# Transformative potential of managed retreat as climate adaptation

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Managed retreat in response to climate change does not inherently lead to societal transformation. Assessing whether retreat has been transformative requires consideration of *what or who* is transformed, at what scale, and *in what ways*. It also requires nuanced consideration of relative spatial and temporal scale, domain of change, and implications for procedural and distributive justice while recognizing historical injustices and opportunities for restorative action. Current practices show managed retreat has not always been transformative in ways that promote justice. Nevertheless, retreat — as both a concept and practice — has potential to change societal perceptions of climate risk, challenge techno-optimistic *in situ* adaptations, and foreground issues of equity as a primary concern in adaptation.

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## Introduction

Soaring temperatures, rising seas, coastal flooding, and hazards across the globe set the scene for many millions of people to be on the move in search of safety, resources, and opportunity in the coming decades. Coastal flooding and sea level rise could affect 350–630 million people by 2100 [1]. Extreme heat could make one third of the world difficult to live in [2]. Not everyone affected will move in response [3], but the scale and severity of long-term climate change pose significant challenges to humanity and raise important questions about the limits of conventional, incremental adaptation.

Incremental adaptation refers to small adjustments to existing practices, but adaptation scholars and practitioners increasingly note that climate change may require transformative adaptation that produces non-linear shifts [4,5,6••]. Adaptations may be 'socially transformative' when they involve fundamental changes to the structure, functions, or norms of society [4,5,6••,7,8,9••,10,11••,12••]. However, delineating when an action has created 'transformative change' is a difficult practice, and there is no universal standard for recognizing when transformation has been achieved [9••,11••]. Some scholars have categorized a shift in location as a non-linear transformation by definition [4]. However, not all relocations are transformative because not all relocations produce fundamental changes in social structures, norms, or relationships. Some simply reproduce the same or worse conditions in a new location.

Understanding the circumstances under which relocations are transformative — for whom, in what ways, and with what implications for justice — are important questions, since managed retreat — also known as planned relocation or resettlement — has gained significant attention as a climate change adaptation strategy and is expected to occur more frequently and at larger scales as climate change unfolds [13,14•,15–20]. People move in many different ways — individually, collectively, and with government assistance — and movement occurs at different spatial, temporal, and governance scales [21•,22•,23]. In this paper we distinguish between managed retreat and climate migration. Managed retreat involves a coordinated effort to permanently move people and assets away from hazardous places while climate migration is often uncoordinated and may be motivated by climate change, economic drivers, or broader challenges of environmental degradation [24]. We focus herein on managed retreat to explore how the purposeful, coordinated nature of managed retreat creates potential for societal transformation. Such retreat occurs, and has occurred for centuries, in various forms, in communities around the world. Retreat may involve the relocation of a handful of homes or the relocation of hundreds of thousands [14•,17,18,20]. It may be government-led or community-led and supported by governmental or non-governmental organizations.

If future managed retreat efforts are to promote societal transformation, we must understand more about the

relationships between the 'how' and 'what' (i.e. spatial scale and domain of change), the 'when' (i.e. temporal scale), and the implications for social and environmental justice (i.e. 'for whom' and 'by whom'). To address these questions, we conducted a critical review of recent studies on managed retreat (2018–2020) and conceptualizations of social transformation to explore the ways in which managed retreat may or may not be transformative. Using the social transformation literature, we explore challenges to the notion of retreat as a transformative process and then discuss how retreat as a concept and practice could inspire social transformation by altering human-to-human and human-to-nature relationships.

## Transformative retreat

Climate change, socio-economic crises, and social injustices have engendered an appetite for transformation. However, transformation may be positive or negative, or both, depending on how the process and outcomes affect people, economies, and ecosystems [8,12••,25]. In this paper, we evaluate managed retreat against a positive notion of transformation, since we presume the goal of climate adaptation is to promote transformation that benefits and empowers people and protects ecosystems. Iwaniec *et al.* [11••] developed a positive framework of transformation based on seven core elements: persistent long-term change, maintenance of open-ended pathways, radical change of fundamental traits, co-production, inclusive evidence base, holistic systems-based approaches, and normative consideration of values and justice [11••]. Not all managed retreat manifests these elements, and
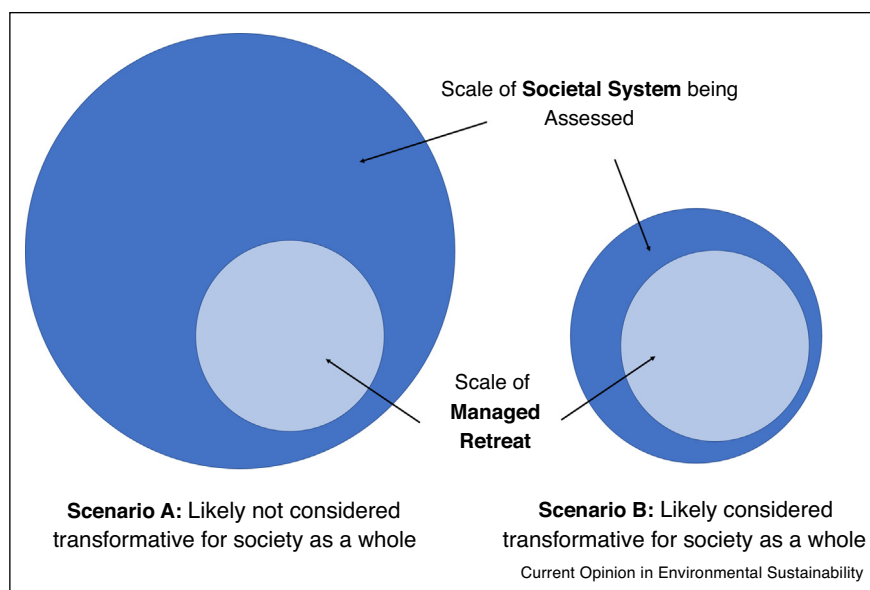
the ability of relocation to transform society depends on the relative scale of the retreat and the societal unit to be transformed (who relocates and what is transformed?), the domain of the change (transformed in what ways?), and the distribution of benefits and costs (who gains or loses through relocation?) across societies and across time.

### Scale – who is transformed?

The extent to which managed retreat is transformative for societies — that is, the extent to which relocations result in fundamental social, economic, or cultural shifts — is likely to depend on geographic and temporal scales. Managed retreat can occur at numerous geographic scales, from a single home to an entire town [17,22•,26–28]. Whether or not managed retreat is transformative depends to some extent on the scale of the system being considered and the relative portion of the population that retreats. For example, when a few households relocate, the experience might be transformative for these households, but it is likely to be an incremental change for the community, city, or nation, particularly if others continue to live nearby or new developments are constructed on neighboring parcels [29,30]. It is the relative size of the relocation and the system being analyzed that matters, rather than absolute numbers of people who relocate (see Figure 1).

Similarly, the temporal scale of retreat is important. The same number of individuals relocating could be incremental if they move piecemeal over decades but transformative if they move all at once. Imagine, for example,

**Figure 1**



**Scenario A:** Likely not considered transformative for society as a whole

**Scenario B:** Likely considered transformative for society as a whole

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Whether managed retreat is considered transformative depends on the relative size and scale of the retreat. The retreat of thousands of people will likely have a significant impact on a small town but is not likely to transform the state or region.

that the 13 million Americans projected to be inundated by sea level rise by 2100 all moved in the year 2030 and all moved to just a handful of destinations [37]. It would be a massive change for the people involved, for the counties they leave, and for the communities asked to absorb those people and their skills, needs, cultures, and norms in a short time span. However, if these same 13 million people moved in waves of 200 000 persons per year for the next eight decades, and moved to thousands of cities and towns spread across the nation, the effect would be very different. To put this in perspective, more than 32 million Americans move every year for non-climate related reasons without, apparently, transforming the nation [38]. All of which is meant to illustrate that the temporal and geographic scales at which relocation occurs will affect whether the retreat is transformative. As discussed in the following sections, the nature of the retreat (experience and outcomes) is also critical in determining whether managed retreat is socially transformative.

Some scholars argue that even incremental changes could, in aggregate, achieve transformation [6••]. It is therefore possible — though not certain — that the movement of a few hundred thousand people per year, over a century, could be transformative for certain geographic regions. It is equally possible that, during that same time period, communities would build new housing on nearby lands and attract new residents, thereby shifting risk rather than transforming the system [29,30,39]. Therefore, the exact conditions under which incremental adaptation actions aggregate to achieve transformation are not clear. We posit that positive transformation is most likely when changes occur in a non-linear manner (i.e. when initial actions inspire later actions to promote larger, broader, faster transformations, leading to an exponential curve rather than a linear one) and when they transform the system in socially meaningful ways (Figure 2). In other words, numbers and speed of change matter but so do qualitative changes in the lives of retreating and receiving communities [32–36]. The nature of transformation may be very different for people who relocate and for origin, neighboring, and receiving communities [31–36], so identifying the community being assessed is an important consideration when evaluating whether retreat has resulted in transformation. It is also important to consider *in what ways* the system has transformed and whether the observed changes are beneficial or harmful.

### Domain – transformed in what ways?

Society can transform in many ways, and not all domains will be changed in any given transformation. Managed retreat has potential to affect economic, social, political, health (mental and physical well-being), and cultural domains. Retreat, for example, may improve physical and safety conditions and reduce pressure on land in originating sites, thus yielding a positive transformation in the environmental and physical health domains.

However, the same relocation may affect the identity, culture, sense of place, livelihoods, and occupational practices of a community, thus producing negative transformation in the cultural and economic domains [40,41•]. The potential for relocation to affect different domains positively or negatively depends on decision-making processes, agency of affected individuals, availability of resources, social capital, and environmental justice goals. In Puerto Rico, retreat led by a community-founded Corporación del Proyecto ENLACE del Caño Martín Peña ensured the active participation of residents in decision making, construction of new homes in resettlement sites and provision of mental health services to alleviate the emotional distress associated with relocation [42]. This voluntary relocation had a strong community buy-in (according to participants) because it protected residents from displacements by offering affordable safe housing in an area of choice selected by participants [42]. Rarely are transformations beneficial across all domains, so one consideration when evaluating the degree of transformation is to consider trade-offs among different domains. Furthermore, it is important to consider how benefits accrue within the community: that is, how the benefits and costs of relocation are distributed [43–45].

### Justice – who benefits or loses?

Transformation may be harmful or beneficial to people and socio-ecological systems [6••] and the benefits and costs are rarely distributed equally across society. Relocations that replicate existing patterns of development or power dynamics and social inequities are neither transformative nor beneficial. To be socially transformative, managed retreat, therefore, should promote justice by challenging existing inequalities in social structures and patterns of vulnerability. This will require various actors throughout the managed retreat process (i.e. participants, communities, and supporting government and non-government organizations) to explicitly address issues of distributive, procedural, recognition and restorative justice [46].

Distributive and procedural justice (or lack thereof) have been well discussed in the managed retreat literature [41•,46–49]. Scholars have called for equitable distribution of beneficial outcomes and for decision-making processes to enable meaningful participation of affected populations, but historic injustices and systems may affect the ability of people to benefit from relocation or to participate meaningfully [41•,46–49]. This is why recognition and restorative justice matter [50–52]. Recognition justice refers to an acknowledgement of existing power dynamics and social structures that engender vulnerability and powerlessness among some groups and not others [39,40,41•]. As an example of why recognition justice matters, in a case study of managed retreat in lloilo, Philippines, researchers evaluated both procedural and distributive justice and found that pre-existing

**Figure 2**
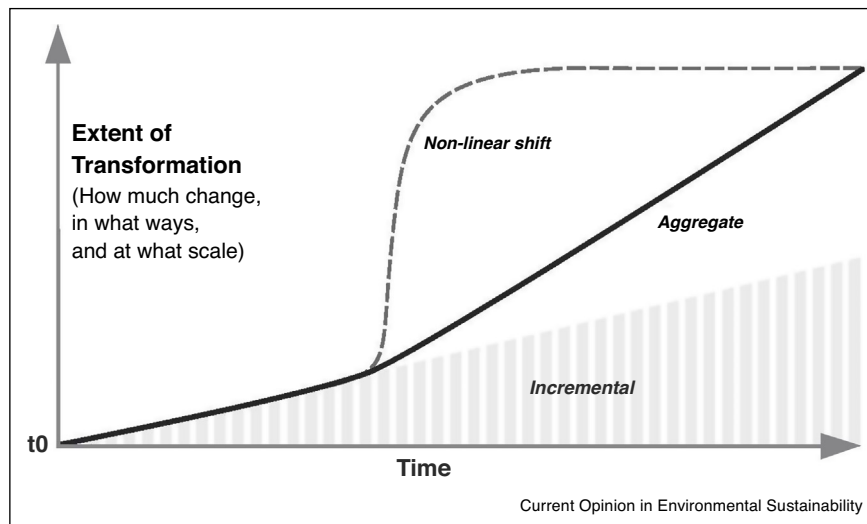


Transformation over time.

Incremental change, transformation through aggregation of incremental actions, and non-linear shifts may all result in social change, but the degree, scale, and nature of the changes are likely to differ. Early on, all three types of adaptation may result in a similar level of transformation for the individuals involved and are equally non-transformative for society. Over time, non-linear and aggregate change result in transformation of society and social structures in more ways and at greater scales than incremental change.

inequalities in wealth and power contributed to the production of inequitable outcomes despite robust planning and broad participation of different groups in the retreat program [45]. Some households benefited from the relocation (through improvements in housing quality, income, and resilience) while others did not [45].

Explicitly acknowledging and challenging patterns of historic and current inequities that contribute to uneven vulnerability and reduced adaptive capacity can open up opportunities to transform systems in ways that promote restorative justice [51,53]. Restorative justice refers to rectifying or ameliorating decisions, conditions, and policies that disenfranchised or harmed communities or that led to inequities that affect the ability of groups to meaningfully participate in decision-making processes [51,53]. As Chu *et al.* note, 'Transformative adaptation reorients climate actions around addressing entrenched equity and climate justice challenges. It focuses on systemic changes to development processes and is aimed at improving people's quality of life, enhancing the social and economic vibrancy of cities, and ensuring sustainable, resilient, and inclusive urban futures' [54•, p. 1]. Achieving these aims is likely to require managed retreat to be situated within larger, holistic efforts to address elements of economic development, land use patterns, and community well-being.

The extent to which relocations have contributed to holistic wellbeing is varied. In some cases retreat has

perpetuated landlessness and poverty or increased vulnerability to physical and livelihood risk [42,45,55•]. Relocations have also been shown to create social isolation and mental stress [36,56,57]. On the other hand, some examples of coordinated retreat through household buy-outs and community relocations appear to have promoted long-term economic, social, and ecological sustainability [22•,26,57–59,60•] (although the procedural and intra-town distributive justice elements have not been thoroughly explored in all these cases [61]). These findings suggest retreat does not universally lead to beneficial or negative outcomes. Also, outcomes vary for different actors participating in the plans and process of retreat.

## Potential for social transformation

Although managed retreat is not always transformative in practice, the concept of managed retreat has potential to promote social transformation by changing perceptions, narratives, and norms about climate adaptation. Specifically, retreat may change social discourse by embodying climate risks, creating empathy, and questioning techno-optimistic approaches to adaptation.

Retreat may change perceptions by turning climate risks and adaptation from abstract or distant events into immediate, personal, and embodied experiences. Relocation of all types (managed and unmanaged) in response to climate change embodies and thereby highlights the challenges climate change and adaptation pose to personal or collective connections to place, culture, and

identity [62–65]. Kuusisto-Arponen and Gilmartin note, 'Migration is an embodied practice. It is not just an act of people moving from place A to place B, but it is also a relational socio-spatial and bodily experience' [66, p. 80]. Relocation involves negotiating new relationships: with people in origin and destination communities, with places, and with identities founded on proximity to specific places or environments. Relocation intrinsically involves a change in place, and '[p]laces have material, interpersonal and symbolic dimensions' [67, p. 593]. The implications of governments planning, funding, or coordinating relocation are perhaps most apparent for indigenous communities and island nations whose cultural practices and histories are tied to the land or who face loss of sovereignty along with loss of place [68–70]; for farmers, herders, and others with nature-based livelihoods [64,71]; and for other communities with strong ties to heritage sites [72]. Indeed, many people have personal identities connected to the place where they live, as illustrated by growing attention to solastalgia — the pain felt by people observing the degradation of their environments [73•]. These problems are also tied to personal identity [74•]. Relocation (or even discussions of relocation) may bring these issues to the foreground in a way *in situ* adaptation strategies do not. This is why it is important for relocation managers to create space for public conversation on such issues.

Managed retreat has potential to change discourse on numerous subjects (not just climate change). Public discussions and questions about who wants to relocate and who does not, who should receive government support to relocate through a managed retreat program, who remains, and how these decisions are made can highlight the role historic injustice has played in shaping climate risk and adaptation options. Similarly, questions about local economies, governance practices, civic action, and democratic participation in the production and reproduction of space become salient. For example, the Isle de Jean Charles Band of Biloxi–Chitimacha–Choctaw Tribe have been described by journalists as the 'first climate refugees' in the United States [75], but media coverage of the tribe's resettlement has highlighted for non-indigenous readers that climate change is not the only driver of risk for the tribe. The island has been threatened by rising seas as well as oil and gas industry activities that have increased the rate of coastal erosion. The tribe's need to relocate was determined, in some ways, when the U.S. Army Corps of Engineers decided that it was not cost-effective to include the island within a protective levee [76,77]. Discussions about relocation in Isle de Jean Charles and other indigenous communities have not transformed those communities or U.S. society, but they do bring questions of equity, rights, and justice to the forefront of public discussions [40,45,46,78]. Other cases of managed retreat are sparking similar conversations in nations around the world.

In the coastal space, for example, conversations about who is protected behind a seawall, and who is not, or who benefits from beach nourishment, and who pays, have rarely achieved the same level of public discussion as who relocates and who remains behind [79–81]. Case studies of managed retreat have highlighted the role that injustices such as colonialism, slavery, gentrification, lack of affordable housing, displacement, and discrimination have had and continue to have on marginalized groups and communities of colour [68,82]. By highlighting the personal, social, and cultural losses that people may experience during managed retreat, discussions of relocation may provoke empathy in the general public, and empathy and political will are important drivers of sustainability and climate adaptation [63].

As a term, managed retreat has given rise to numerous synonyms in part because the word 'retreat' is politically difficult and often associated with loss and defeat [83,84]. Retreat could also be considered a surrender, and although surrender is often considered negatively, it is possible that surrendering to nature could inspire a positive reconnection with nature in new ways. Managed retreat most often occurs where structural adaptations are not feasible [85], so rather than build more levees, retreat may encourage people to make 'room for the river' [86,87]. The very name of the famous Dutch program suggests a conceptualization of the river as an equal, as an object worthy of equal space within a developed landscape. Notably, this has not resulted in a cessation of levee-building in the Netherlands, but the concept has spread to other nations [86] and other hazards [88]. The proliferation of the idea of 'making room for the river' has not translated into just or positive transformation in all instances, but it does suggest the need for a co-existence of nature and humans in ways that are protective of nature as opposed to human interest alone. We caution that such protection should also account for those historically or spatially marginalized. We see potential for optimism insofar as a discussion of retreat presents a divergence from the techno-optimism that has dominated much of climate adaptation to date.

To date, retreat has generated a growing body of research and news coverage, and discourse around the subject has begun to normalize retreat as an adaptation strategy not as a last resort [89] but as a potentially 'unavoidable' reality [90, p.64] — even for wealthy nations. This recognition that managed retreat could or perhaps should occur, even in places where the conventional approach has been to stay and build, presents a divergence from techno-optimistic adaptation that puts faith in the ability of engineering and emerging technologies to address climate risks rather than societal change [91]. Structural or technological adaptations are often more politically palatable because they require less direct recognition of the threats being faced, and they may encourage people to believe

that climate change will cause few fundamental disruptions to their daily lives [92]. Retreat may offer a different perspective on our relationship with nature and a different narrative on what it means to adapt.

## Conclusion

Shifts in location have sometimes been considered transformative by definition, but managed retreat does not implicitly involve or lead to transformation. When distinguishing incremental from transformative shifts, questions of who is transformed (individuals, communities, nations), over what time period, and in what ways are as important as questions of how fundamental, long-lasting, and holistic a change proves to be [11••]. The potential for transformation to have both positive and negative dimensions, in the same process, also needs to be considered. Transformative managed retreat should be a means of disrupting and redressing socially unjust systems and structures rather than reinforcing or replicating them. How transformative a retreat or relocation proves to be will depend on why it is deployed, how it is managed, who is involved, and what ecological, social, economic, and normative changes are produced. Empirical research that uses comparative case studies of managed retreat to assess the scale of change, domain, and outcomes can support future policy decisions and analyses. Research on social preferences and trade-offs between different domains (e.g. social, cultural, economic, environmental) can also inform practice.

Regardless of whether a particular instance of retreat is transformative, the concept of managed retreat may have potential to transform perceptions, narratives, and norms surrounding climate change adaptation by embodying climate risks, foregrounding issues of justice, and questioning techno-optimistic approaches to adaptation. Achieving this potential will most likely happen when retreat is pursued by individuals, communities, adaptation planners, and governments not as an end but as a means to achieve broader transformation [93]. If the goal of a managed retreat program is defined as the relocation of people, then the program ends when people have physically moved, regardless of the implications of that movement for their well-being. If, however, the goal of the program is defined as societal transformation, then physical movement becomes just one component of a larger set of programs and policies. Managed retreat, the physical relocation it embodies, the shift of psychological and emotional connections to land and to community, and the narratives it creates, may all unlock the potential for transformations to occur, but movement itself is just the beginning.

## Conflict of interest statement

Nothing declared.

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