

URBAN GREENING AND HUMAN-WILDLIFE RELATIONS IN PHILADELPHIA:  
FROM ANIMAL CONTROL TO MULTISPECIES COEXISTENCE?

*Christian Hunold*

*Department of Politics*

*Drexel University*

*Philadelphia, USA*

*Email: [hunoldc@drexel.edu](mailto:hunoldc@drexel.edu)*

ABSTRACT

City-scale urban greening is expanding wildlife habitat in previously less hospitable urban areas. Does this transformation also prompt a reckoning with the longstanding idea that cities are places intended to satisfy primarily human needs? I pose this question in the context of one of North America's most ambitious green infrastructure programs to manage urban runoff, Philadelphia's *Green City, Clean Waters*. Given that the city's green infrastructure plans have little to say about wildlife, I investigate how wild animals fit into urban greening professionals' conceptions of the urban. Practitioners relate to urban wildlife via three distinctive frames: 1) animal control, 2) public health, and 3) biodiversity. Their implications for peaceful human-wildlife coexistence in greened cities are explored.

KEYWORDS

Urban greening, green infrastructure, urban wildlife, human-wildlife relations, urban conservation

New urban ecological imaginaries demand new conceptual  
languages and ideas, ways of imagining cities that resist

binaries and analytic closure in favor of an openness to the ways that ecology, community and justice intersect.

Nate Millington (2013)

## INTRODUCTION

Urban greening, or green infrastructure, refers to public landscaping and forestry projects that create, improve, or expand urban green spaces. The predominant discursive framing of such projects as natural capital investment in the revitalization of postindustrial U.S. cities emphasizes the production of valuable ecosystem services, including interception of stormwater runoff and improved water management, moderation of the urban heat island effect, carbon sequestration, improved air quality, improved health and wellbeing, and wildlife habitat (Albro, 2019; Dover, 2015). This buoyant defense of urban greening has been subject to critical scrutiny, particularly from an environmental justice perspective (Dooling, 2009; Gould & Lewis, 2016; McKendry, 2017). Investment in green infrastructure to attract capital as well as affluent residents to postindustrial urban landscapes (McKendry & Janos, 2014) in some cases deepens rather than dampens longstanding environmental injustices borne by low-income residents and people of color (Anguelovski, 2015). As neighborhoods that are cleaned and greened become appealing to private investors, some long-term residents – more likely to be older, poorer, and members of minorities than the new arrivals – find themselves displaced from their neighborhoods in the wake of ecological gentrification (Miller, 2016; Safranksy, 2014; Wolch et al., 2014).

The impact of urban greening on nonhuman animals is similarly multivalent. As Byrne and Wolch (2009) noted a decade ago, urban parks built on reclaimed industrial brownfields displace people, flora, and fauna, introducing a narrow assortment of new species (Groffman et al., 2014) that comprise the “urban pastoral” (Gandy, 2003). However, to the extent that aesthetics and recreation are not the sole drivers of urban greening, local ecological diversity may benefit from such efforts (Aronson et al., 2017). Ambitious city-

scale urban greening initiatives underway in several North American cities, for example, are driving an unprecedented expansion of wildlife habitat through the construction of parkland, green roofs, retention ponds, rain gardens, and so on. To be sure, promoting ecological diversity is not among the top priorities of such multibillion dollar capital improvement projects. In the United States, investment in green infrastructure seeks primarily to improve municipal compliance with federal water quality standards and, in so doing, to provide a number of secondary environmental amenities, sometimes including wildlife habitat (Brears, 2018). However, even though new home construction for Canada Geese is rarely the express purpose of green infrastructure installations, wildlife is taking advantage of these friendly spaces (Schilthuizen, 2018).

Significantly, greened cities' increasing hospitability to wildlife is not confined to the wildland-urban interface at the frontier of urban sprawl (e.g., Collard, 2012; Stroud, 2012). The emergence of inextricably intertwined human-wildlife geographies in residential neighborhoods of the urban core is a distinctive development that poses pressing ethical and practical questions about accommodating the needs of wild animals in urban spaces not ordinarily considered wildlife habitat (Donaldson & Kymlicka, 2011; Frank, 2016; Luther, 2013; Wolch, 2002). Thus, I ask whether cities teeming *with* wildlife are also becoming cities *for* wildlife, not just materially but also ontologically, in the sense that the needs of wild animals are actively accommodated in policy and design. If urban greening increases abundance and diversity of wildlife communities in previously less hospitable urban settings, does this transformation also prompt a public and political reckoning with the longstanding idea that cities are places intended to satisfy primarily human needs? To what extent does urban greening enliven, not just wild animals' bodies, but human ecological imaginaries that resist human/nature binaries and invite experimentation with new forms of multispecies conviviality?

I approach these questions through the lens of the City of Philadelphia's ambitious, multibillion dollar, multi-decade green infrastructure program to manage urban runoff, *Green City, Clean Waters*.<sup>1</sup> City-scale urban greening, I contend, amounts to redesigning urban landscapes *as if* wildlife mattered, effectively inviting wild animals to move in. Insofar as this transformation is shaped by the values and actions of urban planners and design professionals, it is imperative to ask how wild animals fit into these practitioners' conceptions of city life. My analysis of the role of urban wildlife in green infrastructure development is based on two distinct sources of qualitative data. First, an analysis of municipal documents related to green infrastructure planning and development in Philadelphia revealed wildlife benefits to be a minor concern. In the municipal vision of green infrastructure laid out in these plans and reports, nature figures as a largely benign provider of ecosystem services. These services are expected to improve environmental conditions in Philadelphia, enhancing residents' quality of life while boosting the city's attractiveness to capital investment and economic development. Wildlife is assumed to benefit from green infrastructure development, but beyond this rather vague understanding the needs of wild animals and the concerns city residents might harbor toward them receive scant attention in the planning documents I have examined. This discovery motivated the second step of my analysis. I conducted sixteen semi-structured interviews with Philadelphia green infrastructure professionals, including park managers, environmental educators, landscape architects, and urban ecologists, in order to better understand the extent to which such professionals might *envision* the city as wildlife habitat. Though wild animals made few appearances in municipal green infrastructure plans, perhaps they played a livelier role in practitioners' imagination or everyday practices? The interview data yielded three discursive framings of urban wildlife, as articulated by green infrastructure professionals: 1) animal control, 2) public health, and 3) biodiversity. These framings exhibit varying degrees of

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<sup>1</sup> <http://www.phila.gov/water/sustainability/greencitycleanwaters/Pages/default.aspx>

nature/culture dualism and incorporate more or less conflictual perspectives on human-wildlife relations. Following a summary of the study results, I discuss the implications of green infrastructure professionals' framings of urban human-wildlife relationalities for multispecies coexistence.

## **Methods**

### Data Collection and Participants

Four major municipal planning reports on green infrastructure, urban greening, and urban sustainability were consulted to determine consideration of wildlife and wildlife habitat in urban greening policy development, including the Philadelphia Water Department's Combined Sewer Overflow Long Term Control Plan *Green City, Clean Waters* (2011), the City of Philadelphia's sustainability plan *Greenworks* (2016), the Philadelphia Planning Commission's plan for growth and development *Philadelphia 2035* (2011), and Philadelphia Parks and Recreation's *Parkland Forest Management Framework* (2013).

Fifteen urban greening professionals were recruited from a contact list, compiled by a research assistant, of forty-three such professionals working in Philadelphia. Study participants were interviewed by the author from June to September 2018. These semi-structured interviews consisted of face-to-face and telephone conversations (based on participants' preference) lasting between approximately 30 and 60 minutes, and were audiotaped. Participants gave verbal consent to be audiotaped and to be quoted anonymously in published research reports. To protect their anonymity, each participant was assigned a number. The research design was approved by the appropriate human subjects institutional review board. Prepared interview questions were intended to make sure that all participants addressed the issues of interest for this study, but the questions were not used to standardize data collection. They merely framed the conversations and were intended to elicit and guide the study participants' narratives. The goal was not primarily to discover *facts* about green infrastructure policy but rather to learn about participants' *experiences* and their *reflections*

about them, in order to better understand how wildlife figured in green infrastructure professionals' thinking.

### Analysis

The municipal urban greening plans were analyzed by the author, with a view to identifying substantive content pertaining to wildlife (e.g., habitat creation, conflict management) in the context of urban greening policy. The interviews were transcribed by three undergraduate research assistants. Coding was completed using the transcripts.

Interview data were analyzed using a modified grounded theory approach (Corbin & Strauss, 1990), a qualitative approach to social research where themes are not selected a priori but where developing theory is connected to the process of data collection and analysis. The goal was to create a description of perspectives on urban wildlife among urban greening professionals that was grounded in, or emerged from, the interview data. The approach was "modified" insofar as literature implied the importance of some themes. Literature on urban human-wildlife relations (Bateman & Fleming, 2012; Elliot, Vallance, & Molles, 2016; Soulsbury & White, 2015) consulted by the author indicated that study participants' perspectives on urban wildlife would be informed by two ontological dynamics: degree of urban/nature dualism (city and nature constitute mutually exclusive realms, with implications for the legitimacy of urban wildlife) and emphasis on human-wildlife conflict (complicating peaceful coexistence in urban settings, where animals may be seen as invading spaces understood to satisfy primarily human needs.)

Analysis began during data collection and transcription when the research assistants and the author discussed and recorded emerging themes and wrote reports to define these themes. Sensitizing concepts from the literature (urban/nature dualisms, human-wildlife conflict) were used to generate some themes while others emerged from the interview data during coding. The three perspectives on urban wildlife (animal control, public health, biodiversity) emerging from the interviews, used to organize the results of the study, were

first proposed by the author during a meeting with the research assistants in July 2018, at a time when approximately half of the interviews had been completed and transcribed.

### Sample Characteristics

Study participants were selected from a combination of municipal agency staff rosters, a municipal list of approved green infrastructure contractors, as well as snowball sampling. They included private and public sector professionals: two urban greening researchers, five private-sector landscape architects/designers, four municipal environmental educators, one statehouse legislative aide, and three officials from municipal agencies involved in green infrastructure design and implementation. The sample included eight women, seven men; ten were White, four African-American, and one Latinx. The sample skewed toward frontline professionals, that is to say, project designers and environmental educators as opposed to head office managers or agency administrators.

## Results

### Green City, Clean Waters: Nature as a Dispensary of Ecosystem Services

*Green City, Clean Waters*, Philadelphia's Combined Sewer Overflow Long Term Control Plan, is set to invest nearly three billion dollars in green infrastructure by the mid-2030s, in order to bring the city into compliance with federal water quality standards, now routinely violated when untreated runoff and combined sewer overflows (CSOs) are diverted into creeks and rivers during rain storms. The plan calls for installing 9,564 greened acres at hundreds of public and private sites across the city by 2036. A greened acre manages at least the first inch of rainfall over an acre of hard surfaces, typically achieved through a combination of rain gardens, tree trenches, porous pavement, and green roofs, reducing runoff pollution by more than 85%. The rationale for investing in a CSO control program that relies primarily on "green" as opposed to "gray" infrastructure (e.g. underground holding tanks) is that green infrastructure is believed to produce, at roughly the same cost, additional "triple bottom line" economic, social, and environmental benefits (Philadelphia Water

Department, 2011: 18-19).

Creation of wildlife habitat, however, plays a limited role in the water department's urban greening agenda. Unlike in U.S. cities where the federal Endangered Species Act constrains development that impacts federally endangered or threatened species (e.g. salmon in Seattle), no such species are present in Philadelphia (Respondent #8). In practice, Philadelphia Water enters into project-based partnerships with community organizations that value green infrastructure as a means to improve wildlife habitat, so long as municipal runoff management goals are met (Respondent #11). Regardless of water managers' priorities, however, the gradual substitution of a third or more of the city's existing impervious cover with nearly 10,000 greened acres will help fill in the existing patchwork of green spaces and improve habitat connectivity within the urban ecosystem. Some installations such as stormwater wetlands, moreover, have considerable individual footprints and may become urban biodiversity hot spots in their own right: "Each wetland is composed of various depths of storage areas, including surface, shallow, and deep areas, and a complex mix of wetland-appropriate landscaping. Stormwater wetlands are one of the best stormwater management tools for pollutant removal and can provide considerable aesthetic and *wildlife benefits*" (Philadelphia Water Department, 2011: 23, emphasis added.)

Philadelphia Water's green infrastructure rollout is unfolding alongside several other municipal urban greening programs. Though stream restoration is not formally part of the CSO Long Term Control Plan, the city is carrying out landscape-scale stream restoration projects in the Cobbs and Tookany/Tacony-Frankford watersheds, among others (Respondents #2, #7). Ambitious tree planting and open space preservation initiatives are also proceeding apace. The Philadelphia Parks & Recreation Department is working to improve the ecological functionality and resilience of existing open space, particularly the sizable tracts of urban forest found across the approximately 5,600 acres of the Fairmount Park system classified by the park system as natural lands (Philadelphia Parks & Recreation,

2013: 13). The goal of this parkland restoration is primarily “to achieve a viable, self-perpetuating, native-dominated and resilient forest ecosystem” (Philadelphia Parks & Recreation, 2013: 11).

Philadelphia’s sustainability plan, *Greenworks*, posits a beneficial relationship between human society and nonhuman nature, with nature conceived of as a storehouse of assets to be protected and improved upon by good stewardship. In return for practicing good stewardship over natural resources, city residents can expect to receive valuable services, such as improved mental and physical health, cleaner air and water, and safer and stronger communities (City of Philadelphia, 2016: 22). This hopeful conception of nonhuman nature as a dispensary of ecosystem benefits reflects a natural capital approach to nonhuman nature, which defends green infrastructure investment in terms of economic, public health, and community benefits (e.g. Chenoweth et al., 2018). Realizing some of these benefits requires that people live close to parks, and so the plan formulates a goal of connecting city residents with nature, particularly those who live in neighborhoods with few existing natural amenities: “Philadelphia is rich in natural assets like our parks, streams, and rivers, and *Greenworks* envisions a future where all our residents can take advantage of these resources. To achieve this vision, we must improve the quality of our existing green spaces and focus investment in neighborhoods least connected to nature” (City of Philadelphia, 2016: 22).

This idea of reaping ecosystem services through investing in natural resources also inform the city’s Comprehensive Plan, *Citywide Vision Philadelphia 2035*, which declares that “[w]ell-maintained open spaces can improve the quality of the immediate and regional environment, the health of the neighbors who frequent the spaces, and the local economy by raising the value of nearby properties” (City of Philadelphia, 2011: 134). Here, protecting natural assets seeks, above all, to position the city and the region to compete for new residents and for capital investment: “Initiatives to improve environmental performance should help create new economic opportunities. Increased energy efficiency, and the

diversification and protection of energy and water resources, should ensure affordable and reliable supplies. And compliance with air and water standards should improve quality of life and help Philadelphia distinguish itself as a world-class location in which to live, work, and visit” (City of Philadelphia, 2011: 144). The water department’s *Green City, Clean Waters*, for its part, emphasizes the recreational value of waterways cleaned up by green infrastructure: “Reducing sewage overflow to our waterways in order to provide our citizens with destinations to play, fish, relax, and reconnect with nature is the foundation of our environmental ethic” (Philadelphia Water Department, 2011: 4). A few references to wildlife benefits and recreational values aside, wild animals are largely absent from the City of Philadelphia’s green infrastructure plans. Wild animals often loom considerably larger in the city residents’ everyday experiences, however.

#### Animal Control: Policing Human-Wildlife Boundaries

“There has to be a reason they’re coming out of nowhere infesting these neighborhoods,” City Councilman Kenyatta Johnson speculated about the abundance of raccoons in his southwest Philadelphia district in January 2017, in response to complaints from constituents (Loeb, 2017). That some city residents may not share an environmental ethic that encourages them to reconnect with nature in their neighborhood is not discussed in the planning documents reviewed above. Wild animals in particular are often experienced as disruptive. Philadelphia politicians note (not entirely tongue-in-cheek) that complaints about raccoons are not far behind citizens’ concerns about the quality of public education and the prevalence of street crime (Respondent #14). Indeed, raccoons generate far more wildlife complaints than any other species, such that the city’s animal control agency’s webpage dealing with wildlife is titled “Raccoons & Wildlife.” In this context, it is important to note that Philadelphia, the United States’ fifth-largest city, is also the country’s “poorest big city,” with an official poverty rate of 26%. Of the city’s approximately 1.57 million inhabitants, roughly 400,000 live below the federal poverty line, with deep poverty concentrated in

specific neighborhoods. While the central business district and some adjacent neighborhoods have experienced a revitalized economy and an influx of younger, college-educated residents, many other neighborhoods suffer from the effects of racially discriminatory redlining, compounded by several decades of economic disinvestment and population loss. Many residential buildings in the city's impoverished neighborhoods are in poor physical condition, providing access opportunities to these structures that attract animals such as gray squirrels and raccoons. In these neighborhoods, wildlife is doing well, for the most part, not as a result of urban greening or ecological restoration projects, but as a result of human abandonment of urban spaces subsequently taken over by plants and animals. In neighborhoods where the presence of wild animals often symbolizes governmental neglect, property damage, and poor health (e.g. asthma), wildlife is not necessarily appreciated (Respondents #5, #12).

Green infrastructure professionals interviewed for this study note that hostile attitudes toward wildlife are not uncommon in impoverished neighborhoods. While some identify lack of environmental education as the main driver of residents' wildlife-related anxieties (Respondent #6, #11), others situate wildlife complaints in a context of lives shaped by persistent material scarcity. Persistent poverty compromises the ability of some residents, especially those who are older and/or not able-bodied, to exclude unwanted animals from their home, giving rise to complaints about nuisance wildlife that are not necessarily frivolous (Respondent #14). In sections of the city where economically and/or racially marginalized *human* communities have been struggling for recognition, study participants regard the argument for reconnecting with nonhuman nature, let alone for interspecies inclusivity, as inseparable from the argument for human environmental justice (Respondent #4).

Policing wildlife in Philadelphia is among the responsibilities (albeit a minor one) of the city's animal control agency, which deals primarily with abandoned and unwanted pets. Officers of the Pennsylvania Game Commission, which regulates sport hunting in the state,

also respond to wildlife-related calls in Philadelphia County. Visitors to the Animal Care and Control Team of Philadelphia’s website are informed that, though Philadelphia is a large city, the presence of wildlife is not in itself a cause for alarm. Rather, it is “not uncommon to observe wildlife walking about on neighborhood streets – even during the daylight hours” (ACCT Philly n. d.). This observation about routine movements of wild animals in the city prefaces a section of the website that offers advice for residents concerned about wildlife near their home. Residents who wish to deter wildlife are advised to secure their trash, to leave no food outside, and to keep their home in good repair to keep animals out. Following a detailed discussion of the conditions under which wild animals classified as rabies vectors under state law are a public or a private responsibility, residents are reminded that

“[h]ealthy wildlife is found in yards, streets, parks, etc. These animals should be left alone and trapping of healthy wildlife is prohibited under state law with the exception of certain, special circumstances. [...] Use the resources provided above to deter these animals from frequenting your neighborhood” (ACCT Philly n. d.).

#### Public Health: Strengthening Connections with Nature

Animal control seeks to protect public health by separating human spaces and animal spaces, and then to monitor human-animal boundaries in order to minimize interspecies contact and the potential for conflict. Historically, animal control is closely identified with the rise of the sanitary city, a public health driven approach to urban governance characterized by a set of infrastructural strategies designed to separate the residents of industrial cities from the hazards of industrial and household waste by conveying waste elsewhere for treatment and disposal (Gandy, 2003; Melosi, 2000). Just as the logic of green infrastructure repudiates the sanitary city’s logic of protecting public health by removing wastewater from the city, nature and wildlife advocacy in the context of green infrastructure development has also turned the old public health argument on its head. Along these lines, E. O. Wilson’s (1990) “biophilia thesis” and Richard Louv’s (2005) “nature deficit disorder”

have inspired public health research that seeks to show that proximity to green spaces and exposure to nature experiences (e.g. walks in the park) improve human physical and mental wellbeing (Kondo et al., 2018; USDA, 2018). This new public health perspective informs the ecological imaginaries of several urban greening professionals interviewed for this study. In this framing, green space serves as a remedy for human maladies. Take the urban heat island effect. On hot summer days, “temperatures in areas of North Philadelphia near industry, highways, and few if any green areas can climb up to 22 degrees Fahrenheit higher than in leafier neighborhoods in the northwest part of the city” (Jaramillo, 2018). Residents of neighborhoods with no tree canopy are far more vulnerable to heat-related stress than residents of neighborhoods with tree-lined streets and yards. Commenting on the city’s Heat Vulnerability Index in a published interview, the director of Philadelphia’s Office of Sustainability concedes this pivotal point:

All the red neighborhoods are minority majority areas [...] How did we get into this situation? Looking at the city’s racial history of redlining – to have people living near industries or near highways that were not desirable, the political history of not being able to provide investments into their parks or other community investments – that’s the big connection here. This is too perfectly aligned with racial demographics to be have been accidental (Jaramillo, 2018).

In order to address such vulnerabilities, the Philadelphia Parks & Recreation Department’s Tree Philly initiative seeks to increase tree canopy coverage to thirty percent in every neighborhood, with the program’s focus shifting from tree-saturated neighborhoods to low-canopy areas of the city (Respondent #13).

Highlighting such connections between green space and public health is important to several study participants. Professionals working with impoverished communities in particular incorporate health-related environmental justice claims in campaigns to educate residents about how investing in green infrastructure might directly benefit their communities

(Respondent #12, #14). These professionals caution against framing green infrastructure in terms overtly critical of anthropocentrism given that marginalized human communities “have never been in the center of anything” (Respondent #4). They fear that prioritizing biodiversity protection over human needs might position green infrastructure, in minority neighborhoods, as one more in a long line of public policies that have devalued the lives of minority communities (Respondent #4, #12, #14).

Study participants also note, moreover, that the ability to access urban green spaces is not simply determined by spatial proximity. That many residents in neighborhoods located right next to city parks and public gardens are nevertheless effectively discouraged, by poorly designed infrastructure or by cultural perceptions, from accessing these spaces is noted by several study participants (Respondent #4, #16). In some cases, access is impeded by dangerous infrastructure. For example, residents of the Cobbs Creek section of Philadelphia who wish to cross 63<sup>rd</sup> Street, a busy surface road, in order to visit the eponymous park located across the road must brave heavy automobile traffic traveling at what are effectively highway speeds (Respondent #16). In a different section of Southwest Philadelphia, some African-American residents reportedly hesitate to visit one of the city’s oldest public gardens abutting their neighborhood because they do not believe the garden “is for them” and/or because its ornate entrance gate signals (wrongly) that entry is not free of charge (Respondent #4).

#### Biodiversity: Reimagining The City as Wildlife Habitat

Several green infrastructure professionals engage city/nature binaries head on and propose to reimagine the city as a whole as wildlife habitat, not just greened spaces set aside for this purpose. Inspired by nondualist approaches to ecology and design such as reconciliation ecology (Forman et al., 2002; Rosenweig, 2003) and biophilic urbanism (Beatley, 2011), these study participants frame the promotion of biodiversity as indispensable to urban planning, whether as a matter of human wellbeing or the long-term survival of the

biosphere. The scientific shortcomings of the biophilia thesis are well known, of course. These weaknesses include lack of evidence in human evolutionary biology for a hereditary affinity for nonhuman nature and the risk of downplaying the complex ways in which many humans in fact experience nonhuman nature (Joye & De Block, 2011; Reeve et al., 2015). Many people, including those who live in cities, enjoy spending time in nature. Numerous studies have shown “that urban residents can gain considerable enjoyment from encounters with urban wildlife [...] or from sharing the local environment with a species” (Soulsbury & White, 2015: 546). Yet widespread indifference, ignorance, annoyance, and even fear vis-à-vis nonhuman animals suggest that biophilia is hardly a universally shared value system (see Biehler, 2013; Luther, 2013). Still, a commitment to nurture greater awareness of human beings’ dependence on nonhuman organisms and to promote the intrinsic value of biodiversity informs how these study participants attempt to make space, materially and symbolically, for wild animals in urban infrastructure design and development.

A pragmatist point of departure for this nondualist approach is a desire to “mitigate our often fatal material infrastructure” (Koelle, 2012: 657). Respondent #15, for example, laments the contradictory character of a conception of urban sustainability that underwrites LEED-certified skyscrapers whose reflective glass façades routinely kill migrating songbirds, as if the buildings had been designed as bird killing machines. The solution, she contends, is urban design informed by scientific understanding of animal behavior (York & Longo, 2017). On this model, knowledge of the mundane details of how species travel through cityscapes in pursuit of resources informs design for biological organisms and generates infrastructure that is less deadly to wildlife while also generating ecosystem services that benefit humans (Respondent #8). Concern for the wellbeing of nonhuman organisms, in this framing, is explicitly extended to an urban ecology understood to include “aspects of urban nature emerging on profoundly altered sites” (Kowarik, 2011: 1979). So, for example, buildings covered with living walls or green roofs may function as sites that introduce their residents to

plants and animals in an urban setting and that engage the public to recognize the connections between the built environment and the natural world (Francis & Lorimer, 2011; Loder, 2014). While this intentional intermingling of human and nonhuman elements in urban design seeks to amplify the psychological and physiological benefits of nature experiences (e.g. Beery et al., 2017), this shift in perspective also recognizes that protection of urban biodiversity is contingent upon not only the installation of green infrastructure, but equally on how well nearby residential and commercial areas are designed and managed with a view to biodiversity promotion (Hostetler, Allen, & Meurk, 2011).

Improving ecological functionality at the landscape level is a central concern for this city-as-wildlife-habitat perspective. Study participants' use of relational spatial metaphors, such as blanketing the human-built environment in a "wildlife tapestry" and "zippering" (Respondent #15, #16) human and nonhuman urban spaces (Respondent #9), reflects a willingness to experiment with a "blending of strategies of controlling, disrupting, and leaving to their own devices more-than-human ecologies" (Lorimer, 2015). "We need green corridors, and not just for people but for animals. We have the ability with all these vacant lots that we have in this city to start to connect things" (Respondent #16). This emphasis on corridors and on tools such as "biodiversity maps" (Respondent #15) signals awareness of the significance for ecological functionality of connectivity and of scale. For example, a planning and design collaboration between the John Heinz National Wildlife Refuge at Tinicum, Pennsylvania Audubon, and the Landscape Architecture Program at Jefferson University hoping to improve habitat for native pollinators in West Philadelphia seeks "to create equal habitat for both wildlife and people within communities from the Refuge to the Philadelphia Zoo so that the benefits of an ecologically diverse ecosystem can be shared among all residents regardless of social, economic, or physical status" (The Pollinator Corridors, 2017).

## **Discussion**

The animal control framing of human-wildlife relationalities renders sightings of wild

animals in the city as fairly unremarkable unless animals intrude into spaces understood to be exclusively human spaces. Animal control is not unrelentingly hostile toward wildlife. That said, this perspective focuses squarely on managing negative interactions between animals and people, whose interests typically take precedence over the needs of wildlife in the event of conflict. The claim that the very same wild animals that routinely occupy “yards, streets, [and] parks” may simultaneously be deterred from “frequenting your neighborhood” implies that the legitimacy of wild animals’ presence in the city depends, at least in part, on which urban spaces animals decide to occupy, and on the extent to which animals trespassing into spaces understood to be human spaces attract negative attention from human observers. On this model, the legitimacy of wild animals’ presence in the city diminishes with increasing proximity to residents’ homes, particularly where poorly maintained residences may be vulnerable to incursions by animals. This is the “brittle legitimacy” granted urban wildlife noted by Donaldson and Kymlicka:

Whatever our mistreatment of domesticated animals and of wilderness animals, there is at least a grudging recognition that they have a right to be where they are. But the very idea of liminal animals – of wild animals living amongst us – is seen by many people as illegitimate, and as an affront to our conception of human space (2011: 211).

In practice, the day-to-day significance for urban wild animals of a municipality’s animal control regime would seem to depend on the extent to which residents regard homes, yards, streets, and parks as spaces for humans, for animals, or for both. Yards, spaces where inside and outside meet, are fascinating sites of multispecies contestation. Private yards have significant implications for managing stormwater given that, at city scale, yard surfaces covered with impervious materials account for a nontrivial volume of runoff. Replacing most of the city’s hardscaped yards with ecologically more appropriate landscaping would also expand habitat (e.g. Belaire, Westphal, & Minor, 2016; Rudd, Vala, & Schaefer, 2002).

Indeed, initiatives like the National Wildlife Federation's Backyard Habitat Certification Program are popular in wealthier Philadelphia neighborhoods where homeowners invest in ecologically informed landscaping that combines aesthetic appeal with the idea of benefiting native plants and animals. Yet, as urban greening professionals note, many homeowners' sense of ownership and desire for privacy override the needs of plants and animals (Respondent #1, #9, #10). Consider the ubiquitous privacy fences that separate backyards in the city's row house neighborhoods. Materially, fence lines literally stand in the way of ecological design. Fences constitute physical hindrances that are hard to manage because they attract vines that smother other plant life and because they disrupt ecologically more viable ground cover and plant diversity. Symbolically, moreover, fences impede habitat connectivity by reinforcing a sense of private ownership. First-time homebuyers in particular are often motivated by a strong sense of ownership and treat their backyard as "just another room," and prioritize its suitability for human uses rather than its capacity to contribute to a more vibrant urban ecology (Respondent #9). Insofar as improving urban sustainability requires, ecologically, strengthening connections among small-scale and large-scale green spaces (Andersson et al., 2014) and, socially, cultivating a shared sense of community and citizen participation (Francis & Lorimer, 2011), yards conceived of as private spaces, optimized for human purposes and separated by fences, may be difficult to reconcile with some requirements of ecological design.

Taken together, these interactions of wild animals with homes in impoverished neighborhoods and with the private yards of middle-class homeowners reveal the persistence of framings of urban wildlife that seek to protect human spaces and interests by policing human-wildlife boundaries. City-scale urban greening, however, undermines the material plausibility of this approach, depending as it does on the idea of maintaining spatially separate zones for humans and for animals. For it is hard to imagine how the construction of thousands of green spaces throughout the city – along roadways, in schoolyards, on rooftops

– will *not*, on the whole, further entangle animal and human geographies by better connecting small-scale and large-scale green spaces. It is already “clear [today] that boundaries between wild nature and urban centers are fictions” (Stroud, 2012: 148). Insofar as the proliferation of greened spaces across the city helps bridge previously disjointed patches of habitat, as well as increase habitat totals, wild animals will find it easier to enter and to move around the city, and animal control inspired advice reminding people how to deter wildlife from frequenting their neighborhoods will risk missing the forest for the trees.

The new public health framing of urban infrastructure relaxes the animal control model’s dualist ontology and, thus, enables a convivial response to periodic moral panics that cast urban wild animals as infestations and invaders whose lives are dispensable. This perspective’s defense of environmental justice in primarily anthropocentric terms does not necessitate omitting advocacy for biodiversity from ecological education and outreach. Rather, study participants foreground acknowledging the racism of the “pale and male” conservation movement as well as the inequitable distribution of green spaces among rich and poor neighborhoods, with a view to showing minority communities how urban greening might lessen racial inequities by improving environmental health and justice (Respondent #14).

As noted above, wild animals do sometimes find their way into people’s homes in impoverished neighborhoods, generating legitimate wildlife complaints. Study participants do not seek to get residents who despise raccoons to change their minds about the animals (Respondent #12, #14). Rather, they attempt to shift the conversation from complaints about raccoons to ways that efforts to enrich biodiversity in urban ecosystems contribute, however indirectly, to human wellbeing. For example, they might discuss ways that environmental health – including habitat for wild plants and wildlife – supports public health, through improved flood control, protection of the drinking water supply, natural pest management (e.g. insectivores), and access to more green spaces for residents of minority-majority

neighborhoods (Respondent #3, #11, #14). The public health perspective emphasizes the usefulness to human communities of certain species (e.g. pollinators) while establishing the legitimacy of urban wildlife more generally as a valuable indicator of functionally intact urban ecosystems. Insofar as wildlife is characterized here as constitutive of green spaces responsible for generating human health-related ecosystem services, this self-consciously anthropocentric framing is, however, spatially *less* dualist than the animal control perspective. The public health perspective's pragmatic acknowledgment of wildlife as a welcome (and, at any rate, unavoidable) component of urban ecosystems does not deny the material reality of the greened city's increasingly intertwined human-wildlife geographies. To the contrary, incorporating tolerance of wildlife into this framing does not have to contend with the animal control model's contradictions, where wild animals' belonging is always provisional.

Framing urban wildlife as deserving of consideration for its own sake offers a more direct challenge to human/nature binaries. Yet reimagining the city as "wildlife habitat with people living in it" (Respondent #15) need not be incompatible with natural capital approaches to green infrastructure investment favored by municipal officials. One study participant, for example, excitedly discussed how Philadelphia's embrace of city-scale urban greening might feature in marketing campaigns to promote urban ecotourism (Respondent #15), echoing the language of natural assets found in municipal vision statements on urban greening, such as *Philadelphia 2035*. The recently opened Philadelphia Rail Park (modeled on New York City's High Line) is being promoted in just this fashion, for example (<https://therailpark.org/the-park/>). In other ways, though, this perspective is distinctive because it treats nonhuman nature, not as a source of decorative design elements or similar utilitarian terms, but as intrinsically valuable. Several participants emphasized greater public acceptance of wildness such as less manicured landscaping – meadows, say, instead of lawns – as a vital ingredient in creating high-quality urban habitat (Respondent #1, #3, #9, #10,

#11). However, they also noted the potential for conflict between the ecological desirability of encouraging self-directed, necessarily unpredictable natural processes (e.g., self-seeding of plants) and public preferences for year-round aesthetic appeal and municipal preferences for easy-to-maintain green infrastructure facilities (Respondent #3, #11). In other words, management decisions regarding how much control to cede to nonhuman processes appear to be contingent on public opinion and site characteristics. Several park managers, horticulturalists, and landscape designers suggested that the public's desire for well-maintained green spaces with clean lines limits how much *laissez-faire* management would be tolerated, at least at the smaller sites typically found in residential settings (Respondent #1, #3, #10, #11). Situated against the backdrop of longstanding economic decline coupled with underinvestment in impoverished neighborhoods, and in their public parks, moreover, some residents may find it difficult to distinguish purposely unkempt wildness from the sort of neglect associated with industrial brownfields and vacant lots (Heckert & Kondo, 2017). Some public land managers and private-sector landscape designers indicated having greater freedom in their work to be intentional about designing for biodiversity at larger sites located at the edges of residential neighborhoods, such as historic cemeteries or Fairmount Park's officially designed "natural lands," sites where public expectations of control tend to be more relaxed (Respondent #3, #7, #11). These green infrastructure professionals' pragmatic acceptance of a sort of sliding scale of wildness as defining opportunities for ecological design in the city echo Braverman's (2015) findings about conservation scientists' turn toward "wildness as a guiding principle, enabling a more dynamic and relational *modus vivendi*" whereby "a species can be "wilder" and a site can be "semi-wild" or "as wild as possible," with neither being "wilderness" per se (Braverman, 2015: 227, 232).

## **Conclusion**

I have explored how green infrastructure professionals in Philadelphia conceptualize human-wildlife relationalities in the context of city-scale urban greening, a massive capital

project that will, in the course of several decades, amount to reengineering urban landscapes *as if* wildlife mattered. But if we are building cities *full of* wildlife, are we also building cities *for* wildlife? To what extent are wild animals being included in green infrastructure professionals' conceptions of the urban? Do such practitioners actively *imagine* the city as wildlife habitat, such that wild animals are thought to belong in urban settings, as opposed to being relegated to a nature assumed to exist somewhere "out there," beyond the walls of the polis (Hodgetts & Lorimer, 2015: 288)?

In Philadelphia, the animal control model's emphasis on conflict prevention provides the policy context in which these transformations are unfolding. As some study participants indicate, animal control is more than just a historical backdrop in this city. Given conditions of deep poverty in many Philadelphia neighborhoods, the demand for animal control services to remove troublesome wild animals from poorly maintained human living spaces will likely persist for the foreseeable future. The dualist ontology of the conflict-management approach to urban human-wildlife relations, however, does not sit easily with the increasingly intertwined human-animal geographies of contemporary greened cities in which human communities and communities of wild animals live in close proximity to one another.

Professionals who advocate for urban green space as a means to improve human health and wellbeing enlist, quite intentionally, categories of useful (pollinators) and beautiful (birds) wild animals. To acknowledge the existence of beneficial human-wildlife relationalities in urban settings, even while sidestepping questions of the intrinsic value of wildlife, is to loosen the conflict-management perspective's grip on conceptualizing human-wildlife interactions. Insofar as proposals for reconnecting people with nature entail embracing the presence in urban areas of habitat for wild flora and fauna, urban wildlife enjoys a more robust sort of legitimacy. Tying urban wildlife to public health, and thus effectively reversing the logic of animal control is an approach practitioners believe can resonate in marginalized human communities suffering disproportionately from

environmental health injustices amenable to amelioration by urban greening. On this view, shifting attention from conflict to tolerance and coexistence with urban wildlife does not require that green infrastructure development explicitly prioritize the wellbeing of urban wildlife, beyond accepting wild animals as signifiers of a vibrant urban ecology. This perspective concedes that sharing space with the occasionally troublesome wild animals thriving in urban yards, streets, and parks may be inconvenient, but is a price urban dwellers must pay for desired ecosystem services. This framing takes a meaningful step toward solidifying the legitimacy of urban wild animals. However, urban greening policy justified in such terms would surely be called upon to address systematically disproportionate wildlife impacts on diverse urban communities.

Ecologically speaking, the “city-as-wildlife-habitat-with-people-living-in-it” perspective mounts a bold challenge to urban/nature binaries and the precariousness of urban wildlife. In Philadelphia, however, this biodiversity-oriented framing of urban greening has had little influence on municipal policy, primarily due to scant support for wildlife-oriented green infrastructure design among municipal officials in *leadership* positions. Street-level officials who participated in this study offered remarkably consistent appraisals that wildlife benefits did not rank very highly on the relevant agencies’ agendas, beyond a sort of *laissez-faire* willingness to letting wildlife take advantage of green space intended to provide mostly human benefits. It remains to be seen, therefore, whether continued deployment of green infrastructure and increased wildlife abundance will trigger a more principled reckoning with the capacity of urban greening to contribute to the co-flourishing of the city’s human and nonhuman communities.

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