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Disasters, migrations, and the unintended consequences of urbanization: What's the harm in getting out of harm's way?

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Abstract   Under many circumstances, the global rural-to-urban migration trend may be increasingly adopted as a short-term coping strategy to shifting ecologies and natural disasters. While offering certain benefits from macro-level economic and public health perspectives, these migrations may also have unintended psychological consequences that are not easily understood through traditional disaster studies or cost–benefit analyses. If the goal of disaster and climate change research is to promote successful adaptation, then the long-term psychological well-being of people who have survived disaster and either adapted in situ or migrated into urban environments, is paramount. This article integrates research on disasters and climate change-induced migration with emerging perspectives from environmental psychology and the psychology of natural disasters to consider the potential costs of particular migration scenarios. We apply this analysis to the case of Shishmaref, Alaska, a rural Iñupiat community on the northwest coast of Alaska facing habitual flooding disasters linked to climate change. Findings from Shishmaref illustrate the cultural vitality of subsistence landscapes and the potential health risks of compromised human–ecological relationships due to migration and/or displacement. Recommendations for policy makers and researchers are offered for promoting long-term well-being among affected individuals and communities.

Keywords   Disasters · Migration · Climate change · Environmental psychology · American Indians · Alaska Natives · Mental health · Health

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Introduction

Disasters today are contributing to migration pressures in unprecedented ways. The Internal Displacement Monitoring Centre (IDMC) recently released a report indicating that disasters displaced three times more people than war or conflict; disaster-induced displacement has more than doubled since the 1970s (Yonetani 2014). Concurrent with this increase in disaster migrations is another socially and environmentally significant global migration trend: The world is becoming more urban (UN 2009). For the first time in the history of humanity, most of us live in urban rather than rural environments. These migration flows and demographic shifts have profound effects on human–ecological relationships and the ways in which communities interact with and relate to the natural environment. As rural-to-urban migration pathways become increasingly well trodden, they may also represent an important adaptation strategy for individuals and communities faced with compromised social and ecological circumstances. While offering clear advantages from certain economic and political perspectives, these migrations may also have unintended negative consequences that are not easily understood through traditional disaster studies or cost–benefit analyses. This article integrates research on disasters and climate change-induced migration with emerging perspectives from environmental psychology and with ethnographic accounts from Shishmaref, Alaska—a case study of one of the first "victims" of climate change—to illustrate the significance of some potential psychological and cultural costs of particular rural-to-urban migration scenarios.

The complexities of rural-to-urban environmental migration and displacement

Migration and/or displacement—both of which occur prior to, and in the aftermath of, a disaster (Marino and Lazrus in press)—constitutes one of many adaptation strategies available for communities under duress (Hunter 2005). Researchers have demonstrated that any environmental or disaster-induced displacement and/or migration is a complex entanglement of environmental, political, social, and economic pressures, which interact with local histories and household and community characteristics to drive outcomes (Landry et al. 2007; Marino in press; Marino and Lazrus in press; Tacoli 2009; Warner et al. 2009). For example, despite what one might expect, research in Mali has indicated that rural-to-urban migrations *decreased* during periods of drought and *increased* outside of drought years, suggesting that in this context, a certain bundle of resources was necessary before the option of relocating as an adaptation strategy was even possible—particularly outside of national boundaries (Findley 1994). Conversely, a number of research efforts have demonstrated that environmental shift and environmental pressures stemming in part from natural hazards contribute to larger rural-to-urban migration trends. Rainfall shortages and increasing drought conditions as a result of climate change have been described as significant *drivers* of rural-to-urban migration in sub-

Saharan African countries (Barrios et al. 2006) and in Mexico (Cohen et al. 2013). Additionally, in Bangladesh, research indicates that after a withdrawal of relief activities, there was a significant migration into urban environments from rural coastal areas following cyclone Aila in 2009 (Mallick and Vogt 2014).

It is clear from this literature that environmental pressures are experienced within the social and historical contexts in which they are embedded, and that the increase in disaster-driven migrations will interact with larger sociopolitical histories and pre-existent migration trends. Because *migration networks*—exemplified by social relationships or personal experiences in receiving communities—increase the likelihood of migration, pre-existent migration trends are critical to understanding migration flows in the aftermath of a disaster. In these cases, as urbanization increases in general, disaster migrants may find themselves pushed to these same locales in search of immediate safety, new, or more resilient livelihoods (Bebbington 1999; Fields 1975; World Bank 2009), health care (Bell and Ward 2000), and other urban pull factors such as education (Rao 2010), all of which are influenced by development decisions (Marino and Lazrus in press; World Bank 2009).

These migration pathways are also occurring in an increasingly warming world. Rural-to-urban migrations that occur in the aftermath of disasters may steeply increase as anthropogenic climatic change contributes to shifting ecologies and increasing numbers of natural hazards such as flooding, sea level rise, fires, drought, and desertification, which are experienced by human communities as disasters (Barrios et al. 2006; Cohen et al. 2013). Research demonstrates that a critical outcome of climate change on human communities will be an increase in natural hazards that result in disasters and that migration will follow as one consequence of ecological shift (IOM 2008, 2011; Marino 2012, 2013; Meyers, 1993; Oliver-Smith 2009). As climate change leads to habitual, recurrent disasters, places which have previously been inhabitable may become no longer habitable (Birk and Rasmussen 2014; Farbotko and Lazrus 2012; IOM 2011; IPCC 1990; Massey et al. 2010; Marino 2012, 2013). We now see that residents of Tuvalu (Biermann and Boas 2010; Farbotko and Lazrus 2012; Lazrus 2012), the Maldives (Bogardi and Warner 2009), and the Alaska Native Villages of Shishmaref, Kivalina, and Newtok (Bronen 2011; Marino 2012), have all been touted as the first victims of climate change and are all instances where climate change-related disasters contribute significantly to migration pressures and displacement.

A number of scholars predict a continuing increase in rural-to-urban migration in Alaska (Meadow et al. 2009) and the Pacific (Campbell and Warrick 2014; Locke 2009) as a result of climate change-related pressures. The complex entanglement of political and environmental effects on migration and/or displacement is particularly well illustrated by Kothari's (2014; Arnall and Kothari 2015) recent work in the Maldives. This work demonstrates how elite control over climate change discourses drives development oriented toward the re-introduction of previously unpopular resettlement plans away from rural areas to a more densely populated set of islands. This is mirrored in both Tuvalu and Alaska, where political will for development in rural areas becomes compromised, leaving housing and water infrastructure increasingly difficult to fund because of climate change narratives of inundated coastlines and disappearing islands (Marino and Lazrus in press).

En masse, the implications of these complex migration scenarios are many. Researchers have suggested that migrations stemming from climate change and climate change-related disasters may affect political instability and armed conflict (Buhaug et al. 2009; Reuveny 2007), as well as local, regional, and global economies, including development decisions and growth trajectories (Stern 2007). In this article, we seek to raise the profile of some of the likely psychological impacts of rural-to-urban migrations under disaster conditions.

Adaptation as long-term psychological well-being

Predicting and tracing the psychological effects of rural-to-urban migrations among disaster victims may seem inconsequential given the scale and scope of climate change-related disasters. If, as some have suggested, climate change will drive hundreds of millions of people from their homes (IOM 2011), what do the psychological effects of increased urban-ness on a subset of these disaster victims matter?

This paper argues that they matter very much. Migration has been a strategic response to ecological shift and natural hazards for millennia. In some instances, migration may be seen as a successful adaptive strategy to hazards, which in consort with failed or floundering social institutions, inadequate development streams, and political neglect has made life-in-place unviable. These migrations, however, may also have unintended psychological consequences. If the goal of disaster and climate change research is to promote successful adaptation, then the long-term psychological well-being of people who have survived disaster and migrated into urban environments is paramount.

In the remainder of this paper, we merge the research literature on environmental psychology and the psychology of natural disasters with a case study of potential environmental migration. We are concerned here with understanding how survivors of disasters and climate change-related disasters fare under rural-to-urban migration conditions. Our investigation is divided into four sections. First, we discuss the psychological impacts of natural disasters in general, outlining the ways in which survivors of disasters are vulnerable to a host of negative social and psychological outcomes—stemming from the immediate effects of the environmental events themselves, as well as from longer-term displacements. Second, we outline ways in which these risks may compound under rural-to-urban migration scenarios by focusing on research that illustrates the benefits of connection with the natural environment and the ways in which urban and vulnerable cultural groups are underexposed to these benefits and overexposed to environmental hazards. Following, we apply these bodies of literature to a case study of Shishmaref, Alaska, a place of profound environmental shift and potential displacement linked to habitual flooding—indeed, an example of one of the first "victims" of climate change. Guided by extensive ethnographic work conducted by the second author of this paper, we describe how concerns from this Iñupiat community about the long-term consequences of rural-to-urban migration are also reflected in central insights from the psychological literature. Finally, we offer suggestions on ways forward by

outlining how adaptation and development planning should pay critical attention to long-term psychological outcomes of migrating populations and by providing suggestions for how to maintain connection to nature, in culturally appropriate ways, as urbanization continues under climate change conditions.

The psychological consequences of natural disasters

Extensive research indicates that there are a great number of profound psychological consequences of experiencing natural disasters, both due to the immediate physical events themselves and from secondary, longer-term processes, including migration and forced relocation (see Doherty and Clayton 2011, for an overview). Briefly, impacts that directly result from the immediate experience of natural disasters themselves include increased post-traumatic stress disorder (Galea et al. 2005; Pietrzak et al. 2013), generalized anxiety and stress (McFarlane and Van Hooff 2009; Norris et al. 2002), somatic disorders (Sattler et al. 2014; Van den Berg et al. 2005), depression (La Greca et al. 2010; Lai et al. 2013), drug and alcohol abuse (Fritze et al. 2008), and domestic violence (Schumacher et al. 2010). Other immediate effects are also observed, including depression and anxiety associated with local or global environmental issues, such as uncertainty about climate change and the stability of environmental conditions (e.g., unpredictable local weather patterns; Buzzell and Chalquist 2009; Fritze et al. 2008; Kidner 2007).

The longer-term mental health consequences of post-disaster migration and displacement are also numerous and may include compromised social cohesion (Nelson et al. 2009), increased stress across many domains of daily life (Fussell and Lowe 2014; Lock et al. 2012; Riad and Norris 1996), increased post-traumatic stress disorder (Rhodes et al. 2010), increased depression (Lê et al. 2013), greater intergroup conflict over scarce resources (Costello et al. 2009; Reuveny 2007, 2008), and increased prevalence of serious mental illness (e.g., major anxiety or mood disorder; Hori and Schafer 2010; Sastry and VanLandingham 2009).

In their comprehensive review of research investigating the psychological impacts of natural disasters around the world, Norris et al. (2002) review substantial data indicating that the mental and physical health problems suffered post-disaster are substantially worse among vulnerable populations, including women, ethnic minorities, people from developing countries, and those with compromised social support networks. Social fragmentation is also identified as a primary form of vulnerability in contemporary research on rural-to-urban migration in China (Chen et al. 2011; Cheung 2013), and the ability to maintain vital social support is deemed to be a primary protective factor in studies of both rural-to-urban migration (Donato and Duncan 2011; Lu 2010) and natural disaster resilience (Jones et al. 2011; Norris et al. 2008).

Findings from the Shishmaref case study, to be described later, illustrate that residents have many of these same concerns about the maintenance of social capital and cultural integrity in a rural-to-urban migration scenario that takes them out of their traditional subsistence territory. While the ability to maintain vital social relationships is known to be essential in fostering resilience to disasters and disaster-

induced migration and displacement (Donato and Duncan 2011; Norris et al. 2008), a growing body of empirical evidence suggests that the maintenance of relationships with the natural environment may be equally important for cultivating longer-term psychological well-being. This may be particularly important for an increasingly urban populace worldwide, and even more so for those vulnerable and forcibly displaced individuals and communities who have relocated from rural-to-urban areas under conditions of climate change and natural hazards.

The vitality of connection with the natural environment

The numerous health benefits experienced by people with a higher quantity and quality of social relationships have been established for quite some time (e.g., Spiegel et al. 1989; Uchino et al. 1996; Taylor et al. 2002), but psychological science examining the health implications of relationships with the natural environment has historically been limited. This tendency is shifting recently, as demonstrated by the increasing empirical and theoretical contributions of environmental psychology (Clayton 2012) and the systematic application of psychological knowledge to address environmental problems and climate change (Swim et al. 2011). Intensive examination of the psychological significance and health implications of our relationships with the natural environment have perhaps been most prominently advocated for by the emerging field of ecopsychology, which contends that personal and ecological vitality are mutually constitutive (Fisher 2013; Kahn and Hasbach 2012; Roszak 1992; Roszak et al. 1995).

A rapidly growing body of research demonstrates that a wide variety of mental, physical, and behavioral health benefits is associated with exposure to natural environments, relative to urban (or "built") environments. In examining these relationships, "exposure to natural environments" has been operationalized in numerous ways, including having green space in one's neighborhood (Mitchell and Popham 2007, 2008; Van Herzele and de Vries 2012), experiencing higher levels of biological diversity in local parks (Fuller et al. 2007), and walking outdoors (Hartig et al. 2003). The particular mechanisms underlying beneficial effects of natural environments depend on the mode of engagement, and examining the complexity of human–nature interactions in terms of their health benefits is an important task for the field (see Hartig 2008; Hartig et al. 2014).

The psychological benefits of exposure to natural environments include increased capacity for directed attention and reduced mental fatigue (Berto 2005; Kaplan 2001), increased positive emotional experiences (Van Herzele and de Vries 2012; Van den Berg and Custers 2011), reduced anxiety and depression (Gonzalez et al. 2009; Maas et al. 2009), reduced aggression (Kuo and Sullivan 2001), reduced stress (Gidlöf-Gunnarsson and Öhrström 2007; Leather et al. 1998), and reduced stress-related illness (Grahn and Stigsdotter 2003; Van den Berg et al. 2010).

A diverse array of physical health benefits is also associated with exposure to natural environments, including improved recovery from surgery (Park and Mattson 2009; Ulrich 1984), physiological stress reduction (Hartig et al. 2003; Van den Berg and Custers 2011), better self-reported health (De Vries et al. 2003; Mitchell, and

Popham 2007), lower disease morbidity (Maas et al. 2009), lower mortality (Takano et al. 2002), and lower mortality related to income deprivation (Mitchell and Popham 2008).

In addition to directly facilitating psychoemotional restoration, natural environments also have indirect positive influences on health by providing attractive locations for engaging in physical activity (Hartig 2008; Kaczynski and Henderson 2007; Pretty et al. 2005) and social interaction (Kuo et al. 1998; Shinew et al. 2004), and by contributing to a dispositional sense of feeling connected with the natural world in a coherent, personally and culturally meaningful way (Wolsko and Lindberg 2013; Zelenski and Nisbet 2014).

While much of the literature cited above has examined the positive health impacts of engagement with the natural world in the lives of Europeans and European Americans living in suburban and urban environments, there is also a great deal of psychological and anthropological work in indigenous cultural contexts which demonstrates that connection with natural environments has many mental and physical health benefits (Adelson 2000; Izquierdo 2005; Labun and Emblen 2007; Lardon et al. 2015; Wolsko et al. 2006). These benefits are due to a life in nature that is not only recreationally enjoyable, but also pragmatically imbued with rich sociocultural value—through the spiritual, social, economic, and physical ramifications of subsistence practices, for example (e.g., Wolsko et al. 2006).

While this literature on exposure to nature and health is encouraging, the distribution of natural spaces tends to favor white and affluent communities (Wolch et al. 2014). Many urban, ethnic minority, and low-SES communities, already suffering from numerous mental, physical, and behavioral health disparities, also tend to live in neighborhoods with less green space (Heynen et al. 2006) and greater exposure to environmental toxins and stressors (Adler and Newman 2002; Maroko et al. 2014). One can easily predict that vulnerable groups displaced into urban environments following a disaster will suffer a similar state of affairs.

From these brief overviews of research on the psychological consequences of natural disasters and the beneficial health effects of engagement with the natural environment, we foresee two typologies of psychological threat to individuals and communities that are faced with environmental migration or disaster-induced displacement. The first involves the immediate psychological trauma of the disaster events themselves. The second stems from migrations that involve significantly compromised social cohesion and mental health outcomes, as well as substantial reductions in safe and culturally meaningful exposure to natural environments. These effects and potential effects are critical to understanding the real threat and real adaptation possibilities for residents of Shishmaref, Alaska.

Shishmaref, Alaska: migration, climate change, and rurality

Shishmaref, Alaska, is a rural Iñupiat community that sits on a barrier sand island on the coast of the Chukchi Sea. Windswept and treeless, the west and northwest coast of the Seward Peninsula is a prime hunting location for sea mammals, including

various types of seal, whale, and walrus. As such, the coast has been inhabited for thousands of years by Iñupiat hunters and their ancestors who have continually positioned themselves on the edge of both the ocean and the mainland in order to take advantage of the wealth of both ecosystems.

The ocean and interaction with the ocean and the coast are central to livelihoods and cultural meaning-making in Shishmaref today. Subsistence food makes up a significant portion of most people's daily caloric intake, and hunting sea and land mammals as well as gathering subsistence berries and greens is a way of life as well as an economic necessity. In addition to subsistence harvests for food, artwork made from locally harvested material is a critical economic sector in Shishmaref. Shishmaref-made *mukluks* (slippered boots) and mittens made from seal skin and fur; sculptures made from whale and caribou bone; jewelry made from fossilized or fresh ivory; and small beaded items such as Christmas tree ornaments and barrettes are known throughout Alaska and beyond as pinnacles of a long-tenured artistic tradition.

In the past 30 years, the village of Shishmaref has been experiencing habitual flooding disasters that are rendering the island uninhabitable. Increased erosion, increased windiness, and later ice melt, all linked to climate change (USGAO 2003, 2009; Hinzman et al. 2005; Huntington 2000), act together to create flooding on the island. The floods and increased erosion are iteratively progressive, so that as the half-mile-wide island erodes, flooding is more likely, and subsequently, large, flood-inducing storms cause erosion. The danger is that as erosion continues, the likelihood increases that a large storm could cause tremendous damage.

The second author of this article spent over six months in the community of Shishmaref, on the northwest coast of Alaska, conducting research on the sociopolitical, historical, and environmental contexts which contribute to high vulnerability of the community to erosion and flooding linked, in part, to climatic changes. Through a combination of ethnographic observation, interviews, surveys, and the investigation of state and federal documents, this research examined a host of social and environmental pressures which have contributed to the compromising condition that the community finds itself in now.

Residents in Shishmaref have voted to relocate off of the island and have been working with state and federal agencies to fund a complete relocation from the island to the mainland since 1974. In order to do this, critical infrastructure such as a barge landing, an airstrip, a school, and a medical clinic would need to be constructed on the mainland, at a site that would offer Shishmaref residents continued access to the ocean within traditional subsistence territory. Despite concerted, long-term efforts by Shishmaref residents, funding for this relocation has not been secured and infrastructure to facilitate the move has yet to be developed in a safe location off of the island. All stakeholders agree that remaining on the island will be increasingly unlikely if sea level rise and erosion continue as expected.

The certainty of flooding sometime in the future, paired with the current lack of commitment from state and federal governments to fund permanent relocation to the mainland, creates a limbo state for Shishmaref residents and other village residents in Alaska who face similar situations. People are waiting; ethnographic interviews indicate that this waiting causes stress and concern among residents (Marino in

press), so much so that local will for relocation has waned under the lack of progress. Current village leadership is increasingly hesitant to discuss relocation due, in part, to the fact that an organized relocation seems increasingly unlikely.

In Shishmaref, disasters have become habitual. Six state-declared disasters have occurred since 1988 (Kinsman et al. 2013), and flooding threatens the community annually. If the psychological consequences of disaster include post-traumatic stress disorder, depression, increased alcohol and drug-abuse, stress and anxiety, and increased levels of domestic violence (among other negative effects), as the literature reviewed above demonstrates, then in cases such as Shishmaref where disasters become *habitual* (linked to ongoing climatic changes and lack of institutional support), these psychological effects will likely become compounded.

Shishmaref is known among residents of the Seward Peninsula as the "friendliest village," and hospitality in the village is legendary among visitors. The psychological effects of habitual flooding disasters threaten the tremendous character and psychological vitality of the village as it exists today. It is hard not to ask in Shishmaref, how much more can people take? When asked in an interview about whether or not he worried about storms, a resident replied, "It's what gives me grey hairs!" More generally, it is critical to make explicit the link between long-term psychological consequences and disaster as an increasingly habitual state. As old ecological norms are breached through climate change and disasters become the "norm" in certain habited locales, there are mental health justifications for locating funding for relocation quickly rather than exposing residents to repeated physical *and* psychological harm.

Yet, in spite of these habitual disasters, Shishmaref residents say that closing the village and relocating the community to a pre-existing township (Nome or Kotzebue) or city/urban area (Fairbanks or Anchorage) is not an option. In one analysis, one hundred percent of 54 households interviewed said that they would not want the village to close and residents to be relocated *outside* of traditional subsistence territory (Marino in press). Across age, socioeconomic status, and gender, residents voice the same resistance to closing the village and moving residents into a more urban environment.

The unanimity and magnitude of this extraordinary concern voiced by community leaders and residents about the possibility of a collective rural-to-urban migration are truly remarkable. In a place where the risks of death and material destruction are very real possibilities in the event of a large storm and flooding event, ethnographic accounts demonstrate that residents discuss these immediate risks *less* frequently than the long-term psychological and cultural ramifications of relocating the entire community out of traditional territory and into a more urban environment. While community members largely agree that relocating is necessary, they believe that remaining in culturally significant rural areas is paramount to long-term, successful adaptation.

In a very real way, this community attitude reflects the analysis of Oliver-Smith (2009), who points out that *survival* for human beings and communities is not necessarily the same thing as *adaption*. He writes, "there may be a significant difference between coping to stay alive and a long-term adaptive process. The distinction between an adaptation and a coping strategy can be crucial in assessing

the effectiveness of adjustments to environmental change" (p. 14). If social conditions are dramatically compromised following migration—if people are generally less safe or less happy—then migrants may have "coped" with disaster, but have not sufficiently adapted to disaster scenarios. If social conditions improve following a disaster, then migration has been a successful adaptation.

When asked about how relocation should occur, residents frequently discussed the need to remain within subsistence landscapes in order to maintain both cultural vitality and food security. The following interview excerpts are examples of the expressed need for access to the ocean and the links among identity, survival, and a continuing relationship with the ocean.

> The raging sea is tremendously powerful and needs to be respected. Shishmaref will need to be protected from the sea and moved to a different location, in due time. The move needs to be closely tied to our hunting traditional cultural practices. We are sea mammal hunters (Herbert Nayokpuk 2005, Personal communication).
>
> Without subsistence, our lifestyle, our culture wouldn't be held together, I suppose. Because we depend on the sea for a lot of our food. The sea is like our supermarket—when the ocean is nice we gather what we can. When the ice is broken up whether it be the bearded seal, the walrus, and then after the ice goes we try to gather as much fish as we can from the sea, you know because it's calm, it's like the store is open when it's calm and like the supermarket is closed. Without that I don't think we'd be able to survive. (Raymond Weyiouanna 2008, Personal communication).

This insistence on maintaining a rural village and maintaining human–ecological relationships that are tied to the ocean came up continually in interviews. Shishmaref residents also expressed the fear that, if planning and funding failed to come together prior to a major disaster, they would be forced into a diaspora and end up in more urban environments.

> We're trying to maintain our community and maintain our subsistence lifestyle and keep the community intact, I mean, by choice. If we ever do get forced to evacuate, my biggest fear is that we're going to end up in Fairbanks or Anchorage (Richard Kuzuguk 2010, Personal communication).

This demonstrated effort to maintain a discrete village in subsistence territory is overwhelming in Shishmaref and stands in contrast to larger rural-to-urban migration trends in Alaska (Huskey et al. 2004) and around the globe (UN 2009).

We acknowledge that what Shishmaref residents *want,* and need to maintain their sovereignty as a federally recognized tribe, is paramount in adaptation planning, regardless of whether or not scientific research and local discourses are in agreement. However, in this case, the emergent literature on psychological health and the natural environment is remarkably consistent with local discourses regarding the risks of relocating outside of subsistence territory. Insight from Shishmaref residents as well as the emerging ecopsychological literature suggests that these kinds of de facto rural-to-urban migrations in response to natural hazards and risk may compromise human–ecological relationships which, in turn, could

significantly undermine psychological and social health and well-being. In addition, urban, ethnic minority, and lower SES communities are all *less* likely to enjoy access to non-built, natural environments and *more* likely to experience significant exposure to industrial environmental hazards (Rinquist 2005; Strife and Downey 2009). This literature contextualizes and legitimizes the fears of residents about the environmental, cultural, and psychological risks of diaspora.

Vulnerability to disasters as diminished access to nature

While we do not wish to underplay the immediate and profound needs of disaster survivors, we argue that attending only to the material needs of victims—including economic development, material quality of life, secure infrastructure, and efficient delivery of health services—is insufficient in determining the long-term success of migration as an adaptive strategy. While certain individuals and communities may choose urban relocation as a viable and perfectly reasonable solution to environmental risk, increased urbanity, for some communities and individuals, may have the long-term psychological consequence of increased disconnection from the natural environment and the attendant anxieties, depressions, and voids of cultural meaning. Indeed, the generally higher levels of mental illness, including anxiety and depression, that are associated with living in urban relative to rural areas (Goodwin and Taha 2014; Lederbogen et al. 2011; Peen et al. 2010; Wang 2004) have recently been interpreted in light of the literature on exposure to natural environments and health (Bratman et al. 2015), arguing that the lack of safe and culturally meaningful access to green space in urban environments constitutes a major public health issue. From an ecopsychological perspective, the same human behaviors that drive environmental degradation and climate change-related disasters also undermine mental health through a general disconnection from the natural world that is compounded in urban environments inhabited by vulnerable groups (Anthony 2006; Fisher 2013; Roszak et al. 1995). When Shishmaref residents express concerns over dislocation outside of subsistence territory following a disaster, they express the compromised trade-offs of risk and safety that are associated with disconnection from nature and disjointed human–ecological relationships. This literature helps explain why Richard Kuzuguk says pointedly, "my biggest fear is that we're going to end up in Fairbanks or Anchorage."

Conclusion

Assuming that disaster-related migrations and displacements will inevitably occur under new climate regimes, we conclude our analysis by outlining four key points for policy makers and other researchers to consider that may better promote long-term psychological well-being among affected individuals and communities.

First, it is necessary to understand that disaster-related migrations and displacements are almost always an outcome of complex social and environmental systems interacting with one another. When social pressures are reduced, adaptation

in place is often possible. In some cases, adaptation in place is a more viable strategy, but might require restructuring of social systems and system interactions. Carefully attending to these social and environmental interactions should then ideally yield a conceptualization of successful migration that includes the long-term consequences of moving for mental health and cultural integrity, and not simply economic benefit and political expediency.

Second, rural-to-urban migration is not the only migration possibility and may not be unidirectional. While rural-to-urban migration will inevitably occur and may be embraced by some communities, development agencies and state institutions need to consider development decisions which make alternative migration options possible, including rural-to-rural migrations and semi-permanent migrations. Infrastructural development and economic development in rural areas are necessary in order to allow for these patterns of migration. Rural-to-urban migrations should also not be considered unidirectional. Particularly, in the case of indigenous communities, leaving a territory in response to risk may not be the same as *abandoning* territory. Development, such as a maintained road or airstrip, which allows continued access to traditional homelands may be critical for maintaining human–ecological relationships and should be considered a necessary cost of long-term adaptation to climate change.

Third, in cases where rural-to-urban migration is the only immediately viable option, a core part of any resettlement plan must include mechanisms for culturally meaningful access to green space and the re-establishment of sense of place as much as the new locale permits. As we have outlined, healthy human–ecological relationships are key contributors to social, mental, and physical health. For communities experiencing rural-to-urban migrations in the context of natural hazards and disasters, these relationships may be especially critical. As such, ensuring green spaces and "green access" in which human–ecological relationships can be maintained in culturally appropriate ways is critical to policy and development decisions that should occur concurrently with increasing migration waves.

Finally, relocating communities should be given space and planning capacity to identify their own needs. We recognize here that the needs of communities experiencing migration pressures linked to natural hazards and as a result of climate change will be distinct. Receiving cities and state and federal agencies in charge of development decisions should allow communities to identify needs for themselves, and those needs should be taken seriously. As our case study demonstrates, residents in Shishmaref can readily identify what the community needs in order to maintain social and cultural vitality. Recognizing diversity in human–ecological relationships and attendant needs during migration and displacement scenarios is crucial in long-term adaptation success.

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