

Nonhuman Climate Refugees: The Role that Urban Communities Should Play in Ensuring Ecological Resilience

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Urban residents have the potential to play a key role in helping to facilitate ecological resilience of wildernes areas and ecosystems beyond the city by helping ensure the migration of nonhuman climate refugee populations. Three ethical frameworks related to this issue could determine whether we have an ethical duty to help nonhuman climate refugee populations: ethical individualism, ethical holism, and species ethics. Using each of these frameworks could support the stronger view that policy makers and members of the public have a moral duty to mitigate the impacts of climate induced migration or the weaker claim that these impacts should be taken into account when making land-use and planning decisions in urban contexts.

INTRODUCTION

Cities play an important role in climate change adaption and mitigation efforts.¹ For example, since the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, the European Union (EU) set both short and long-term emission targets that are currently guiding the implementation and adaption of urban policies across European cityscapes.² In the context of the United States, cities, such as San Francisco and Chicago, are increasingly adopting “sustainability” or “climate change” action plans that are often aimed at stemming the global phenomena and addressing a wide range of impacts at the local level.³ These include but are not limited to the reduction of greenhouse gas emissions, mitigating the “urban

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¹ Carolyn Kousky and Stephen H. Schneider, “Global Climate Policy: Will Cities Lead the Way?” *Climate Policy* 3 (2003): 359–72; Cynthia Rosenzweig, William Solecki, Stephen A. Hammer, and Shagun Mehrotra, “Cities Lead the Way in Climate-Change Action,” *Nature* 467 (2010): 909–11.

² O. Heidrich, D. Reckien, M. Olazabal, A. Foley, M. Salvia, S. De Gregorio Hurtado, H. Orru, J. Flacke, D. Geneletti, F. Pietrapertosa, J. P. Hamann, A. Tiwary, E. Feliu, and R. J. Dawson, “National Climate Policies Across Europe and their Impacts on Cities Strategies,” *Journal of Environmental Management* 168 (2016): 36–45; K. Bäckstrand and O. Elgström, “The EU’s Role in Climate Change Negotiations: From Leader to ‘Leadiator,’” *Journal of European Public Policy* 20 (2013): 1369–86.

³ Calla Ostrander and Donald Oliveira, *San Francisco Climate Action Strategy* (San Francisco: San Francisco Department of the Environment, 2013); Katharine Hayhoe and Donald J. Wuebbles, *Chicago Climate Action Plan* (Chicago: Lipman Heome, 2010).

heat island effect,” preparing for severe weather, and increasing the numbers of green roofs, green buildings, and sustainability initiatives.

While these projects are laudable, arguably, the majority focus on reducing emissions and lessening the consequences of climate change for human populations living in these regions.⁴ However, regardless of whether emissions are stemmed in the near future, individual changes are currently “accumulating and being amplified more broadly. [They are impacts that] have been observed across genes, species, and ecosystems to reveal a world already undergoing substantial change.”⁵ While effects on genes are beyond the scope of this paper, I argue that cities can also play an important role in reducing the impact of climate change on species and larger biotic communities. Indeed, as climates continue to change, a wide range of species may be moving into urban areas, as their ranges shift, or may be urban-locked and thus unable to migrate, such as those that inhabit urban forests. Thus, it is imperative that we gain a clearer picture of potential ethical issues that may arise, as species continue to adapt to changing temperatures.

Specifically, in this paper I argue that urban residents have the potential to play a key role in helping to facilitate ecological resilience of “wilderness” areas and ecosystems beyond the city, as they can help to ensure the migration of nonhuman climate refugee populations. After which, I apply the following three ethical frameworks to this issue to determine whether we have an ethical duty to help nonhuman refugees: environmental individualism, environmental holism, and species ethics. I end by defending the position that policy makers and members of the public using each of these frameworks could support (a) the stronger claim that humans have a moral duty to mitigate the impacts of climate induced migration, or (b) the weaker claim that we should take these impacts into account when making land-use and planning decisions in urban contexts. However, before presenting this argument, it is important to define the term *nonhuman climate refugee*.

NONHUMAN CLIMATE REFUGEES DEFINITION

While environmental factors have historically played a role in human migration, with the advent of climate change, the severity of natural disasters and their frequency seem to be on the rise.⁶ This increase continues to play a major role in inducing migration, as the effects of a changing climate are linked to the following two types of environmental “push” factors: (1) sudden events, such as hurricane

⁴ Ibid.

⁵ B. R. Scheffers, L. D. Meester, T. C. L. Bridge, A. A. Hoffmann, J. M. Pandolfi, R. T. Corlett, S. H. M. Butchart, P. Pearce-Kelly, K. M. Kovacs, D. Dudgeon, M. Pacifici, C. Rondinini, W. B. Foden, T. G. Martin, C. Mora, D. Bickford, and J. E. M. Watson, “The Broad Footprint of Climate Change from Genes to Biomes to People,” *Science* 354, no. 6313 (2016): 716–32.

⁶ François Genenne, *An Introduction to International Migration Studies: European Perspectives* (Stockholm: Amsterdam University Press, 2012).

Katrina that devastated parts of the United States in 2005, and (2) “slow-onset events,” such as the rise of sea levels and the threat of desertification.⁷ Since the early 1990s, one of the most problematic ramifications of a changing climate is environmental migration. In this vein, the International Panel on Climate Change (IPCC) stated that “the gravest effects of climate change may be those on human migration as millions are displaced by shoreline erosion, coastal flooding and severe drought.”⁸ More recently, the International Displacement Monitoring Centre warned that, since 2009, approximately 22.5 million people have been displaced due to climate related events.⁹ The general position accepted by the international community is the following: that environmental induced migration *of humans*, due to climate change, is increasingly becoming an important ethical issue that needs to be addressed.

When we turn to nonhuman others, empirical research concerning species specific environmental migration is growing steadily from a wide range of academic disciplines¹⁰ Like humans, other species historically responded to environmental “push” factors, such as flooding and drought, by migrating to new areas better suited to their flourishing¹¹ In addition, they are also impacted by “pull” factors or those that induce movement due to some benefit, such as a prevalence of food, water, suitable habitat, etc.¹² In the ecological literature, this is frequently described as a species following their “ecological niches” or “climate niches,” which can approximately be defined as the identifiable limits of a species’ range or the range in which a species can flourish.¹³ This type of migration is distinct from the movements of migrating species, as these movements are a direct result of environmental factors and not part of “seasonal” behavioral patterns.

Today, a plethora of species are expected to shift their ranges in response to

⁷ Ibid.; James N. Gregory, *American Exodus: The Dust Bowl Migration and the Okie Culture in California* (New York: Oxford University Press, 1991).

⁸ J. W. McTegard, G. W. Sheldon, and D. C. Griffiths, eds., *Impacts Assessment of Climate Change, Report of Working Group II* (Canberra: Australian Government Publishing Service, 1990).

⁹ IDMC: International Displacement Monitoring Centre, “Global Estimates 2015: People Displaced by Disasters,” <http://www.internal-displacement.org/publications/2015/global-estimates-2015-people-displaced-by-disasters>.

¹⁰ M. C. Urban, Accelerating Extinction Risk from Climate Change. *Science* 348:6234 (2015): 571–573; C. D. Thomas, A. Cameron, R.E. Green, M. Bakkenes, L. J. Beaumont, Y. C. Collingham, B. F. N. Erasmus, M. Ferreira de Siqueira, A. Grainger, L. Hannah, L. Hughes, B. Huntley, A. S. van Jaarsveld, G. F. Midgley, L. Miles, M. A. Ortega-Huerta, A. T. Peterson, O. L. Phillips, and S. E. Williams, “Extinction Risk from Climate Change,” *Nature* 427 (2004):145–48; M. W. Tingley, W. B. Monahan, S. R. Beissinger, and C. Moritz, “Birds Track Their Grinnellian Niche through a Century of Climate Change,” *Proceedings of the National Academy of Sciences USA* 106, supp. 2 (2009): 19637–43.

¹¹ L. Angetter, S. Lötters, and D. Rödder, “Climate Niche Shift in Invasive Species: The Case of the Brown Anole,” *Biological Journal of the Linnean Society*, 104, no. 4 (2011): 943–54.

¹² Gemenne, *An Introduction to International Migration Studies: European Perspectives*.

¹³ Claire Palmer and Brendon M. H. Larson, “Should We Move the Whitebark Pine? Assisted Migration, Ethics, and Global Environmental Change,” *Environmental Values* 23 (2014): 641–62.

climate change.¹⁴ For example, Tingley et al. found that, out of the 53-bird species they tracked in the Sierra Nevada mountains, 48 species (90.6 percent) shifted their range to track their specific climate niche.¹⁵ Additionally, changes to the climate are negatively impacting the annual movements of migrating species, such as geese, as biotic and abiotic cues are disrupted due to the alteration of habitat, changes in resource availability, etc.¹⁶ While birds are some of the most mobile species and, thus, usually the first to follow ranges, a wide spectrum of flora and fauna are in the process of moving to higher elevations or further north, as temperatures rise.¹⁷ Unlike annual migrations, this shift is problematic as climate changes are correlated with the “rapid increase of species loss due to migration interruptions, competition from new species entering novel ecosystems, as they follow their climate niches, and species loss due to environmental stress.”¹⁸ To add to the IPCC argument above, one could argue then that a dire effect of climate change may be the displacement of millions of humans *and nonhumans* as environmental niches shift.

As climate induced change contributes to push factors for both humans and nonhumans, I argue that the climate refugee definition should be expanded to include nonhumans. However, for the purposes of this paper, I introduce the term *nonhuman climate refugees* to specifically signify flora and/or fauna that are induced to leave their current geographical range due do the impacts of a changing climate. Indeed, one could argue that novel problems associated with migration, as well as ethical, justice, and environmental strategies to address these issues, may depend on which group we focus on. However, it is important to note here that I am not making a metaphysical argument or attempting to reinforce a facile human/nonhuman binary, as this theoretical position can be problematic.¹⁹ My goal in this paper is more pragmatic in nature. Specifically, (1) I hope to bring attention to the issues associated with nonhuman climate migration (beyond the work detailed below) to the wider environmental philosophy community and (2) to justify the claim that urban residents are both uniquely situated, and have a *prima facie* ethical duty, to help mitigate the negative impacts of climate change, beyond the city limits. However,

¹⁴ Céline Bellard, Cleo Bertelsmeier, Paul Leadley, Wilfried Thuiller, and Franck Courchamp, “Impacts of Climate Change on the Future of Biodiversity,” *Ecology Letters* 15 (2012): 365–77 ; D. B. Botkin, H. Saxe, M. B. Araujo, et al., “Forecasting the Effects of Global Warming on Biodiversity,” *Bioscience* 57 (2007): 227–36.

¹⁵ Tingley et al., “Birds Track Their Grinnellian Niche through a Century of Climate Change.”

¹⁶ Thomas T. Moore, “Climate Change and Animal Migration,” *Environmental Law* 41, no. 393 (2011): 394–404.

¹⁷ Palmer and Larson, “Should We Move the Whitebark Pine?”

¹⁸ Samantha Noll, “Non-human Climate Refugees: The of Role of Agriculture for Ecological Resilience for a Changing Climate,” *Eursafe News* 19, no. 1 (2017): 10–12; FAO.org., “Wildlife in a Changing Climate,” <http://www.fao.org/docrep/015/i2498e/i2498e.pdf>

¹⁹ Cary Wolfe, *What is Posthumanism?* (Minneapolis: University of Minnesota Press, 2010); Kelly Oliver, *Animal Lessons: How They Teach Us to be Human* (New York: Columbia University Press, 2009).

before making this argument, it is important to briefly outline the current work environmental ethicists are doing in this area.

CURRENT WORK ON MANAGED RELOCATION

Today, work in environmental ethics on climate change induced nonhuman migration predominantly focuses on providing a theoretical apparatus that could help address ethical questions that arise during managed relocation projects. Here “managed relocation” (also known as “assisted migration”) should be understood as a conservation strategy that involves the transportation of species to different ecosystems prior to an anticipated climate range shift.²⁰ This strategy is highly contentious among ecologists and those working in conservation, as it raises several important ecological concerns that should be addressed prior to implementation. For this reason, Ben Minter and James Collins argue that “a more dynamic and pragmatic approach to ethical analysis and debate is needed.”²¹ In response, we have seen the sharp increase of work outlining decision-making frameworks that could help guide managed relocation projects²² and case-study analyses²³ intended to compliment this work. As both the decision to implement managed relocation projects and opposition to such projects are value-driven, work teasing out values guiding this conservation strategy and the ethical implications of such proposals are of importance. However, ethical issues concerning nonhuman climate refugees go well beyond managed relocation projects, as species are increasingly moving (on their own) with their climate niches to new areas, and in particular, the city.

THE CONTEXT OF THE CITY

This lack of theoretical work is troubling, especially in light of the research on species climate niche migration and the role that cities could play in the mitigation of harms. In particular, as cities uniquely impact the movement of nonhuman species refugees, I argue that residents could play an important role in potentially mitigating negative impacts *during the process of migration*. Indeed, as Marie

²⁰ Ben A. Minter and James P. Collins, “Move it or Lose it? The Ecological Ethics of Moving Species Under Climate Change,” *Ecological Applications* 20, no. 7 (2010): 1801–04.

²¹ *Ibid.*, p. 1801.

²² O. Hoegh-Guldberg, L. Hughes, S. McIntyre, D. B. Lindenmayer, C. Parmesan, H. P. Possingham, and C. D. Thomas, “Assisted Colonization and Rapid Climate Change,” *Science* 321 (2008): 345–46; D. M. Richardson, J. J. Hellmann, J. S. McLachlan, D. F. Sax, M. W. Schwartz, P. Gonzalez, E. J. Brennan, A. Camacho, T. L. Root, O. E. Sala, S. H. Schneider, D. M. Ashe, J. Rappaport Clark, R. Early, J. R. Etterson, E. Dwight Fielder, J. L. Gill, B. A. Minter, S. Polasky, H. D. Safford, A. R. Thompson, and M. Vellen. “Multidimensional Evaluation of Managed Relocation,” *Proceedings of the National Academy of Sciences USA* 106 (2009): 9721–24.

²³ Palmer and Larson, “Should We Move the Whitebark Pine?”

Tremblay and Colleen St. Clair argue, “urbanization represents a major threat to biodiversity world-wide because it causes permanent degradation and fragmentation of biologically rich natural communities.”²⁴ Even without taking climate change into account, habitat fragmentation and loss due to urban development are associated with extinction events and population declines of several native taxa, including birds,²⁵ arthropods,²⁶ and mammals.²⁷ In this context, one can infer that climate induced migration will only exacerbate this situation, as species are pushed to follow their ecological niches, regardless of whether urban areas are located between acceptable habitat within their range.

In fact, some biologists and ecologists worry that the levels of species currently going extinct due to climate change will significantly rise with the destruction of current habitat and if suitable habitat is made inaccessible by barriers, such as waterways, agricultural lands, and cityscapes.²⁸ These types of landscapes tend to produce interlocking areas of habitat not conducive for migration. For example, in contrast to wilderness areas, agricultural lands have historically been associated with the loss of biodiversity.²⁹ According to the Food and Agricultural Association of the United Nations in 2016, intensive crop cultivation creates “barriers (physical, chemical and ecological) [that] will prevent the natural movement of individual animals in the short term and prevent the gradual shift of populations of plants and small territorial animals in the medium term.”³⁰ Liberal usages of herbicides, pesticides, and other additives, when coupled with monocrop intensive farming, tend to produce areas that are not conducive for wildlife.³¹ These issues have led conservation scientists and ethicists to argue that agricultural management practices need to change so that agricultural areas are more conducive for migration.³² Likewise, as I argue below, urban contexts also have the potential to block migrations or provide aid, as refugees move through urban areas.

²⁴ Marie A. Tremblay and Colleen C. St. Clair, “Permeability of a Heterogeneous Urban Landscape to the Movements of Forest Songbirds,” *Journal of Applied Ecology* 48 (2011): 679–88.

²⁵ K. R. Crooks, A. V. Suarez, and D. T. Bolger, “Avian Assemblages along a Gradient of Urbanization in a Highly Fragmented Landscape,” *Biological Conservation* 115 (2004): 451–62.

²⁶ D. A. Holway and A. V. Suarez, “Homogenization of Ant Communities in Mediterranean California: The Effects of Urbanization and Invasion,” *Biological Conservation* 127 (2006): 319–326.

²⁷ Andrew J. Hansen, Richard L. Knight, John M. Marzluff, Scott Powell, Kathryn Brown, Patricia H. Guide, and Kingford Jones, “Effects of Exurban Development on Biodiversity: Patterns, Mechanisms, and Research Needs,” *Ecological Applications* 15 (2005): 1893–1905.

²⁸ Janneke Hille Ris Lambers, “Extinction Risks from Climate Change,” *Science* 348, no. 6234 (2015): 501–02; P.L. Zarnetske, D. K. Skelly, and M. C. Urban, “Bioetic Multipliers of Climate Change,” *Science* 336 (2012): 1516–18.

²⁹ Donald W. Macdonald, Eva M. Raebel, and Ruth E. Feber, “Farming and Wildlife: A Perspective on a Shared Future,” in Donald W. Macdonald and Ruth E. Feber, *Wildlife Conservation on Farmland* (Oxford: Oxford University Press, 2015), pp. 1–20.

³⁰ FAO.org., “Wildlife in a Changing Climate,” p. 31.

³¹ Macdonald et al., “Farming and Wildlife: A Perspective on a Shared Future.”

³² Ibid.; Samantha Noll, “Climate Induced Migration: A Pragmatic Strategy for Wildlife Conservation on Farmland,” *Pragmatism Today* 8, no. 2 (2017): 24–41.

When coupled with cityscapes (sans wildlife corridors and/or wilderness areas), agricultural lands' negative impacts for wildlife are problematic as, as approximately eleven percent of the world's land surface (13.4 billion hectares) is currently utilized for food production.³³ In the United States, "about half the landmass is used for agriculture [and] in the United Kingdom, the figure is forty percent."³⁴ In contrast, "around 4,002,828 hectares worldwide can be categorized as areas not habitable by humans and/or land set aside for preservation and recreation . . . [and in] the United States, only about twenty percent of land has been set aside for conservation or preservation."³⁵ Of these areas, J. L. McGuire et al. found that only forty-one percent still retain the connectivity necessary to facilitate non-human species migration. In the context of the United States, this means that approximately ten to twelve percent of land is currently useful for species migration.³⁶ As Noll argues, "while this percentage will fluctuate widely, depending on the country, if the United States is any indication, areas conducive for migrations may be seriously lacking."³⁷ While some species adapt quite well to agricultural areas (such as earthworms, blackbirds, deer, etc.) and cities (such as coyotes, deer, rats, and raccoons), these barriers could be harmful to a wide range of other species not able to traverse and/or adapt to the above contexts.

These and other challenges to migration have led P. L. Zarnetske et al. to argue that "many species face uncertain fates under climate change. Some will persist by shifting their range or adapting to local conditions, whereas others will be lost to extinction."³⁸ While this doesn't necessarily mean that specific species will migrate, it appears that when ecological niches shift, the following options are available to species: to adapt, migrate, or go extinct. This may be an overly simplistic understanding of the situation. However, if climate induced migration is exacerbating extinction events and urban residents have the ability to limit the negative impacts of climate induced migration on species (thus helping to reduce extinction events), then one could argue that they have a moral duty to do so. Urban residents could play an important role in potentially mitigating larger ecological impacts of climate change. If this is the case, then ethical work needs to be in place to help motivate and guide such action in cityscapes. In this vein, the following section of the paper

³³ Jelle Bruinsma, ed., *World Agriculture: Towards 2015/2030: An FAO Perspective* (London: Earthscan Publications, 2003), <http://www.fao.org/3/a-y4252e.pdf>.

³⁴ Paul B. Thompson, *The Agrarian Vision: Sustainability and Environmental Ethics* (Lexington,: University Press of Kentucky, 2010).

³⁵ Noll, "Climate Induced Migration: A Pragmatic Strategy for Wildlife Conservation on Farmland," p. 26.

³⁶ J. L. McGuire., J. J. Lawler., B. H. McRae., T. A. Nuñez, and D. M. Theobald. 2016. "Achieving Climate Connectivity in a Fragmented Landscape," *Proceedings of the National Academy of Science USA* 113, no. 26 (2016): 7195–7200.

³⁷ Noll, "Climate Induced Migration: A Pragmatic Strategy for Wildlife Conservation on Farmland," p. 26.

³⁸ Zarnetske, "Bioetic Multipliers of Climate Change," p. 1516.

explores whether (a) humans have a moral duty to mitigate the impacts of migration, or (b) if we have an ethical duty to take these impacts into account.

AN ETHICAL ARGUMENT FOR ASSISTING NONHUMAN CLIMATE REFUGEES

According to Peter Atkins,³⁹ since the birth of the “modern city” in the nineteenth century, nonhuman animals were roughly placed into the four following categories: (1) useful animals, such as those used for food production, transportation, etc.; (2) wild animals that bring enjoyment, such as song birds and those in zoos; (3) companion animals, or those that can live in the human home, such as dogs and cats; and (4) pest animals or those that transgress human boundaries, such as rats and cockroaches. While this schema focuses on animals and one could critique it as flawed or overly simplistic (song birds could be placed in two categories, for example), Atkin’s categorizations illustrate a basic tension between species that are conceptualized as a part of the urban environment and those that are seen as interlopers or invasive. This is particularly the case when “wild” species move into populated areas, be those plant varieties (garlic mustard in Lansing) or animal species (the Asian carp in Chicago). Diane Michelfelder has gone so far as to argue that “when wildlife members reproduce and become abundant within urban settings, they are more often than not viewed as intrusive, as making cities less “livable” for (human) others.”⁴⁰ This, in turn, causes tension, as the newly labeled “invasive,” “pest,” or “intrusive” interloper is removed, thus physically reestablishing the boundary between wild and urban.

Due to this tension, as early as 2003, Michelfelder explored how we could balance the increase in the density of humans in urban areas with a “greater abundance” of wildlife moving into cityscapes for the benefit of all.⁴¹ She ends by challenging city management and land-use planning professionals to take wider impacts on nonhumans into account when making decisions. In short, she challenges urban policy makers to value wildlife populations in cityscapes and make “ethical management” decisions accordingly. This challenge appears to be more pressing today, as climate change pushes greater numbers to and through cityscapes. However, it is important to note here that public policy and policy makers are not working in an environmental ethical vacuum.

In addition to the human-centric ethic critiqued by Michelfelder, Christine Reed argues that “the environmental ethics underlying public policies and public debate are often cast in terms of a dichotomy between ethical holism [or environmental holism], preserving nature as self-sustaining ecosystems, versus ethical individualism

³⁹ Peter Atkins, *Animal Cities: Beastly Urban Histories* (Burlington: Ashgate Publishing, 2012).

⁴⁰ Diane P. Michelfelder, “Valuing Wildlife Populations in Urban Environments,” *Journal of Social Philosophy* 34, no. 1 (2003): 80.

⁴¹ *Ibid.*

[or environmental individualism], protecting the welfare of individual animals.”⁴² While this analysis largely focuses on debates concerning wild animals in rural areas, both positions have been used to defend urban management strategies, such as the argument to increase the diversity of tree species and genera in urban areas to promote environmental stress resistance⁴³ and the argument that wildlife corridors are necessary for species flourishing, as they control the dispersal of animals within and beyond city limits.⁴⁴

As environmental individualism and environmental holism are at least cursorily established in current policy circles, I use these frameworks as starting points from which to explore the ethical aspects of nonhuman climate refugees. In addition, as the potential extinction of species is a key element of climate change impacts, the analysis will also include a discussion of ethical associations concerning species. Specifically, the next section of the paper explores the following question: when viewed from these positions, do we have an ethical duty to help alleviate the negative impacts of nonhuman migration in the context of climate change? To answer this question, I will first turn to environmental individualism, before applying environmental holism and ending with a discussion concerning species. This section ends with the argument that all three frameworks provide justifications to support the mitigation of negative impacts of nonhuman climate migration. However, it should be noted that the analysis below is purposefully broad, as the general purpose of this essay includes the twin goals of bringing attention to nonhuman climate migration and to providing a basic argument that urban residents have a *prima facie* duty to help. Important work could be conducted using each of the specific ethical approaches discussed under the wider categories of environmental holism, environmental individualism, and species ethics below. This fine analysis is beyond the scope of this paper, but will hopefully grow from this initial treatment.

While there are a wide range of individual focused ethics, the most prominent approach concerning nonhumans consists of theorists arguing that nonhuman others have a specific capability (be that consciousness, the ability to suffer, to lie, etc.) that places them in the ethical sphere.⁴⁵ After which, the theorists apply specific ethical theories (such as utilitarianism, rights theory, virtue ethics, feminist care ethics, etc) to ethical questions, modifying these so that they can be used to guide action in human-animal contact zones. Depending on which individual focused ethic (that gives equal consideration to nonhuman others) you apply, ethical concerns

⁴² *Ibid.*; Christine M. Reed, “Wild Horse Protection Policies: Environmental and Animal Ethics in Transition,” *International Journal of Public Administration* 31, no. 3 (2008): 278.

⁴³ Henrik Sjöman, Andrew D. Hiron, and Nina L. Bassuk, “Urban Forest Resilience Through Tree Selection—Variation in Drought Tolerance in Acer,” *Urban Forestry and Urban Gardening* 14 (2015): 858–65.

⁴⁴ H. A. Aziz and M. H. Rasidi, “The Role of Green Corridors for Wildlife Conservation in Urban Landscape: A Literature Review,” *IOP Conference Series: Earth and Environmental Science* 18, no.1 (2014): 1–7; Tremblay and St. Clair, “Permeability of a Heterogeneous Urban Landscape to the Movements of Forest Songbirds.”

⁴⁵ Claire Palmer, *Animal Ethics in Context* (New York: Columbia University Press, 2010).

associated with species migration could include issues related to animal suffering,⁴⁶ the violation of rights,⁴⁷ the inability of nonhuman others to meet their needs or to achieve telos,⁴⁸ etc. For example, Singer's animal ethic includes an argument that suffering has special moral importance and all beings who have this capacity should be included in the utilitarian calculus. Additionally, Regan's animal rights ethic is built on the claim that most mammals are subjects of a life, meaning that they "can want and prefer things, believe and feel things, and recall and expect things" and thus focuses on whether or not the interests of individuals are being respected.⁴⁹ In contrast, Nussbaum's capabilities approach⁵⁰ heavily relies on conceptions of what it means for animals to "flourish" and focuses on cultivating such flourishing in nonhuman others.⁵¹

As climate induced migration could potentially cause suffering, undermine the interests of those migrating (such as the desire to nest), and negatively impact individual flourishing, one could use individual focused ethics to support (a) the stronger claim that humans have a moral duty to mitigate the impacts of migration, or (b) the weaker claim that we have an ethical duty to take these impacts into account, depending on which ethic you adopt. However, as discussed above, it is important to remember that environmental individualist positions predominantly start from the position that nonhuman individuals should be considered during ethical decision making. From this starting point alone, one could argue that the plight of nonhuman climate refugees should be included in public debate and/or policies aimed at addressing a wide range of impacts at the local level that are a part of larger climate change action plans. However, individual focused ethics would prioritize helping the refugees, themselves, rather than prioritizing ecosystem health or species.

Turning to an environmental holist perspective, I argue that policy makers adopting this position would also support either the strong or weak position above, depending on which individual ethic is employed. Roughly, environmental holism moves away from placing the locus of ethical import on the individual and, instead, prioritizes the ecosystem, as the world could be intrinsically good "even if there were no sentient beings to enjoy it."⁵² For example, Callicott ascribes to a form

⁴⁶ Peter Singer, *Animal Liberation: The Definitive Classic of the Animal Movement* (New York: Harper Perennial Modern Classics, 2009).

⁴⁷ Tom Regan, *The Case for Animal Rights* (Berkeley: University of California Press, 2004).

⁴⁸ Bernard E Rollin, *Farm Animal Welfare: Social, Bioethical, and Research Issues* (Ames: Iowa State University, 1995).

⁴⁹ Regan, *The Case for Animal Rights*, p. 209.

⁵⁰ Martha C. Nussbaum, *Frontiers of Justice: Disability, Nationality, Species Membership*. (Cambridge: Belknap Press, 2007).

⁵¹ Palmer, *Animal Ethics in Context*.

⁵² G. E. Moore, *Principia Ethica* (Cambridge: Cambridge University Press, 1903); Reed, "Wild Horse Protection Policies: Environmental and Animal Ethics in Transition"; Kristin Shrader-Frechette, "Individualism, Holism, and Environmental Ethics," *Ethics and the Environment* 1, no. 1 (1996): 57.

of environmental holism in which he, drawing from Leopold,⁵³ argues that we should place the welfare of the biotic community above the individual, as “in the last analysis, ‘the integrity, beauty, and stability of the community’ is the measure of right and wrong actions affecting the environment.”⁵⁴ If we ascribe ethical primacy to the biotic community, then the impacts of climate change on ecosystems is particularly problematic. Thus, an environmental holist would also support both claims, but for different reasons, as they would prioritize overall ecosystem health, rather than the flourishing of individual animals.

This shift in focus to species brings us to the final framework discussed in this paper. In particular, I argue that one could also support the strong and weak claim above utilizing a species ethics framework. It should be noted here that the ontological and ethical status of species is controversial in philosophy of biology, environmental philosophy, and ethics.⁵⁵ Biologists and philosophers of science such as Ronald Sandler and Marc Ereshefsky disagree on how we should define the term *species* and the ontological status of this category, while ethicists such as Russell Powell and Eugene Hargrove hold conflicting positions concerning whether we should place species within the ethical sphere.⁵⁶ These wider discussions are important as “species are the fundamental taxonomic units of biological classification. Environmental laws are framed in terms of species. Even our conception of human nature is affected by our understanding of species.”⁵⁷ In the context of the city, everything from sustainability plans and local policies to urban planning could be impacted by how we define species and what ethical weight we place on this category.

Due to the focus of this paper, ethical valuations of species are of particular importance. In this vein, species could be given various types of ethical values, including but not limited to intrinsic value, extrinsic non-instrumental value, and instrumental ecological value.⁵⁸ For those who argue that species are intrinsically valuable, a morally considerable being is one that has interests that stem from the intrinsic value of the nonhuman other in question.⁵⁹ The intrinsic value status of a being is usually connected to having a specific capacity, such as personhood, goal-directedness, sentience, etc. As species are loosely connected meta-populations,

⁵³ Aldo Leopold, *A Sand County Almanac* (New York: Ballantine Books, 1968).

⁵⁴ J. Baird Callicott, *In Defense of the Land Ethic: Essays in Environmental Philosophy* (Albany: State University of New York, 1989), p. 58.

⁵⁵ Marc Ereshefsky, “Species,” in Edward N. Zalta, ed., *The Stanford Encyclopedia of Philosophy* (Fall 2017 edition), <https://plato.stanford.edu/archives/fall2017/entries/species/>; Ronald L. Sandler, *The Ethics of Species: An Introduction* (Cambridge: Cambridge University Press, 2012).

⁵⁶ Ereshefsky, “Species”; Sandler, *The Ethics of Species*; Russell Powell, “On the Nature of Species and the Moral Significance of their Extinction,” in Tom L. Beauchamp and R. G. Frey, eds., *The Oxford Handbook of Animal Ethics* (Oxford: Oxford Press, 2011), pp. 603–27; Eugene Hargrove, “Weak Anthropocentric Value,” *The Monist* 75 (1992): 119–37.

⁵⁷ Ereshefsky, “Species,” p. 1.

⁵⁸ Powell, “On the Nature of Species and the Moral Significance of their Extinction.”

⁵⁹ Regan, *The Case for Animal Rights*, p. 39.

it is difficult to visualize how species have the above capacities.⁶⁰ Due to this complication, ethicists have argued that we could apply group rights to species or recognize the fact that damage to a group entails damage to individuals. Other ethicists draw from the work of Korsgaard to argue that species have “extrinsic non-instrumental value.”⁶¹ This type of valuation collapses the dualism between instrumental and intrinsic valuation, by arguing that species could be both useful in themselves and have useful properties. As Powell argues, “Coming to appreciate the extraordinary evolutionary journey of a species is meaningful in and of itself, even if it does not lead to other valuable information or ends.”⁶² This information is also instrumentally valuable for humans, as it situates the human species in a larger evolutionary context. Finally, readers of this paper are probably most familiar with instrumental ecological value. This is the view that species have instrumental value, in so far as they provide resources (such as food, fiber, and fuel) that are useful for humans and contribute to “ecosystem services” (such as water filtration, carbon sequestering etc.) that humans need to survive.⁶³

There are currently heated debates in the literature on the finer points of valuing species, from the irreducibility of species, to the value of higher taxa. With this being said, if one accepts the position that species have value, be that intrinsic, extrinsic non-instrumental, or instrumental ecological, then one could argue that humans have moral duties to help mitigate species extinctions (though which species we should focus on is a larger discussion beyond the scope of this paper). As the inability of species to migrate is connected to extinctions, we could then make additional arguments that align with the strong and weak claims above.⁶⁴ Specifically, we could argue from this position that humans have a moral duty to mitigate the impacts of migration, as this will reduce the number of extinctions. From this position the weaker claim is entailed in the first as taking impacts to species into account when making decisions is imperative for mitigating impacts.

Thus, policy makers and members of the public using an environmental individualist, environmental holist, or species ethics framework could support (a) the stronger claim that humans have a moral duty to mitigate the impacts of migration, or (b) the weaker claim that we should take these impacts into account. However, those holding these disparate frameworks would support the claims for distinct reasons, as individualists prioritize individual animal flourishing, while holists focus on overall ecosystem system health, and nonhuman centered speciesists’

⁶⁰ Ronald L. Sandler, *The Ethics of Species: An Introduction* (Cambridge: Cambridge University Press, 2012).

⁶¹ Christine M. Korsgaard, *The Sources of Normativity* (Cambridge: Cambridge University Press, 1996); Powell, “On the Nature of Species and the Moral Significance of their Extinction,” p. 611.

⁶² Powell, “On the Nature of Species and the Moral Significance of their Extinction,” p. 612.

⁶³ M. R. Felipe-Lucia and F. A. Francisco, “Ecosystem Services- Biodiversity Relationships Depend on Land Use Type in Floodplain Agroecosystems,” *Land Use Policy* 46 (2015): 201–10; Sandler, *The Ethics of Species: An Introduction*.

⁶⁴ Zarnetske, “Bioetic Multipliers of Climate Change,” p. 1516.

goal is to ensure that meta-populations, as whole, do not disappear. It is beyond the scope of this paper to explore these conflicts further, however, it is important to note that these different priorities have the potential to cause conflict concerning the aim and design of on-the-ground initiatives. In fact, some projects may be in direct conflict with one another, such as those that could potentially prioritize the flourishing of individual beings (such as mustard grass, Asian carp, wild cats, or lionfish) that, also, may be problematic ecologically, as they are invasive species. In addition, as problems associated with nonhuman climate refugees are at least partially the result of climate change, this analysis would be remiss if it did not at least cursorily mention current ethical frameworks used in this literature. In general, work in climate change ethics focuses on a wide range of concerns from the political, governmental, and economic to the social and moral.⁶⁵ Even with this wide range of approaches, however, ethical questions concerning climate change are often framed in terms of global justice, with ethical analysis occurring at the level of international politics and state action.⁶⁶ According to Dale Jamieson, “activists and leaders from developing countries often speak of climate change as an injustice that rich countries inflict on poor countries.”⁶⁷ This, in turn, has been used as a justification for adopting a virtue-based ethic such as that of Jamieson or a global citizenship ethic such as that of D’Olimpio and O’leary.⁶⁸ While the justice approach has been, and continues to be, problematized and defended, this cursory analysis illustrates the important role that justice frameworks play in current climate change debates.⁶⁹

From a justice perspective, one could push back on the above application of individual and holistic ethics, arguing that, if climate change is an injustice perpetrated against the locally and globally most vulnerable, then we have a special moral duty to impacted human populations. Thus, city action plans are responding in an ethical manner when they focus lessening the impacts of climate change on both vulnerable global populations (through the reduction of greenhouse emissions) and local populations situated in such a way as to bear the brunt of the consequences of a changing climate. When one takes wider historical and justice contexts into account, work aimed at mitigating the suffering of nonhuman climate refugees would only serve to take precious resources away from this larger ethical mandate. This counterargument is problematic for two reasons. First, it assumes that humans

⁶⁵ L. D’Olimpio and M. J. O’Leary, “The Ethical Considerations of Climate Change: What Does It Mean and Who Cares?” *Australian Quarterly* 84, no. 1 (2013): 10–32.

⁶⁶ Paul Clements, “Rawlsian Ethics of Climate Change,” *Critical Criminology* 23, no. 4 (2015): 461–71; Dale Jamieson, *Reason in a Dark Time: Why the Struggle against Climate Change Failed—and What It Means for Our Future* (Oxford: Oxford University Press, 2015).

⁶⁷ Jamieson, *Reason in a Dark Time*, p. 194.

⁶⁸ Jamieson, *Reason in a Dark Time: Why the Struggle Against Climate Change Failed—and What It Means for our Future*; D’Olimpio and O’Leary, “The Ethical Considerations of Climate Change.”

⁶⁹ D’Olimpio and O’Leary, “The Ethical Considerations of Climate Change”; D. Mittler, “The Changing Ethics of Climate Change,” *Ethics and International Affairs* 28, no. 3 (2014): 351–58.

are separate from the environments within which they live. As a loss of biodiversity could translate into the reduction or disruption of ecological services,⁷⁰ it is shortsighted to ignore these larger environmental impacts. Second, if we expand the justice framework to include displaced species and apply it to the above analysis, then one could argue that humans have reaped the benefits of fossil fuel use at the expense of other species and ecosystems, which have taken on a disproportionate amount of the risks. When using this lens, ethical issues associated with (1) ecosystem restoration; (2) the mitigation of negative impacts; and (3) increasing nonhuman access to environmental goods would all come to the ethical forefront. Third, local communities and policy makers could, in fact, choose to organize efforts in such a way that human impacts are brought to the forefront. However, this does not necessarily violate (a) the stronger claim that humans have a moral duty to mitigate the impacts of migration or (b) the weaker claim that we should take these impacts into account. Policy decision making is not a zero-sum game, as small changes, such as creating wildlife corridors, connecting green-spaces, and utilizing green-roofs, etc. could be used for dual purposes (benefitting both humans and nonhumans) and help provide passage for nonhuman migrants through urban areas.⁷¹ In short, the decision to focus on mitigating effects on human populations does not mean that we cannot also work toward addressing ecological impacts. These decisions are highly contextual and will have to be made by citizens and policy makers on the ground.

CASE STUDY: LIVABLE CITIES OF ALL SPECIES

In this paper, I have presented the argument that urban residents have the potential to play a key role in helping to ensure the migration of nonhuman climate refugee populations. If this is the case, then further questions need to be addressed. Specifically, (1) what urban residents is this paper referring to and (2) what would efforts aimed at this goal look like on the ground? There are a wide range of case-studies coming out of urban ecology, human geography, and related fields that can help provide answers to these two questions. For example, in the essay “The Politics of Providing for Nature in Cities,” Michael Houck explores how regional planners in the contexts of Europe and the United States are helping to create more sustainable cities by adopting holistic and ecologically focused approaches to planning.⁷² This shift in planning priorities largely “emanated from the European Union whose 1990 *Green Paper on the Urban Environment* called for “more integrated, holistic approaches to planning, and the need to view cities as a necessary part of the solution

⁷⁰ Felipe-Lucia and Francisco, “Ecosystem Services.”

⁷¹ Aziz and Rasidi, “The Role of Green Corridors for Wildlife Conservation in Urban Landscape.”

⁷² Michael C. Houk, “In Livable Cities is Preservation of the Wild: The Politics of Providing for Nature in Cities,” in Ian Douglas, David Goode, Mike Houck, and David Maddox, eds., *The Routledge Handbook of Urban Ecology* (New York: Routledge, 2010), pp. 48–62.

to global environmental problems.”⁷³ In this vein, the *European Sustainable Communities* report declared, “The city must be viewed as a complex, interconnected and dynamic system. Cities are both a threat to the natural environment and an important resource in their own right.”⁷⁴ These papers amounted to a call to action that spurred regional planners in the EU to better incorporate ecological goals into larger city planning ventures.

The result of this work is an increase in the adoption of conservation planning tools, such as green wedges and wildlife corridors, with the intended purpose of delivering “increasingly densely developed landscapes while simultaneously becoming more environmentally sustainable.”⁷⁵ Examples include Amsterdam, where green wedges have been used to balance access to nature with other planning goals, and the German city of Freiburg, where green wedge action plans were implemented to integrate natural areas into cityscapes.⁷⁶ Finally, according to Houk, the city of Helsinki has also “incorporated myriad nature oriented programs including nature preserves, important bird, amphibian, reptile, and bat areas, areas of oral interest, and protected habitats.”⁷⁷ Here “green wedges” should be understood as an alternative to “green belts,” or girdles of natural areas around a city that are often of limited use to human residents. Specifically, green wedges can be defined as thin “fingers” or corridors of open space that span from the countryside to the heart of cities in order to provide interconnected networks of greenspace across urban areas that are managed by community members.⁷⁸

This definition highlights two key actors that are necessary for incorporating natural areas into cityscapes: (a) regional planners and (b) community members and/or groups that help to manage urban green space. The work of regional planners has the potential of shifting the design of cityscapes to provide the possibility of integrating green spaces and corridors, while community members and groups actively work to further design and maintain these green areas. The Wildlife Conservation Society’s Mannahatta Project (based at the Bronx Zoo) is an excellent example of a grassroots urban ecological initiative, as well as the New York City High Line project, which transformed the New York Central Railroad into an elevated linear park and greenway.⁷⁹ Thus, both city planners and a multiplicity of urban residents, from planners to nongovernmental organizations, and educational

⁷³ Archive of European Integration (AEI), “Green Paper on the Urban Environment,” 27 June 1990, p. 49, <http://aei.pitt.edu/1205>.

⁷⁴ Timothy Beatley, *Green Urbanism, Learning from European Cities* (Washington D.C.: Island Press, 2000), p. 16.

⁷⁵ James P. Evans, “Wildlife Corridors: An Urban Political Ecology,” *Local Environment* 12, no. 2 (2007): 132.

⁷⁶ Houk, “In Livable Cities is Preservation of the Wild”; Beatley, “Green Urbanism, Learning from European Cities.”

⁷⁷ Houk, “In Livable Cities is Preservation of the Wild,” p. 49.

⁷⁸ Ian Lindley, Landscape Institute, “Green Belt vs. Green Wedge,” <https://www.landscapeinstitute.org/blog/green-belt-vs-green-wedge>; Fabiano Lemes de Oliveira, “Green Wedges: Origins and Development in Britain,” *Planning Perspectives* 29 (2014): 357–79.

entities, all have the potential to play an important role in helping to ensure the migration of nonhuman climate refugee populations through cityscapes, as green wedges and corridors could successfully be incorporated into urban design and maintained by residents. The two examples of community projects in New York, as well as the three European cities discussed in the previous paragraph, are concrete examples of form that such initiatives could take on the ground, as an ethical mandate is translated into community action.

CONCLUSION

Cities play an important role in climate change adaption and mitigation efforts.⁸⁰ In the context of the United States, cities, such as San Francisco and Chicago, are increasingly adopting “sustainability” or “climate change” action plans that are often aimed at stemming the global phenomena and addressing a wide range of impacts at the local level. While these projects are laudable, arguably, the majority focus on reducing emissions and lessening the consequences of climate change for human populations. However, regardless of whether emissions are stemmed in the near future, individual changes are currently accumulating and being amplified more broadly. “[Impacts that] have been observed across genes, species, and ecosystems to reveal a world already undergoing substantial change.”⁸¹ In this paper, I have argued that urban residents have the potential to play a key role in helping to ensure ecological resilience of ecosystems beyond the city, as they can help ensure the migration of nonhuman climate refugee populations. After which, I defended the ethical position that policy makers and members of the public using each of the frameworks could support (a) the stronger claim that humans have a moral duty to mitigate the impacts of migration, or (b) the weaker claim that we should take these impacts into account.

With a wide range of keystone species currently being threatened, the urban landscape may have to shift from an area characterized by interspecies conflicts, to one that plays an important role in mitigating species loss and thus helping to ensure ecological resilience. How best to do that, however, will have to be determined by citizens, scientists, and policy makers on the ground. My purpose in this paper was not to provide the answers to these questions, but simply to put forth an ethical argument that urban residents are not divorced from larger ecological discussions. Cities have an important role to play in both mitigating climate change and ensuring ecological resilience of “wilderness” areas and ecosystems well beyond the city street.

⁷⁹ Eric W. Sanderson, *Mannahatta: A Natural History of New York City* (New York: Harry N. Abrams, 2013); Joshua David and Robert Hammond, *High Line: The Inside Story of New York City's Park in the Sky* (New York: FSG Originals, 2011).

⁸⁰ Kousky and Schneider, “Global Climate Policy: Will Cities Lead the Way?”; Rosenzweig, “Cities Lead the Way in Climate-Change Action.”

⁸¹ Scheffers et al., “The Broad Footprint of Climate Change from Genes to Biomes to People.”