

# Managed Retreat in the United States

A.R. Siders<sup>1,2,\*</sup>

<sup>1</sup>Disaster Research Center, Biden School of Public Policy and Administration, Geography and Spatial Sciences, University of Delaware, Newark, DE, USA

<sup>2</sup>Twitter: @sidersadapts

\*Correspondence: [siders@udel.edu](mailto:siders@udel.edu)

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Managed retreat—the purposeful, coordinated movement of people and assets out of harm’s way—is a controversial and often overlooked adaptation tool but also a potentially transformative one. In the United States, managed retreat has occurred primarily through federally funded property acquisition programs that are unlikely to be able to scale to meet the future demands of climate change. There are numerous psychological, institutional, and practical barriers to engaging in managed retreat, so understanding how United States communities have overcome these barriers, even at a small scale, could provide insights for applying retreat in other contexts and at larger scales. This paper articulates why the United States needs managed retreat to be viable at scale, identifies barriers, recommends areas for scholarship and practice to learn from past experience, and argues for a national vision for coastal adaptation, such as a National Seashore, to provide a coordinating and motivating focus for future work.

## Introduction

In 2018, the Fourth National Climate Assessment stated that retreat will be “unavoidable” for some United States (US) communities.<sup>1</sup> In the 2019 Climate Town Hall, presidential candidates said that managed retreat—the planned, purposeful, coordinated movement of people and assets away from risk—might be necessary. Recognition of retreat as a possibility is a major shift from the rallying cries of “build it back” and “never retreat” that sounded after Hurricanes Katrina and Sandy. Seasons of record-breaking climate-related disasters—hurricanes on the coast, floods in the Midwest, fires and drought in the west, heat in the south—have shown that US adaptation policy can no longer afford to ignore one of the most potentially transformative tools available.

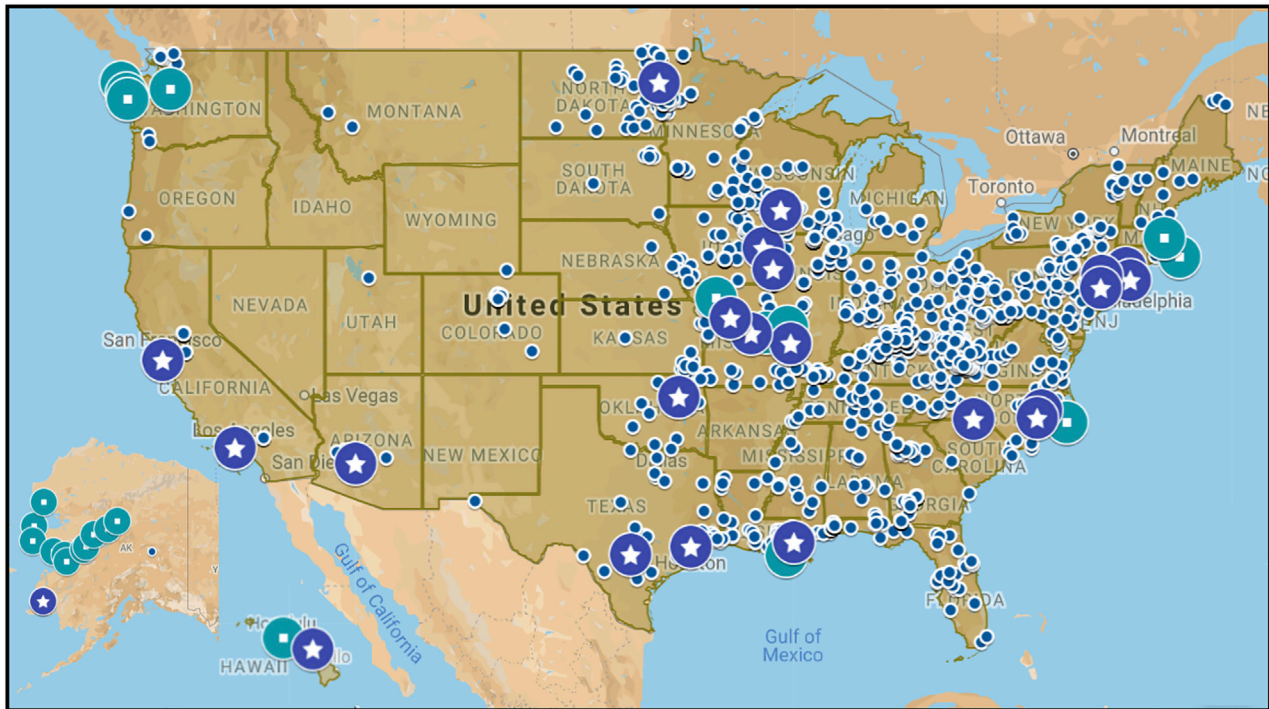
Managing retreat in the US will not be easy. Strong and constitutionally protected private property rights, a bankrupt federally subsidized flood insurance program, and dense economic activities and development on at-risk coasts have made retreat difficult to discuss, much less implement.<sup>2–6</sup> There are equity concerns as well: the US coast is both a playground for the wealthy and home to some of the most disadvantaged and historically marginalized people in the nation. As a result, US flood management has historically focused on enabling people and infrastructure to remain in at-risk areas: resisting floods with walls and levees, adding sand to eroding beaches, or elevating homes to avoid rising tides.<sup>2,7</sup> Managed retreat has occurred but at a relatively small scale. Since 1989, the US Federal Emergency Management Agency (FEMA) has funded managed retreat in over 1,100 counties across 49 states, acquiring more than 40,000 properties (see Figure 1)<sup>8–11</sup>—a small fraction of the estimated 49 million housing units in shoreline counties.<sup>12</sup> Knowing that retreat can occur, even at small scales, in such a hostile environment as the US may provide insights into how seemingly insurmountable barriers can be overcome in other contexts and at larger scales.

Climate change is likely to require managed retreat at much larger scales. Real estate worth \$1.4 trillion is already located within 700 feet of the US coast,<sup>12</sup> and sea-level rise alone is projected to affect 4–13 million Americans.<sup>13</sup> If just one-tenth of these people or buildings retreated, it would cost \$140 billion—almost 30 times what FEMA has spent on managed retreat to date—and affect 5–10 times as many people. Even low sea-level rise projections and existing development will require managed retreat to occur at a much larger scale and on a faster timeline than has yet been achieved. If development continues to accumulate in risk-prone areas, or if global emissions are not reduced and climate change continues unabated, the number of people at risk and the scale of managed retreat that may be needed will be even higher.<sup>14</sup>

Achieving large-scale retreat could have significant benefits and transform US social, economic, and ecological systems. Transformative adaptation can be achieved by introducing new practices or governance systems, adapting at large scales, or shifting the location of activities.<sup>15,16</sup> Managed retreat by definition shifts the location of people and assets, but the extent of the transformation depends on scale. When a household retreats, it is transformative for the household but not the community who remains. When a community relocates, it is transformative for the community but not the nation. Large-scale managed retreat at a national level would provide an opportunity and incentive to redesign underlying norms and infrastructure. It would require institutional and legal reforms and behavioral changes. Difficult decisions about who pays and who receives support would inspire difficult conversations about past injustices and current inequalities. Politicians and community leaders would need to put long-term communal good above short-term economic or political gain. Nationally, it might require Americans to reconceptualize our relationship with risk and what it means to own property.

The following sections lay out the argument for pursuing large-scale managed retreat in the US, identify barriers, and provide





**Figure 1. Managed Retreat in the United States**

The Federal Emergency Management Agency and the Department of Housing and Urban Development have funded managed retreat across the United States (small dots). Large circles note communities who have relocated together or are considering relocation, and stars indicate academic studies and reports.

recommendations to maximize the transformative potential of managed retreat. The intent is to introduce readers who may be unfamiliar with managed retreat as an adaptation strategy, or unaware of the US context; to provide an agenda for researchers and practitioners working to make managed retreat a viable option, and to reconceptualize managed retreat as opportunity rather than defeat.

Managed retreat in the US, both research and practice, has been primarily a response to riverine and coastal floods and storms and has focused on residential relocation.<sup>2,3,10,11,17</sup> In reflecting the state of the field, this perspective will therefore also focus on residential retreat from coastal floods and flood-related hazards. This does not imply that managed retreat should be limited to these contexts. Commercial retreat will also be necessary, and conversations are already emerging about the potential for managed retreat to be used in response to other hazards, such as wildfire.<sup>18</sup> Future research will need to consider what lessons apply across contexts.

### Why Manage Retreat?

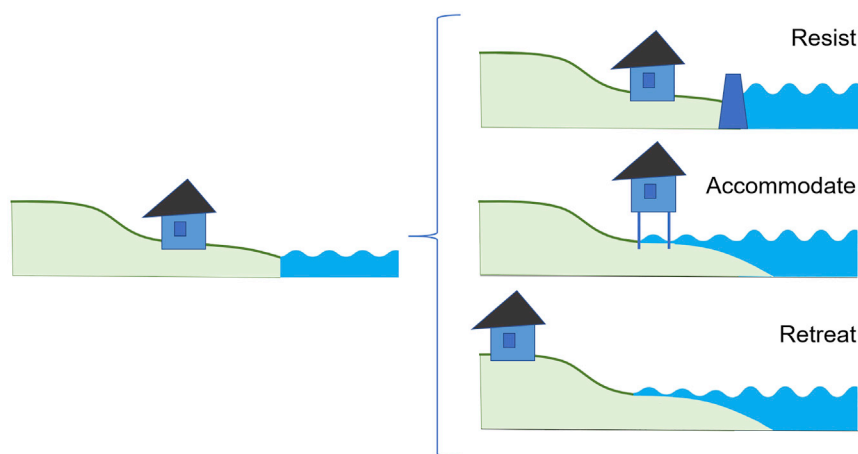
Managed retreat “is the strategy that most effectively eliminates risk.”<sup>9</sup> Coastal adaptation strategies are often classified as resist, accommodate, or retreat (see Figure 2).<sup>19</sup> Resistance measures such as seawalls and levees can fail or be breached, as demonstrated by Hurricane Katrina, Superstorm Sandy, and the Midwest floods of 2018 and 2019. Armoring can encourage development in at-risk areas by creating a false sense of security.<sup>20</sup> Elevated homes may not be high enough to avoid damage, and even safely raised homes may still be exposed to

contamination and disease spread by flood waters<sup>21</sup> or isolated by flooded roads. Retreat moves people and assets away from these risks.

Managed retreat will not be the appropriate answer everywhere. Some places will build walls. Some will elevate. The reason the US needs managed retreat to be a viable adaptation option is that some places will retreat and some will need support to do so.

If retreat is not managed—that is, if it is not purposeful and coordinated through a community or government agency—it will still occur, and unmanaged retreat creates costs and missed opportunities.<sup>22,23</sup> Homeowners or towns unable to afford rising insurance premiums, armoring, elevation, or repeated recoveries from disasters may simply leave. Some are leaving already.<sup>24,25</sup> A decade after Hurricane Katrina, New Orleans had tens of thousands of abandoned properties.<sup>26</sup> Falling real estate prices in at-risk areas<sup>27,28</sup> force some homeowners to sell at a financial loss, risk living through another storm, or abandon their homes.<sup>25</sup> Abandoned properties can become eyesores for which the local government has to pay to maintain,<sup>26,29</sup> and empty lots can destroy the sense of community. Loss of property tax revenue can make it more difficult for a town to pay for public services or other adaptations. The National Climate Assessment notes that this type of economic loss may become more frequent as sea levels rise.<sup>12</sup> Conversely, growing demand for housing in safe locations may drive up prices and displace existing communities or contribute to gentrification.<sup>30</sup>

With management, it is possible to mitigate harms and maximize benefits.<sup>2,22,23</sup> Management can provide funding to people



**Figure 2. Adaptation Categories**

Unlike resistance or accommodation, managed retreat provides long-term risk reduction and potential for transformation. Resistance and accommodation measures can buy time for the thoughtful planning and social reform needed to engage in large-scale managed retreat.

or cultural ties. Place attachment can become central to personal identity and strongly influence decision making.<sup>40–42</sup>

There are also irrational barriers to relocation. People often underestimate risk<sup>41,43</sup> and overestimate the effectiveness of protective measures.<sup>44</sup> Flood maps that are inaccurate, out of date, or fail to capture future risk due to develop-

ment or climate change<sup>45,46</sup> contribute to a lack of risk awareness, as do laws and policies that allow real estate agents, sellers, or landlords to conceal past flood damage from prospective buyers.<sup>47</sup> Repeated disasters can increase the accuracy of risk perception,<sup>36,48,49</sup> but people have short memories<sup>50</sup> and will overlook even personal experience if they have a strong attachment to place.<sup>51</sup> Government agencies and officials often suffer from these same cognitive biases,<sup>52</sup> which makes it difficult for them to address these errors in residents.

Even when aware of the risks, people often choose to maintain the status quo rather than pursue any course of action (known as status quo bias).<sup>53</sup> I call it nostalgia bias when people act as though by doing nothing they can return to the world of the (often mythical) past. People may resist action because they do not like the options available. They may resist managed retreat in particular if they equate retreat with defeat. Many people acknowledge that retreat will need to occur “somewhere” but fail to recognize that their home might be the place. It is a kind of optimism bias,<sup>48</sup> the belief that sea levels will not rise here or that, if they do, someone (usually the federal government) or some yet-to-be-invented technology will protect this place. Federal tax dollars may indeed pay for Mayor de Blasio’s \$10 billion-dollar plan to save Manhattan, but it is unlikely that billions will be spent in every rural township.<sup>54,55</sup>

These barriers may appear intractable, but over 40,000 property owners in the US have overcome them and chosen to participate in managed retreat. There are untold numbers of people who want to relocate but are trapped, unable to do so without the support of a managed retreat program.<sup>18,56,57</sup> The challenge of managed retreat in these cases is finding ways to identify such residents and provide them with support. Disasters play a role in motivating people to retreat, as do sense of place, local cultural norms, financial status, availability of affordable housing, and public services.<sup>36,37,58</sup> Why these factors are sufficient in some contexts and not others is not known.

#### **Institutional**

Actors with power to engage in managed retreat in the US (residents, local and state governments, real estate industry) have financial incentives to prevent retreat, while stakeholders with incentives to encourage retreat (such as federal taxpayers, federal agencies, and future generations) have little or no power.

who want to leave but are unable to afford to move (so-called trapped populations). It can put land to beneficial use by creating public parks, restoring wetlands to absorb floodwaters, or providing habitats for endangered species.<sup>10,31</sup> Managed programs can consider the people who remain (how to help retain connections and social cohesion) and the destinations (how to prepare receiving communities for population growth).<sup>22</sup>

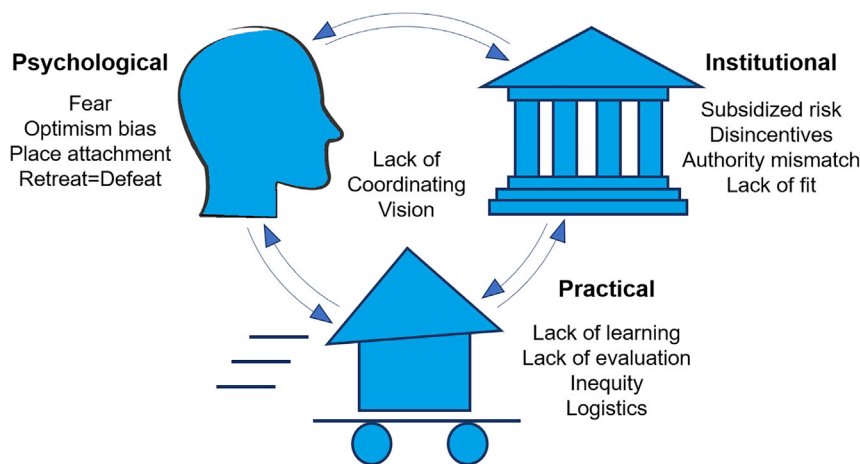
Perhaps most importantly, managed retreat provides an opportunity for transformation: social, economic, and ecological. It offers the chance for communities—those who stay and those who relocate—to reinvent themselves, to “forge new beginnings on safer ground.”<sup>9(p8)</sup> When Soldiers Grove, Wisconsin, relocated its business district away from the Kickapoo River, the town decided to relocate in a way that would reinvigorate the economy and stem population loss or even stimulate growth.<sup>32–34</sup> Residents chose a location that was not only safer from floods but closer to the local highway to encourage economic growth; they relocated the town well to avoid contamination from floodwaters; and they created a regulation to promote solar power in the new district—forward thinking in 1979.<sup>32–34</sup> New businesses arrived, the town’s economy and population grew, and Soldiers Grove became known as Solar Town. Moving was not just about fleeing floods; it was about breathing new life.

#### **Barriers to Managed Retreat**

Managed retreat has been limited in the US by numerous barriers, categorized here as psychological, institutional, and practical. Barriers may interact and reinforce one another across categories (see Figure 3). For example, low insurance rates (institutional) reduce motivation to retreat (psychological), while public resistance (psychological) can limit the ability of politicians to make institutional reforms. When barriers reinforce one another, they can be particularly difficult to address through incremental change and may instead require system-wide transformation to address numerous barriers simultaneously.<sup>16</sup>

#### **Psychological**

Many people who live in at-risk areas do not want to retreat.<sup>35–39</sup> Some resistance is rational. People enjoy living near coasts; they enjoy the access, views, and recreation. Some people’s livelihoods depend on coastal proximity. Others have strong historic



**Figure 3. Barriers to Managed Retreat**

Barriers interact and may reinforce one another, requiring transformation of social, legal, and economic systems to address.

This disconnect, along with subsidies that spread risk and disincentivize action, makes managing retreat at scale difficult.<sup>59</sup>

Local governments determine land use and zoning and largely control where development occurs, but because many local governments rely on property taxes for revenue, they have little financial incentive to pursue retreat (in fact, retreat may be economically damaging for them<sup>60</sup>). Property developers make short-term financial gains from developing on the coast and do not pay the long-term consequences. Homeowners who do not want to retreat can refuse, while homeowners who want to relocate are not allowed to apply directly for federal financial assistance but must instead convince a state or local authority to request retreat funds on their behalf. On Staten Island, for example, Oakwood Beach residents requested a buyout from New York City after Hurricane Sandy, and the city refused.<sup>61</sup> The community was only able to relocate because residents convinced the state government to apply for buyout funds on their behalf.

States can support retreat directly, by implementing property acquisition programs as in New York and New Jersey, or indirectly by creating setback regulations, banning shoreline armoring, and establishing building codes.<sup>10,62,63</sup> However, states may also rely on property tax revenue or development fees or may be unwilling to oppose local governments who want to promote floodplain development.

Federal government has the least authority to regulate land use and pays the most when at-risk communities do not retreat. Federal taxpayers largely fund construction of floodwalls and beach nourishment through the US Army Corps of Engineers and support elevation through FEMA. Tax dollars fund the National Flood Insurance Program (NFIP), which has been bankrupt for years. Much has been written about the myriad ways the NFIP is broken: in brief, not enough at-risk property owners participate in the program to spread the risk, and those who do participate have artificially discounted premiums, so they do not pay the full cost of living in risk-prone areas.<sup>5,64,65</sup> Since 2017, Congress has reauthorized the NFIP 11 times, unwilling to authorize a broken program for more than a few months and unable to fix it.<sup>66</sup> Disaster recovery money also provides an informal type of insurance. People rely on disaster costs to be paid from federal coffers, and there are few incentives for state or local governments

to reduce how much disasters cost.<sup>67</sup> Even at-risk homeowners, research shows, have taken few steps to minimize the damage they will experience.<sup>68</sup>

As a result of this mismatch between authority and incentive, cases arise such as Dauphin Island, Alabama, where residents have paid \$9.3 million in premiums and received \$72 million in claims since 1988 (plus an additional \$80 million in disaster recovery money).<sup>69</sup> Across the nation, thousands of properties have been destroyed and rebuilt multiple times: one in Mississippi has been rebuilt 34 times in 32 years, using \$663,000 in federal tax dollars to rebuild a home worth \$69,000.<sup>70</sup> Florida, New Jersey, and North Carolina have allowed more than 9,000 new homes to be built in flood zones since 2010,<sup>71</sup> putting 9,000 families at risk and increasing the cost of insurance and post-disaster recovery for federal taxpayers. Americans may resist government regulation, especially when it comes to land use, but as one local expert commented about Dauphin Island, “it is a case study of schizophrenia. The property owners want to be left alone, except when there is a storm. Then they want the taxpayers to pay for new roads and bridges and sand and [to] help them rebuild.”<sup>72</sup>

A seemingly clear solution to this morass would be to align incentives with authority. This would mean making states, local governments, and residents in at-risk areas pay more: more in insurance premiums, more of the post-disaster costs. However, this is problematic. Disasters already cause financial hardships and widen wealth inequalities, even with (or because of) federal disaster aid.<sup>73</sup> Small towns and low-income residents may be unable to pay increased premiums or protection costs. In these scenarios, residents might remain in at-risk areas, with little protection and no insurance umbrella to help recover, or leave through unmanaged retreat. Conversely, if wealthy towns and residents are allowed to erect privately funded seawalls or other defenses without state or federal oversight, they could displace risks and destroy beach access, turning the coast into a private asset rather than a common good.<sup>74</sup> Aligning incentives with authority therefore presents challenges, but if the system is not reformed, federal tax dollars will continue to pay to keep residents in areas where their lives and properties are at risk.

Private sector norms and policies also establish incentives. Insurance and reinsurance companies have paid billions as a result of disasters and risk-prone development. As a result, credit-rating companies such as Moody’s are beginning to incorporate climate risks and adaptation actions into city credit ratings, which affect cities’ ability to attract capital and issue bonds.<sup>75</sup> This could motivate local authorities to take action, and even to consider managed retreat, but it could also be financially devastating for cities whose risk exposure is so high that no amount of adaptation could outweigh the risk.

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Comprehensive federal policy on coastal adaptation—including resistance, elevation, and retreat strategies—seems more likely to achieve fair outcomes than ad hoc actions taken by individuals and private sectors. Addressing institutional barriers would require changes in underlying legal, financial, and social infrastructure. Practitioners have proposed reforms, and some localities are experimenting with change, but these efforts have not yet been evaluated or applied at scale.

### Practice

Over 1,000 US communities have engaged in managed retreat,<sup>11</sup> but there is little evidence that more recent efforts are learning from past experience.<sup>76</sup> Lack of learning is not for want of material. FEMA has published showcase reviews of more than 100 buyout programs.<sup>77</sup> Towns have published reports documenting their relocation process.<sup>32,78,79</sup> There is even a documentary about the Valmeyer, Illinois, relocation on YouTube. A long history of research on migration, displacement due to environmental disaster and development (e.g., dam construction), and government resettlement has a rich literature of lessons learned, but few appear to be transferred to managed retreat.<sup>80,81</sup>

Learning may be slowed by a lack of data and comprehensive evaluations. Most evaluations of managed retreat in the US have focused on the process by which retreat occurred or on a limited set of outcomes, such as whether subsequent damage was avoided.<sup>17,36,38,82–84</sup> Without data on specific management approaches (e.g., whether or not a buyout offered incentives for participation) and outcomes (e.g., where people moved), researchers cannot assess how management approaches lead to specific outcomes or how these approaches could be altered to improve future outcomes.

For example, where do people go? One study of the Staten Island, New York buyouts found that 20% of participants relocated to floodplains with an equal or greater risk of flooding, and 98% moved to areas with higher poverty rates.<sup>85</sup> The first finding raises questions as to whether buyouts reduce or displace risk. Residents who relocate to another at-risk area may have a false sense of security that retreating has “solved” their risk exposure. The second is concerning because relocation to lower-income neighborhoods has been shown to reduce future expected income of children, so relocations could affect the economic well-being of generations.<sup>86</sup> The Staten Island relocation may be unique, as the program offered incentives to relocate nearby and housing pressures in New York City may have constrained residents’ choices, but other programs have not assessed where people have gone, so we do not know if this is an outlier or the norm. Knowing where people go would help to evaluate management methods (e.g., does providing relocation advice help people move to safer places?), help receiving communities to plan, and help people considering retreat to understand their options.

Similarly, how has land been used after managed retreat? Open spaces can be designed to absorb floodwaters, provide playgrounds and gardens, combat the urban heat island effect or improve air quality, or provide habitat.<sup>9,10,31,60</sup> Too often, however, land where retreat occurs has not been used productively and remains derelict.<sup>29</sup> One study found that derelict lots were more common in a low-income minority neighborhood while open spaces in a white affluent neighborhood became parks

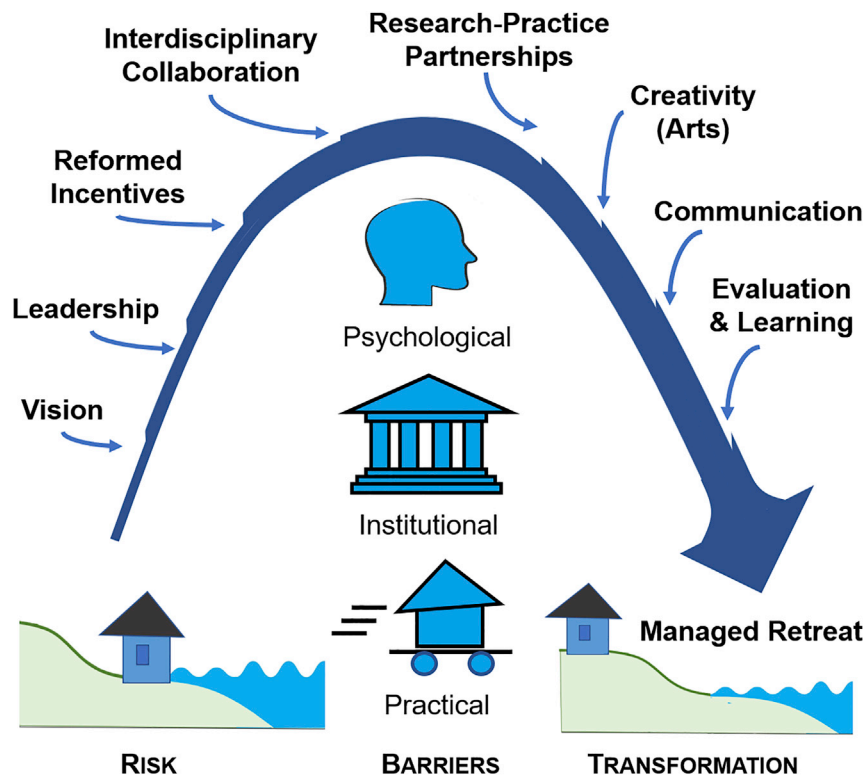
or gardens.<sup>87</sup> Knowing how land is used would help evaluate and inform management approaches (e.g., how can small parcels be used beneficially?) and may affect calculations on the cost-effectiveness of managed retreat.

Has managed retreat been fair? Academic and media reports have raised concerns that managed retreat in the US disproportionately affects low-income and minority communities,<sup>11,17,88</sup> enables white flight,<sup>87</sup> or disproportionately benefits white communities.<sup>89</sup> Data on the race and wealth of homeowners involved in managed retreat is not publicly available, so determining whether (much less why) buyouts have a disproportionate effect is complicated. Recording these data and making them available, with appropriate privacy protections, would aid equity evaluations.

If retreat disproportionately affects a group, is that a mark of success or failure? It is an open question whether managed retreat support is a benefit that should be offered to low-income and minority communities (who suffer most during disasters and may need most assistance to relocate) or a harm that should not be inflicted on these communities (who may have been targeted for resettlement in the past or for whom relocation may cause the most harm). Should managed retreat programs purchase million-dollar homes? Should they be offered primarily to socially vulnerable communities? Economic analyses of coastal adaptation suggest that retreat should occur in rural areas where properties are sparse and values low, while resistance measures (e.g., seawalls) should be prioritized in areas of high-value assets and dense populations.<sup>54,90</sup> Such an approach, however, has been shown to leave low-income and minority populations disproportionately exposed to hazards<sup>55</sup> and may exacerbate social and racial inequalities.<sup>17</sup> If not by economic analysis, however, it is unclear how governments should decide where to prioritize managed retreat. Community willingness has been suggested as an important element, although waiting for grassroots support raises further equity issues as it places the burden to act on residents, and disadvantaged communities may have less political weight to make their requests heard. More research on how communities that have used managed retreat have decided where to employ this tool will be necessary to inform future efforts.

Other practical elements that require improvement include timing and relocation assistance. FEMA-funded buyouts take too long: case studies suggest it could be a year or more between the time disaster strikes and an offer is made.<sup>8–10</sup> Renters have been largely overlooked. Under the US Uniform Relocation Act, renters receive additional relocation assistance in a managed retreat program, but it is unknown whether such assistance is sufficient in a post-disaster context. Mobile homes represent a similar challenge: owners are sometimes treated as homeowners (as they own the structure) and sometimes renters (as they lease the land). It is not clear which scenario leads to better outcomes.

Voluntary property buyouts have been the most common form of managed retreat in the US,<sup>62</sup> and research on retreat has followed suit, but it is not clear that buyouts are the way forward. Purchase prices may be too low to enable owners to find comparable housing and too high to scale up to meet future demand. Other policy options have been less well studied, have generated expensive litigation, or have encountered reluctance by



**Figure 4. Overcoming Barriers Requires Diverse Actors Coordinated by Leadership and Vision**

may be true if the goal of the program is to create a floodplain to absorb storm-water,<sup>10,60</sup> but neighborhood parks and “pocket prairies” for species habitat<sup>31</sup> may serve better by being widely distributed. The best use of the land and best retreat strategy will depend on the goals to be achieved.

#### Diversity

Research on managed retreat will require interdisciplinary collaborations (e.g., psychologists, communication experts, economists, lawyers, ecologists, engineers, and disaster scientists). It will also require research-policy coordination. As practitioners innovate with new ways of managing retreat, rigorous evaluations will be needed to provide data and analysis to inform other practitioners of their advances.<sup>22</sup> Public officials can support research and evaluation by documenting processes and outcomes (e.g., how decisions to retreat are made and where people

move after a buyout). Professional organizations can support communities of practice around retreat to facilitate knowledge exchange and learning. The private sector will also play a major role in changing financial incentives for retreat, so public-private collaborations will be needed to support residents and local governments as they adjust to new market norms.

#### Future Directions

To address the barriers to managed retreat will require evaluations, contributions from diverse actors, and vision and leadership to coordinate it all (see Figure 4).

#### Evaluations

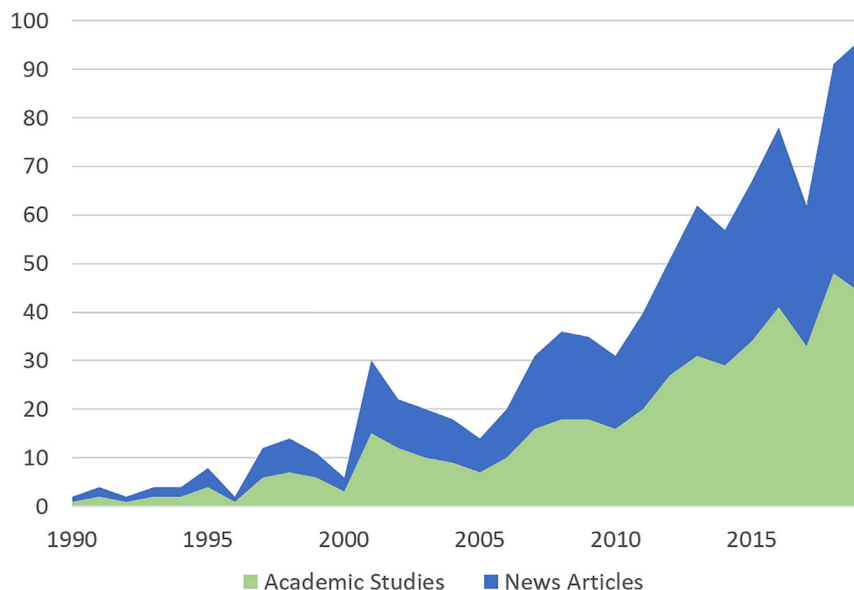
Managed retreat has only recently received attention from academia and the media (see Figure 5). Research on how US communities have overcome the barriers described above, how managed retreat has actually been managed, and what outcomes have been achieved is therefore still emerging. Soldiers Grove, Wisconsin, and Valmeyer, Illinois, demonstrated that whole-community relocation is possible, but the long-term costs, benefits, and lessons to be learned from these cases still need to be identified.<sup>32,33,78</sup> Houston, Texas, has engaged in the largest buyout program in the US, but how this was achieved or whether it has resulted in an overall reduction in flood risk for the city is still uncertain.

Even understanding what “successful” managed retreat means or looks like will require additional research. Identifying goals and metrics is a critical step in both execution and evaluation.<sup>22</sup> It may seem obvious that the goal of retreat is to move people away from risk, but there are nuances involved. For example, is the goal to move anyone who is at risk (including millionaires and new arrivals) or to help those who do not have the resources to relocate on their own? How is the land intended to be used? Common wisdom holds that large retreat programs that create one contiguous parcel are most beneficial, and this

may be true if the goal of the program is to create a floodplain to absorb storm-water,<sup>10,60</sup> but neighborhood parks and “pocket prairies” for species habitat<sup>31</sup> may serve better by being widely distributed. The best use of the land and best retreat strategy will depend on the goals to be achieved.

Funders, both public and private, can promote collaboration by supporting interdisciplinary and applied work and by encouraging or requiring broad dissemination of results and open data sharing. Managed retreat is not a purely environmental issue: it also has implications for housing, wealth inequality, transportation, energy efficiency, and environmental justice. Funding agencies and foundations who work on these issues and recognize their connections to retreat—that the relocation of large numbers of people presents a major opportunity to address environmental, social, and technological issues—will be best positioned to influence the way in which retreat occurs and the way receiving communities expand.

Media engagement will play an important role in addressing the psychological barriers to retreat. Journalism can do much to normalize the conversation, to make the concept less taboo, and the word “retreat” less provocative. Few adaptation strategies need a public relations campaign as much as managed retreat. Investigative journalism can raise awareness and provide accountability, but there is also a role for storytelling, documentaries, and other artistic media. Telling the stories of people who have retreated—why they moved, where they went, and how their lives changed—can dispel people’s fear of the unknown and provide hope. Stories of people who want to retreat but have been unable to do so can raise awareness of the risks of staying in place and the need for government support.



**Figure 5. Research and Reporting on Managed Retreat Have Recently Grown in the United States**

Based on keyword searches for “managed retreat” and “buyouts AND (flood or sea level or hurricane or storm)” in Web of Knowledge and Nexis Uni databases.

he past, creates community, passes information to newcomers, and tells a story of transformation. Memorials, reunions, documentaries, performance art, sculpture, and paintings all have potential to ease transition and enable managed retreat.

#### **Vision**

Coordinating so many actors—practitioners, media, academics, funders, artists, heritage keepers, community members—will require vision and leadership (see Figure 4). Managed retreat is a difficult thing to do, and as with most difficult

Future managed retreat will need to be creative. Almost all conversation around managed retreat in the US has focused on voluntary residential buyouts, because they have been the most common type of retreat in the US.<sup>62</sup> Other legal strategies such as conservation easements, rolling easements, transfer of development rights, public trust doctrine, and exactions have been proposed but not used or used with little recognition.<sup>8–10,62,63,94,95</sup> It seems unlikely, however, that buyouts will be the way forward, as they are expensive and difficult to scale. Academics and practitioners are trying out new legal strategies and regulations, testing communications approaches, and holding community workshops. The more creative these experiments are, the greater their potential to transform society. Retreat creates a new beginning. It begs the mind to imagine what could be: how people could live away from the coast while maintaining or even strengthening ties to the ocean, how coasts could be public lands used for public good, how floodplains could be allowed to ebb and flow with storms, how communities could live with the water rather than battle against it.

One way to encourage more creative retreat solutions could be to enlist creative people to work on the problem. The French military is recruiting science fiction authors to imagine future threats. What solutions could artists envision for adaptation? Climate fiction novels<sup>96</sup> and disaster films<sup>97</sup> change the way people think and feel about risk and could be a tool for communication or a way to envision utopian futures. Cultural heritage management is part of the retreat conversation internationally but is often overlooked in the US. Memorials, for example, are an important step in disaster recovery that are rarely used in the US.<sup>29,98</sup> One example of how commemoration and cultural heritage are tied to retreat is Portsmouth, North Carolina. Repeated storms drove the last Portsmouth residents to retreat in 1971, and the village became part of the Cape Lookout National Seashore, with a few buildings preserved as a museum. Today the Friends of Portsmouth Island and the Seashore host a biannual Homecoming celebration that gathers people with a historic tie or an interest in the island.<sup>99</sup> The celebration honors

things, people need a reason to engage. They need a goal that captures the imagination, inspires action, and coordinates the efforts of numerous people in a range of sectors; a goal such as putting a man on the moon or a New Deal effort to provide electricity to the South. Retreat is not a goal. Building sustainable, safe, economically and culturally thriving communities with strong connections to a healthy coastal environment is a goal. Managed retreat is a tool to achieve this goal.<sup>22</sup>

One vision that could inspire and coordinate action is a National Seashore—a vast public land circling the US, where everyone could access and no one would own the land.<sup>100</sup> Rosetta S. Elkin at Harvard University calls it the National Seashore in reference to existing national sea- and lakeshores: public parks set aside for recreation. A truly national-level Seashore could be a scaled-up version of these smaller parks. It could extend miles inland or just a hundred yards to provide a buffer against storms, a critical setback for development, and public land for recreation and access. The designation would not prevent working shores, remove ports or fishing harbors, or infringe on tribal rights or historic sites. It would limit infrastructure development. It would limit second, third, and fourth vacation homes and prevent buildings from accumulating too close to the shore. Some areas could be conserved more strictly and others open to more activities, and the overall Seashore would likely be a patchwork of different scales: a small path in New York City, a sweeping space in rural South Carolina. Each state or local area could implement according to local needs and would know that their efforts were building toward something large enough to truly transform the US coast.

Achieving such a grand vision would not be easy, but having vision enables people to unite and work toward a common cause, a common future. Or, proposing vision may inspire others to articulate their visions for the future. After all, a National Seashore is a controversial idea. Articulating it urges people to consider: if not a National Seashore, why not? And, if not a National Seashore, then what?

Coastal adaptation in the US currently occurs without a unifying goal or vision. Cities are walling themselves off from the ocean without discussing whether or not they want to become walled cities.<sup>100</sup> Better to have a frank discussion about goals and the role that managed retreat can play in achieving those goals.

Retreat at large scale in the US—whether managed or unmanaged—is unlikely to happen this year. It may not happen this decade. The urgency in managed retreat is to set plans in place: to have conversations about what Americans want their future coast to look like; to consider the role managed retreat can play in achieving those goals; to identify areas where retreat may need to occur; to prohibit, limit, or modify development in those areas (e.g., allow new buildings only under temporary use permits); to determine threshold conditions and tipping points at which retreat will be pursued; and to establish preliminary procedures for retreat. Conversations around retreat need to happen before the emotional turmoil of post-disaster recovery. Advance conversations also provide time for institutional reform and provide people with time to adjust psychologically to the prospect of change. For example, homes in floodplains could be purchased by the government and occupied by residents for the duration of their lives or rented on 20- or 30-year leases. A community could decide this year that when nuisance flooding occurs more than ten times in a month, they will relocate Main Street to a predesignated site at higher elevation. Or a town might simply decide not to build the new school, condominium, or fire station in the floodplain. Ceasing to advance is the first step in retreat.

All of these actions will require leadership, which is central to all climate adaptation, and managed retreat is no exception.<sup>4,78,91</sup> Leadership occurs at many levels. It can be the mayor who advocates for a coastal setback, the administrator who denies a developer's request for an exception to the building ban, or the Senator who proposes insurance reform even if it is unpopular. In short, leadership puts the long-term well-being of the town, state, or nation above short-term gratification or profit. It will be difficult. It will require sacrifice. It will also create our best opportunities for transformation.

Retreat is often mistakenly equated with defeat, but as US Marine Corps General Oliver P. Smith said, "Retreat, hell! We're just advancing in a different direction." Retreat does not have to signal failure. A strategic withdrawal is a decision to step back, find solid ground, regroup, and forge ahead in a new, more prosperous direction. It is about choosing battles, not losing them. The US has been heading down a path of concrete walls and abandoned homes. We have the chance to do better. We have the chance to rethink how we live with the coast and with each other, to build equality, and to preserve something beautiful for future generations. That does not sound like loss. That sounds like a fresh start.

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