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Brooks A. Bolsinger
Seattle Pacific University

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CHANGING CLIMATES, DYING CULTURES:
A STUDY OF PLACE ANNIHILATION AS A RESULT OF CLIMATE CHANGE

by

BROOKS BOLSINGER

FACULTY ADVISOR: DR. ERIC LONG

SECOND READER: DR. KATHLEEN BRADEN

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Abstract

Research has established the phenomenon of cultural annihilation: the notion that the members of cultures can perceive a sense of loss when the geography upon which their culture is built undergoes a dramatic destructive change. This review examines prevailing literature to uncover existing and expected ways that climate change will impact cultures, specifically damaging the shared history that is infused into the geographic traits that make up a culture's homeland. It examines three case studies - Native American tribes in Alaska, the island nation of the Maldives, and the country of the Netherlands - to highlight vulnerabilities that these three cultures face due to global climate change, finding that vulnerability to cultural annihilation from changes in geography due to climate change depend on three key factors. These factors relate to the way that a culture developed in response to its geographic homeland, the specific geographic niches of a culture's ecological and environmental conditions, and the ability of a society to protect itself through financial means. This review concludes by examining the need for better understandings of our cultural geography and the ways in which cultures are able to adapt to a changing biosphere.

Introduction

Ken Hewitt (1983) asserts that humans create our places by endowing them with our collective cultural identity. As a geographer, Hewitt (1983) examined the effects that war has on cultures and drew a link between the wellbeing of the places upon which a culture is built, and the success of a culture as well, eventually minting the idea of cultural annihilation through place death. This concept describes how the destruction of geographic attributes of a place instills a sense of loss among the inhabitants that call that place home (Hewitt 1983). With this in mind, Hewitt (1983) suggests that existence of a society is built on a notion of geographic stability, and we have infused our places with the collective memories of our societies. When the geography of places changes calamitously, societies experience a sense of loss that can impact the ways that cultures continue to live. This phenomenon has been documented to result from war, natural disasters, and development, such as dam construction (Hewitt 1983; Windsor et al. 2005). While the process of place annihilation, or “place death”, has been described, what is less clear is how this process will continue to grow as global environmental and geographic stability is undermined via anthropogenic climate change. In this review, I examine the potential and realized threats that climate change poses to cultures through the destruction or alteration of their geographical locations by analyzing three case studies: native tribes in Alaska, the island nation of the Maldives, and the nation of the Netherlands.

Place Annihilation

The concept of Place Annihilation emerged out of humanist anthropological thoughts (Entrikin 1976, Tuan 1976, Hewitt 1983, Hay 1998a,

Hay 1998b). Tuan (1976), in particular, described place as a strictly human – and humanizing – concept: the human species has the ability to understand place in abstract terms: people can remember the form of a place as a concept, and build emotional attachments based on the shared memories a culture has shared there. He goes on to highlight the emotional bonds that humans create with the places in which they live.

“We pause to answer biological exigencies; each pause establishes a location as significant, transforming it into place. The humanist recognizes the analogy, but again he is disposed to ask how the quality of human emotion and thought gives place a range of human meaning inconceivable in the animal world. A case that illuminates human peculiarity is the importance that people attach to the biological events of birth and death... Shrines dedicated to birth and death are uniquely human places.” (Tuan 1978).

In short, one component of being human is to personify the geography of a place with the collective memories that each individual has in association with his homeland; to infuse and memorialize the aspects of his culture within the geography itself, through memory, artwork, architecture, or other markers of society. Hay (1988a) succinctly summarizes key aspects of humanist geography by analyzing three distinct facets of human emotional connections to places: the connections among “the perceptual realm of awareness, attitudes, and memories; the emotional realm of feelings, preferences, and values; and the experiential realm of bodily and sensory contacts.”

Hewitt (1983) builds on these three traits during his analysis of how destruction of a place can impact culture. His work examines the impact that wartime had on place death, particularly World War II. Wartime tactics of aerial bombing aimed to destroy key industrialized areas and to incite fear in the civilians of an enemy nation – turning morale into a weapon and culturally significant geography into a target. Hewitt (1983) characterized cities as repositories for the collective identity of a culture. He echoes Tuan (1978) and Hay (1988a) by asserting that place is not merely the spatial relations and habitats in which humans exist, but rather that human societies shape their places by infusing them with the emotional memory of the lives, interactions, and art of those who have lived there – forming an emotional connection between a place and the culture formed in that place (Hewitt 1983). Our places, then, are not just experienced but are the aggregate result of human interactions that have created the cultures we associate with places.

Hewitt's (1983) examinations of destroyed cities take this even further. By examining cities like Cologne and Hiroshima in wartime, he describes how inhabitants of a place can describe a sense of loss when that place undergoes a traumatic geographic change, a phenomenon colloquially termed "place death." Hewitt (1983) goes on to outline how recovery efforts ranged from trying to rebuild the city exactly as such, to using the destruction as a blank slate to rebuild in a more efficient manner. However, what inhabitants found was that the collective memory of their culture that had been ingrained in the terrain and buildings of the place was still lost and would be lost forever. Thus, in war culture itself could be targeted (Hewitt 1983).

Hewitt's (1983) work culminates when he outlines the key tenets of wartime place death in society. Aggressors could easily attack the three precepts that Hay (1988a) describes as crucial to creating a sense of place by destroying settlements, concentrating on the death of noncombatants and the indiscriminant destruction of homes, culturally significant buildings, and eliminating all avenues for aid (Hewitt 1983). When those three aspects of human geography are eliminated, victims endure a phenomenon that destroys their sense of place and annihilated much of their collective culture.

While climate change will not have the same acute and concentrated destruction that wartime bombings caused, the threat is similarly dangerous. Climate change has the potential to radically change the geography of the places in which people have built their societies. The threat from climate change is anthropogenically induced and methodical, and it will alter geographies in fundamental ways: sea levels will rise, ocean chemistry will change, ice floes will retreat, and biomes will shift, just to name a few effects. However, the pace of this change is far more rapid than what could be seen as natural shifts of geography or culture. Rather, much like acts of war, these anthropological changes occur fast enough to spark cultural change. When these geographic events happen, cultures built on the presumption of a stable ecological system will be fundamentally altered, and the factors of human geography will be undermined, to devastating effect.

Here, I will examine three case studies –native tribes in Alaska, the island Development State of the Maldives, and the Netherlands – as examples for both current and prospective examples of cultural annihilation, examining both the vulnerabilities that these cultures have towards climate change as well as

dangers that these cultures are presently experiencing. These case studies were selected to provide an examination of cultures in a variety of biomes and socio-economic conditions, from tropical to arctic, and from a native economy to an industrial one. In examining these cultures, I intend to demonstrate how the fundamental changes that are related to climate change present a risk that modern societies have never experienced before – one that is methodical in its destruction, predictable in its effects, and one to which human cultures are extremely vulnerable.

Dam Construction: a Precedent for Cultural and Place Annihilation

However, I will prelude these case studies by first examining an established example of cultural annihilation as it pertains to environmental degradation: the construction of dams in North America. Fueled by the growth of industry and the allure of secure water rights and energy sources, dams were constructed across North America, often through the ancestral homelands of Native American tribes. Windsor and McVey (2005) highlight one particularly relevant example by emphasizing the impacts of dam construction on the Cheslatta T'En tribe in Canada. Windsor and McVey (2005) highlight the efficient methods of place annihilation by dam construction: when the Cheslatta Tribe's native homelands were flooded by a massive dam construction site, and the entire tribe was moved onto a reservation in an entirely different biome than their ancestral homeland, the two geographers note that the very health of the people suffered. The Cheslatta's way of life was foundational to their existence; even though they were by no means isolated, their strong emotional tie to their land and their traditions of subsistence dating back generations were crucial to

their foundation of their society (Windsor, McVey 2005). As the Kenny dam was completed, local authorities pushed the Cheslatta tribe from their homelands, either by offering them paltry sums for their land or forcibly removing inhabitants, and relocated the entire tribe to a reservation located in a plains biome. During the dam's construction, the village's cemetery, the cultural link to their past, as well as their church were submerged under the rising waters. Because of the all-encompassing destruction resulting from dam construction, such episodes create striking parallels to Hewitt's (1983) definition of place death: the homes of inhabitants are completely and indiscriminately destroyed and leave no chance for any assistance or efforts to provide some form of repair or aid. In addition, the resulting relocation and cultural change caused a tremendous increase in alcoholism and substance abuse, leading to a spike in mortality (Windsor, McVey 2005). While an event such as the flooding of Cheslatta lands is by no means a violent act of warfare such as the ones from which Hewitt (1983) derived his theories of place annihilation, the blatant disregard for the lives of the Cheslatta T'En tribe and the serious consequences for the cultures that undergo such dramatic place annihilation emphasizes how important geography is to cultural identity.

Tales of other episodes of place annihilation dot the map of North America. The recent documentary *Damnation* (2014) chronicled the effects of dams on native tribes, particularly in eastern Washington State. One of the key case studies examined in the documentary is the Nez Perce tribe, one village of which had made their home along the Columbia River around the former Cililo Falls: a crucial fishing ground, which acted both as a place to harvest food and rendezvous with members of other tribes. When the falls were flooded by the

construction of a dam downstream, the Nez Perce described the event as traumatic, saying that the experience of watching the falls flood was “like a death, like a funeral, and they could not go through that again” (Knight, Rummel 2014). Indeed, cases like these describe the intense connections that cultures build on what they expect to be the one constant of their existence: the land they have lived on for generations. While chronicling these environmental and cultural disasters, Lenaghan (2010) declares dams to be the “new engine of colonialism” and “it is clear that no level of financial compensation or admission of culpability on the part of government can replace the history, traditions and culture which have been lost”.

However, what is especially relevant for the discussion of cultures is what Windsor and McVey (2005) discover about cultures after the realities of devastation has set into tribal life. In the subsequent decades after their homeland was flooded, alcoholism rates rose to 95%, and crime, drug use, suicide, and welfare dependency, all of which were nonexistent before the relocation, rose substantially. However, in an attempt to reconnect their youth with their homelands, the Cheslatta applied for a grant that would enable village elders to hunt and trap the area around their former homeland with the youth of their tribe. One year later, “by 1991, both alcohol use and welfare dependency had dropped below 35%. But, after three years, the funding ended and alcohol use and welfare dependency began to rise again” (Windsor, McVey 2005). What the work of Windsor and McVey (2005), Lenaghan (2010), and even Hewitt (1983) highlight is the tremendous connection to place that a society naturally builds. More than merely a setting or an environment that can support a way of life, a place allows for a sense of connection to a person’s identity and history.

People do not simply live in our places; instead, people fill them with memories, share them with loved ones, and bury deceased in them – in a sense, allowing us to commune with our ancestors by sharing a location with them. Destruction of a place and its culture through processes as disparate as war and dam construction have yielded long-term societal, health, and economic consequences for those affected.

As such, if past environmental degradation has created so much damage to cultures and posed such deadly risk to certain ways of life, it is reasonable to assume that future environmental degradation could have a similar outcome. Climate change, with the tremendous risk that it poses to weather patterns, biodiversity, biomes, and climate stability, has the potential to alter dramatically the geography of places around the globe. Just like the construction of dams or the dropping of bombs, such changes will require people groups to watch as the foundations for their ways of life collapse, and ask questions as to what the future holds for all societies on a changing planet.

Alaska: Different Geographies, Similar Cultural Impact

For an initial look into the cultural impacts of climate change, few places are better suited than Alaska. As a geographic place, the ecosystem of Alaska is considered to be supremely vulnerable to climate change. The Intergovernmental Panel on Climate Change (IPCC) highlighted the impact that warming environments are having on ecosystems in Alaska, emphasizing that the complex ecological foundations of the arctic north and the key salmon fisheries that native cultures rely on are in significant danger (Stocker et al. 2013). As the planet continues to warm, cultures that rely on these complex interactions

are starting to experience the loss that comes with cultural annihilation as a result of place death. Native tribes face different changes to their geography across different biomes, but still experience similar sentiments of cultural annihilation.

The first example of such geographic change, and its cultural implications, is the Inuit tribes north of the Arctic Circle. In this particular region, Inuit societies are built on the notion of a stable sea ice and a sturdy foundation of permafrost. However, these facets of the environment are deteriorating because of climate change, putting both the entire arctic environment at risk (Mars et al. 2007, Stocker et al. 2013, Field et al. 2014, Shanley et al. 2014) and the rich cultural heritage of the Inuit as well.

The effects of anthropogenic climate change are already starting to impact the arctic. Warming of the planet will be the most dramatic and accelerated in the Polar Regions, which are already sensitive ecosystems to thermal fluctuations (Stocker et al. 2013). For Inuit tribes that have built their cultures on this fragile environment, the risk factors are not merely high – these cultures are already experiencing slow and devastating place death.

The literature concerning anthropogenic climate change is well established and impacts that it is already having on the Arctic are clear, for example loss of sea ice, warming permafrost (ground that is permanently frozen year round because of the long, extreme winters and cool temperatures of a short summer), increased coastal erosion, thinning glaciers, an increased stress on marine mammals from habitat loss and fragmentation (Hinzman et al. 2001, Laidre et al. 2008, Lord 2011, Stocker et al. 2013). For Inuit cultures in this region, the ecological changes already occurring to their place are starting to

dramatically undermine their way of life, putting their entire culture at risk of annihilation.

The arctic environments in which the Inuit live rely on a very particular balance of specific and interrelated ecological attributes (Hinzman et al. 2001, Lord 2011). The coastal ecosystem on which many Inuit villages are built relies on a foundation of permafrost, protected and supported by sea ice. Sea ice forms a crucial platform for the entire ecosystem, from affecting productivity to supporting the food chain to providing crucial habitat for marine mammals. As the planet is warming, the loss of sea ice is putting pressure marine mammals in the region, and in particular the hooded seal, polar bear, and narwhal (Hinzman et al. 2001, Lord 2011). Later forming, thinner, and less stable sea ice has dangerous direct implications to the ecological food web as well as secondary impacts on the coastal environment, particularly when matched with warming trends. The warming of the Alaskan arctic has seen snow cover melt earlier than ever before, and total snow cover lessen in recent decades – which is linked to a displayed 2-4 degree Celsius increase in permafrost temperature (Stocker et al. 2013). This loss of permafrost stability disrupts the foundation upon which the tundra biome of the arctic is founded (Hinzman et al. 2001, Lord 2011, Stocker et al. 2013).

In coastal regions, the combined loss of sea ice and permafrost loss is suggested to lead to higher increases in coastal erosion (Lewellen 1970, Hinzman et al. 2001, Stockler et al. 2013, Field et al. 2014), which can literally cause villages to fall into the ocean. The most dramatic example of this is the small Inuit community of Shishmaref, located on a barrier island in the Arctic Circle. Tribal elders of Shishmaref claim to have inhabited the tiny island in some context, only

a little over four miles long and half a mile wide – for four thousand years (Lord 2011). What has been demonstrated is the increasing rate of erosion in the area that is undermining the geographic landscape upon which native tribes have built their villages. In the past, sea ice provided a barrier to oceanic wave action; with sea ice forming later and thinner than in the past, this barrier has been less effective of preventing erosion. Simultaneously, the thawing of permafrost has destabilized the foundation of the land under Shishmaref, making a formerly habitable barrier island too unstable to support development. This is exacerbated by engineering projects to create seawalls; erosion around the ends of the seawall has increased, which has only worked to undermine the foundation of the seawalls and cause their collapse (Lord 2011, Mason 2012).

The complex ecological interactions of Shishmaref underlie the pressures that climate-impacted cultures are feeling. Inuit tribes are intensely connected to the rituals and knowledge of their land, and as such, are acutely aware of ecological changes. For instance, Lord (2011) describes how village elders were able to predict weather with shocking accuracy, while also recognize that the climate of the arctic ecosystem had changed by observing subtle differences in weather patterns and animal behavior.

But even more importantly, the intense connections of Native people to their land underlie their cultural vulnerability. Native tribes have infused their places with their collective human memories and have invested their cultural knowledge into their ability to survive in such harsh conditions. What makes climate change a potential annihilator of native tribes in Alaska is not simply that it is changing the geography of a place, but when the climate changes, the environmental conditions of the arctic region that Inuit cultures had taken as

certainty also change. The interactions that native cultures have not only with their land, but also with the changing of the seasons, the harvesting of animals, and the flora of their region is intrinsic to their collective culture. When this disappears, their connection to their ancestors, their identity, and their place in the world is severed.

The consequences of such changes are devastating not solely in the cultural scale, but also on the individual scale. Much like the Cheslatta, displaced native tribespeople tend to have little success, suffering from increased homelessness, alcoholism, and crime (Lord 2011).

The bleakest aspect of Native tribes in Alaska is how few options they have to protect their cultures. Without the foundations of industry and modern society, the only capital that native cultures possess is natural. While some tribes can sell their land to oil companies or take advantage of tourism, most tribes are losing both their cultural heritage during climate change and their only natural resources that they could possibly use for investment. In the case of Shishmaref, the national government already has to invest in the construction of seawalls and is proposing a plan to move the entire village to the mainland, all of which would simply be impossible financially if the villagers themselves had to pay for such programs (Lord 2011, Mason et al. 2012, Marino 2012).

The stability and viability of salmon populations are a second crucial point of cultural sustainability, which focuses not on changes to the explicit form of a culture's geography, but rather on changes to the ability for their geography to sustain them. Salmon population viability is crucially linked to the egg-to-fry survival rate of a watershed population, particularly in the notion of climate change (Battin 2007, Bottom 2009, Lord 2011, Leppi et al. 2014). The anadromous

lifecycle of salmon populations means that populations of salmon cover widespread geographic regions. This spawning ritual is crucially important to cultural groups and ecological sustainability, as the running and fully mature salmon are a key food source for Inuit tribes in the southern regions of Alaska (Lord 2011). Hatching occurs during spring runoff, allowing the small fish to develop and mature in freshwater ecosystems before returning to the sea, from where they will eventually run themselves.

One particularly important change that will affect salmon directly is the altering of seasons throughout Alaska – winters shorten and are milder, summers are longer (Battin 2007, Bottom 2009, Lord 2011, Stocker et al. 2013, Leppi et al. 2014). In even the most conservative IPCC scenarios, this will move the timing of winter runoff to earlier dates in the year, increase stream temperature, and alter precipitation (Lord 2011, Stocker 2013, Leppi et al. 2014). One of the key impacts of these changes is an increase in scouring to salmon egg beds, significantly decreasing the number of salmon that become fry. This scouring affects salmon stocks when they are most vulnerable and when salmon populations have the least ability to adapt to changing stream ecosystems (Battin 2007, Lord 2011, Leppi et al. 2014). Indeed, Leppi et al. (2014) demonstrated that salmon populations could actually increase due to higher water temperatures that would increase the freshwater survival of individuals in streams throughout Alaska. However, the scouring of beds from increased severity in runoff events will likely reduce the success of salmon populations (Leppi et al. 2014). As Shanely and Albert (2014) note, this is expected to be indicative of more harmful long-term freshwater ecosystem, with some populations expected to experience a 1-fold to 3-fold increase in runoff events when salmon eggs are in their beds. The

crucial linkage between egg-to-fry development and climactic conditions could create an unforeseen new alteration to the environments of salmon populations and undermine existing management programs to maintain stocks (Bottom 2009). The ultimate result could very well be devastating, for both ecological and cultural reasons.

As such, loss of salmon stocks could be devastating to Alaska, especially to the cultures that rely on them. Native tribes in Alaska have long seen salmon as crucial to their culture, and hold their existence in high regard. Lord (2011) interviewed native tribespeople to better understand the crucial ways in which salmon are central to the existence of native people. In one example, she highlights how native tribes are turning away from their traditional ways of life when salmon populations start to decline. Lord (2011) describes how native people, living in their ancestral villages with some modern conveniences, still rely on salmon to support their lifestyle. She describes how food prices in these sub-arctic villages are two to three times higher than in urban Alaska (Lord 2011), which means that being able to afford such living still requires the traditional harvesting of salmon. Lord (2011) describes how the cost of living for those without salmon harvesting drives some people off their ancestral lands towards cities. As such, the humanistic connections to native cultures and their land are directly linked to the sustainability of salmon populations. Salmon do not just support the lives of people, but also provide a crucial foundation for cultural development and maintenance. The emotional connection that salmon harvesting has for native tribes living near streams allows them to harvest from their homeland, and provides a sense of connection and interaction among themselves, their ancestors, and their native lands.

Native tribes now face a new cultural threat. For centuries, their cultural health and stability was built on a stable, specific, and harsh climate in a biome that itself was specifically adapted ecologically to a specific ecosystem. This cultural stability was based around the process of living in nature and passing their collective knowledge as people from elder to youth. Humanist geographers would highlight that this collective knowledge provided the sense of place crucial for the development of healthy and sustainable cultures; the emotional ties to their land, their experiences of hunting in their environment, and learning the crafts of survival in the same way that their ancestors had done for centuries. They have stored their collective identity in the permafrost, the short growing seasons of Alaskan summers, and in the assurance of salmon runs every fall, just like Hewitt's (1983) societies had stored their collective memories in the foundations and architecture of their societies. The geography upon which they have created a culture is not the constant it used to be. For some tribes, changing seasons and warming climates have started to make their way of life difficult to sustain and their villages unlivable. For others, declining natural resources have made it difficult to continue living in their ancestral lands. In both cases, Native tribes are now experiencing a cultural annihilation phenomenon as a result of geographic change, requiring them to either live in a land that no longer supports their culture, or abandon the foundations of their culture entirely in order to survive.

The Maldives: Living and Dying in the Ocean

As a nation, the Maldives is something of an enigma; located in the middle of the Indian Ocean, the small nation-state is a case study of economic

development. Building on a massive expansion of a tourism industry that has ballooned since 1972, the Maldives has grown with a massive infusion of foreign visitors, which have left behind many resources to develop. However, as a nation composed purely of low-lying islands and atolls derived from coral reefs with an economy relying in large part on a healthy environment, the Maldives is especially vulnerable to risk when it comes to climate change. Indeed, a changing climate, with rising sea levels, could see much of the nation inundated with water at the same it loses its coral reefs (Hoegh-Guldberg 1999, Munday 2004, McClanahan et al. 2007, Gaskill 2010, Stocker et al. 2013, Field et al. 2014, Carrington 2015), not merely stunting their promising future of economic development, but undoing it entirely.

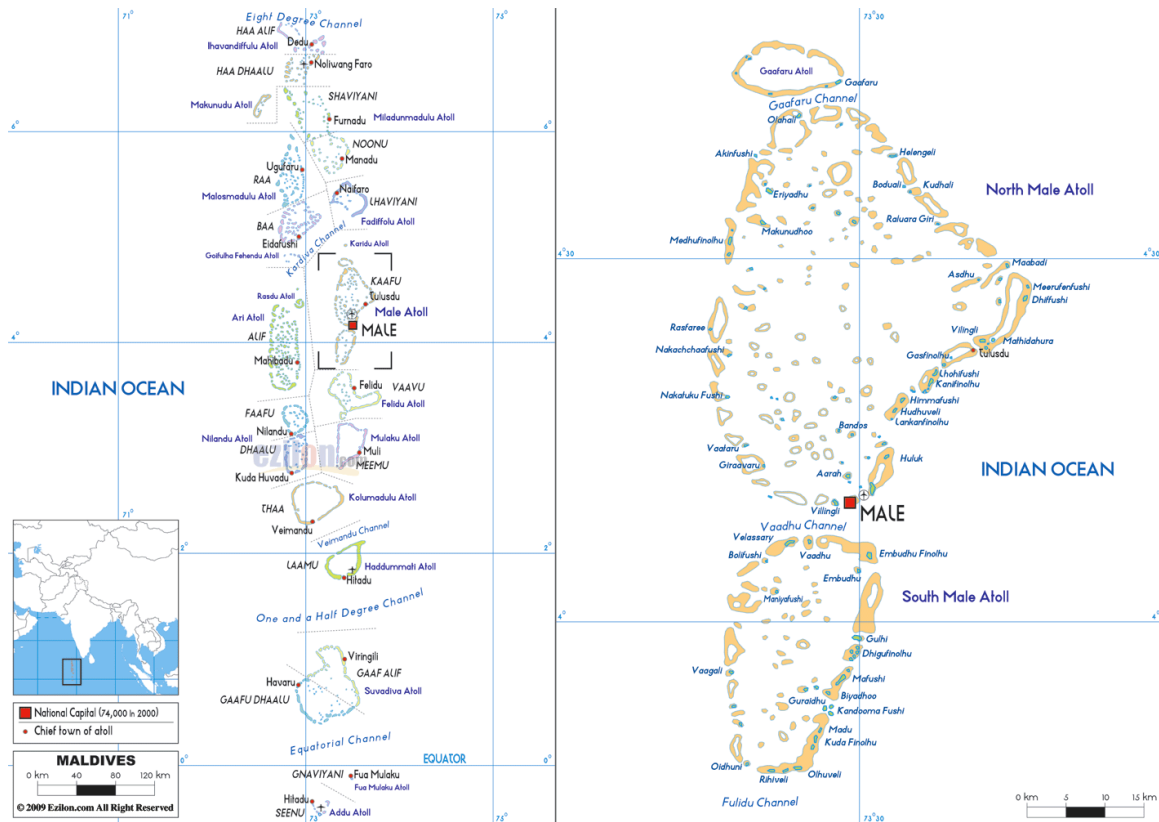


Figure 1: A Map of the Maldives, demonstrating the atolls that make up most of the nation-state's geography. Each atoll is a system of many smaller islands, but the entirety of the nation-state's geography is low-lying, placing it at extreme risk of a variety of climate change impacts.

Accessed at: <http://www.ezilon.com/maps/images/asia/political-map-of-Maldives.gif>

The Maldives has a long past involving both tremendous foreign influence and foreign rule. The islands themselves have been inhabited since the fourth century, but much of the influence on the current culture has been bestowed after three periods of occupation (Maloney 1976). Occupation by Islamic rulers infused the Maldives with a religious and cultural identity much like the Indonesian and Sri Lankan societies, with deep Islamic cultural cues, but the Portuguese and, most recently, the British have also ruled it. While the Maldives finally gained permanent independence in 1965, the nation as a whole has spent much of its long history as self-governing; while initially ruled by a Sultan for

much of its history, democratic movements have established themselves in the present. During the reign of the first prime minister in 1953, rather progressive policies for a developmental state were established: education for women, telephone lines, and power plants were all built to try to bring the Maldives into the modern era (Maloney 1976). During much of this time, the largest export industry was tuna fishing, and Maldivian villagers lived a relatively subsistence existence that had little investment.

In contrast to that history, The Maldives stand today as a unique cultural and political entity. The nation speaks a native language called Dhivehi, and is made up of 1,192 islands in eleven atolls, harboring a population of about 300,000 people (Moosa et al. 2007). Despite three foreign occupations, much of the Maldives' history is one of independence. Maloney (1976) highlights how governing the country was challenging from distance, and aside from benefits of port cities, not much was gained by foreign powers by controlling the islands, thus letting the islands more or less govern themselves. The nation finally earned its official independence in 1972, when British control left the islands and the country was admitted into the United Nations.

Tourism has boomed since 1972, ballooning from two resorts and 280 beds to 97 resorts and 20,000 beds by 2009 (Maldives Monetary Authority 2010) coinciding with a high degree of government intervention and drive to market tourism in the Maldives to the international community. This development of tourism has utilized the natural resources present in the region to bolster their economy, bringing foreign dollars into the nation while simultaneously preserving their natural capital (Riza and King 2010, Scheyvens 2011, Shakeela et al. 2011, Bhat et al. 2014). As such, islands dedicated to tourism have become

very wealthy, catering to western tourists. In islands inhabited by Natives, however, much of the culture is relatively unchanged. Most native islanders live in a manner similar to how they have for generations, relying most often on tuna fishing and production. As a result, tuna fishing has grown to be the second largest industry in the Maldives (Maloney 1976, Scheyvens 2011, Shakeela et al. 2011, Sovacool 2012).

As such, Maldivian culture and economics are closely linked to the health of both the local and global environment. Geographically, however, it is extremely vulnerable to climate change: recognized as the lowest country in the world, the Maldives lie only a few meters above sea level, and projections of sea level rise paint a grim picture for the future of nation. The IPCC Fifth Assessment Report (2013) estimates that the current sustained levels of carbon emissions could result in nearly a full meter of sea level rise, putting the Maldives at a “high” to “very high” risk of impact from climate change. In particular, the report stated that the “maintenance and enhancement of ecosystem functions and services and of water and food security” would be a key adaptation issue (Stocker et al. 2013, Field et al. 2014). With a rising tide, flood, storm, or tsunami events could easily inundate the islands with saltwater, contaminating water and food supplies and isolating villagers with little-to-no way to support themselves (Shenk 2011, Lazarus 2012, Sovacool 2012).

Aside from the risks of climate change concerning the sea level, the changing chemistry of a warming ocean is also crucial to the future of the Maldives. Much research has already been conducted about the mechanisms for coral bleaching and dieoff, and oceans have warmed enough already to irreparably damage coral reefs around the world (McClanahan 2007, Stocker

2013). This has already manifested itself within the Maldives, with coral dieoff events occurring in 2005 and 2010 (Gaskill 2010). Tremendous damage has been observed, not only to the marine biodiversity that relies on coral reef structures, but also on the economic benefits that come from diving, snorkeling, and reef tourism (Gaskill 2010). As the economy is wholly derived on either the harvesting or tourism industries based on their natural resources, the Maldives does not have the financial capital to develop mitigation strategies such as seawalls on the entirety of their 1,192 islands, a developmental dilemma that was especially highlighted by Shenk (2011). As a developing country, native inhabitants have little financial power and capital to protect their geography, and even if they could, those inhabitants are powerless to stop the changes to ocean chemistry and ecology and thus are powerless to protect their culture.

As such, the Maldivians face a future of cultural annihilation, wherein the environment on which they founded their culture is at risk of changing drastically. As a nation that has made an existence out of the ocean, the Maldives has relied on the ability of the ocean to provide sustenance and survival, and for tourist dollars to provide economic development. However, what this entails is that the entire cultural identity of the Maldivians is directly in relation to their natural capital. The common theme identified in the literature examined in this review is a foundation for the nation's culture and development in their natural resources. As such, when these are put into jeopardy, the tenets of place annihilation apply. This particular destruction will certainly be indiscriminate and complete (Hewitt 1983). Unlike the Cheslatta, however, for whom the destruction forced them off their lands, this indiscriminate destruction will instead leave most of the land intact but will make it completely

uninhabitable. As islands shrink from erosion, and sea levels rise, the fresh groundwater resources that islanders rely on for drinking will become contaminated and destroyed. Either through an increased risk of ground seepage, or from increased frequency of flooding events, islanders will no longer be able to rely on their old water resources. When combined with the loss of coral reefs, which provide a habitat for an enormous amount of biodiversity and act as a key source of food and recreation, it becomes evident that every aspect of the Maldivian economy, both for subsistence and tourist industries, is at risk of disappearing.

Especially challenging for potential responses to climate change for the Maldives will be the implications of independence. One of the traits stressed by Maloney (1976) was the independence of Maldivian society; the island chains have been particularly hard for foreign powers to govern. While they went through three periods of foreign oversight, Maldivian rulers were still largely free to operate as they had for generations. The independence of the Maldives has substantial cultural significance. Having made their society from the ocean, ruled autonomously for most of their one thousand year history, and then developed it once they won their final independence from the British, the Maldives have infused their island nation with the sentiment of freedom. Now, despite the fact that they emit minimal carbon, they are reliant on the rest of the world for mitigation, aid, and abatement. Indeed, the first part of their cultural heritage is already at risk, and the ability to make independent decisions about their future is threatened by global carbon emissions.

As the Maldivian culture relies wholly on the ocean for their success, that culture is at a very high risk for cultural annihilation. As every aspect of their

existence is drawn from the sea, any small change to that ecosystem will likely have negative impacts on their culture. Unlike Alaskans, who could point to myriad environmental vulnerabilities, ranging from a loss of sea ice and permafrost, to declining wildlife and salmon populations, Maldivians are at risk because of how much they rely on one particular ecosystem. As such, the cultural society present in the Maldives is similarly at risk to undergo the same factors of annihilation present in cases presented by Hewitt (1983). Further, there is little chance for the Maldives to reinvent themselves, because their society is already built on natural capital, they have a tremendously small amount of physical and natural capital that they could utilize with the goal of changing and supporting a cultural reinvention. Just like the Cheslatta, there is little potential for a cultural reinvention or repair. The environments and lands that they infused with their cultural and trusted for their survival are expected to be made barren and inhospitable.

Rising from Uncertainty and Change in the Netherlands

Of the developed nation-states of the world, perhaps no nation is at more immediate risk than the Netherlands. A state that is as much of a developmental marvel as a bastion of western society, the Netherlands is built in a geographical lowland, with much of the nation below sea level (Kabat et al. 2005). Throughout much of the history of the Netherlands, the nation has had to develop ways to carve out land for its existence through a series of impressive water management systems. Human settlement in the area dates back to about 500BC, when inhabitants started building mounds on which to live in the flooded lands of the area. While much of the history of Dutch culture (and to a lesser extent, Friesen

culture as well) and the Netherlands has revolved around the floods and storms inherent in living in a low-lying area in the North Atlantic, the history of the Netherlands is one of adaptation.

Throughout the seventeenth century, the Netherlands was seen as the epicenter of a newly globalized economy. It had developed a nation of traders, artists, artisans, and explorers that launched the Dutch Golden Age: an age that defined its cultural heritage and identity that led the world towards a globalized and intercontinental future. Brook (2009) noted that Vermeer's paintings provide a lens through which to view the seventeenth century Dutch world from progress in art, to social norms, to a focus on the greater world.

For instance, during the seventeenth century, trade, globalization, and mercantilism dominated political and economic landscape of the Netherlands, and dramatically shaped its culture, and Vermeer's paintings show various subjects wearing beaver skin hats in rooms with maps of the world on the wall. In other scenes, the Dutch East India Company brings fruit from far off lands, both importing exotic new goods while simultaneously exporting Dutch culture to the world.

During its golden age, the progressive Dutch culture was engaging the newfound possibilities of trade and civilization. However, if the geography of the Netherlands had remained the same, this culture should not have existed at all. The Dutch built their culture by adapting their land to their lifestyle, creating a culture with an attitude of resilience and a progressive worldview that will set a precedent in a future with a changing climate.

The most famous developments of the Netherland's geographical area were the creation of the diking system, starting around 1134 AD. From the

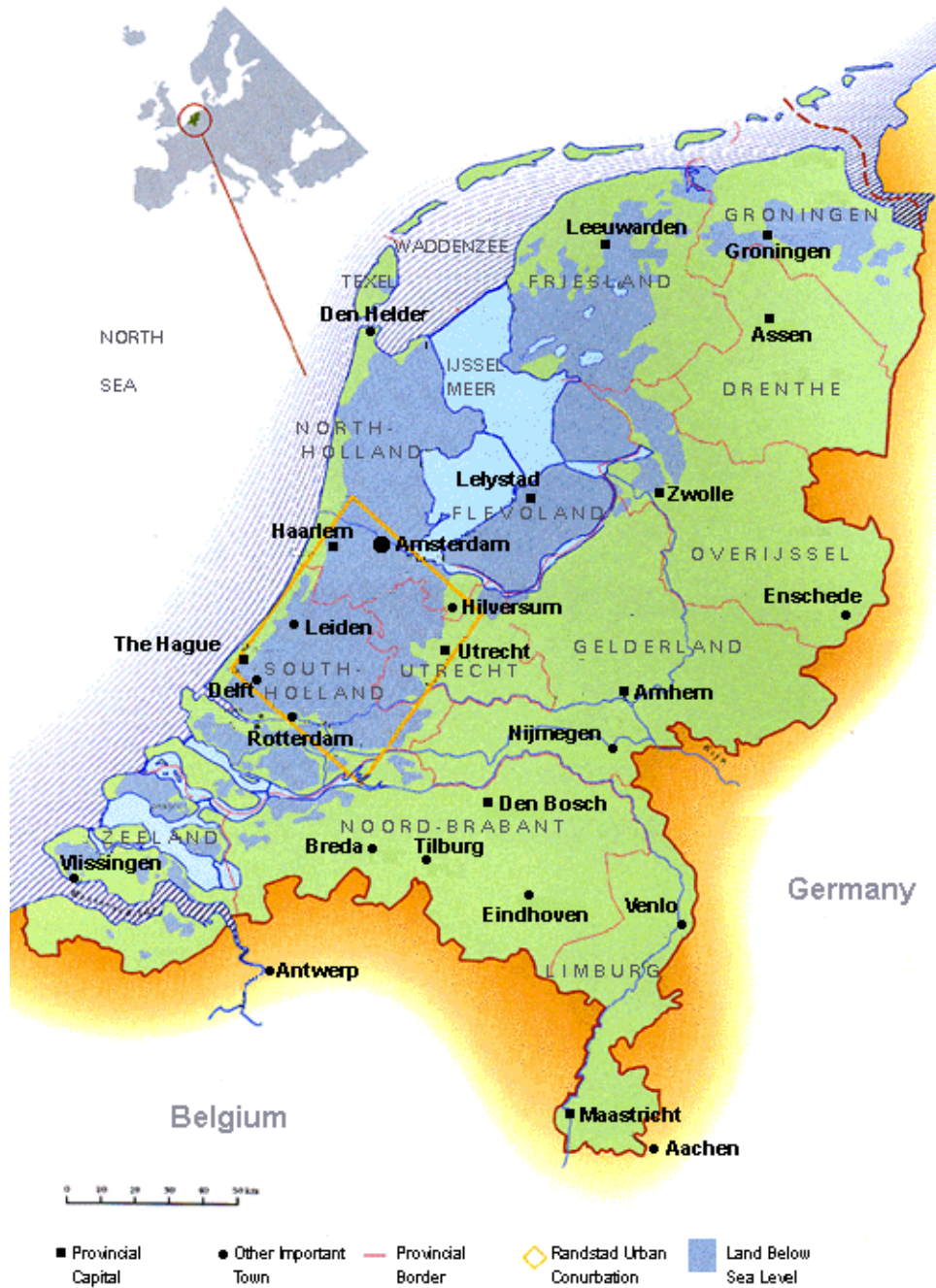


Figure 2: A map of the Netherlands highlighting regions that would be underwater if not for the extensive diking systems in place. Darker shaded areas are below sea level. Accessed at: <https://s-media-cache-ak0.pinimg.com/originals/d1/ac/04/d1ac0447726ea156992103e02c2dc00a.jpg>

creation of strict water boards that regulate water to the erection of windmills,

the Netherlands took a proactive stance to carving out a culture in a land that is lower than sea level (VanKoningsveld et al. 2008). As a result of centuries of this concerted effort, about 60% of the Netherlands territory, and about 70% of the producers of their GNP, is below sea level, as elaborated in Figure 2 (Kabat et al. 2005).

As such, the Netherlands stands to be a supremely vulnerable nation to changes to its environment. As their history of flooding and flood control demonstrates, the entire nation has been required to build a niche for themselves out of the sea, a mission made far more challenging when confronted with the realities of climate change. The literature on the Netherlands identifies two main climate challenges: the rise of sea level in the region, and the increase of storms in frequency and intensity, particularly when it comes to the impact that increased forces of wind will create. The IPCC expects sea levels to rise as much as 0.98 meters in its most extreme scenarios, with modest sea levels rise across all models examined (Stocker et al. 2013). However, the Netherlands does face a relatively unique challenge with storms of increasing severity. Models have consistently demonstrated that storms will become more powerful than before, especially in the long term (Dorland et al. 1999, Kabat et al. 2005, Knutson et al. 2010).

Of particular concern is the role that wind will play in the economy of the Netherlands. Climate change is expected to cause wind force to strengthen throughout the small state by 2050 (Hurk et al. 2006). Even a modest 2% increase in wind intensity could lead to a 50% increase in storm damage, exacerbated by the growth of industry into vulnerable, coastal regions (Dorland et al. 1999, VanKoningsveld et al. 2008).

In addition to storm risk, the rising sea and history of storm surges in the Netherlands create what, at first, look to be a dangerous vulnerability for the small nation-state. However, as Vankoningsveld et al. (2008) describe, the history of the Netherlands has been one of adaptation to rising tides for centuries. Vankoningsveld et al. (2008) demonstrate that the geography of the Netherlands came to its present form during the penultimate ice age, with the ice cap over the area carving out the low delta landscape about 180,000-130,000 years ago. What followed then was a history of rising seas and adaptation to make a life from the ocean. In order to better manage the threat of floods and storms coming off the ocean, Dutch leaders established water boards, which legislated and managed water in the region and coordinated efforts to dike off dangerous rivers and allow regions to coordinate how to reclaim, drain, and protect their land from the water around them – continually improving their system to contend with storm surges, floods, and coastal erosion, as well as later increasing the available land for agricultural purposes (VanKoningsveld et al. 2008).

In particular, two aspects of Dutch development are crucial to note. First, the land upon which they built their culture and society has been one of flux and change and has required a series of adaptations. In this case, the perceptual and experiential realms of Dutch culture have been developed in the presence of water, even before the development of their successful diking and management system. As such, adaptability and determination have been instilled in their cultural identity; much of their country, and the economic success of the Dutch traders throughout their golden age, could not have been accomplished had they not dramatically shaped the land to their needs. Secondly, the Dutch sense of

place was developed with the mindset of adaptation. While most countries instilled their sense of place through their perceptions, emotions, and experiences they felt while interacting with their place – thus infusing cultural value into their place – the Dutch had to create much of their place, thus making a sense of place that echoes their determination and success. As such, it is little surprise that the Dutch became tremendously successful traders and merchants because they had already built an identity on forging success for themselves out of the sea. As VanKoningsveld et al. (2008) demonstrated, the Dutch have lived with the realities of sea level rise for centuries and have built a culture by manipulating nature to their end. The frequent flooding of the land meant that the first order of any society was to protect it and later, in order to grow, they had to take back the land from the sea. They had to learn how to live in the cold years of the Little Ice Age, in an area with a history of storm surges, flooding, and periodic destruction.

It is interesting to apply Hay's (1988a) aspects of a sense of place to the Netherlands. While Alaska and the Maldives are home to societies that see their environment as crucial to their survival and necessary to their success, the Dutch have viewed their land as a potentially inhospitable resource. The perceptual understanding consists both of memories of the destruction of the periodic floods of the region as well as the incredible civilization that they built upon it. Indeed, one of their cultural symbols is the windmill, a tool used to pump and control water; an example to the degree of which their identity in their place has been fused with the need for control. Their cultural experiences have seen this land as hostile and dangerous, in which nature could easily destroy them and their

places if they did not control it, and they have had to live and learn from the cultural memories of destruction.

In order to survive, the Dutch had to be proactive, learning to live with nature, to subdue nature, and prepare for the potential disasters of the future. In order to grow, they had to learn to take back land, altering the geography of the area to sustain their population. By the time the Dutch Golden Age dawned, the Netherlands had already been willing to challenge the norms of their environment for hundreds of years; they had found their cultural identity in the need to adapt to change.

As such, the risks of place annihilation in the Netherlands are relatively low, not because their land is not at risk, but because the threats that climate change will pose on Dutch culture is nothing new. This assertion is based both on the physical attributes of their society but also in the literature surrounding their nation. The Netherlands is one of the few states that have actively investigated their risks for climate change and are trying to come up with solutions for adaptations. Indeed, one study aimed to rank different methods of adaptation to climate change on both a quantitative and qualitative scale, finding that the most effective solutions were integrated water and coastal management systems that aimed to create an efficient way to work with nature to ensure security (Bruin et al. 2009). Clearly, the academic and political communities of the Netherlands not only recognize the threats of climate change but they are acting to protect themselves against those threats. Their cultural heritage has survived and succeeded because of the way the Dutch have proactively shaped their environment.

This culture is even reflected in the people of the Netherlands as well. Despite the fact that the Dutch government is one of the most active governments in preparing for the impacts of climate change, the people of the Netherlands felt that the government had not done enough to cut down on carbon emissions and protect themselves from the consequences of climate change. In a class-action lawsuit, Dutch plaintiffs, almost 900 of them, wanted the courts to compel the government to reduce climate emissions to 40% below 1990s levels by 2030 for the sake of environmental justice (BBC News 2015).

The existence of such a lawsuit highlights the value that the Dutch put on their land and the earth and how their interactions with their land have shaped their culture. By being a progressive force, they have succeeded in building a culture where there was once ocean and now are actively preparing to defend that culture in the face of climate change. That is not to say that climate change will have no effect on the Netherlands; rather, it demonstrates that the Dutch are willing to work to protect their culture from the threats of climate change, in part because they have done so before.

Conclusion

The problem of climate change, in terms of its scale, potential impact, and consequences, is unlike any other challenge modern humans have encountered. Caused by anthropogenic pollution, climate change will impact the entire biosphere, with the only likely means for mitigation being a collective shift in how humans produce energy.

For cultures, such a problem has the potential to be deadly. This review analyzed the unique pressures that three particular cultural case studies are

anticipating or experiencing. As a whole, each of these societies are expected to experience some form of climate change and cultural pressure; however, each culture will bear the impact differently. As such, a few conclusions can be drawn from this review.

First, how a culture is developed is as important as where it developed. In the case studies of Alaska and the Maldives, cultures developed with a close reliance on their land and natural capital, for both cultural and physical survival. This reliance was based on a geography that has been viewed as stable and predictable, with natural cycles and behaviors that could be easily anticipated. Particularly in Alaskan cultures, a harmony with the land was part of their cultural teachings, and a respect for the development of a symbiotic relationship with their surroundings. Despite the harsh environment and tough conditions inherent in living in arctic and sub-arctic environments, Alaskan culture built a culture that glorified and relied on their environment. Alaskan art, language, and ways of life all center on putting themselves into synchrony with the natural ebb and flow of seasons, but when these flows are disrupted, and the environment no longer acts like it has for centuries, that culture can no longer survive as it has before. Similarly, in the Maldives, where societies have governed themselves for centuries, the Maldivian culture is built upon a geography of isolation, and few new influences have found a foothold in their culture. As such, islanders can still trace their Islamic traditions back centuries and have developed and preserved a unique language. For the Maldives, they have developed and maintained their culture out of necessity. While they do not share the same degree of spiritual appreciation for the cycles of life, they do have a cultural history and collective cultural knowledge that has allowed them to fish

and farm an existence on a tiny patch of land, and otherwise govern themselves. As such, it is why Maldivians have been wary of foreign influence on their culture, despite the developmental benefits that tourism has brought to their society. The Maldives has existed, survived, and governed themselves by living in a manner identical to how they lived for generations. Both of these cultures developed an attitude of sustainability towards their geography; both environments had been good to these societies, so why should they feel the need to change them? This contrasts with the Netherlands, which had to build and defend their culture from the forces of nature for centuries. To the Dutch, nature was not a friendly resource; it was at times destructive. As such, Dutch culture developed into a culture of adaptation, which has prepared them for a future of climate change with far more effectiveness than the environments of the Maldives and Alaska have prepared their cultures. Indeed, the collective humanistic interactions of a culture to its environment in its past influences the risks that such a culture has for the future.

Secondly, a culture's risk to climate change is directly related to the specificity of its "geographical niche". Just as species are characterized according to the environmental conditions needed to survive and thrive, so too can we characterize the vulnerability of cultures. Species are often characterized as generalists or specialists, reflecting the breadth of resources used, which in turn can predict the degree to which they can adapt to changes in their environment. In the context of climate change, specialist species are more likely to face extinction, as they are less likely adapt to new climates and still survive (Munday 2004, Chevin et al. 2010). In the same manner, cultures that rely on very specialized geographical niches will find themselves most vulnerable to

cultural annihilation as a result of climate change. Native cultures in Alaska have, perhaps, the most specialized “geographical niche” of these three case studies because their way of life relies on very specific changes in seasons. Although a variety of food sources (e.g., fish, marine mammals, and ungulates) contribute to their diet, each requires an environment threatened by climate change. Their culture is heavily built on the traditions behind passing their cultural knowledge of survival from generation to generation, including passing on their cultural values of respect to the earth, environmental responsibility, and ecological knowledge from one generation to the next. As such, because climate change is likely to affect so many aspects of their environment, it is also putting native tribes at a greater risk of place annihilation, destroying the shared emotions, perceptions, and physical interactions by means of destroying their land. In contrast, the Netherlands, by means of global trade and colonization, is a culture that has actively engaged and established itself in places as far ranging as China and North America. Their history of adaptation has allowed their cultural heritage to exist and thrive in nearly every geographic region. Indeed, much of the golden age of Dutch culture involved globalization, bringing in cultural influences from other environments, cultures, and places and incorporating them into their own cultural fold. Their shared experience of reclaiming their homeland as their own has created a culture that acts much like a generalist species and is far more culturally prepared to thrive and survive in a world that is undergoing newfound changes of its own. Thus, a history of cultural adaptability will likely reduce the likelihood of cultural annihilation via place death as the world changes and undergoes dramatic and rapid changes.

Third, wealthier cultures are more able to protect their cultural geography than poorer cultures. Much as climate change is projected to impact poor individuals most dramatically (Adger, Kelly 1999, Thomas, Tyman 2005), so too do impoverished cultures have the highest risk of cultural annihilation via place death. Partly, this is because poorer cultures tend to rely more on the natural capital around them; the poorest villagers of the Maldives still rely largely on tuna catches and subsistence farming for survival. However, what wealthier cultures have is physical and financial capital. Nations like the Netherlands have the financial resources to adapt their environment and protect their culture, shielding their sociological, economic, and cultural assets from climate change. Places like the Maldives simply do not have the money to be able to preserve their sense of place. As such, a wide range of impoverished cultures may disappear as their places are threatened, helpless to maintain their way of life as the geography and ecology of their homelands change.

This review asserts that cultural death via place annihilation is another potential consequence of anthropological climate change, along with myriad well-established ecological consequences, (Hoegh-Gulburg 1999, Hinzman et al. 2005, Mars and Houseknect 2007, Gaskill 2010, Stockler et al. 2013, Field et al. 2014). However, further research is needed to better understand how cultures have and can adapt to changes in their cultural geography and what can be done to ensure that cultures are able to maintain their sense of place even when their places are changing. Such research requires an interdisciplinary emphasis, applying ecologic, social, economic, and anthropologic aspects to geographical study. Hopefully, such collaboration could be used to mitigate the tragic physical and psychological consequences of place annihilation.

In addition, the notion of cultural annihilation raises questions about the rights that people have been entitled to enjoy. Both the Universal Declaration on Human Rights and the International Covenant on Economic, Social, and Cultural Rights declares under international law that all people are entitled to their culture and recognizes that it is as essential to the foundation of a global community that honors the rights of all people (UN General Assembly 1948, UN General Assembly 1966). As such, further studies into the legal justification and rights enumerated to peoples under international law could be pursued, with an aim of understanding potential recourse under the tenets of international law.

Such further studies can further identify the best ways to preserve parts of the collective human experience that are at risk of disappearing altogether in the face of climate change, and can foster a better understanding how humanity can work actively to protect the cultural identities of our societies. Understanding climate-related vulnerabilities of cultures, as well as how to protect cultures from these new risk factors, is a challenge requiring a concerted effort of future academic research.

Appendix A

This thesis examines the intersection of two distinct fields of academic study: climate change ecology and humanistic geography, with the aim of better understanding how cultures are impacted and at risk of annihilation as a result of anthropogenic climate change. In crafting this thesis, it became very clear to me that our places are much more than geography, and our cultures are much more than just an aggregation of thoughts and memories. Our cultures are dynamic, like ourselves: they interact with other cultures, evolve slowly over time, and find their identity in the places they are established. But most importantly, they are mortal entities. From a Christian religious background, this mortality is crucial not only to our heritage as descendants of the nation of Israel, but also acts as a conviction. We as Christians have a heritage based in the connections of land, but also a conviction to support and cherish the lives and dignity of those we encounter.

The story of Israel involves motifs of place, or lack thereof. Israel emerged out of Egypt and into the Promised Land, as documented in Exodus and Deuteronomy, and then was later banished in diaspora due to faithlessness, as told in II Kings (New Revised Standard Version). The culture of Israel throughout the meta-narrative of the Bible is one of God and his people, and the notion of place is a recurring theme. As such, the foundation of the Christian faith, itself, is one that emphasizes the impacts of place. From the triumph of having a land to call their own, and Israelite flourishing under the rule of King David, and then the later tragedy of conquest and diaspora, the Israel story presents a validation of place in the texts that form a foundation for our own

Christian faith. This thesis, then, is crucial to our own Christian story, and how we find our own Christian identity.

Christians, however, are not meant to simply understand the impacts of culture, but to engage culture. Jesus calls us to “make disciples of all nations”, spreading the redemptive message of grace to the world (Matthew 28:19, New Revised Standard Version). From a political standpoint, however, nations are not places, but people. A nation is a group of people sharing a collective identity, and (as the case of Palestine and, well, the history of Israel demonstrate) nations can be landless. However, these nations do not arise out of nothing. Nations are made up of people, and people form emotional attachments to their homelands even when they are not legally entitled to their own land. We Christians follow a God of empathy and reconciliation, and if we are to make “disciples of all nations,” we must then also empathize with the cultures of those nations we are engaging. When we approach a person with arms of empathy, we validate that person’s existence, including that person’s upbringing, culture, places, experiences, and values. We cannot engage others without demonstrating that we love not simply the person, but the culture that that person came from.

Thus, this thesis implies a Christian mandate of proactive change. Some scholars have already called for a Christian doctrine of conservation (Pope Francis most notably comes to mind) but this thesis emphasizes that caring for the planet is not simply caring for creation. Rather, by caring for the planet, we can demonstrate a compassion for those at risk of cultural annihilation and emphasize that we as Christians are called not just to love people, but also to love people unconditionally. In this case, that means to love their history, their

culture, their geography, their relationships, and their collective knowledge, regardless of who they are and where they are.

One of the central conclusions of this thesis is that cultural annihilation via place death is a particularly human consequence of climate change, alongside a myriad of other social, ecological, and economic ramifications. However, when this is put into a Christian perspective, it no longer is merely another scary idea to worry about; it rather becomes a call to action, for we have a new way to minister, love, and ultimately, demonstrate Jesus's grace to cultures across the globe.

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