Greenways for Climate Adaptation: Avoiding the 'Green Paradox' while Improving Urban Resiliency

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Abstract

Greenway planning and design is an important approach to climate adaptation in urban areas. In this paper we bring together literature on green gentrification, climate adaptation, and equity in an early exploration of equity issues specific to urban greenways for climate adaptation ('adaptation-greenways'). Similar to environmental risks and green space access, impacts of climate change are distributed unevenly across urban space. Climate-vulnerable communities are often minority- and lower-income neighborhoods. Greenways can redress existing inequities ('pre-equity issues') by providing green space access and climate adaptation benefits in vulnerable communities. Recent projects demonstrate that greenways, while redressing existing inequities, can introduce new inequities ('post-equity issues') at the same time. This is the 'green paradox', where poor initial site conditions underlying existing inequities in minority- and lower-income neighborhoods can give rise to intense price and development pressure when these areas are revitalized by urban greening. As a consequence, greenways may lead to 'green gentrification' when urban greening creates increased property values and risk of exclusion and displacement. While less explored to date, urban greenways for climate adaptation may yield similar outcomes when improved resilience brings increases in property value, the benefit of which does not accrue to existing residents. The very neighborhoods that need resiliency investment to redress past environmental harms and prevent increased vulnerability are the same ones whose residents may be concerned about being priced out as improvements increase the market value of the newly-safer properties. Green-gentrification literature provides preliminary suggestions of practical steps that can be taken to address the 'green paradox'. We assess whether the same strategies are likely to apply when greenways are planned for climate adaptation. This is worth investigating, because adaptation-greenways may require differences in the needs of design. We conclude with a summary of considerations for future adaptation-greenway planning and design.

Introduction

> *As adaptation investments are planned, complex equity issues can arise. East Boston, for instance, is a relatively poor neighborhood with long-standing minority businesses and residents. It is also, and not unrelatedly, the area of the city that is most at risk for coastal climate change such as flooding from sea level rise (even on 'blue sky' days), as well as from more intense hurricanes (City of Boston 2016). The City of Boston is working on designing adaptation options for this area, including adding waterfront greenway parks (City of Boston 2017a). At workshops, residents reported they were equally or more concerned about the potential displacement pressures from gentrification resulting from adaptation investments as compared to concerns*

regarding the actual climate impacts in their unprotected neighborhood (City of Boston 2017b; Hamin Infield 2017).

In other words, green gentrification concerns could halt adaptation actions. It seems obvious that this cannot be the answer: to just leave poor communities vulnerable to longer-term climate-based displacement so that they are not vulnerable to near-term property-value-based displacement. Sorting out and preparing for the complexity of equity issues will be an important role for planners and designers.

We know that as climate change and disruption increases over the next decades, our cities can expect more intense heat waves, storms, and precipitation, among other risks (IPCC 2014). Urban areas need to adapt in order to be more climate resilient. Greenway planning and design is an important approach to climate adaptation in urban areas (Rouse and Bunster-Ossa 2013). In the right place and with the right design, linear green space can assist in reducing climate impacts in cities. Greenways providing tree cover may provide shade and reduce ambient temperatures in nearby residences leading to reduced cooling needs and thus reduced GhG emissions; lower indoor temperatures may reduce morbidity and mortality from heat waves; on a daily basis, cooler temperatures may improve quality of life. Greenways may also function as 'sponges', absorbing floodwater and slowing the sheet flow after intense rain (Rouse and Bunster-Ossa 2013). In this paper we term greenways designed specifically to assist in reducing exposure to climate change hazards as '*adaptation-greenways*', to differentiate them from greenways without this adaptation objective and also to differentiate them from more spatially dispersed and typically non-contiguous urban greening policies.

Adaptation-greenways which improve resiliency can also be important moves toward more equitable cities. Lower-income and minority neighborhoods tend to be underserved in urban greening and access to greenways and tend to be located in areas that may be more vulnerable for environmental and climate risks (Gould and Lewis 2018; Wolch, Byrne, and Newell 2014; Chu, Anguelovski, and Robert 2017; Cutter and Finch 2008). Greenways offer the possibility of providing benefits in terms of green space and climate adaptation while addressing problems of environmental justice and equity at the same time.

There is a rising concern, however, that any sort of environmental improvements can result in property value increases that push existing residents out of their neighborhoods. A process of 'green gentrification' manifests when increased property values lead to exclusion and displacement of residents as a result of urban greening (Anguelovski et al. 2018; Gould and Lewis 2018; Wolch, Byrne, and Newell 2014). The most drastic US example is the High Line in New York, which is believed to have led to a 103% increase in property values between 2003 and 2011, despite the recession (New York City Economic Development Corporation 2011 by Wolch, Byrne, and Newell 2014).[1] As a newly developed urban park, the High Line not only became an extremely (perhaps excessively) popular tourist attraction but also "an anchor for the super-gentrification (Lees 2003) of western Chelsea" (Loughran 2014, 50).

Wolch, Byrne, and Newell (2014, 234) call this phenomenon the 'urban green space paradox':

"(W)hile the creation of new green space to address environmental justice problems can make neighborhoods healthier and more esthetically attractive, it also can increase

[1] A note of caution, however: the article did not report that they had differentiated the increase in value from overall market forces and the increase in value from this investment in particular.

housing costs and property values. Ultimately, this can lead to gentrification and a displacement of the very residents the green space strategies were designed to benefit."

This paradoxical effect of urban green space has led various researchers to advocate caution in urban greening initiatives, further developed by the strategy of 'just green enough' (Curran and Hamilton 2012; Wolch, Byrne, and Newell 2014). In line with the example of East Boston, greenways for climate adaptation could also be surrounded by concerns and caution, on the grounds that the increases in property value that ensue are worse for residents than the (expected) climate risk itself. In this paper, therefore, we explore greenways for climate adaptation: How to avoid the 'green paradox' while improving resiliency?

Goals, Objectives, and Methods

In order to answer the question above, we (1) explore equity concerns and reported cautions related to greenways and climate adaptation. Our main method is literature review, we summarize our findings in the *Background and Literature Review* section. In the *Results* section we (2) highlight practical steps that have been promoted in the green-gentrification literature (without the adaptation objective) to address the 'green paradox'. Next, we assess whether these strategies seem likely to apply when greenways are planned for climate adaptation. Together with this assessment, we discuss our assumption that differentiating factors are at stake when adaptation is the main objective of greenway planning and design in the *Discussion and Conclusion* section. In the same section, we (3) conclude with a summary of considerations for future research, planning and design.

Background and Literature Review

In this section we explore equity concerns and cautions related to greenways and climate adaptation. We mainly focus on equity concerns related to green gentrification. Since we are interested in adaptation-greenways, we include literature on equity impacts of climate adaptation and climate gentrification in our review. Instead of creating a full overview of these key concepts, the main purpose of this review is to bring together literature on green gentrification, climate adaptation, and equity.

Equity concerns

In order to better understand equity concerns related to greenways and climate adaptation, we distinguish between 'pre-adaptation equity issues' and 'post-adaptation equity issues.' Existing equity issues which greenway and climate adaptation interventions seek to address, we call '*pre-equity issues*' ('pre' in terms of prior to intervention). In contrast, '*post-equity issues'* are equity issues resulting out of greenway and adaptation interventions (see Figures 1 and 2).

Pre-adaptation equity issues. One way to frame greenways in general and more specific greenways for climate adaptation, is to frame greenways as moves toward more equitable cities. Literature on urban greening confirms how access to and benefits from green space is unevenly distributed in urban areas (Wolch, Byrne, and Newell 2014). In their article, Wolch, Byrne, and Newell (2014, 234) describe the fact that "many US minority communities lack green space access". Anguelovski et al. (2016) and Mohai, Pellow, and Roberts (2009), among others, summarize literature on environmental justice showing how vulnerable neighborhoods also have to deal with environmental risks. By planning greenways, a variety of existing inequities in cities can be addressed.

An additional layer of concern has been added by linking the concepts of environmental justice and climate change, recognizing that already-vulnerable communities are often the ones that are most climate-vulnerable as well (Mohai, Pellow, and Roberts 2009; Douglas et al. 2012). Similar to urban green space and environmental risks, the impact of and capability to respond to climate change are distributed unevenly (Cutter and Finch 2008; Morello-Frosch et al. 2009).

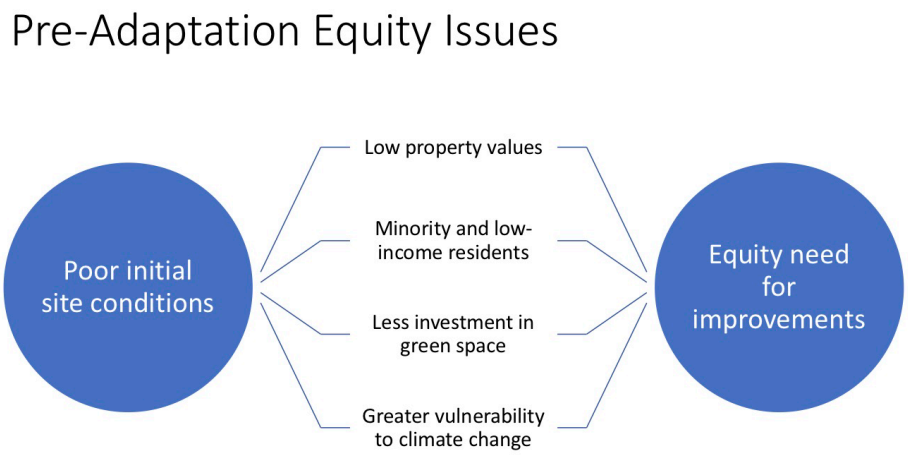

Figure 1: Pre-Adaptation Equity Issues

Post-equity issues. By introducing the concepts of 'green gentrification' and the 'urban green space paradox', urban-greening literature acknowledges the paradoxical fact that green investments can introduce unwanted outcomes as well as the wanted ones. Gould and Lewis (2018, 13) describe how the concept of green gentrification "grows out of literature on environmental injustice showing that the environmental 'bads' in society, such as toxic pollutants and locally unwanted land uses, are disproportionately found in minority and poor neighborhoods." This concept of green gentrification leads Wolch, Byrne, and Newell (2014) to emphasize the paradoxical effects of urban greening by coining the concept of the 'urban green space paradox', referring to urban green space strategies which: "If they are successful from the perspective of urban residents and businesses, they may ultimately exclude those whose need for access is most acute" (Wolch, Byrne, and Newell 2014, 239).

More recently, Keenan, Hill, and Gumber (2018) introduced a theory of 'climate gentrification' which captures the process by which the impact of climate change and climate adaptation leads to gentrification. Similar to standard greenway investments, property values may increase as a consequence of investments in the engineered resilience of buildings and infrastructure, leading to the displacement of the very populations the action was supposed to benefit (Keenan, Hill, and Gumber 2018). As such, greenway and adaptation interventions can lead to post-equity issues, as summarized by the article of Anguelovski et al. (2016, 345) which highlights how:

> *"adaptation interventions can reinforce historic trends of socioeconomic vulnerability, compound patterns of environmental injustice, and create new sources of inequity."*

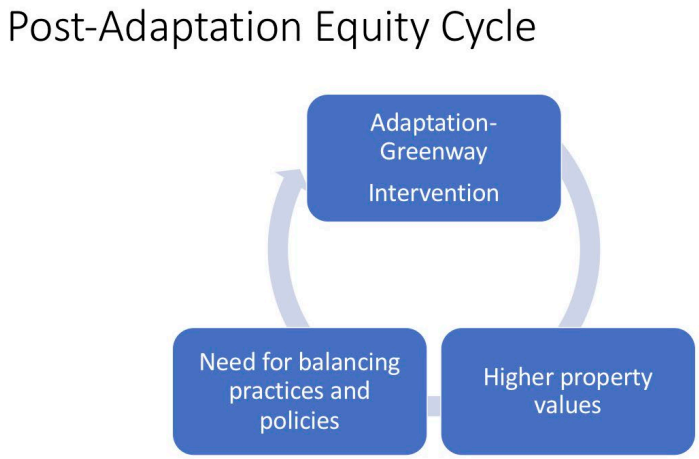

Figure 2: Post-Adaptation Equity Cycle

Reflection: Advocates of caution

The field of climate change planning is in the preliminary stages of being connected to literature on environmental justice and green gentrification, and green gentrification is itself a relatively new term. Nevertheless, authors are coming out strongly regarding risks of gentrification from greening and adaptation projects. Focusing on urban greening in general, Gould and Lewis (2018, 14) take a strong position, arguing that: "Urban greening through the creation or restoration of an environmental good increases environmental inequality in the absence of policy intervention." Connecting to adaptation, Anguelovski et al. (2016, 334) relate the fields by describing how "even environmental goods have been shown to produce negative impacts through gentrification" and how "new priorities around climate adaptation and resilience, therefore, emerged." Keenan, Hill, and Gumber (2018, 9), on the socioeconomic consequences of resilience investments, state that: "The challenge for the public sector is to build a sensitivity to the economic effects of climate change and climate change adaptation on property markets within existing policy regimes."

The green-gentrification literature evolved toward strategies to deal with the paradoxical effects of greenway planning. Climate-adaptation literature also starts to reflect on current adaptation practices and policies from an equity perspective (Anguelovski et al. 2016; Keenan, Hill, and Gumber 2018). After recognizing and advocating caution regarding equity issues related to greenways and climate adaptation, strategies are now being suggested to deal with the paradoxical effects of greenway and adaptation interventions (see *Results* section).

What seems to be remarkably absent so far, however, are studies that empirically document the effects of resilience actions on property values and turn-over. Such testing is likely underway in several institutes; in advance of such findings, however, in the *Discussion and Conclusion* section we identify ways that adaptation-greenways may be different from other urban greening projects, as a way to suggest a policy and research agenda for adaptation-greenways.

Results

Generally, there seem to be two approaches to addressing risks of gentrification during urban greening projects. The first is the 'just green enough' strategy, which focuses on participatory processes and using small-scale interventions (that will effectively fly under the radar of large developers while still bringing some benefits to residents). The second approach contains more specific policies that have been used historically to prevent excess gentrification, selected and applied to be relevant to urban greening. We discuss each of these briefly below.

Just Green Enough. The concept of 'just green enough' is introduced by Curran and Hamilton (2012) based on field work on environmental gentrification in Greenpoint, Brooklyn. The strategy of 'just green enough' has grown out of empirical research on environmental and green interventions in cities as New York and Toronto (Schauman and Salisbury 1998, Pearsall 2010, Newman 2011, and Curran and Hamilton 2012 by Wolch, Byrne, and Newell 2014). The strategy is further explored by Wolch, Byrne, and Newell (2014, 234) who define 'just green enough' strategies as "urban green space strategies that explicitly protect social as well as ecological sustainability" and explain that strategies that are 'just green enough' should be developed in order to reap benefits while avoiding the urban green space paradox. The main components of a 'just green enough' strategy can be summarized by a focus on process and scale. Community engagement and small-scale interventions seem to be key elements of a successful 'just green enough' strategy (Schauman and Salisbury 1998, Pearsall 2010, Newman 2011, and Curran and Hamilton 2012 by Wolch, Byrne, and Newell 2014).

Anti-Gentrification Policies. In addition to, or in place of, the 'just green enough' approach, a wide range of possible policies could be used to stabilize property values and limit turn-over of residences and local businesses in large-scale urban greening projects. Wolch, Byrne, and Newell (2014) create a useful overview of policy options: affordable housing provision, housing trust funds, rent stabilization programs, homeownership incentives, shared equity housing projects, business requirements for rent controls, set-asides for local ownership and employment, and measures to maintain industrial uses (Jerzyk 2009, Kennedy and Leonard 2001, and Pendall, Nelson, Dawkins and Knapp 2005 by Wolch, Byrne, and Newell 2014).

In the next section we elaborate on these practical steps that can be taken to address the 'green paradox'. In addition, we assess whether 'just green enough' strategies and the anti-gentrification policies apply when greenways are planned for climate adaptation.

Discussion and Conclusion

In this section we explore the ways in which adaptation-greenways (as connected, linear open spaces designed to catch storm flow and/or cool nearby streetscapes and buildings) differ from other urban greening efforts, and whether these differences need to be accounted for when transferring the concepts behind green gentrification and 'just green enough' strategies to adaptation-greenways. We theorize that among the key differences to considerations of design and post-adaptation equity are: higher public health and safety concern, longer time frame, bigger scale, and greater cost for bigger scale and projected climate. Next, we elaborate on each of these four differences.

In terms *of public health and safety*, the need to protect vulnerable communities from immanent hazards, adds significant urgency to more general urban greening projects. *Time* is a difference as well; the benefits

of urban greening are relatively immediate, while the benefits of hazard reduction can be further in the future and harder to recognize, since disaster averted is not always very easy to see. This may be especially pertinent to the real estate market post-adaptation: whether developers will actually respond to creation of a lower-hazard environment is not a simple question, resting as it does on the present value of projects, with current benefits far outweighing discounted future benefits. The *scale* of urban greening is more flexible compared to the larger space needed for adaptation-greenways. Advocates of the 'just-green-enough' approach encourage (very) small-scale interventions. It is not clear if small-scale interventions will be effective in adaptation. In fact, a quick review of city plans such as those for Boston and New York City makes it appear likely that 'big moves' such as wholesale development of new greenways are required to make real differences in resilience to hazards. Thus, it is not evident that a 'just-adapted-enough' strategy focusing on small-scale intervention is technically feasible, but research in this area would help illuminate this question. Given that adapatation-greenways tend toward larger rather than smaller initiatives and that their technical specifications may be higher to respond to future climate conditions, there is likely to be a *greater cost* for them. Cities will no doubt look to some increase in property value and thus municipal taxes as a way to repay their investments.

Among the key similarities to the literature described above is that public participation can be a core component of an equity-centered adaptation-greenway, although the technical goal of hazard reduction requires careful vetting of the feasibilty of publicly-generated designs (Douglas et al. 2012). What can be clearly taken from the literature is the importance of community engagement in the planning process, and taking concerns very seriously.

In this paper we have drawn upon green-gentrification literature for lessons when planning and designing greenways for climate adaptation. Amidst the desire to assure equity in urban greening and resilience actions, it is easy to assume that issues raised by green gentrification can be directly applied to climate adaptation moves such as greenways. We find, however, that while there are similarities, there are also differences and the direct transference of concepts from one to the other needs to be done carefully – the potential for 'just adapted enough' may be limited.

The complex combination of the concepts of greenways, green gentrification, climate adapation, and equity opens up signficiant research needs. Gentrification has been an outcome with some urban greenways (such as the High Line), but research needs to document the empirical impact of adaptation-greenways on property values and housing and business turn-over. The depth of concern by residents needs to be established, to be sure this is not just a theoretical or ocassional problem. Similarly, whether gentrification due to adaptation-greenways is a concern for the cities paying for the adaptation-greenway needs to be established. In many cities, the increase in property values from such investments is an intended, not unintended, outcome. Crucially, all of the technical and process challenges of assuring that the greenways achieve current benefits alongside long-term adaptation goals needs to be assessed and then monitored as projects are implemented.

Generally, we conclude that considerations of the balance of different equity components needs to be explicit when planning and designing adaptation-greenways. Earlier in the paper we discussed pre- and post-adaptation equity – while post-adaptation and the risk of gentrification is important, it should not overwhelm the need for action based on the pre-adaptation environmental justice and equity issues. This paper has sought to clarify some of the essential issues to be considered, but significant empirical research is needed to establish the impacts of adaptation-greenways once they are built and the efficacy of potential

tools in assuring that the important benefits of adaptation are not overwhelmed by unintended consequences.

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