Gese 2000) and suppressed by hunters, trappers, and landowners. In the northeast, residents are expressing growing concerns about coyote (*Canis latrans*) foraging behavior. Changing human demographics has resulted in exurban sprawl within forest and farm lands near metropolitan areas. In New York, anecdotal reports of coyotes killing pets in the backyards of homes in residential areas are on the rise (D. Bogan and NYSDEC, unpublished report). Coyote attacks on children have occurred in the western United States (Baker and Timm 1998, Carbyn 1998, Timm et al. 2004), and there is increasing potential for such attacks in the northeastern United States. On 6 April, 2007, a toddler in Middletown, New Jersey, was attacked and bitten on the back of the neck while playing in a suburban back yard. Prompt action by an 11-year-old child

playing nearby, who shouted and kicked at the coyote biting the toddler, averted a potential tragedy. Consequently, public anxiety about personal safety is being expressed in many communities, particularly for small children in neighborhoods where coyotes exhibit boldness and show little fear of people (see Siemer et al. 2007).

Previous coyote behavior and ecology studies were primarily focused in agricultural areas of the western United States (Lehner 1976, Andelt 1985). However, the bulk of coyote complaints, concerns, and questions received from the public by state wildlife agencies in the northeast are from areas with high human densities. Inadequate research exists on coyote behavioral ecology in human-altered landscapes from the northeastern United States (Bogan 2004, Kendrot 1998, Person and Hirth 1991, Way et al. 2004). Anecdotal evidence suggests a change in the social structure, foraging behavior, and territorial behavior of northeastern coyotes since their recent range expansion (Gompper 2002). Moreover, northeastern coyotes are larger than populations of southwestern coyotes (Thurber and Peterson 1991) that have been documented to negatively interact with humans (Timm et al. 2004). Past hybridization between wolves and colonizing coyotes may also affect ecological and behavioral traits exhibited in northeastern coyotes (see Gompper 2002, Wilson et al. 2004). It is important to know when a predator is active and where it forages, especially in relation to human activity. Studying coyotes in residential areas can provide baseline data for public education programs to reduce human behaviors that could increase the risk of a coyote attack.

Recent studies have shown that coyotes exhibit primarily nighttime activity in suburban landscapes in New York (Bogan 2004), Massachusetts (Way et al. 2004), Arizona (Grinder and Krausman 2001), and southern California (Riley et al. 2003). Coyotes appeared more comfortable traveling through yards at night, and commonly bedded down within 50 m of homes during the day (Way et al. 2004). Adult female coyotes were occasionally active during the day near their dens, but residential areas were avoided until nighttime. Timm et al. (2004) suggest increased foraging demands of breeding coyotes while pup-rearing increases the potential for human and pet attacks.

Way (2000) indicated one social group of coyotes (3-4 individuals) could cover 75-100 km per night in a territory averaging 30 km^2. Travel corridors (e.g., railroad tracks and power lines) provided linear pathways allowing coyotes to cover long distances quickly. These large movements, combined with increasing boldness towards people (Timm et al. 2004), could lead to more coyote sightings and the perception that coyotes are becoming more numerous in a community. The emerging picture of suburban coyotes is that they move quickly over long distances through human-dominated landscapes and forage opportunistically (Way et al. 2004).

Coyotes colonized New York State during the past 60 years, entering the state from the north across the St. Lawrence River Valley (Fener et al. 2005). Coyotes spread rapidly across the state at an estimated rate of 78-90 km per decade, and now are found throughout New York State except for Long Island. Scant information exists concerning relative coyote density, abundance, survivorship, or population growth.

RESEARCH AND MANAGEMENT NEEDS

State wildlife agencies regulate coyote populations primarily through hunting and fur harvest, and indirectly through habitat manipulation. The goal is to

manage coyotes in a way that both enhances recreational opportunity, and reduces potential negative impacts from these animals. Baseline population parameters are necessary to develop robust population models to advance knowledge of coyote demographics and spatial ecology. This knowledge is essential when setting realistic population goals, and making decisions for management intervention regarding nuisance issues.

Recently, fecal DNA methods have been used in western North America to evaluate genetic based capture-recapture population estimates (Kohn et al. 1999, Prugh et al. 2005), and link individual animals to their diets (Fedriani and Kohn 2001). Coyote scat was collected along standardized transects, using the existing trail systems within the study areas, and was genotyped to identify individual coyotes for population estimation. The reliability of such genetic techniques is still open to discussion and requires improvement. In the northeast, much research is needed to link group social size, spatial behavior, and diet preferences to actual estimates of coyote abundance.

Collecting scats also allows biologists to evaluate suburban coyote dependence on anthropogenic food sources (e.g., garbage, pets, and handouts). The picture emerging to date is that coyotes use patches of natural area in fragmented landscapes (Bogan 2004), and forage primarily on natural prey items (Bogan and Kays, unpublished data). Detailed spatial-ecology information is needed to understand the proportion of time spent foraging in natural and residential areas, and the underlying causes for coyotes switching from natural prey to anthropogenic food items.

Biologists are just beginning to understand coyote behavioral ecology (i.e., home range size, habitat use and selection, and den site location) in suburban areas of the northeast. Group social structure, and the behavior of breeding pairs, juveniles, and transients, has received little research attention until recently. Basic information concerning litter size and survivorship are needed to model future population growth. These data are necessary for creating state-of-the-art, spatially-explicit population models to investigate demographic change. Such a model could be used to investigate the effects of varying levels of selective removal by Nuisance Wildlife Control Operators (e.g., age, sex, and social status) on coyote population growth, social structure, and the potential for problematic behaviors. The initial steps will include estimating population parameters based on current spatial behavior, social structure and dynamics, and key demographic variables (e.g., survivorship, cause-specific mortality, juvenile dispersal, and adult emigration) and an additional parameter for representing selective removal. This information will help identify the potential for future negative human-coyote interactions and identify the best means of applying lethal control to curb negative coyote behaviors.

Studying coyote behavioral ecology and population trends reveals one side of the issue of human-wildlife conflicts. Human dimensions research is necessary to identify human behaviors that foster negative animal behaviors, and further understand actual and perceived risks associated with suburban/urban wildlife in the northeast. The integration of coyote behavioral ecology research, advanced modeling and statistical techniques with human dimensions research is needed to develop a complete assessment of the current status and nature of human-coyote interactions in suburbia. With a more thorough understanding of these complex interactions, wildlife agency staff will be better prepared to allay or confirm fears the public has about

coyotes in general, or assist the public when conflicts do arise between coyotes and people or pets.

LITERATURE CITED

ANDELT, W.F. 1985. Behavioral ecology of coyotes in south Texas. Wildlife Monographs 49:1-45.

BAKER, R.O., AND R.M. TIMM. 1998. Management of conflicts between urban coyotes and humans in Southern California. Proceedings of the Vertebrate Pest Conference 18:299-312.

BOGAN, D.A. 2004. Eastern coyote home range, habitat selection and survival in the Albany pine bush landscape. M.S. Thesis. University at Albany, State University of New York, Albany, NY. 83pp.

CARBYN, L.N. 1989. Coyote attacks on children in Western North America. Wildlife Society Bulletin 17:444-446.

FEDRIANI, J.M., AND M.H. KOHN. 2001. Genotyping faeces links individuals to their diet. Ecology Letters 4:477-483.

FENER, H.M., J.R. GINSBERG, E.S. SANDERSON, AND M.E. GOMPPER. 2005. Chronology of range expansion of the coyote, *Canis latrans*, in New York. Canadian Field-Naturalist 119:1-5.

GOMPPER, M.E. 2002. Top carnivores in the suburbs? Ecological and conservation issues raised by colonization of northeastern North America by coyotes. BioScience 52:185-190.

GRINDER, M.I., AND P.R. KRAUSMAN. 2001. Home range, habitat use, and nocturnal activity of coyotes in an urban environment. Journal of Wildlife Management 65:887-898.

KENDROT, S.R. 1998. The effects of roads and land use on home range use, behavior and mortality of eastern coyotes (*Canis latrans* var.) in northern New York. M.S. Thesis, State University of New York, College of Environmental Science and Forestry, Syracuse, NY.

KITCHEN, A.M., AND E.M. GESE. 2000. Changes in coyote activity patterns due to reduced exposure to human persecution. Canadian Journal of Zoology 78:853-857.

KOHN, M.H., E.C. YORK, D.A. KAMRADT, G. HAUGHT, R.M SAUVAJOT, AND R.K. WAYNE. 1999. Estimating population size by genotyping faeces. Proceedings of the Royal Society of London 266:657-663.

LEHNER, P.N. 1976. Coyote behavior: Implications for management. Wildlife Society Bulletin 4:120-126.

PERSON, D.K., AND D.H. HIRTH. 1991. Home range and habitat use of coyotes in a farm region of Vermont. Journal of Wildlife Management 55:433-441.

PRUGH, L.R., C.E. RITLAND, S.M. ARTHUR, AND C.J. KREBS. 2005. Monitoring coyote population dynamics by genotyping faeces. Molecular Ecology 14:1585-1596.

RILEY, S.P.D., R.M. SAUVAJOT, T.K. FULLER, E.C. YORK, D.A. KAMRADT, C. BROMLEY, AND R.K. WAYNE. 2003. Effects of urbanization and habitat fragmentation on bobcats and coyotes in southern California. Conservation Biology 17(2):566-576.

SIEMER, W.F., H. WIECZOREK HUDENKO, AND D.J. DECKER. 2007. Coyote management in residential area: Human dimensions research needs. Proceedings of the Wildlife Damage Management Conference 12:421-430.

THURBER, J.M., AND R.O. PETERSON. 1991. Changes in body size associated with range expansion in the coyote (*Canis latrans*). Journal of Mammalogy 72:750-755.

TIMM, R.M., R.O. BAKER, J.R. BENNETT, AND C.C. COOLAHAN. 2004. Coyote attacks: An increasing

suburban problem. Transactions North American Wildlife and Natural Resources Conference 69:67-88.

WAY, J.G. 2000. Ecology of Cape Cod coyotes (*Canis latrans* var.). M.S. Thesis, University of Connecticut, Storrs, CT. 107pp.

WAY, J.G., I.M. ORTEGA, AND E.G. STRAUSS. 2004. Movement and activity patterns of eastern coyotes in a coastal, suburban environment. Northeastern Naturalist 11:237-254.

WILSON, P., J. JAKUBAS, AND S. MULLEN. 2004. Genetic status and morphological characteristics of Maine coyotes as related to neighboring coyote and wolf populations. Final report to the Maine Outdoor Heritage Fund Board, Grant #011-3-7. Maine Department of Inland Fisheries and Wildlife, Bangor, ME. 58 pp.