



OPEN ACCESS

EDITED BY

Nadia Seeteram,
Columbia University, United States

REVIEWED BY

Brendon Swedlow,
Northern Illinois University, United States
Veronica Olivotto,
Urban Systems Lab, United States

*CORRESPONDENCE

David G. Casagrande
✉ dac511@lehigh.edu

RECEIVED 19 August 2024

ACCEPTED 12 March 2025

PUBLISHED 03 April 2025

CITATION

Casagrande DG and Lampman A (2025)
Ecomyopia on the Chesapeake: social and
cultural barriers to climate-induced managed
retreat.
Front. Clim. 7:1483086.
doi: 10.3389/fclim.2025.1483086

COPYRIGHT

© 2025 Casagrande and Lampman. This is an
open-access article distributed under the
terms of the [Creative Commons Attribution
License \(CC BY\)](#). The use, distribution or
reproduction in other forums is permitted,
provided the original author(s) and the
copyright owner(s) are credited and that the
original publication in this journal is cited, in
accordance with accepted academic
practice. No use, distribution or reproduction
is permitted which does not comply with
these terms.

Ecomyopia on the Chesapeake: social and cultural barriers to climate-induced managed retreat

David G. Casagrande^{1*} and Aaron Lampman²

¹Department of Sociology and Anthropology and the Center for Catastrophe Modeling and Resilience, Lehigh University, Bethlehem, PA, United States, ²Department of Anthropology and Archaeology, Washington College, Chestertown, MD, United States

Ecomyopia is the tendency to ignore important environmental information that challenges structures of power and place-based identities. Predictions of relative sea-level rise on the Eastern Shore of Maryland include catastrophic land loss over the next 50 years but have not promoted serious discussion about managed retreat. We review literature emerging from Mary Douglas' theory of the cultural construction of environmental risk and psychological theories of cognitive dissonance and social identity to examine why many residents of the Chesapeake Bay resist relocation in the face of rising sea level. We use this theoretical synthesis to analyze 63 in-depth interviews conducted on the Eastern Shore of the Chesapeake Bay to examine how social institutions and widely shared narratives of heritage and identity frame discussion of sea-level rise. Technological solutions to shoreline erosion dominate the discourse as a means of avoiding cognitive dissonance caused by relocation's existential threat to place-based identity. As predicted by the Cultural Theory of Risk, group identities shape risk perceptions associated with rising sea level and climate change. Discourse in our case study illustrates how confirmation bias is a social process and why those who challenge the status quo are marginalized as environmental information is transformed into preferred solutions. We generalize from this case study to explain how ecomyopia can preclude managed retreat as a rational strategy in regions threatened by anthropogenic climate change and rising sea levels.

KEYWORDS

managed retreat, cultural theory of risk, cognitive dissonance, social identity, climate change, tidal flooding, ecomyopia

Introduction

Smith Island, home of the watermen for centuries, is a cultural icon and tourist destination in the middle of the Chesapeake Bay on the east coast of the United States (Figure 1). Maryland's official state dessert, the Smith Island Cake originated here. With a permanent population of around 200, it is accessible only by boat. The first European occupation began in 1686, and many current residents trace their ancestry back to colonial times (Rehak, 2024, p. ix). Like most of the Chesapeake Bay area, the island is experiencing more frequent flooding due to a combination of rising sea level and tectonic subsidence (Spanger-Siegfried et al., 2017). Although hurricane Isabel in 1993 caused more damage, a few homes and businesses on Smith Island were damaged by Superstorm Sandy in 2012. To avoid the risk of potential future storm damage, some residents petitioned the state for federal buyouts of their homes (Shostak, 2022). But most residents vehemently opposed the buyouts and county officials would not approve them. Instead, residents mobilized to form a non-profit advocacy group called "Smith Island United" and successfully petitioned for structural improvements to control erosion, which they see as the real threat to the community's survival (Kobell, 2014).



FIGURE 1

Interviews conducted in Talbot, Dorchester, and Somerset Counties on Maryland's Eastern Shore revealed how group identity and cognitive dissonance shape perceptions of risk associated with rapidly rising relative sea level. Interview locations and major geographical features are identified.

The response of Smith Islanders to the buyout proposal is not unique. As we will demonstrate, it exemplifies attitudes and beliefs found on Hoopers Island, Tilghman Island, and many other communities on Maryland's Eastern Shore (Kobell, 2020). When we read about the rejection of the Smith Island buyouts, we immediately thought about the broader implications for managed retreat. With no land elevation >5 feet above sea level and most structures situated at sea level, which is projected to rise rapidly, Smith Island would appear to be an exemplary candidate for managed retreat. Instead, the events on Smith Island exemplify “agnostic adaptation” (Kuh, 2015): adapting to some effects of climate change without attending to the core problem or even admitting climate change exists. Although agnostic adaptation encourages pro-active behavior to address environmental risk, it may detract from efforts to solve the long-term problem, which can eventually overwhelm short-term efforts (Koslov, 2020). In this article, we use research we conducted on Maryland's Eastern Shore to integrate the Cultural Theory of Risk with psychological theories of cognitive dissonance and social identity to explain the rejection of managed retreat. We situate these findings within the broader issue of ecomyopia: the tendency for societies to ignore, dismiss or deny environmental information with potentially catastrophic implications (Casagrande et al., 2017).

Relative sea level rise on the Eastern Shore of Maryland

The Eastern Shore of Maryland is bordered by the Atlantic Ocean to the east, and the Chesapeake Bay on the west (Figure 1). Hundreds of miles of shoreline and numerous rivers and wetlands dominate the terrain. Nearly a third of the population of Maryland resides on the Eastern Shore, but population density is low, with small towns scattered across the landscape. The history and the future of these towns is intimately tied to the ocean and the estuary, which are experiencing rapid environmental change due to rising sea level (Rehak, 2024). Casagrande first traveled to Smith Island in September 2016 to find out more about the failed buyout proposal and sample the famous cake. Upon disembarking from the ferry, he was surprised to find the streets knee-deep in water, blocking access to his accommodations. There was no storm. It was an abnormally high tide. It turns out that such “sunny day flooding” has become increasingly common and many locals consider it to be normal.

Maryland's Eastern Shore region is highly vulnerable to tidal flooding (Figure 2) and storm surge due to low elevation, land subsidence, erosion, and rising sea level resulting from glacial melt and warming ocean waters (Scott, n. d.). The IPCC (2023) indicates that relative sea level rise along the East Coast of the United States is



FIGURE 2

Abnormally high tides that cause “nuisance flooding” in the Chesapeake are becoming higher and more frequent because of rising absolute sea level combined with tectonic subsidence. Commercial fishing infrastructure like this Chesapeake waterman’s shanty built to accommodate tidal flooding are an example of an adaptation that will eventually be overwhelmed.

accelerating due to anthropogenic climate change. Relative sea level is a result of changes in both absolute sea level and land elevation. Relative sea level (RSL) in the Chesapeake area is rising 50% faster than places like New York City because of tectonic subsidence that began with glacial retreat at the end of the Pleistocene (Piecuch et al., 2018). RSL has risen more than a foot over the past 100 years (Boon et al., 2010), and Boesch (2015) suggests that the accelerated effect of climate change could result in RSL rise of 5.7 feet by 2100.

The largest impacts of increased flooding on the Eastern Shore of Maryland will be seen in Somerset, Dorchester, Talbot, and Queen Anne’s counties. In this region approximately 41,000 homes worth nearly \$20 billion USD are situated <5 feet above mean high-tide lines (Boesch, 2015). Nearly 60% of Dorchester County lies in the 100-year floodplain (Cole and Shore, 2008). Tidal nuisance flooding, or “sunny day flooding,” exceeding 1.5 feet above mean high water, has risen rapidly in these counties, and could become a daily occurrence along the waterfront by 2050 (Sweet et al., 2014). Spanger-Siegfried et al. (2014) indicated that the waterfront in the city of Cambridge, in Dorchester County, will go from 30 flood events per year today to 242 flood events per year by 2050. According to Cole and Shore (2008), outside of Louisiana, Texas, Florida and North Carolina, the lower Eastern Shore between Dorchester County, Maryland, and Accomack County, Virginia have the largest population in the United States that is facing this extensive level of flood risk.

Shoreline erosion exacerbates the problem in the region. According to the Maryland Shore Erosion Task Force (2000), more than 260 acres of tidal shoreline are lost each year in Maryland. This is approximately 4.7 million cubic yards of shoreline eroding annually on the Chesapeake Bay (Chesapeake Bay Program Nutrient Subcommittee Sediment Workgroup’s Tidal Sediment Task Force, 2005). The average rate of erosion in the region is a foot per year, but in some locations, it can be as much as 10 feet per year. This translates

into 45,000 acres of shoreline lost over the past century. Erosion will accelerate with rising sea level (Maryland Shore Erosion Task Force, 2000).

The Eastern Shore is also vulnerable to flooding from increasing frequency and intensity of hurricanes and storms associated with human-induced climate change. Modeling by Emanuel (2005) indicates that, over the past 40 years, North Atlantic hurricanes have increased in accumulated annual duration by roughly 60% and that annual average storm wind speeds have increased by 50% over the same period. Low lying land, disappearing wetlands, unprotected shorelines, and eroding barrier islands along the Eastern Shore all allow for storm surge to be more destructive. In severe storms, people describe cars being flooded, houses falling into the bay, and even floating caskets that have emerged in the floods. Under existing conditions, the smallest increase in sea level can exacerbate storm flooding, and even weak storms will have magnified effects on people and property. The Eastern Shore Land Conservancy (2015) estimates that by the year 2050 a Category 1 hurricane with just a five-foot storm surge could flood more than 10,000 homes in the region.

Flooding currently impacts homes, commercial real estate, farms, forests, wetlands, and infrastructure, causing billions of dollars in damage and increasingly forcing people to relocate. Annapolis and Baltimore have experienced a 900% increase in flooding in their historic downtown areas. Estimates are that, without structural solutions, these cities will experience more than 300 flood events per year by 2100. Annapolis, the state capital, is spending \$82 million to control tidal flooding in its historic waterfront (Stephenson, 2024). Ocean City, a tourism powerhouse in Maryland, spends upwards of \$10 million dollars every 4 years on beach renewal to keep its structures intact (Koslof, 2022).

Residents of the Eastern Shore are well-attuned to environmental changes (Rehak, 2024). They point out the encroachment of “ghost

forests”—stands of dead trees killed by salt-water intrusion (Kirwan and Gedan, 2019)—and the loss of large tracts of land to erosion in places like Hooper’s Island, which is losing 24 acres a year (Kobell, 2020). Septic systems are failing as the water table rises. Residents lament the loss of cultural heritage as cemeteries erode and collapse into water. In locations that are dealing with increased frequency of tidal “sunny day flooding,” people adapt by donning high-water waders, building berms around their yards, driving inexpensive used “saltwater cars” during high tides (Figure 3), and elevating homes and garages (Figure 4). Demographic and economic changes combined with inundation and erosion have contributed to abandonment of several Chesapeake Islands over the last 100 years (Arenstam Gibbons and Nicholls, 2006; Kenney and Brainard, 2014). In a process we will refer to as “retreat by attrition,” older family homes in rural areas have been left to decay into the encroaching marsh (Figure 5) as younger generations move away for economic opportunity.

Although there is variation in beliefs based on age, occupation, religion, and political orientation, many long-term residents on the Eastern Shore avoid discussing climate change even as they lose their land to its forces (Kobell, 2020). Instead, they explain changes as immutable natural cycles and point to the forces of erosion which can be partially managed through structural solutions. The State of Maryland is proactive in providing support for climate adaptation, but local governments focus mostly on infrastructure improvements to control erosion and manage “nuisance” flooding. No comprehensive policies exist to address the problem of long-term rising sea level. Meanwhile, realtors talk about the “last mortgage cycle” in parts of the region due to banks being unwilling to underwrite mortgages with

high flood risk. Blackwater National Wildlife Refuge (Figure 1) is purchasing land and homes to create coastal wetland migration corridors. The Maryland Department of Transportation is questioning investments in roads and bridges serving areas soon to be uninhabitable. Emergency personnel face increasing difficulties responding to areas frequently flooded by high tides.

Managed retreat as a policy option

The population exposed to sea level rise in North America could increase by 71% to 580,000 between 2020 and 2040 (IPCC, 2023, p. 100). By 2100, Hauer et al. (2016) predict a potential 13.1 million Americans could be migrating because of rising sea level. The population that will be impacted on Maryland’s Eastern Shore is small, but the culture is iconic of the heritage of the Chesapeake and their water-based livelihoods make them highly vulnerable. What are potential solutions to the problem of rising sea level? Most American policy makers and the public prefer structural solutions like dams, seawalls, bulkheads, levees, dikes, flood containment reservoirs, drainage canals, raised roads, raised utilities, or beach nourishment (Bukvic and Owen, 2017; Mileti, 1999, p. 144). Each of these have negative impacts. For example, levees and dikes encourage development in areas naturally prone to flooding (Di Baldassarre et al., 2018), which can have lethal consequences, as in the case of levee failures in New Orleans during Hurricane Katrina (Pilkey et al., 2016, p. 41–49). Although a seawall might preclude surface water from entering a protected area, hydrostatic pressure of the



FIGURE 3

Many residents of Smith Island use older inexpensive “saltwater cars” during nuisance tidal flooding because of corrosion from the salt. Such adaptations help residents “normalize” events that others would find difficult. The red and white building is the only school on the island and is attended by eight students ranging from preschool through 7th grade. The potential loss of such cultural institutions due to declining population threatens community-based identity.



FIGURE 4

This Eastern Shore home has been elevated with a new and higher foundation to avoid water damage to living areas. Preferences for such structural solutions help to avoid the cognitive dissonance associated with more demanding solutions like relocation or managed retreat. Agnostic adaptation (attempts to mitigate increasing flood risk while avoiding topics like climate change or rising sea level) can alleviate risk in the short term while increasing it over the long term.



FIGURE 5

Retreat by attrition: multigenerational homes abandoned by younger residents who see little economic incentive to adapt properties to rising sea level dot the landscape. Here we see tidal salt marsh species like *Phragmites australis* and *Spartina* spp. taking over an abandoned property.

ocean forces water underground through sand or porous rock, which must be pumped out at great expense and risk of pump failure, which also occurred in New Orleans. A seawall also blocks inland rainwater from escaping a protected area during a high rain event like a hurricane, which causes flooding. Public funding for structural projects is contingent on benefit–cost analyses (Sylves,

2012). The value of real estate in Manhattan justifies high costs of protective infrastructure. This would not be true for sparsely populated places like Smith Island.

Individual property owners can make improvements to their homes and businesses like elevating a structure (Figure 4) or installing tide-control berms around a property (Cole and Shore, 2008). While

an elevated structure may protect personal items, utility delivery and access to the structure for emergency response are precluded during flooding. The National Flood Insurance Program (NFIP) requires participating communities to adapt and enforce such mitigations through building ordinances. In exchange, members of the community can purchase flood insurance from the federal government at a discount (Horn and Webel, 2023). Although the goal is to promote resilient development, the unintended consequence is that NFIP has encouraged more development in flood-prone areas (Peralta and Scott, 2024). Increased flooding resulting from climate change, beginning with Hurricane Katrina and Superstorm Sandy, has caused insurance claims to exceed revenue from premiums leaving the NFIP over \$20 billion debt (Horn and Webel, 2023).

We assume most of the people in our study area do not want to relocate. But the landscape is dotted with homes abandoned to encroaching wetlands (Cole and Shore, 2008). Perhaps retreat caused by flooding and erosion could be more efficient, effective, and equitable if relocations are planned and supported with resources (Siders et al., 2021). “Managed retreat” refers to strategic assistance for the relocation of people and infrastructure away from areas vulnerable to hazards such as rising sea level and flooding (Hino et al., 2017). In the US, retreat has occurred mostly in the form of voluntary buyouts funded by Federal Emergency Management Agency (FEMA) or Housing and Urban Development (HUD) programs in which the government purchases property at fair-market value, removes structures, and the vacant land is turned over to the local government with the restriction that it can never be built on again (Siders, 2019). Some local governments have used the land to create parks for recreation while others have restored wetlands for flood control (Zavar and Hagelman Iii, 2016). The ethical justification for encouraging and assisting relocation from high-risk areas is to reduce injury and loss of life. Managed retreat could also relieve the pressure that increasing disasters resulting from climate change are placing on emergency responders (Arnell, 2022), in some cases overwhelming emergency management agencies.

A systematic approach to managed retreat would mitigate the emerging insurance crisis. Banerjee et al. (2024) estimate that over the last 30 years natural catastrophe insured losses have grown annually by 3% more than the global economy (p. 2). NFIP is heavily burdened by “repetitive loss” properties (Hayat and Moore, 2015) that can be prioritized for relocation with managed retreat (Frimpong et al., 2019). Escalating claims from climate-related hazards like hurricane winds are undermining private insurance profitability and firms are withdrawing coverage from entire states (First Street Foundation, 2023). Louisiana and Florida have created publicly backed insurers of last resort to ensure mortgages on homes and businesses can be obtained in flood-prone areas. As the impacts of climate change accelerate, artificially extending the availability of low-cost insurance is unsustainable and will likely replicate the human tragedy of New Orleans.

Managed retreat would also allow governments to strategically plan for disinvestment in infrastructure. State agencies like the Maryland Department of Transportation face decisions whether to continue maintaining or building roads and bridges serving areas likely to be uninhabitable within the typical 30-year planning cycle. Accepting managed retreat also presents the potential to transform the perception that humans can indefinitely subjugate nature because it requires a degree of humility and recognition of the value of natural ecological processes (Siders et al., 2021; Koslov, 2016).

We are not promoting managed retreat as a panacea. Some coastal cities will easily meet benefit–cost assessments and have geo-physical characteristics amenable to structural solutions. The loss of tax base when residents relocate to other jurisdictions threatens the financial stability of coastal municipalities, although comprehensive planned relocations within the same jurisdiction can help maintain the tax base (BenDor et al., 2020; Knobloch, 2005). Loss of tax base is more likely with *de facto* retreat by attrition.

Managed retreat has social justice implications. While the public generally supports voluntary buyouts, involuntary relocation using eminent domain raises concerns that governments may not act in an equitable manner (Mach et al., 2019; Siders, 2019). FEMA buyouts require benefit–cost justifications that can disqualify sparsely populated areas with low home values or promote “disproportionate protection of wealthy homeowners and relocation of low-income homeowners” (Siders, 2019, p. 250), depending on political and economic context.

Marino (2018) and Koslov (2016) document cases in which groups of homeowners desire relocation but governments attempt to deny them. In other cases, the majority in a community and their leaders may oppose relocations, which, as in the case of Smith Island, denies the opportunity to the few who want them. If the fair market value of a home is low or over-mortgaged, lower-income and elderly homeowners may not be able to afford a new home and cannot accept a buyout. Ideally, as in the case of Valmeyer, Illinois, plans are made collaboratively and inclusively to encourage equitable outcomes and protect the tax base (Knobloch, 2005). Siders et al. (2021) suggest that equitably just processes of managed retreat may offer potential to correct broad social inequities. While residents may feel that managed retreat amounts to appropriation of land and erasure of cultural heritage, it can provide a haven from the impacts of climate change and allow communities to reinvent themselves in a new location.

Statistical analyses of survey data to identify variables that influence perceptions and attitudes about relocation or buyouts provide a starting point for explaining socio-political outcomes of cases like ours. Although demographic and socio-economic characteristics are important variables, they alone have proven insufficient for predicting perceptions of relocation (Bubeck et al., 2018). Concern about flood risk has been correlated with support for buyouts (e.g., Hotard and Ross, 2023; Seebauer and Winkler, 2020). Studies have found that people who have experienced floods recently (Frimpong et al., 2019) or frequently (Bukvic et al., 2018; Robinson et al., 2018) are more likely to support or accept buyouts. Our research area experienced significant flooding from storms in 2003, 2007, and 2012 and many residents contend with chronic tidal flooding more than once per month. To our knowledge, only one property has ever been bought out in our study area and opposition to buyouts remains entrenched (Kobell, 2020). Although Chesapeake residents fear erosion, they express little concern about rising sea level, which appears to bias them toward agnostic adaptation and structural solutions.

Homeowner trust in buyout program administrators tends to increase the likelihood of participation (De Vries and Fraser, 2012; Kick et al., 2011). How was trust gained to allow buyouts in Staten Island (Koslov, 2016) but not on Smith Island? The theoretical framework we present below situates trust within the concept of group identity. Although attachment to place and community influence attitudes about buyouts, research has not clearly identified under

which conditions this translates into accepting or rejecting buyouts (De Vries and Fraser, 2012; Koslov, 2016; Phillips et al., 2012; Robinson et al., 2018).

If all the variables described above were similar between two communities, we still would not be able to predict which would embrace or reject buyout proposals. We propose a theoretical framework of how individual cognition and social dynamics interact to create ecomyopia and lead to rejection or alteration of environmental information that might encourage managed retreat.

Theoretical basis for Ecomyopia as an impediment to managed retreat

Here, we develop a theoretical framework for explaining perceptions of managed retreat on Maryland's Eastern Shore, including the potential for evading or denying the topic of rising sea level. Cultural Theory of Risk (CTR), first proposed by Douglas and Wildavsky (1982), has been applied widely in risk perception research (Siegrist and Árvai, 2020). We integrate CTR with psychological theories of cognitive dissonance and social identity to explain why many residents around the Chesapeake Bay strongly resist relocation in the face of rising sea level.

The essence of CTR is that any individual's perceptions of threats conform to their identity and worldview, both of which emerge from the social groups they feel they belong to and groups they are opposed to (Johnson and Swedlow, 2024). For Douglas and Wildavsky (1982), group membership conforms to two social dimensions: willingness to accept social controls (grid) and levels of group commitment (group). These social dimensions determine which types of threats or risks will be of concern to individuals who fall within one of four categories created by the two dimensions. They argued that environmentalists favor egalitarianism and tend to be more concerned with social equity and justice, mistrust large corporations and government bureaucracies, and therefore fear the impacts of technologies like nuclear energy. Conservative capitalists are more individualistic, eschew institutional control, value meritocracy, and focus on risks emerging from social upheaval that might threaten the free market.

Four subsequent decades of research demonstrated that clusters of characteristics and values associated with social groups correlate with concern about specific types of risks, including new technologies, environmental contamination, natural disasters, or climate change (cf. Buss and Craik, 1983; Chassang et al., 2024; Kahan, 2012; Johnson et al., 2020; Johnson and Swedlow, 2021; Wildavsky and Dake, 1990). Maibach et al. (2009) demonstrated how concern, dismissal, or denial regarding global warming is strongly correlated with social group characteristics and values like those proposed by Douglas and Wildavsky. Thompson (2003) admonished that differences in CTR values should be identified and brought to the forefront of conversations about climate change to facilitate progress through democratic compromise. His suggestion has influenced approaches to international treaty negotiation, IPCC recommendations, and participatory national policy processes (Verweij et al., 2022). In this study, we are using CTR to understand why perspectives on flood risk and solutions differ between residents and policymakers on a local scale.

An alternative explanation for perceptions of types of risk emerged independently in psychometric research with more of a focus

on characteristics of the risks than characteristics of people (Siegrist and Árvai, 2020). This research indicated that two dimensions—uncertainty (how much is known about the threat) and dread (how afraid someone is about a threat)—greatly influence risk perceptions. Other researchers have found additional factors, including how widespread impacts could be, trust in experts, and ability to control the threat (Chassang et al., 2024). Quantitative survey researchers synthesized CTR and psychometric approaches to further clarify correlations between social groups and specific threats (Chassang et al., 2024; Kahan, 2012; Johnson and Swedlow, 2024). For example, why would some people feel more dread about a risk like climate change than others? But like Chassang et al. (2024), we are interested not just in what people perceive as threatening or why, but how such perceptions function.

Here, we build on the success of previous theoretical syntheses by utilizing cognitive dissonance theory to explain how social characteristics influence which characteristics of risks are attended to. We posit that in-group commitment and attachment to place can both impact risk perception. It is through socially mediated management of cognitive dissonance that people develop perceptions and behaviors related to dread, uncertainty, trust in experts, extent of potential impact, or ability to control a threat (Chassang et al., 2024). Why might sense of place cause a person to feel more dread and stronger group identity and how might positions on continuous survey scales lead to specific behaviors?

Leon Festinger proposed the theory of cognitive dissonance in which he argued that a person experiences psychological discomfort if two cognitions or behaviors are equally important but logically contradictory (Festinger, 1957). As a result of this discomfort, the subject changes a belief or behavior or seeks new information to enhance the consonant cognitions or diminish the importance of the dissonant cognition. This theory became a dominant paradigm in psychological research and led to hundreds of experiments in which subjects were forced to deal with their cognitive dissonance under controlled conditions so that researchers could observe changes in the values, opinions, or behaviors of research subjects (Harmon-Jones and Mills, 2019). The bulk of this research focused on individuals in experimental settings, but some social psychologists have followed Festinger's original focus on group dynamics (Cooper, 2007).

In their participant observation of cult members who believed the world would be destroyed, Festinger et al. (1956) found that cult members who were alone when the prophecy was disconfirmed changed their beliefs about the prophecy. Those who were together became even more committed to their beliefs and started to proselytize more aggressively. The cult members could not ignore that the world was not destroyed any more than our Chesapeake research subjects can ignore the impacts of rising sea level. In both cases, reactions to cognitive dissonance are a process of both individual cognition and social interaction.

Narratives of rising sea level and disappearing land have the potential to induce fear of loss of property, community, and identity among the residents and business owners around the Chesapeake. When experimental participants are confronted with a fear-evoking cognition that requires a difficult solution like a behavior change, they are more likely to engage in denial than those presented with a solution that appears more reasonable to achieve (Aronson, 2008). This conforms to research showing that people are more likely to engage in disaster mitigation behaviors if they believe they have the

capacity to successfully complete them; either alone (Babcicky and Seebauer, 2019) or as a group (Bubeck et al., 2018). In this way, individual cognition produces perceptions of risk control as measured in surveys (Chassang et al., 2024). Abandoning one's home and relocating is a difficult, socially contentious, and likely unreasonable option for many people (Hotard and Ross, 2023; Shostak, 2022). We would expect that the tendency of our Chesapeake research subjects to engage in denial of rising sea level and/or engage in structural solutions, even ones unlikely to succeed in the long run, will be heavily influenced by social interaction. Social processes influence how individual cognition leads to levels of dread or perceptions of risk control as measured in survey research (Chassang et al., 2024).

Festinger (1957) and subsequent researchers have emphasized that the more commitment one has to a belief, value, or behavior, the higher the potential is for cognitive dissonance (Harmon-Jones et al., 2015). Multigenerational attachment to place (referred to colloquially in our study area as "been-heres") in our Chesapeake population represents a high identity commitment that would be challenged by rising sea level and land loss. For more recent transplants (referred to colloquially as "come-heres"), difficult life-changing decisions like investing in a retirement home on the Chesapeake shoreline would also represent a high commitment. In all cases, people faced with the prospect of leaving a home and community are likely to resist relocation, even in the face of potentially catastrophic loss.

How people react to cognitive dissonance is heavily influenced by the groups they consider themselves to belong to or aspire to belong to. According to Social Identity Theory (Tajfel et al., 1979), much of one's personal identity is constructed out of their group membership; both how we see ourselves conforming to our group's values and ideals and how these are used to differentiate in-groups from contrasting groups in which "...a social category acquires its meaning by contrast with other categories" (Hogg, 2001, p. 56). Our perceptions of what represents a risk (Douglas and Wildavsky, 1982), including climate change, terrorism, or social deviance, are based on the values and ideals we use to categorize social groups, including how we believe contrasting groups are constructing risk differently.

Cognitive dissonance has also been shown to cause confirmation bias (Festinger, 1957 referred to this as "selective exposure"). To avoid dissonance-arousing situations, people prefer to be exposed to information supporting rather than conflicting with their current beliefs (Fischer and Greitemeyer, 2010). Kahan (2012) and Newman et al. (2018) found that the worldviews developed within the Cultural Theory of Risk influence the way people choose information and information sources when thinking about climate change. This could bias perceptions of how certain experts are about risk severity (Chassang et al., 2024). We would expect our Chesapeake research subjects experiencing rising sea level to select information that would avoid cognitive dissonance as they seek to explain their observations. Furthermore, much of the information they are selectively exposed to would likely be repeated in conversation. Confirmation bias is strongly associated with group commitment and identity (Kahan, 2012). Very strong commitments to group identity challenged by very serious threats like rising sea level could likely exacerbate confirmation bias and denial and result in proselytization like that documented by Festinger et al. (1956).

How might we explain impediments to managed retreat in our case study? Many inhabitants of the Chesapeake's Eastern Shore must find themselves in a state of chronic cognitive dissonance. Multi-generational residents, or been-heres, feel their commitment to

place-based heritage is threatened, whether they accept rising sea-level and climate change or perceive others who believe in climate change as a threat. Retired and part-time come-heres must experience cognitive dissonance that normally follows the commitment of an important life-decision like buying a house and later realizing it is at high risk for flood damage (Festinger, 1957). Neither would escape chronic cognitive dissonance caused by observing increased tidal flooding, encroaching ghost forests, coastal erosion, or media attention to rising sea level. The slow onset of the problem would allow for social norms of cognitive and physical adaptation to develop. This process would be punctuated by moments of crises, like Superstorm Sandy and the Smith Island buyout proposal, that cause acute disconfirmation of normality. We would expect these events to generate perceptions of threat to within-group cohesion (e.g., some Smith Island residents wanted to be bought out) and threats from external contrasting groups (e.g., big government bureaucracies and environmental alarmists who "want us to leave"). We are interested in documenting how individual cognitive processes interact with social dynamics to produce reactions like the formation of Smith Island United and their aggressive pursuit of structural solutions.

Methods

The research study area included Talbot, Dorchester, and Somerset Counties on the Eastern Shore of Maryland (Figure 1), all of which are experiencing higher tides and are at increasing risk of flood damage over the next 50–100 years. Between May 2017 and July 2019, we conducted 63 semi-structured interviews. Forty-eight interviews were with homeowners, retirees, Chesapeake watermen, educators, realtors, tourism operators, restaurant owners, and others. Chesapeake watermen are independent commercial fishermen of oysters and blue crabs who tend to be religious and are respected regionally for their work ethic (Paolisso, 2002). Interviewees were recruited by contacting government offices, businesses, and people mentioned in news stories, through personal references (snowball sampling) and recruiting people during chance encounters while doing field work. Interviews were conducted in-person in residences or workplaces. We also conducted 15 policy interviews with county planners, floodplain and wildlife refuge managers, local emergency managers and dispatchers, elected officials, and the director of a conservation organization. Interviews lasted between 45 and 120 min and totaled 48 h and 28 min. All interviews were audio recorded and transcribed verbatim. Each interview was given a unique identifier by which the identities of interviewees could not be known. Transcriptions were then imported into MAXQDA for thematic analysis (Vaismoradi et al., 2013).

Semi-structured interviews followed an interview guide with a set of prepared questions. We began by asking what "the Chesapeake means to you" to solicit narratives of sense of place. Subsequent questions about tidal and storm surge flooding and the future of the community were intended to invoke cognitive dissonance. Interview questions also probed for identity, community and sense of place, flooding experience and perception of flood risk, individual and community adaptations to flooding, and observations and perceptions of the impact of climate change on flooding. We also encouraged interviewees to speak freely about topics related to flooding, and interviewers probed interesting or unexpected answers to solicit more in-depth perspectives.

An “explanatory research question” clarifies an identified phenomenon to explain why it occurs and produce hypotheses (Barroga and Matanguihan, 2022). We ask: how do individual cognition and social dynamics interact to preclude managed retreat as a response to rising sea level on the Eastern Shore of the Chesapeake? We assume that cognitive dissonance results from the conflict between physical evidence or information about rising sea level due to climate change and place-based identity and decisions to move into coastal areas. We derived seven hypotheses (Table 1) from the theoretical synthesis, which we tested using thematic analysis (Vaismoradi et al., 2013) in MAXQDA. We developed 29 codes for themes relating to phenomena predicted by the Cultural Theory of Risk, Group Identity Theory, and Cognitive Dissonance Theory. We then coded all 63 semi-structured interviews to identify, quantify, and present examples of how the hypotheses were supported or rejected. The tests of hypotheses were binary: statements providing evidence for the items in Table 1 exist in the discursive data or they do not. But we also provide quantitative support and explanations for our interpretations in our results.

Using MAXQDA, we systematically coded transcribed interviews for themes related to our deductive hypotheses (Vaismoradi et al., 2013), such as climate change, sea-level rise, erosion, identity, history, decision making, community and personal adaptations to flooding, and attitudes about relocation. MaxQDA allows users to query codes to identify relationships such as how often codes co-occur in coded text. We determined the frequency in which themes overlapped, revealing associations between concepts that emerged in narratives. All quotations below were excerpted from interview transcriptions. They are identified by a number and location where they were conducted or identified as an interview with policymakers.

Results

Our goal was to test hypotheses resulting from theoretical synthesis of the Cultural Theory of Risk (CTR), Cognitive Dissonance Theory, and Social Identity Theory to deductively explain how our

study population thinks about risks of rising sea level and how that influences adaptive decisions including potential relocation. Of the 80 people we interviewed, 49 were male and 31 were female, 47% were life-long, mostly multi-generational, residents (been-heres) and 53% had moved into the area more recently (come-heres). Eight interviewees were self-described watermen.

All interviewees expressed apprehension about the future of the region, whether it was loss of cultural heritage and economic decline or loss of land because of rising sea level and erosion. About half the interviewees (47%) expressed belief in rising sea level, 29% denied it, and 23% were unclear. All policy interviewees expressed concern about rising relative sea level and its impacts but expressed reservations about discussing it outside of their professional networks. Fifty-six percent of the interviewees who expressed belief in rising sea level were come-heres and 44% were been-heres. The been-heres who expressed belief tended to be college educated and work in government or education. The largest difference was that those who clearly denied sea level was rising were twice as likely to be been-heres (67%) than come-heres (33%). Of the eight watermen, one expressed belief in rising sea level, two denied it, and five were uncommitted.

All but one of the emergency managers or policy experts were favorable about managed retreat, and every policy interviewee expressed concern about impacts on community and heritage. They noted that rising sea level hinders emergency response, threatens property values and property tax revenue, and will soon require infrastructure disinvestment decisions. None of the county or municipal personnel were implementing buyout programs or had near-term plans to do so. Among non-policy interviewees, 48% expressed negative attitudes about managed retreat and buyouts, 30% expressed positive attitudes and 22% were ambivalent. This indicates a gap between policy makers who see a need to begin planning for retreat and a public mostly ambivalent or somewhat hostile to the idea. As one policy interviewee put it:

Retreat is a four-letter word for a lot of the communities that you go into. You're going to learn that they really do not want to give up their heritage or their family's land or whatever... (Policy 6).

TABLE 1 Hypotheses generated by the explanatory research question: how do individual cognition and social dynamics interact to preclude managed retreat as a response to rising sea level on the Eastern Shore of the Chesapeake? The theory from which each hypothesis derives is identified to indicate overlap within our theoretical synthesis. The test of each hypothesis is that interviewees will produce statements that serve as examples of each hypothesis or not.

Hypotheses	Theoretical perspective		
	Cultural theory of risk	Social identity	Cognitive dissonance
1. Commitment to group identity when evaluating threats	X	X	
2. Selective attention to risks because of commitment to decisions, sense of place, or cultural heritage	X	X	X
3. Psychological discomfort resulting from contradictory cognitions		X	X
4. Denial or evasion of relative sea-level rise			X
5. Social processes defining the feasibility of solutions	X	X	X
6. Denigrating or ignoring information that contradicts beliefs (confirmation bias)			X
7. Reactive behaviors like agnostic adaptation to tidal flooding, political engagement, or proselytizing	X	X	X

Belief in rising sea level appears to influence attitudes about managed retreat and buyouts. Of the interviewees who expressed favorable attitudes about managed retreat and buyouts, 82% expressed belief in rising sea level and 18% were uncommitted. No one who denied that sea level is rising had favorable attitudes about relocation. Conversely, of those with negative attitudes about managed retreat and buyouts, 47% denied sea level was rising, 23% believed sea level was rising, and 30% were uncommitted. As might be expected, come-heres were twice as likely as been-heres to have favorable attitudes toward buyouts and managed retreat.

Hypothesis 1: commitment to group identity when evaluating threats

In our analysis of interviews with the public, we coded 611 segments of text with the theme of group identity. The most common overlapping theme (42% of segments) was expressing a sense of community. For example:

It's the small-town feel. Every story you hear about a small town, everyone knows everyone, everyone's children play together, all of that is true... Everyone was a waterman. If you did not help on your dad's boat, maybe one of the neighbors needed help on their boat, and everyone helped out... (Cambridge 1).

...if someone's in trouble, everyone is there and I mean everyone. If you cannot pay your electric bill, the church is gonna pay it or someone is gonna anonymously pay it. (Smith Island 4).

Another important overlapping theme (27% of segments) was using local environmental knowledge to mark group identity and boundaries:

Some of those watermen are not dumb. They're not educated but they are intelligent... And there's generations of data, what you call data, what we call just history (Crisfield 5).

People here know how to survive because they do know how to live off of Mother Nature. They know how to fish, they know how to forage, they know how to get through a storm, they know what to do when they do not have energy. (Smith Island 16).

...you think all of these with damn PhDs, and they think they know what they are talking about and they are dead, damn wrong... I have a different perspective, because I live on an isolated island. It gives me insight and I can understand it a lot more than they can. (Smith Island 3).

Somewhat less common, we found the theme of group identity overlapped with cultural heritage and tradition (11% of segments):

... our town is built on maritime heritage. And a smaller part, on agriculture heritage, that's who we are... We continue to harvest the bounty of the bay, even when there was no harvest to be harvested anymore... Those are the citizens that make up the heritage of the last two to three hundred years of this region. (Crisfield 2).

The most pronounced example of a threat to cultural integrity posed by an outside group is how Smith Islanders viewed the buyout proposal as externally motivated and disrespectful of group identity:

They tried getting us off here after Sandy. They tried buying everybody out and there's quite a few people here that said they would not leave here unless they were in a coffin. So, there was no way they were letting them. (Smith Island 14).

I think the government thought it was a good idea in a lot of ways 'cause they... would've helped some people, but the community felt like it would harm the neighborhood, so to speak, it will destroy our culture and they are very proud of their culture here and want to maintain it. (Smith Island 10).

Quite a few people had talked about if they left the buyout on the table and Maryland tried pushing people off of the island, that we would try and push for Virginia to pick us up as part of their state. (Smith Island 14).

As predicted by CTR and Social Identity Theory, these statements validate Hypothesis 1. Interviewees expressed commitment to group identity when evaluating threats. In response to our interview questions about flooding and government buyouts, residents explicitly excluded outsiders and government agents from a shared in-group sense of community that is based on social capital, cultural heritage, and ecological knowledge.

Hypothesis 2: selective attention to risks because of commitment to decisions, sense of place, or cultural heritage

Out of 611 interview segments relating to group identity, 106 (17%) involved discussion of risk or threats. Risk of losing heritage or community, including the dying lifestyle of the watermen, was mentioned in 26% of policy interviews, but 40% of interviews with the public. Policy interviewees focused more on the risk of losing heritage in a professional sense of protected assets:

I think there needs to be a political will to help the community be resilient, not to just say, you need to move—looking at the heritage of the people, you cannot get that back. You cannot just move them 20 miles and say their heritage is the same. It's the history of the state, because we are a water-dependent state in so many areas. (Policy 4).

Although residents do see themselves as emblematic of a cultural ideal...

I think the other thing about the island is that it's such, it's very interesting to me that the state identity of Maryland is so consumed by what we are on Smith Island. You know, blue crabs, the Chesapeake Bay, the Smith Island cake. All that is so important and we are the heart of that. (Smith Island 4).

...they were more concerned with how social change might affect their personal identities and blur social group boundaries:

There's still a lot of good people down there, but there's also been an influx of retirees down there in areas. I do not even know who these people are. (St. Michaels 1).

I hate to see these islands turn into a bunch of high-rises. Once upon a time this marina would be chock full with nothing but workboats. You hardly ever saw a party boat, you never saw a sailboat, but that kind of gives you an idea of how many watermen there is left. It's a dying breed...It used to be that everybody was related to everybody around here. It's not that way anymore. (Hoopers Island 1).

We got the millennials and the 'yuppies' on the upper island... they'll be here soon I'm sure...I hate to say it but they are out in the middle of the road with their bicycles and their double baby strollers and they are jogging... and got their goddamn kayaks all over the place. (Hoopers Island 4).

But some were willing to accept social change to avoid losing all sense of place:

...my faith shows me that while the work on the water is kind of ebbing away and...it's so difficult to make a living on the water, that it's being replaced by tourism, you know, and I believe, I believe God has sent that to us to sustain us and cause us to be able to stay here. (Smith Island 5).

Loss of population was a frequent topic among the public; in particular, whether cultural institutions like churches, schools, fire departments, and stores are sustainable.

When I was growing up, everybody knew everybody. Um, the highlight was the church. That's where we congregated. Almost everybody on the island would go to church and I notice now that both churches are only a handful of people in them. (Hoopers Island 2).

...we have three churches and we do not have many people but we can manage to keep three churches going just on this small community and, uh, so we take one day at a time and that's all we can do. (Smith Island 8).

Well a family of five moved here and we only lost four people that year! (Smith Island 7).

These perceptions are nested within a group-based Eastern Shore worldview that local heritage and culture are not valued by outsiders, which creates the risk of disinvestment:

Who's going to buy houses on Smith Island to fix it up if the government says we are not supporting Smith Island anymore. (Crisfield 5).

So, after Hurricane Sandy they were ready to do a buyout of the island, which would have bought out houses of anyone who wanted to sell out. But they only allotted two million dollars for it. It'd have also made us ineligible for any assistance whatsoever, meaning that from that point forward they would have given up on the island. (Smith Island 4).

This perception reflects a very real benefit–cost policy worldview:

...we were told by the state nobody wanted to put money into anything that was going to be below a certain sea level or was in a flood hazard. (Policy 9).

Residents clearly indicate that erosion, not sea-level rise, is the primary threat to their resources, lifestyle and heritage. Policymakers, on the other hand, view erosion as a major problem that is conceptualized within a broader context of rising sea level. Residents assert that erosion is an immediate threat to their community and should be prioritized to allow for structural solutions:

I've been living on this island...all my whole life. And as far as I can see, I do not see where the sea level has risen that much. We get eroded away...and we have got to get something done for that. (Smith Island 15).

Well our thoughts, based here on the island, is that our problem is more related to erosion than climate change...for me climate change exists but it's less serious. It's not an immediate concern here on the island. Our immediate concern is erosion...erosion will do us in long before climate change. (Smith Island 4).

Flooding? Right here, right now we do get flooded out. But we need to build some bulkheads...especially around this part of the island...because we are getting washed away. (Smith Island 15).

...if they'd have put bulkheads or stones around Holland Island, it'd still be there today. (Smith Island 14).

Interviewees mentioned concerns about other types of risks from flooding, but these tended not to co-occur with statements about group identity. Risks that flooding poses to infrastructure, tax base, and emergency response were mentioned only in policy interviews.

In our discussion of group identity above, we provide examples of high-commitment of multi-generational been-heres to a sense of community, cultural heritage, and group identity. Come-heres also expressed commitment to their decisions to relocate into the area. One woman married a been-here waterman and they decided to live on Smith Island. When asked if she would consider relocation, her response was personal, but also alludes to her group commitment:

No. Oh, no, never...Because this is your home, and it's my husband's...he has his boat and we have our home, you know, and history, the culture, we would not want to give up on it. No, no. Most people, most everybody would not. (Smith Island 13).

These statements validate Hypothesis 2. As predicted by CTR and Social Identity Theory, commitment to sense of place and cultural heritage influenced which risks people would pay attention to. Residents were less concerned about sea-level rise and more concerned with the effects that out-migration or government disinvestment would have on the community. Interviewees focused on the failure of the government to address erosion, which shifts blame to the out-group. Cognitive Dissonance Theory predicts that

information contradicting important decisions like who to marry or where to live can create cognitive dissonance and therefore influence perceptions of risks.

Hypothesis 3: psychological discomfort resulting from contradictory cognitions

We identified 10 examples of people clearly talking about psychological discomfort that we attribute to cognitive dissonance. For example:

It's kind of like it comes up, like especially in high tide it will get worse or whatever but it's not like, we do not come together and sit around a table and discuss the future, we are just kinda living for tomorrow more than worry because if you worry, you can worry yourself to death. (Ragged Point 1).

Because I know what's coming...I'll be dead and planted but...I really have a big concern for my grandchildren. I know what they are going to inherit. (Crisfield 1).

Okay, erosion is the big issue here. I wish that all the monies that was put towards the studies for the global warming...sea level rise? Well it scares the crap out of people so I guess that's what the TV's want, you know...It's erosion here. (Hoopers Island 3).

As expressed by a floodplain manager who is a been-here:

If you mention the word sea level rise, it really explodes in their mind...people depend on the water a hundred percent for their income...so they are right to deny it, because once they stop denying it, then they put doubt into their lives and once they put doubt into their livelihood, what else do you have? (Policy 5).

As predicted by Cognitive Dissonance Theory, these statements validate Hypothesis 3. Cognitive dissonance emerges in these interviews due to contradictory cognitions that cause psychological discomfort. This discomfort forms the basis for responses to threats described in the following hypotheses.

Hypothesis 4: denial or evasion of relative sea-level rise

We found 40 examples of people denying sea level is rising that we believe result from cognitive dissonance induced by our questions:

This right here is a marina...where my grandfather used to keep his boat tied up. When I was a little, little boy...I remember climbing on and off the boat, and I do not see any difference of what it was like 50-some years ago. (Hoopers Island 1).

Me relocate? I ain't going nowhere. Not because of flooding. That's not going to make me move, flooding...I'll be 75 in October and I've been living out here all my whole life. And as far as I can see, I do not see where the sea level has risen that much. (Smith Island 15).

...I do not think that man can destroy what God has created. We need to watch what we do, we need to throw trash where it needs to go, and we need to do all the things, you know, that common sense tells you to do, and things that the Bible says is right to do pertaining to our environment and other things, but I do not think we can destroy the world or whatever, I just do not believe it. (Smith Island 11).

...you hear all this stuff about we are sinking, we are sinking. We're not sinking. We're eroding away, but we are not sinking. (Smith Island 15).

You know, I remember when I was a kid. That sea level has not come up. It's not no difference. It's erosion. (Hoopers Island 3).

Cognitive Dissonance Theory predicts that people are more likely to engage in denial if a cognition they have high commitment to is threatened. The statements above validate Hypothesis 4. Interviewees situated their denial of sea level rise within high commitment to sense of place, group identity, religious belief, or life histories.

Hypothesis 5: social processes defining the feasibility of solutions

Relocation, including buyouts, is an unreasonable option for many interviewees:

No. I would not do it...Unless, you know, the tides come in relentlessly into the homes and, you know, you just cannot keep doing that over and over. That would be the only way. (Smith Island 5).

Structural adaptation to erosion is by far the preferred solution. We coded 129 segments of text in which interviewees were talking about erosion. These were heavily concentrated in interviews with residents of Smith, Hoopers, and Deal Islands. In Hoopers Island Interview 3, 19% of the interviewee's verbiage was dedicated to erosion. Our data suggest that high commitment to group identity leads people to focus on erosion, rather than sea-level rise, to avoid cognitive dissonance. Homeowners perceive structural strategies to be more feasible, like raising a house to avoid water damage or installing bulkheads or rip rap to control erosion:

There's my house. I got a six-foot high foundation. I'm not gonna get flooded again. I've even got the garage floor above flood level. (Hoopers Island 1).

...a lot of them, after that hurricane, they started, they lifted their houses and put a couple more layers of cinder block to raise it up. (Royal Oak 1).

The old man used to come and get the tires...and would lay tires up and down the shoreline to stop the erosion. (Hoopers Island 1).

Large-scale erosion control is expensive, so homeowners and business owners have channeled their concern into lobbying for government projects:

...we have the Smith Island United...We have a lobbyist...she lobbied to...help us get funding for the jetties and stuff that they built and the project they are doing down here now to shore up the shoreline over there to keep from eroding. (Smith Island 1).

These types of statements validate Hypothesis 5. Per Social Identity Theory, interviewees construct identity as members of a group. As predicted by the Cultural Theory of Risk, group identity determines what types of risk an individual will be concerned about. Cognitive dissonance encourages interviewees to attend to risks that have solutions over which they can exercise more control. A major contribution of our theoretical synthesis is the implication that belonging to a group will enhance a sense of control. In this case, by interacting with other group members, interviewees leveraged group identity to lobby outside the group for structural solutions to erosion instead of managed retreat.

Hypothesis 6: denigrating or ignoring information that contradicts beliefs

Confirmation bias is interpreting or focusing on information that is consonant with deep convictions while ignoring contradictory information. This often results from cognitive dissonance. Residents and business owners provided numerous explanations of why their observations were evidence of erosion and not rising sea level:

If sea-level rise is the problem, why did the west side of Highland's Island go so much faster and the marsh is still on the east side. (Crisfield 5).

Various explanations for why ghost forests (Figure 6) do not result from saltwater intrusion provide a good example:

Now there's a big old pine and it's dead, but there's one right beside it - perfectly healthy...it do not make sense. There's a thing called pine beetles and a lot of times if you go and look you'll see little teeny-tiny holes in the trees and there's sawdust at the bottom of them and that's from these pine beetles... (Hoopers Island 1).

Regional biologists assert that pine beetle infestation is a problem that is exacerbated by saltwater weakening the trees. They point to the ground vegetation below the trees converting to salt-tolerant aquatic species as evidence for rising sea level. Both parties are paying attention to details consonant with their worldviews.

We also documented a type of confirmation bias that borders on proselytization. Policymakers, elected officials, and residents who believe in rising sea level are self-censoring either from fear of retribution or because they fear that invoking sea level rise will interfere with the ability to carry out their directives. This effectively eliminates dissonant information for all members of the community:

...it took me forever to understand that you do not talk about climate change down here. You talk about erosion and flooding, and that's okay. But do not talk about climate change. (Deal Island 1).

Oh, absolutely a hot potato. You talk with someone at the counter and you can get yelled at. 'It's never, ever flooded on my property. The sea level rise does not matter.' (Policy 5).



FIGURE 6

"Ghost forests" in which trees are dying off can be observed along coastal areas of the Chesapeake. Worldviews associated with different social identities determine whether people believe trees are dying because of saltwater intrusion into upland forest as a result of rising sea level or there are other causes like pine bark beetles.

“...we cannot think about this; it’s the third rail in politics on the Eastern Shore to talk about sea-level rise, climate change, anything that has to do with changes to the environment.” (Policy 2).

If sea-level rise is a third rail, managed retreat is like a fifth rail. It’s an asteroid. (Policy 2).

These types of statements validate Hypothesis 6 that interviewees are engaging in confirmation bias because of cognitive dissonance. Self-censorship highlights how confirmation bias is a socially normative process.

Hypothesis 7: reactive behaviors like agnostic adaptation to tidal flooding, political engagement, or proselytizing

We found multiple statements to support Hypothesis 7. Political lobbying for erosion control by Smith Island United can be considered a form of proselytizing as a socialized response to deep cognitive dissonance like that predicted by Festinger et al. (1956). Interviewees also attempted to proselytize us directly:

Please, please just listen to the erosion. That’s all I ask. Just listen to the people tell you about the erosion. (Hoopers Island 3).

Our coding method revealed an unanticipated theme we believe results from cognitive dissonance. Many interviewees downplayed the inconveniences and financial expenses incurred from nuisance tidal flooding, implying that it is a normal part of living near the water.

But you can get where you need to get, you know, if you have got boots, or if you drive through it. We just drive through it. (Smith Island 14).

They’re a minor inconvenience, really. I think the last count was fifty-seven days a year we have tidal flooding out of three hundred. (Smith Island 4).

We labeled this phenomenon “normalization” to recognize it is an adaptive social norm. We coded 145 segments of text with the normalization theme. Of the 10 most heavily coded interviews, six were from Smith Island. Although many normalized adaptations occurred within the household, they must be socially legitimated as normal to alleviate cognitive dissonance:

You just kind of deal with it. Living down here you just kinda learn. It’s like oh, the tide’s high, just drive slowly through. And like if I see the tide’s high I’ll take my mom so they can go to town for a couple hours and wait for the tide to go down because she’s got a smaller crossover SUV. (Ragged Point 1).

Deal with it. Move on. And that’s what everybody is used to where I’m from. That’s it. What’d you have to do? Oh, I had to go buy new boots because mine were dry rotted and my feet got wet. What else did you do? Oh, I got a sump pump. End of conversation, literally. End of conversation. (Trappe 1).

Many normalized adaptations involve cooperation, which contributes to a sense of community and shared identity of resilient people. For example, school busses cannot drive through standing water:

I would pick up all the kids down here that needed to get to school. Twice a morning I’d take them up to the Phillips Crab House up there and I’d meet the bus and all the kids would get on it. (Fishing Creek 1).

...it’s a community effort, and the community will step up to the plate and help transport to a bus if needed. (Church Creek 1).

We found evidence of agnostic adaptation in our interview data. Of the interviewees who denied sea level was rising, 82% engaged in some form of personal adaptation (whether simply buying waterproof boots or elevating a house) or community-based adaptation (lobbying for erosion control or driving children through flooded roads to meet the school bus). None of these interviewees expressed positive attitudes about managed retreat or relocation. In some cases, they were cognizant of their agnostic adaptation. As one interviewee put it:

I go to meetings. I’ll wink and nod and say, ‘Yes, sea level’s coming up,’ as long as they are giving me a shoreline. (Crisfield 5).

Been-heres rarely made negative comments about come-heres who conform to social norms like working hard, attending church, and helping neighbors. Indeed, it appears that come-heres leveraged the risk posed to local identity by external forces to integrate into been-here culture. Most of the founders of Smith Island United, including the first president, were come-heres who were clear about their intent for the Smith Island Vision Plan to capitalize on local heritage including tourism based on waterman experiences and a waterman apprenticeship program:

...and within Smith Island United’s plan, there’s talk for, uh, economic development and growth. And we wanted to keep the watermen up front and as the main thing, we wanna preserve our culture, we wanna preserve the island itself and the birding life and just bring everything together so people can understand what we are all about. (Smith Island 4).

Surprisingly few residents mentioned risk of flooding to home equity whether from water damage or discouraging potential buyers. Retirees who had purchased homes did not have mortgages and expressed little concern about legacies. Multigenerational homeowners had little equity in older homes that do not conform to building codes and many had been abandoned. Instead, risk to home equity was used to delineate social group boundaries. Been-heres believed people who buy or build homes as investments drive up the tax base and were complicit in the Smith Island buyout:

...there was this whole thing about, ‘our home values will decline.’ Well, that would come from come-heres, not from people that were born and raised here. Because they do not want their home value being higher, ‘cause it just means their property taxes are higher and

they are not planning to sell. They're just planning to live here the rest of their lives. (Smith Island 7).

It was politics! It was one family on the island who were come-heres who bought a house and wanted to leave but had overpaid, bought the house during the real estate bubble...so they had no way out. So they went to FEMA when FEMA came and proposed this buyout ... We saw that as a signal that hey, you do this, it's gonna send a message to the politicians and to the general public that we have had it and they are starting to buyout houses. So, we opposed it on those grounds. (Smith Island 4).

In addition to Cognitive Dissonance Theory, Hypothesis 7 derives from Social Identity Theory and CTR. Behaviors like proselytizing and agnostic adaptation are perceived to be socially desirable and are a response to threats that are selected for attention based on group identity.

Discussion

We found evidence to support each of the seven hypotheses we produced through the synthesis of Cognitive Dissonance Theory, CTR, and Social Identity Theory (Table 1). Festinger et al. (1956) case study showed how disconfirmation of the belief that the world would end led to greater belief commitment and proselytization. In a similar process, our interviewees respond to environmental signals of rising sea level by denying sea level rise and engaging in proselytization about erosion and government disinvestment. Interviewees also engage in confirmation bias when determining what information to pay attention to when evaluating risk. As predicted by Social Identity Theory, interviewees made statements about their identity that were based heavily on groups they perceived they belong to. Consistent with the findings from other CTR research, group-based identity determined which threats interviewees attended to and strongly biased adaptive behaviors.

In addition to helping explain why residents do not consider managed retreat as a response to rising sea level, we hope our theoretical synthesis advances the social science of risk perception more generally. In particular, we use cognitive dissonance to explain why identity biases groups to attend to specific risks or threats as predicted by CTR. We also provide evidence for how the management of cognitive dissonance is a social process.

Although discursive data from our study elucidates mechanisms for how thought processes and social interaction lead to correlations between group identity and concern about types of risk documented by extant survey research, we recognize limits to our qualitative methodology. One limitation is that we did not directly measure commitment to membership in the four social categories predicted by CTR. Kahan (2012) and Johnson and Swedlow (2024) argue that self-identification with a group is not binary but exists along a continuum of group commitment (group) and acceptance of control (grid). In the future we could code our qualitative data for group and grid dimensions. Alternatively, future survey research might combine CTR indices with indices that measure cognitive dissonance to identify additional pathways through which risk perceptions are formed (Chassang et al., 2024). Additionally, although we provide evidence for processes that lead to beliefs and behaviors, we cannot know how these phenomena

are distributed throughout the population without quantitative survey data that would be particularly useful for public policy.

Conclusion

Ecomyopia occurs when groups, including entire civilizations, use social and cognitive processes to ignore, deny, or discount important environmental information that challenges structures of power or place-based identities. In their analysis of the American Southwest, Casagrande and Peters (2013) demonstrated how communities responded to cognitive dissonance caused by the trauma of rapidly dwindling water reserves. The notion that there might be too many people and too little water was taboo. Instead, communities discussed structural solutions that could reduce water consumption and extend settlement of the region in the short term while ignoring the long-term implications. Kuh (2015) calls adapting to climate change using short-term, ecomyopic solutions that ignore the root cause or even deny the existence of climate change “agnostic adaptation.”

Our goal was to provide a theoretical exposition for ecomyopia and agnostic adaptation. We have demonstrated how the evolution of social identities can bias different groups of people to attend to different types of risk and interpret and share information to support those biases. Residents of Maryland's Eastern Shore with a deep commitment to their heritage and sense of community respond to cognitive dissonance caused by the existential threat of rising sea level by focusing their attention and actions on the problem of erosion. This appears to have resulted in agnostic adaptation. All efforts are dedicated to mitigating the immediate impacts of flooding and erosion with no attention to managed retreat or mitigating greenhouse gas emissions. Floodplain managers who are intentionally avoiding the topics of climate change and rising sea level in order to encourage flood mitigation behavior are promoting agnostic adaptation. Marino and Lazrus (2015) argue that externally imposed problem definitions of rising sea level denigrate local knowledge and constrain choices. In a democracy where policymakers must adapt to the beliefs of constituents, choices like managed retreat may be constrained by agnostic adaptation.

Agnostic adaptation leads to ecomyopia by creating a dangerous illusion of addressing a problem but failing to solve the root cause of the problem with potentially dire long-term implications. Much like Festinger's cult members waiting to be rescued, the current global socio-political system has spent most of the last three decades seeking technological breakthroughs to save us from anthropogenic climate change rather than making difficult decisions like disinvesting in infrastructure and relocating populations that will be displaced by rising sea level (Pilkey et al., 2016). As our case study indicates, providing more detailed evidence of rising sea level will not change beliefs because of confirmation bias. As our quotes demonstrate, using science to frame a problem will not change opinions because it comes from a potentially threatening external group. It appears that only softening the boundaries between groups could enhance the flow and effect of information.

Data availability statement

The datasets presented in this article are not readily available because of interviewee anonymity. Requests to access the datasets should be directed to dac511@lehigh.edu.

Ethics statement

The studies involving humans were approved by the Lehigh University Institutional Review Board. The studies were conducted in accordance with the local legislation and institutional requirements. The ethics committee/institutional review board waived the requirement of written informed consent for participation from the participants or the participants' legal guardians/next of kin because the study received exempt status.

Author contributions

DC: Writing – original draft, Writing – review & editing. AL: Writing – original draft, Writing – review & editing.

Funding

The author(s) declare that financial support was received for the research and/or publication of this article. Research expenses were funded by a Washington College Douglass Cater Society of Junior Fellows Research Grant, Washington College Collaborative Research Grant, Hodson Trust Grant and a Lehigh University Faculty Research Grant.

References

- Arenstam Gibbons, S. J., and Nicholls, R. J. (2006). Island abandonment and sea-level rise: an historical analog from the Chesapeake Bay, USA. *Glob. Environ. Chang.* 16, 40–47. doi: 10.1016/j.gloenvcha.2005.10.002
- Arnell, N. W. (2022). The implications of climate change for emergency planning. *Int. J. Disaster Risk Reduc.* 83:103425. doi: 10.1016/j.ijdrr.2022.103425
- Aronson, E. (2008). Fear, denial, and sensible action in the face of disasters. *Soc. Res. Int. Q.* 75, 855–872. doi: 10.1353/sor.2008.0033
- Babicky, P., and Seebauer, S. (2019). Unpacking protection motivation theory: evidence for a separate protective and non-protective route in private flood mitigation behavior. *J. Risk Res.* 22, 1503–1521. doi: 10.1080/13669877.2018.1485175
- Banerjee, D. C., Bevere, L., Garbers, H., Grollmund, D. B., Lechner, R., and Weigel, D. A. (2024). Natural catastrophes in 2023: Gearing up for today's and tomorrow's weather risks. Zurich: Swiss Re.
- Barroga, E., and Matanguihan, G. J. (2022). A practical guide to writing quantitative and qualitative research questions and hypotheses in scholarly articles. *J. Korean Med. Sci.* 37, e121–e120. doi: 10.3346/jkms.2022.37.e121
- BenDor, T. K., Salvesen, D., Kamrath, C., and Ganser, B. (2020). Floodplain buyouts and municipal finance. *Nat. Hazards Rev.* 21:04020020. doi: 10.1061/(ASCE)NH.1527-6996.0000380
- Boesch, D. F. (2015). Come high water: sea level rise and Chesapeake Bay. College Park, MD: Maryland Sea Grant.
- Boon, J. D., Brubaker, J. M., and Forrest, D. R. (2010). Chesapeake Bay land subsidence and sea level change: An evaluation of past and present trends and future outlook. Gloucester Point, VA: Virginia Institute of Marine Science.
- Bubeck, P., Wouter Botzen, W. J., Laudan, J., Aerts, J. C. J. H., and Thieken, A. H. (2018). Insights into flood-coping appraisals of protection motivation theory: empirical evidence from Germany and France. *Risk Anal.* 38, 1239–1257. doi: 10.1111/risa.12938
- Bukvic, A., and Owen, G. (2017). Attitudes towards relocation following hurricane Sandy: should we stay or should we go? *Disasters* 41, 101–123. doi: 10.1111/disa.12186
- Bukvic, A., Zhu, H., Lavoie, R., and Becker, A. (2018). The role of proximity to waterfront in residents' relocation decision-making post-hurricane Sandy. *Ocean Coastal Manage.* 154, 8–19. doi: 10.1016/j.ocecoaman.2018.01.002
- Buss, D. M., and Craik, K. H. (1983). Contemporary worldviews: personal and policy implications. *J. Appl. Soc. Psychol.* 13, 259–280. doi: 10.1111/j.1559-1816.1983.tb01739.x
- Casagrande, D. G., Jones, E. C., Wyndham, F. S., Stepp, J. R., and Zarger, R. (2017). Ecomyopia in the Anthropocene. *Anthropol. Today* 33, 23–25. doi: 10.1111/1467-8322.12326
- Casagrande, D. G., and Peters, C. (2013). "Ecomyopia meets the longue durée: an information ecology of the increasingly arid southwestern United States" in

Acknowledgments

The authors wish to acknowledge the following students who assisted with interviews and data analysis: Kirstin (Webb) Janocha, Haley Hartman, Seth Miller, Emily Rugg, Sarah McGee, Tiana Edwards, Michael Hudak, Daniel McDowell, and Keira Burger.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Environmental anthropology: Future directions. eds. H. Kopnina and E. Shoreman (New York, NY: Routledge), 97–144.

Chassang, I., Rohmer, O., and Chauvin, B. (2024). Cultural values, risk characteristics, and risk perceptions of controversial issues: How does cultural theory work? New York, NY: Wiley.

Chesapeake Bay Program Nutrient Subcommittee Sediment Workgroup's Tidal Sediment Task Force. (2005). Available online at: <https://nepis.epa.gov> (Accessed July 15, 2024).

Cole, W. D., and Shore, M. E. (2008). Sea level rise: Technical guidance for Dorchester County. Annapolis, MD: Maryland Eastern Shore Resource Conservation & Development Council.

Cooper, J. M. (2007). Cognitive dissonance: 50 years of a classic theory. Los Angeles, CA: Sage.

De Vries, H. D., and Fraser, J. C. (2012). Citizenship rights and voluntary decision making in post-disaster U.S. floodplain buyout mitigation programs. *Int. J. Mass Emerg. Disasters* 30, 1–33. doi: 10.1177/028072701203000101

Di Baldassarre, G., Kreibich, H., Vorogushyn, S., Aerts, J., Arnbjerg-Nielsen, K., Barendrecht, M., et al. (2018). Hess opinions: an interdisciplinary research agenda to explore the unintended consequences of structural flood protection. *Hydrol. Earth Syst. Sci.* 22, 5629–5637. doi: 10.5194/hess-22-5629-2018

Douglas, M., and Wildavsky, A. B. (1982). Risk and culture an essay on the selection of technological and environmental dangers. Berkeley, CA: University of California Press.

Eastern Shore Land Conservancy (2015). Eastern shore coastal resilience assessment. Easton, MD: Eastern Shore Land Conservancy.

Emanuel, K. (2005). Increasing destructiveness of tropical cyclones over the past 30 years. *Nature* 436, 686–688. doi: 10.1038/nature03906

Festinger, L. (1957). A theory of cognitive dissonance. New York, NY: Harper and Row.

Festinger, L., Riecken, H. W., and Schacter, S. (1956). When prophecy fails. Minneapolis, MN: University of Minnesota Press.

First Street Foundation (2023). The 9th National Risk Assessment: The insurance issue. New York, NY: First Street Foundation.

Fischer, P., and Greitemeyer, T. (2010). A new look at selective-exposure effects: an integrative model. *Curr. Dir. Psychol. Sci.* 19, 384–389. doi: 10.1177/0963721410391246

Frimpong, E., Kruse, J., Howard, G., Davidson, R., Trainor, J., and Nozick, L. (2019). Measuring heterogeneous Price effects for home acquisition programs in at-risk regions. *South. Econ. J.* 85, 1108–1131. doi: 10.1002/soej.12341

Harmon-Jones, E., Harmon-Jones, C., and Levy, N. (2015). An action-based model of cognitive-dissonance processes. *Curr. Dir. Psychol. Sci.* 24, 184–189. doi: 10.1177/0963721414566449

- Harmon-Jones, E., and Mills, J. (2019). "An introduction to cognitive dissonance theory and an overview of current perspectives on the theory" in *Cognitive dissonance: Reexamining a pivotal theory in psychology*. 2nd ed (Harmon-Jones, E. E., Washington, DC: American Psychological Association), 3–24.
- Hauer, M. E., Evans, J. M., and Mishra, D. R. (2016). Millions projected to be at risk from sea-level rise in the continental United States. *Nat. Clim. Change* 6, 691–695. doi: 10.1038/nclimate2961
- Hayat, B., and Moore, R. (2015). Addressing affordability and long-term resiliency through the National Flood Insurance Program. *Environ. Law Rep.* 45, 10338–10349.
- Hino, M., Field, C. B., and Mach, K. J. (2017). Managed retreat as a response to natural hazard risk. *Nat. Clim. Chang.* 7, 364–370. doi: 10.1038/nclimate3252
- Hogg, M. A. (2001). "Social categorization, depersonalization, and group behavior" in *Blackwell handbook of social psychology: Group processes*. eds. M. A. Hogg and R. S. Tindale (Malden, MA: Blackwell Publishers), 56–85.
- Horn, D. P., and Webel, B. (2023). Introduction to the National Flood Insurance Program (NFIP). Washington, DC: Congressional Research Service.
- Hotard, A. E., and Ross, A. D. (2023). Home buyout without relocation: an examination of dissonant hazard mitigation perceptions among Gulf Coast residents. *Risk Hazards Crisis Pub. Policy* 13:e12284. doi: 10.1002/rhc3.12284
- IPCC. (2023). "Climate change 2023: synthesis report. Contribution of working groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change." Geneva, Switzerland: IPCC.
- Johnson, B. B., and Swedlow, B. (2024). Measuring cultural identities in cultural theory survey research. *Soc. Sci. Q.* 105, 1565–1586. doi: 10.1111/ssqu.13419
- Johnson, B. B., and Swedlow, B. (2021). Cultural theory's contributions to risk analysis: a thematic review with directions and resources for further research. *Risk Anal.* 41, 429–455. doi: 10.1111/risa.13299
- Johnson, B. B., Swedlow, B., and Mayorga, M. W. (2020). Cultural theory and cultural cognition theory survey measures: confirmatory factoring and predictive validity of factor scores for judged risk. *J. Risk Res.* 23, 1467–1490. doi: 10.1080/13669877.2019.1687577
- Kahan, D. M. (2012). "Cultural cognition as a conception of the cultural theory of risk" in *Handbook of risk theory: Epistemology, decision theory, ethics, and social implications of risk*. eds. S. Roesser, R. Hillerbrand, P. Sandin and M. Peterson (Dordrecht: Springer Netherlands), 725–759.
- Kenney, A., and Brainard, J. (2014). Vanished Chesapeake Islands Chesapeake quarterly, 13(2 & 3). Available online at: <https://www.chesapeakequarterly.net/sealevel/main12/> (Accessed June 2, 2024).
- Kick, E. L., Fraser, J. C., Fulkerson, G. M., McKinney, L. A., and De Vries, D. H. (2011). Repetitive flood victims and acceptance of FEMA mitigation offers: an analysis with community-system policy implications. *Disasters* 35, 510–539. doi: 10.1111/j.1467-7717.2011.01226.x
- Kirwan, M. L., and Gedan, K. B. (2019). Sea-level driven land conversion and the formation of ghost forests. *Nat. Clim. Chang.* 9, 450–457. doi: 10.1038/s41558-019-0488-7
- Knobloch, D. M. (2005). Moving a Community in the Aftermath of the great 1993 Midwest flood. *J. Contemp. Water Res. Educ.* 130, 41–45. doi: 10.1111/j.1936-704X.2005.mp130001008.x
- Kobell, R. (2014). Early warnings from smith and Tangier Islands. *Chesapeake Q.* 13, 2–3.
- Kobell, R. (2020). Residents can only watch as sea slowly devours their towns. Mayo, MD: Bay Journal.
- Koslof, E. (2022). It costs nearly \$10M to replenish Ocean City's beaches every four years. *WUSA9*. Available at: <https://www.wusa9.com/article/news/verify/cost-of-repairing-damaged-beaches-erosionstorms-ocean-city-fact-check-2022/65-e829632d-1d6a-4a63-b763-378ee38065d5> (Accessed March 22, 2025).
- Koslov, L. (2016). The case for retreat. *Publ. Cult.* 28, 359–387. doi: 10.1215/08992363-3427487
- Koslov, L. (2020). "Avoiding climate change: 'agnostic adaptation' and the politics of public silence" in *Environmental governance in a populist/authoritarian era*. ed. J. McCarthy (London: Routledge), 268–280.
- Kuh, K. F. (2015). Agnostic adaptation. *Environmental law. Reporter* 45, 10046–10048. Available at: http://repository.uchastings.edu/faculty_scholarship/1485 (Accessed March 22, 2025).
- Mach, K. J., Kraan, C. M., Hino, M., Siders, A. R., Johnston, E. M., and Field, C. B. (2019). Managed retreat through voluntary buyouts of flood-prone properties. *Sci. Adv.* 5:eax8995. doi: 10.1126/sciadv.aax8995
- Maibach, E., Roser-Renouf, C., and Leiserowitz, A. (2009). *Global Warming's six Americas 2009: An audience segmentation analysis*. New Haven, CT: Yale project on climate change and the George Mason University Center for climate change communication.
- Marino, E. (2018). Adaptation privilege and voluntary buyouts: perspectives on ethnocentrism in sea level rise relocation and retreat policies in the US. *Glob. Environ. Chang.* 49, 10–13. doi: 10.1016/j.gloenvcha.2018.01.002
- Marino, E., and Lazrus, H. (2015). Migration or forced displacement?: the complex choices of climate change and disaster migrants in Shishmaref, Alaska and Nanumea, Tuvalu. *Hum. Organ.* 74, 341–350. doi: 10.17730/0018-7259-74.4.341
- Maryland Shore Erosion Task Force (2000). State of Maryland shore Erosion task force final report. Annapolis, MD: Maryland Shore Erosion Task Force.
- Mileti, D. S. (1999). *Disasters by design: A reassessment of natural hazards in the United States*. Washington, DC: Joseph Henry Press.
- Newman, T. P., Nisbet, E. C., and Nisbet, M. C. (2018). Climate change, cultural cognition, and media effects: worldviews drive news selectivity, biased processing, and polarized attitudes. *Public Underst. Sci.* 27, 985–1002. doi: 10.1177/0963662518801170
- Paolisso, M. (2002). Blue crabs and controversy on the Chesapeake Bay: a cultural model for understanding watermen's reasoning about blue crab management. *Hum. Organ.* 61, 226–239. doi: 10.17730/humo.61.3.2dc5c4gxap2f6nvw
- Peralta, A., and Scott, J. B. (2024). Does the National Flood Insurance Program Drive Migration to higher risk areas? *J. Assoc. Environ. Resour. Econ.* 11, 287–318. doi: 10.1086/726155
- Phillips, B., Stukes, P. A., and Jenkins, P. (2012). Freedom Hill is not for sale, and neither is the lower ninth Ward. *J. Black Stud.* 43, 405–426. doi: 10.1177/0021934711425489
- Piecuch, C. G., Huybers, P., Hay, C. C., Kemp, A. C., Little, C. M., Mitrovica, J. X., et al. (2018). Origin of spatial variation in US East Coast sea-level trends during 1900–2017. *Nature* 564, 400–404. doi: 10.1038/s41586-018-0787-6
- Pilkey, O. H., Pilkey-Jarvis, L., and Pilkey, K. C. (2016). *Retreat from a rising sea: Hard choices in an age of climate change*. New York, NY: Columbia University Press.
- Rehak, J. K. (2024). *We live in the water: Climate, aging, and Socioecology on Smith Island*. Baltimore, MD: Johns Hopkins University Press.
- Robinson, C. S., Davidson, R. A., Trainor, J. E., Kruse, J. L., and Nozick, L. K. (2018). Homeowner acceptance of voluntary property acquisition offers. *Int. J. Disaster Risk Reduc.* 31, 234–242. doi: 10.1016/j.ijdrr.2018.05.002
- Scott, M. (n. d.). *Dorchester County flood vulnerability study*. Study commissioned for the eastern shore conservancy. Easton, MD.
- Seebauer, S., and Winkler, C. (2020). Should I stay or should I go? Factors in household decisions for or against relocation from a flood risk area. *Glob. Environ. Chang.* 60:102018. doi: 10.1016/j.gloenvcha.2019.102018
- Siders, A. R. (2019). Social justice implications of US managed retreat buyout programs. *Clim. Chang.* 152, 239–257. doi: 10.1007/s10584-018-2272-5
- Siders, A. R., Ajibade, I., and Casagrande, D. (2021). Transformative potential of managed retreat as climate adaptation. *Curr. Opin. Environ. Sustain.* 50, 272–280. doi: 10.1016/j.cosust.2021.06.007
- Siegrist, M., and Árvai, J. (2020). Risk perception: reflections on 40 years of research. *Risk Anal.* 40, 2191–2206. doi: 10.1111/risa.13599
- Shostak, C. (2022). For the sake of the Smith Island cake: a reinterpretation of the Stafford act to facilitate culturally informed community buyouts and relocation. *Duke Environ. Law Policy Forum* 32, 329–356. Available at: <https://scholarship.law.duke.edu/delpf/vol32/iss2/4> (Accessed March 22, 2025).
- Spanger-Siegfried, E., Dahl, K., Caldas, A., Udvardy, S., Cleetus, R., Worth, P., et al. (2017). When rising seas hit home: Hard choices ahead for hundreds of US coastal communities. Washington, DC: Union of Concerned Scientists.
- Spanger-Siegfried, E., Fitzpatrick, M., and Dahl, K. (2014). *Encroaching tides: how sea level rise and tidal flooding threaten U.S. east and Gulf Coast communities over the next 30 years*. Cambridge, MA: Union of Concerned Scientists.
- Stephenson, M. (2024). City of Annapolis awarded \$3.7 million in flood and Stormwater mitigation Grant funding. Annapolis, MD: Office of the Mayor. Available at: <https://www.annapolis.gov/CivicAlerts.aspx?AID=1816> (Accessed July 15, 2024).
- Sylves, R. T. (2012). "Federal Emergency Management Comes of age: 1979–2001" in *Emergency management: The American experience, 1900–2010*. eds. C. B. Rubin, A. Jones and A. Kovacich (Boca Raton, FL: CRC Press), 115–166.
- Sweet, W., Park, J., Marra, J., Zervas, C., Gill, S., et al. (2014). *Sea level rise and nuisance flood frequency changes around the United States*. NOAA technical report NOS CO-OPS 073. Silver Spring, MD: National Oceanic and Atmospheric Administration, National Ocean Service.
- Tajfel, H., Turner, J. C., Austin, W. G., and Worchel, S. (1979). An integrative theory of intergroup conflict. *Org. Identity Reader* 56:65.
- Thompson, M. (2003). Cultural theory, climate change and clumsiness. *Econ. Political Wkly.* 38, 5107–5112. Available at: <http://www.jstor.org/stable/4414349>. (Accessed March 22, 2025).
- Vaismoradi, M., Turunen, H., and Bondas, T. (2013). Content analysis and thematic analysis: implications for conducting a qualitative descriptive study. *Nurs. Health Sci.* 15, 398–405. doi: 10.1111/nhs.12048
- Verweij, M., Ney, S., and Thompson, M. (2022). Cultural Theory's contributions to climate science: reply to Hansson. *Eur. J. Philos. Sci.* 12:34. doi: 10.1007/s13194-022-00464-y
- Wildavsky, A., and Dake, K. (1990). Theories of risk perception: who fears what and why? *Daedalus* 119, 41–60.
- Zavar, E., and Hagelman Iii, R. R. (2016). Land use change on U.S. floodplain buyout sites, 1990–2000. *Disaster Prev. Manag.* 25, 360–374. doi: 10.1108/DPM-01-2016-0021