# CLIMATE CHANGE COMMUNICATION IN AN AT-RISK STATE: A CASE STUDY EXAMINING FREQUENCY AND FRAMING OF CLIMATE CHANGE COVERAGE BY LOCAL TELEVISION NEWS IN HAWAII

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**Abstract**

This study aims to answer some fundamental questions about the frequency and framing of climate change as a news topic in Hawaii. This investigation draws inspiration from the annual reports published by Media Matters, which provide important statistics on how major national television news organizations such as NBC, CBS, ABC, FOX, and PBS cover climate change and global warming in the media. Due to the profound nature of such topics, and the role that local television news still plays in American life, it is critical to understand how and to what degree these concepts are being conveyed to the public on a local level. This is particularly relevant to the state of Hawaii because of the high level of risks its people face due to the known vulnerabilities of island communities to the projected effects of climate change, such as sea level rise. By using content analysis to examine segments aired by Hawaii News Now during the year 2016, and comparing local coverage frequency and content to national news data, this study shows that local television news coverage of climate change and global warming is greater in frequency in comparison to national network coverage, however there is a tendency to exclude the terms "climate change" and "global warming" when reporting on many of the related topics. This suggests that, although there is greater quantity, there is a need for better quality in local representations of climate change by television news media.

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## 1. Introduction

Climate change has been declared one of the most serious and critical issues facing the world today by the scientific community, with an overwhelming consensus that this growing crisis is largely due to anthropogenic activities. Climate change is a threat to the stability of our planet as a life support system for many species, including ourselves (Smith et al., 2009). World leaders have spoken out about the seriousness of the costs of not taking aggressive action to develop mitigation and adaptation plans for the current climate trajectory. A changing of attitudes, priorities, and policy must happen to meet these challenges. This is where the media play an important role, perhaps even a responsibility. In many ways, media acts as a central "interpretive system," from the local community level to the societal level (Peters & Heinrichs, 2005). In general, media is a large participant in framing, or helping to define social problems by reporting causation and proposed solutions (Iyengar, 1991). Media coverage that specifically reports on the environment and climate change issues has further been shown by research to greatly impact public opinion, concerns, and understanding of the subject (Burgess, 1990; Antilla, 2010; Brulle et al., 2012). Yet, news that directly discusses reports on issues of climate change is one of the most neglected stories in mainstream media, contributing to the "spiral of climate silence" that researcher Anthony Leiserowitz (2016) has argued:

> Our findings suggest that there is a climate change 'spiral of silence,'
> in which even people who care about the issue, shy away from discussing
> it because they so infrequently hear other people talking about it –
> reinforcing the spiral. (p. 1)

This void of serious discourse on climate change has been apparent in the American 2016 political debates as well, which is indicative of a cycle where the public has not prioritized climate change, so political debate moderators and other members of the media don't pursue the topic. If the general public remains disinterested and uninformed on issues of climate change, then political leaders and policy makers are not pressured by the voting public to make climate change mitigation and adaptation a higher priority for discourse and action. Without meaningful engagement through trusted media sources and opinion leaders, support for policy change in favor of responding adequately to the challenges of climate change will remain divided. Although there has been significant advances in recent years for raising awareness and garnering support for new policies (Moser, 2016), there is still much to be done. If 63% of Americans are "fairly worried" about climate change (Gallup, 2016), then what of the other 47% of Americans, how can they be reached? This highlights the significance of climate change communication research, which has grown into its own field, with its own theories, and fortunately has had a steady increase in publications.

The aim of this study is to take a closer look at the local media of Hawaii and how climate change is addressed. Because Hawaii is located in the Pacific Ocean, it is one island chain of many that is considered particularly vulnerable to the negative impacts of climate change (Barnett & Adger, 2003). One might think that because of this vulnerability and other factors, such as Hawaii being a host for major climate change conferences and a center for conducting climate science research through its university system, the media of Hawaii would place a higher priority on climate change news coverage in local media than some other places, perhaps even more attention than the national news, similar to what one George Mason University study found in 2014 as discussed later in this paper. But to date, there is paucity in research on climate change communication in Hawaii, and comparisons of local media coverage versus national media coverage are equally scarce.

The results of this study will help to fill the knowledge gap of climate change communication research in Hawaii, including broadening the understanding of what climate change impact topics are being covered, if local media is giving climate change denial airtime, and if local media is including the scientific community in their reporting. This will be done by examining to what extent climate change news is being reported in the local media and where possible, comparing it to national data. Local media in this case will be limited to local television news broadcasts. Local television news is still very relevant in Hawaii, as it is in many other places. Back in 2013, Pew Research analysis of Nielsen data showed that 71% of Americans were getting their news from local TV stations and this percentage was much higher than network and cable news (Mitchell et al., 2013). As of 2016 the preference for local media via the TV screen remained true. Pew reported that 57% of surveyed adults in the US get most of their news from TV, local television being the majority of that percentage (Barthel et al., 2016). As digital access to news grows in popularity, TV still remains strong. Ryan Ozawa, while serving as Director of Communications at Hawaii Information Services, has stated that despite local newspapers struggling with the effects of the internet, local television news audiences in Hawaii have continued to grow (Ozawa, 2015), keeping it relevant.

This study also explores media framing of climate change news in Hawaii. This is a unique element of this study because it deepens our understanding of how the usage of particular language might divorce local news events from the bigger picture of climate change. The association between issues like climate change and sea level rise, coastal erosion, water inundation, rise of infectious diseases, agricultural sustainability, species decline, extreme weather conditions, economic stability, immigration, food security, amongst many others, are important for the public to understand and to draw those connections.

## 2. Literature Review

### Climate Change Communication and its Challenges

Climate change communication in the context of this study refers to "the diverse processes by which climate change-related information, knowledge, ideas, emotions, meaning, values, and behaviors flow between individuals and through societies" (Yale PCCC, 2016, para. 1). It has become an established and productive field (see Figure 1), similar to the growth of other specified communication fields like science communication, health communication, and risk communication (Brown et al., 2010). It has become increasingly important to understand and improve the ways in which institutions and societies discuss and report on the topic of climate change as an integral part of planning and preparing for a future environment that will be very different from the one people are accustomed to today, or previously. The challenges and necessary future direction of climate change communication research have been thoroughly plumbed yet continues to unfold as the world and its politics move to address these changes.

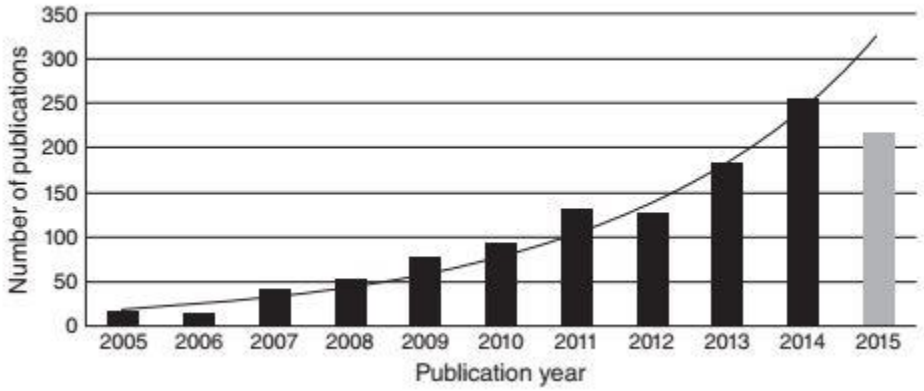



**Figure 1**. Climate Change Communication Publications from 2005 to 2015 (2015 not complete). Reprinted from "Reflections on climate change communication research and practice in the second decade of the 21st century: what more is there to say?" by S. Moser, 2015, *WIREs Climate Change*, 7, p. 345.

The ability for us to communicate about our surrounding environment is an instinctive and fundamental process that we share with many life forms. In order to survive, early humans, like other creatures working together in systems, had to be able to tell each other where water and shelter could be found, edible plants could be harvested, animals could be hunted, and what dangers were nearby. The importance of communicating about our changing climate, though much more complex now than ever before, is just as crucial today as it has ever been for the sustainability of our species and others.

There is no straightforward answer to the questions of what obstacles modern communicators of climate change face. Scholars have been varied in placing priority on certain challenges. Even if to a large extent much of communication research on climate change has been focused on "discursive representations, framing, and perception," (Cox, 2010, p. 123), some have suggested that, in this current environment where urgency is needed, the "primary communication challenge lies more in mobilizing a relatively aware constituency than in persuading more people to accept the scientific consensus'' (Carvalho & Peterson, 2009, p. 131). In other words, for the segment of the American population that has accepted climate change as a reality, they need to know what's next and what they can do, moving towards global cooperation, development and adoption of new technologies, policies, and an understanding of the necessary changes we now must make to our ways of living, thinking, and behaving.

When it comes to talking about climate change, one of the challenges has perhaps been the terminology itself. A study from Yale University found that the terms "global warming" and "climate change," are both used more predominantly depending on which political party the speaker is affiliated with, and that these terms tend to mean different things to different audiences, and therefore have a tendency to "activate different sets of beliefs, feelings, and behaviors, as well as different degrees of urgency about the need to respond" (White, 2014, para. 3). Back in 2002, a republican strategist advised the Bush administration on how to succeed at the "environmental communications battle" by swapping out the preferred language, stating:

> It's time for us to start talking about 'climate change' instead of global warming…'climate change' is less frightening than 'global warming'. As one focus group participant noted, climate change 'sounds like you're going from Pittsburgh to Fort Lauderdale.' While global warming has catastrophic connotations attached to it, climate change suggests a more controllable and less emotional challenge. (Leiserowitz et al., 2014, p. 7)

Within the scientific community, there are clear differences between the terminologies because they represent very different concepts.

"Global warming" was first coined in 1975 by geochemist Wallace Broecker of Columbia University, a change from the previous language used, "inadvertent climate modification," and refers precisely to the increase in human emissions of greenhouse gasses that lead to higher global surface temperatures (Conway, 2009, para. 3). The term "climate change" refers to changes in the statistical properties of a climate system when being measured over an extended period of time, independent of the cause (IPCC, 2001). Technically speaking then, the use of "climate change" offers some wiggle room, while global warming is very specific. Using the right language is a positive step, one that has been resisted in some places, like Florida, which has been called the "ground zero" of sea level rise due to already very visible consequences of global warming they are facing (Urdaneta, 2014, p. 1). The outrageous story of Florida state officials outright banning the use of the words "climate change, global warming, and sustainability" in official discourse after Governor Rick Scott took office back in 2011 (Korten, 2015, para. 4) is disturbing on a number of levels. *Think Progress* responded by reminding us that, "it's hard to address sea level rise without also addressing the broader problem of climate change" (Valentine, 2015, para. 9), emphasizing the importance of making those connections when talking about climate change, regardless of who the speakers are.

The topic of climate change is one of the most divisive politically. One major study looked at twenty-seven variables across the world when exploring how people feel about the topic of climate change, and concluded that the "intuitively appealing variables" like sex and education are far less relevant than political orientation and ideology (Hornsey et al., 2016, p. 622), but most importantly, these beliefs have a minimal effect on the extent to which people are willing to start living their lives in ways that are better for the environment. This suggests that, despite the media silos people are resigned to and what language usage they prefer, society generally agrees that, when the need is presented, people are willing to accept changing their lifestyles in order to prioritize the planet and its future, at least in theory.

Aside from lexical choice, a large challenge to productive climate change communication has been the struggle between vying interests that have helped sustain the division along political lines, enabling a battle to play out in American media. When those with high stakes in the fossil fuel industry began to feel their interests challenged, they went out of their way to hire highly suspect scientists, lobbyists and think tanks to intentionally mislead the public and political spheres, to which the media projected this scientist-versus-scientist drama that effectively muddled the issue for some time and contributed to a vicious wave of climate change denial (Jacques et al., 2008). This had the unfortunate result of painting climate scientists as alarmists while constructing a dangerous balancing of "both sides" by the media. Climate change denial happens when people intentionally "obstruct, delay, or derail" the effort to create environmental and industrial policies that are aligned with the scientific consensus that we need to decarbonize the economy (Greenpece, 2000). This sewing of doubt was made obvious when leaked documents from the American Petroleum Institute were published, quoting them as stating that their "victory will be achieved when the citizens 'understand' [recognize] uncertainties in climate science" (Union of Concerned Scientists, 2015, para. 10). Although skepticism and denial still exist in this country today, the majority have accepted climate change as a reality and so the discourse has shifted well beyond the distraction of debate.

With the 2016 Unites States election having passed, it might be more important than ever to mobilize the public and put pressure on leaders. President Donald Trump, who is on public record calling climate change a "Chinese hoax" (Jacobson, 2016, para. 3), stated on the campaign trail that he would "cancel" the Paris climate change agreement, and has placed other climate change deniers in positions within his administration, causing some warranted alarm within the scientific community. One notable example was his selection for the Environmental Protection Agency transition team chair, Myron Ebell, who has been called an "oil industry mouthpiece" by American media (Shnayerson, 2007, para. 1). Trump, who is quick to defend coal and oil interests in the US, poses a serious threat to the hard-earned progress of climate change discourse.

Politics aside, climate change communication has perhaps innately faced other challenges as well. Susan Moser has asked the question, "is there something in the *nature* of the climate problem itself and how humans interact with the climate that makes it more challenging to communicate than other environmental, hazard, or health issues?" (Moser, 2010, p. 33). She answers this adequately by describing some of the challenges that have further been corroborated by other researchers, two of them being closely related: distance and invisibility. The distancing of climate change as something not happening "in our own backyards" and not of immediate concern due to its temporal definition is problematic to meaningful discourse (Patchen, 2006, p. 23). Much of the most tangible evidence of climate change happens in places on the peripheral, like arctic sea ice melting and glaciers shrinking in distant locations, coral reef damage below the ocean surface, and the vanishing coastlines on sparsely populated islands. These "distant," global problems might obscure local environmental concerns and delay response. According to Paul Wapner (2000), this "ecological displacement" is furthered "when people are unwilling to address environmental problems as they emerge within their immediate community. As a result, people tend to export the experience of environmental harm to others" (p. 358). Invisibility of the elements of climate change, like not being able to physically see the accumulation of greenhouse gasses, complicates the demonstration of these effects to the public as well (Moser, 2010, p. 34).

Another conflicting dimension that Moser argues is the insulation from the environment that modern urban societies have constructed around their lives: people leading a life lived largely inside climate controlled homes, schools, cars, and jobs where the incremental changes to our environment are easier to dismiss. As the heat island effect becomes more prevalent in cities, the dependence on this insulation becomes reinforced (EPA, 2016). This distancing and separation of society from the natural environment can only inflame climate change.

Yet another challenge in communicating climate change is the breadth and sheer complexity of the topic, which has fed into feelings of uncertainty for the public. The average American citizen probably does not have the time, wherewithal, or interest in regularly reading scientific journal articles on climate change and, historically at least, the public have gotten most of their scientific information and knowledge, particularly about environmental topics, from the mass media (Wilson, 1995). Describing these complexities in accessible ways has been a challenge for many fields, challenges that science communication research has explored for some time. There was a now famous survey conducted over a decade ago, asking 2,000 journalists and editors, and 2,000 scientists and engineers how they felt about each other, and the results showed that neither the scientists nor the journalists believed that the media in the US had done a very good job of explaining science to the general public (Chappel & Hartz, 1998). These results emphasized a need and a challenge, one that still remains today, for media, scientists, the public, and the policy makers to greatly improve communications among each other, as well as a call for the necessary increase in scientific literacy for the society as a whole.

One last challenge worth mentioning is specific to conventional mediums like the one explored in this paper, which was summarized by Ouariachi et al. (2017) as having inherent limitations of one-way message transmission (p. 11). Although the internet has made multi-directional conversation more accessible, this has not degraded the importance of local television news media to inform communities, as will be discussed later.

**Framing of Climate Change News**

> To break through the communication barriers of human nature, partisan identity, and media fragmentation, messages need to be tailored to a specific medium and audience, using carefully researched metaphors, allusions, and examples that trigger a new way of thinking about the personal relevance of climate change. (Nisbet, 2009, p. 14)

To a certain extent, all information reported through media is packaged in an ordered way, with an emphasis on particular details, and news producers all have their own organizational "stylebooks," preferences, priorities, and recommendations tailored for their audiences, which are commonly and perhaps too broadly referred to in the field of communications as "framing." As Entman (1993) described the process itself, "To frame is to select some aspects of perceived reality and make them more salient in the communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation and/or treatment" (p. 55). In other words, framing is critical to the social construction of reality. Framing as it is defined and understood in communication is related to agenda setting theory, but uniquely different in that it doesn't just bring attention to one particular topic, but also refers to the way that a topic is organized and presented. A frame can be thought of as a process similar to what happens in photography, where the artist brings focus to a specific subject by creating limitations on what is and isn't seen, and how that image is composed. Some examples of the techniques used to frame messages are metaphor, narrative or story, use of tradition, the use of slogans or jargon, use of symbolic artifacts, creating contrasts, and applying spin or value judgment (Fairhurst & Sarr, 1996).

The angles at which climate change communication research has studied frame building and setting in the media is varied. According to Semetko and Valkernburg (2000), there are five

common, generic frames that are prevalent in news media: the conflict frame, the responsibility frame, the economic consequences frame, the human interest frame, and the morality frame. But beyond these, there are multiple studies that look specifically at framing of climate change, some of these being the framing of climate change as local versus distant threats (O'neil & Nicholson-Cole, 2009; Spence & Pidgeon, 2010; Spence et al., 2012), positive and negative efficacy in framing (Kellstedt et al., 2009; Morton et al., 2011; Milfont, 2012), framing climate change specifically as a public health issue (Maibach, 2010; Myers et al., 2012), attribution of responsibility frames (Dirikx & Gelders, 2010), the "science and technology" frame (Wagner & Payne, 2015), "political economic" frames (Boykoff, 2008), and of course the notorious framing of climate change in the U.S. media as having two sides of equal weight, which ultimately gave climate change denial a lofty platform for a time (Hoffman, 2011; Weber & Stern., 2011; Bain et al., 2012; Shehata & Hopmann, 2012; McCright et al., 2016).

The production of news that informs the framing of subject matter tends to adhere to certain journalistic norms. Boykoff and Borkoff (2007) divide these into first-order and second-order journalistic norms (p. 3). First-order norms (personalization, dramatization, and novelty) work in combination with second order norms (authority-order and balance) to shape what they associate with "episodic framing" within the context of climate change news, in opposition to "thematic framing, whereby stories are situated in a larger thematic context – and this has shown to lead to shallower understandings of political and social issues" (pp. 3-4). By this standard, at least historically, perhaps it is has been within the very norms of popular western journalism to misrepresent climate change.

Media has been taken to task in the past on neglectful or irresponsible framing and agenda setting. Some research has noted that climate change reporting has been largely lacking in presenting the challenges is poses to economies, national security, public health, the connections between climate change and extreme weather patterns, and mainstream media has even ignored major events like the impacts of the XL pipeline, the EPA's Methane Reduction Plan, the New

York Attorney General's investigation of Exxon, and President Obama's Climate Action Plan (Media Matters, 2015). Climate change in the media has been limited by the space that we put it allow it. It's a very narrow box that reporting has traditionally been resigned to, in the science sections as one climate scientist described it (Holtouse, 2016). Making climate change personal, through innovative storytelling and reporting, where it can be expressed in relation to immediate communities on the local level and taking full advantage of all channels for public discourse is where the conversations need to go.

**Local Coverage of Climate Change**

The local media discourse is historically a fundamental cog of the societal processes in a given place. It can help to visualize a community by offering up a glimpse into what matters to that community; issues of local politics, events, and crime, to the everyday dealings of weather, traffic, and services, to the more deeply personal interest stories that help create a sense of identity for a particular population. Despite some traditional local media outlets struggling, and even local digital media platforms facing financial difficulties (Waldmen, 2014), the necessity and relevance of localized media remains.

This is reflected the most recent data from Pew Research Center (2017) showing that Americans still heavily rely on their local televised news more so than cable and network news to stay informed and connected with their communities. In previous polls the local news in general, either by newspaper, local television, radio, or other local services, were more closely followed than national networks, and a majority of these "local news enthusiasts" believed they could affect their communities by making them better places to live (Pew Research Center, 2012), meaning that many local news audience members believed that their actions can most certainly impact the way of life in their communities, and this provides hope for mobilizing and motivating audiences to help make changes a reality.

This value people attach to place plays an important role in understanding how audiences most effectively respond to climate change communication, and this can be maximized by constructing what might be called "daily life" framing, allowing climate science to be interpreted through a local, everyday lens that not only relies on, but helps sustain that connection between communities and their immediate, local environment. Media reporting undoubtedly has an important role in framing of public perceptions on the topic of climate change, and as research has shown, there is a notable increase in audience engagement, empowerment, and the willingness to act when discourse is happening at the local level. As Howarth and Black assessed (2015):

> Locally, [climate change in local media] would lead to increased salience of the issue, increased science literacy, reduced misperceptions of the science, enlightenment of what research the public helps to fund, better incorporation of local concerns and understanding in decision-making and increased understanding of the scientific process. For climate scientists and local media this would lead to a better understanding of each other's culture, improved science communication skills, clearer understanding of the impact and value of research locally, increased understanding of the context within which science is understood and applied, and trusted relationships between journalists and scientists, where each feels comfortable in dealing with the other. (p. 507)

It remains clear that local media has untapped educational possibilities where enabling it can to be a powerful tool. In an experiment conducted in collaboration with a local television station in South Carolina, WLTX TV, researchers aired an educational segment during the nightly weather report and found that this improved the understanding of climate change among the local audience members consistent with its content, showing that local TV weather casters are in the

unique position to connect weather conditions and climate change, greatly improving public science-based understanding of the issue (Zhao, 2014). In preparation for this study, I reached out to local news stations to see which producers might be receptive and willing to assist me by providing data. One station had their weatherman respond, who said outright that they actually don't cover stories of climate change because it's not what their audiences are interested it. That interaction highlighted the serious lack of willingness for some local media to take advantage of their position to better their own communities in this regard, especially on the level that has been tested and proven to be successful.

There has been evidence that local media has been reporting on climate change issues more diligently than national news, at least in places of particular vulnerability. In research conducted by George Mason University, the disparity between news media coverage of global warming and sea level rise, for example, becomes measurable when comparing the local news with national "prestige" news in places on the U.S. east coast that are at risk for coastal flooding and severe weather, among other things. They found that, from years 2001 to 2015, the local newspapers from areas with coastal vulnerability showed a large increase in coverage, whereas the national papers surveyed (which also happen to be centered in cities with coastal vulnerability) remained relatively low, with a large drop in 2014 (Akerlof, 2016). This further emphasizes the importance that we carefully scrutinize our news media through research so that we can hold our media accountable for reporting (or not reporting) issues that should matter to our communities. If satirical comedy programming like *The Daily Show* have in the recent past been shown to cover global warming twice as much as the traditional press (Pew Research Center, 2008), then the expectations we hold for our local media, particularly in a place like Hawaii which has major vulnerability to such effects, should be deeply considered.

**Climate Change in Hawai‘i**

One of the early problems with effective climate change communication to the public, which was taken full advantage of by the climate change denial movement in order to manufacture uncertainty in the United States, was visibility (Ungar, 1992), because for many people, the effects were simply claims about immediate weather conditions and not part of a more disconcerting trend. The iconic image of the polar bears on melting arctic ice further distanced the idea of climate change for people at home. Professor Mike Hulme differentiates these physical depictions of climate change, which he refers to as "lowercase climate change," from the concept of "uppercase Climate Change," which is a more complex sociological idea of climate change, "...the matrix of power relationships, social meanings and cultural discourses that it reveals and spawns - causing us to rethink how we take forward our political, social and economic projects over the decades to come" (Hulme, 2007, para. 7).

In Hawaii, perhaps a more effective image depicting the physical threat of climate change and sea level rise is that of an empty space in the ocean where once there was an island. Whale Skate Island, formerly part of the largest atoll in the Northwestern Hawaiian Islands, was at one time a 15 acre volcanic shoal full of vegetation, sea birds, turtles, Hawaiian monk seals and other species, but was swallowed up by the rising sea level over a period of 20 years (Song, 2004). Sea level rise is a very serious concern for Hawaii, one that is accelerating due to rising global temperatures associated with climate change (Watson et al., 2015). The impact of this alone is complex, and poses a risk in many ways, such as the inundation of freshwater systems, the spread of disease and contamination, infrastructural and economic destabilization, ocean acidification, coastal flooding and erosion, farming and food security, forced migration and resettlement, the decline of many species both in water and on land, the range of invasive species and so on (Sea Grant, 2014). These are not only "lower case climate change" threats, but profoundly "uppercase Climate Change" threats that will impact society and culture in Hawaii to its deepest core.

Hawaii has been somewhat proactive, first passing the Global Warming Solutions Act in 2007 (Act 234, House Bill No. 226, SD2, HD2, CD1) and then passing legislation on July 16, 2009 in a special session, entitled Act 20 (Senate Bill No. 266, SD2, HD2, CD1), which set up a Climate Change Task Force within the Office of Planning to study the scope and impacts of climate change trends in the state. Yet despite these efforts, and formations of many committees, alliances, panels, programs, and organizations in Hawaii to discuss, study, and plan for climate change since passing these bills (ICAC, PICCC, PACIOOS, SOEST, and Sea Grant for example), Hawaii received a very disappointing assessment in 2015 from a Climate Central report, stating that despite Hawaii facing serious and ever increasing threats from rising heat and coastal flooding, "the state has taken only limited action to address current extreme heat risk. Although Hawaii has taken strong action to address current coastal flooding risks, most states facing this threat have done much more," (p. 2) giving Hawaii a grade of "D-" in general, an "F" specifically for temperature rise preparedness, and a "D-' for coastal flooding preparedness (Hawaii News Now, 2015).

In 2014, the Hawaii Legislature passed legislation for further action (Act 83, House Bill 1714, HD1, SD2, CD1), which notes that "Hawaii is one of the few coastal states that has not adopted a statewide climate adaptation plan, yet is among the most vulnerable." The passing of this act formed the Interagency Climate Adaptation Committee (ICAC) and started a major research report underway on sea level rise vulnerability, which is due at the end of 2017. The report will focus on issues like groundwater inundation and erosion. Regardless of the results, the challenge of making serious changes will remain. On the ICAC's website, it has a saying in Hawaiian, *pili na mea a pau*, which translates to "all things are related." It is inherent within the local traditions and culture that recognition of climate change and subsequent action are manifest. On the ballot for the general election in 2016, the people of Hawaii voted on Charter Amendment no. 7, which had asked: "Should the city use its powers to serve the people in a sustainable and transparent manner and to promote stewardship of natural resources for future and present

generations, and should the city create an Office of Climate Change, Sustainability, and Resiliency?" The details of the bill were reported on local Hawaii News Now, along with statements made in opposition of the bill (Davis, 2016), showing that there are active efforts to raise awareness of climate change legislation and what it means for the community.

Current projections of sea level rise in Hawaii stand at a shift of one foot by the middle of the century and then 2.5 to 6.2 feet by the century's end (Codiga & Wager, 2011, p. 1). Essentially, areas like Waikiki are predicted to become wetlands as far as one mile inland, while many of the beaches, including North Shore, will erode away. Just the economic impact alone is staggering. Scientists have projected that at least 35% of Hawaii's coral reef ecosystems will be destroyed if immediate action is not taken, costing the tourism industry $1.2 billion (Davenport, 2015).

Tourism is such a large part of the economy in much of Hawaii. Damage to the environment would be catastrophic because the natural beauty of Hawaii's iconic features are a major driver for vacation travel and tourism in Hawaii. This would most likely suffer a massive drop, effecting the livelihood of many. A 2014 Huffington article with the dramatic headline "Climate change will ruin Hawaii, new study suggests," shows that this projection is already on the radar of the national public. They reported that the oceans, rainfall, ecosystems and people of the Pacific are all at very serious risk, and as University of Hawaii geology professor put it, "By the end of the century, I would be surprised if Waikiki Beach is still there" (Cave, 2014).

Another powerful representation of how vulnerable Hawaii is to climate change can be seen in the decline of native, iconic bird species. A recent study shows the rise of mosquito-borne diseases like avian malaria are responsible for the sharp drop in populations of nearly every single native bird species on the island of Kauai (Paxton, et al., 2016). The *'i'iwi*, or honerycreepers, a widely recognized symbol of the Hawaiian Islands, are heading towards extinction within the next five to ten years without serious intervention. The rise of temperatures in the usually much cooler interior forests of the mountains have warmed up to such an extent that mosquitos can now

breed there, widening the vector for spreading of mosquito-borne illnesses.

The rising temperatures have not gone unnoticed for the people of Hawaii, especially students sitting in hot classrooms. Governor David Ige signed a bill to spend $100 million of the state general funds for heat abatement efforts, for the purpose of "funding capital improvement program equipment and installation costs for air conditioning, other heat abatement measures, energy efficient lighting, and other energy efficiency measures at public schools" (Senate Bill 3126, HD1, SD2, CD1), ideally cooling 1,000 classrooms in Hawaii. The local television news of course covered this story (KHON, 2016; HNN, 2016; KITV, 2016), but neglected to connect these rising temperatures and the need for "heat abatement measures" to climate change or global warming. These kinds of news stories that are reporting content that is relevant to local audiences, personal in the way it concerns local families, local infrastructure, and local politics, are lacking the important detail of causation, showing a missed opportunity to connect climate change to daily, local lives in Hawaii, which would serve as an important means to addressing the issue.

Because of the strong dependence on and loyalty to local television news in Hawaii by residents, the coverage is important to daily lives, yet there is an ongoing controversy in regards to market ownership, complicating the role of local television news media. In 2009, a merger of three station operations (KHNL, KFVE, and KGMB) took place between owners Raycom Media and the MGC Corporation, which acted as a shared services agreement (SSA) under one consolidated venture, Hawaii News Now, owned not by any local entity, but by corporations on the mainland United States (Enay, 2011). This merger resulted in a complaint filed to the Federal Communications Commission by the Media Council of Hawaii, stating that this new arrangement was breaking regulations and stipulating that one entity can't own or control two of the four major stations within a single media market. HNN has defended the move by claiming that the merger was simply a means of pooling resources and this has enabled them to improve the quality of news being reported, but there is evidence showing otherwise. By comparing coverage before and after the SSA, it was found that there exists now more than ever a pattern of significant news

story duplication / repetition across the stations, greatly lessening the diversity of reporting, "the obvious and unambiguous result being a reduction in the number of separate news voices in the market," (Yanich, 2011, p. 30), and mergers like this are clearly driven by economic incentives, not the interests of the public.

The damage this SSA has done to "diversity, competition, and localism" of television news in Hawaii emphasizes the concern over reporting on the important topic of climate change. By having to rely on a monopolized market for information, the audience is potentially at risk of losing out on matters of major impact. While the case between the FCC and HNN owners remains pending, research that creates a greater understanding of the state of our local news media is critical. When one and a half million people only have essentially three local television news sources, it becomes imperative that those stations are covering the most important news effecting our communities. The growing concentration of media ownership in the United States has been an expanding concern as more and more mergers have taken place over the past three decades, local media included, and this is rightfully disquieting for those paying close attention to the declining quality and diversity of news coverage in this country, especially when it comes to climate change.

## 3. Research Questions

With this review of climate change communication research in mind, the development of primary questions for this study have been formed. Because there is no research available specifically on climate change news reporting frequency and framing in Hawaii, it would be difficult to hypothesize the results, but based on the evidence that Hawaii is particularly vulnerable to the effects of climate change because it is an island state, that it might be expected to find a higher frequency of coverage than that of the national network news.

**RQ1-1:** What is the frequency of local television news segments in Hawaii dedicated to climate change?

**RQ1-2:** What climate change impact topics are being covered in local television news?

**RQ1-3**: What is the frequency of news segments containing climate change denial?

**RQ1-4:** What is the frequency of news segments containing interviews or quotes from scientists in regards to climate change related topics?

**RQ2:** How does local news reporting differ in frequency from national broadcast news reporting on climate change news?

**Definitions of Key Terms**

*Local news segments on climate change*: This refers to the activity of reporting about an event or subject that is aired on local television news in Hawaii which provides the content for this study. The news must specifically be about climate change related events, such as rising heat / temperatures, coastal flooding / erosion, ocean warming / acidification, global / arctic warming, coral bleaching, species decline, sea water inundation, draught, superstorms, climate change talks / research being reported on, etc.

*Reporting frequency*: This refers to and is determined by how often climate change coverage appears in the news reporting for the given time (example: one segment per week). A study relying on frequency can determine issue attention. Where applicable, frequency can also be broken down to include the total amount of segments for the entire study period (example: forty segments for the entire year), and how much time was spent on each segment (example: most climate change segments ran less than two minutes, for a total of sixty minutes of coverage for the year).

*Climate change denial*: The dismissal, denial, or doubt expressed that climate change is a real occurrence, that it is caused by humans, and that it is impacting nature and society.

*Framing of climate change:* In the context of this study, framing refers to the process by which the news media associates, or dissociates the events they are reporting on from the effects of climate change through choices of information inclusion and exclusion.

*Climate change impact topics:* This refers to what category segments can be organized into by means of how the events themselves could impact society. These topics include the economy, national security, extreme weather, public health, plants & wildlife, and others to be determined by content analysis.

*Use-mention distinction:* Differentiation between a word or phrase about a subject, rather than a word or phrase being used as a signifier that is only mentioned and not referring to anything other than itself. For example, a news story about an actress and her relationship with

her husband where she is quoted as saying, “we never talk about climate change or politics, because we disagree on that. But otherwise we talk about everything!” This statement, and conversely the article it is in, are not specifically about climate change even though the phrase “climate change” is in the language of the story.

**Table 1. Methods & Analysis Summary**

| Research Question | Variable | Analysis | Codebook Question |
|---|---|---|---|
| RQ 1-1 | Climate change news segments (local) | Frequency of climate change news segments and runtime | Section I – Q 1 |
| RQ 1-2 | Climate change impact topics | Frequency of climate change impact topics | Section II – Q 1 and 3 |
| RQ 1-3 | Climate change denial | Frequency of climate change denial | Section II – Q 4 |
| RQ 1-4 | Interviews / quotes from scientists | Frequency of interviews / quotes from scientists | Section II – Q 5 |
| RQ 3 | Climate change news segments (local and national) | Frequency difference between local and national climate news segments | Section II - Q 1 plus additional data from Media Matters if available |

## 4. Methodology

This study primarily used quantitative, as well as an element of qualitative content analysis to try and answer the research questions posed. Content analysis in this context is defined as a method to describe and analyze communicative content and message characteristics by a systematic and objective means (Berelson, 1952) and is one of the most commonly used methods for climate change communication research. Because this study investigated the frequency and framing of climate change stories presented in local mass media, using a codebook adapted to code specific content for systematic organizing will be the best method for collecting and analyzing this data. The unit(s) of analysis are individual local news stories covering climate change related topics. Analysis was organized and conducted through Microsoft Excel for ease of data entry and accuracy of calculation, as well as convenience of visualizing data for the final report. Although the initial coding is rather simplistic in that it relies on text search, some of the stories require some deeper, more critical attention.

### Sampling and Timeframe

Typical national television news analysis by researchers traditionally has the benefit of using large transcript archives, such as LexisNexis or the Vanderbilt University Television News Archive, but local television news analysis can often prove far more problematic because archives are often very minimal or are managed by a company that charges for access. Because this study is not funded, I have relied on my connections at local television stations in order to obtain much of the data. The data in this case was being collected by a combination of means then, using the local station online archives that are provided on their website, along with data collected from the station that has been shared by staff. The sample strategy was dependent on what had been made available, which had then determined the timeframe as one full year (2016).

The local station selected for this study is Hawaii News Now (HNN), which alone controversially owns nearly 50% of the market in Hawaii (Enay, 2011), so data from HNN should provide a reasonable sample. The timeframe for the data being searched is precisely from January 1st, 2016 to December 31st of 2016 for two reasons: (1) This data is readily available with some time, energy, and dedication required to go through the archives. Because some HNN staff have agreed to accommodate me with data from this time period only, due to internal changes of how their data is archived, I will have to work within these limits; (2) This time frame is relevant for this study because it is the most recent, and I am seeking to know what the state of coverage is as currently as possible and not at some earlier time. Furthermore, Media Matters has published their annual report on climate change coverage in the national news media, so this data has been used to make an interesting comparison between local and national reporting frequency and content.

**Selection of Coding Categories for Content Analysis**

In order to best answer the research questions, the content was coded according to common topics in climate change related news. For a sample of coded data, refer to Appendix A. Based on the literature review, the following words and phrases have been searched for in the content analysis text search: climate change, global warming, heat wave, sea level rise, coastal flooding / erosion, species decline, mosquitos, coral bleaching, ocean acidification, greenhouse gases, draught, glacial melt, arctic warming, superstorms, sea ice melt, and water inundation. The coding categories of impact topics (extreme weather, plants & wildlife, economy, public health, and national security) were selected and modeled based on a Media Matters study (2016) for some comparison, as well as an additional "other" category. Media Matters also analyzed climate change denial in their report, as well as contributions from scientists, which led me to include those two questions in this study. The coding process was tested for intercoder reliability with

two coders using the Krippendorff's Alpha with a result of 0.87 for the lowest scoring variable (Appendix C for more detail).

**Research Process and Content Analysis**

The following general steps were taken in order to answer the research questions:

1. An initial search was conducted by going through the listing of all news story manuscripts made available by HNN, referred to as the *TV news archival reports*, for stories during 2016 related to climate change by searching for the key words. This was done by entering each one into the search field in their record system (see Appendix B for example). Repeats of the same story, as well as teasers that were used to announce stories to be covered later in the programming were not counted. The records consisted of all the news stories ran on a given day, from the morning "Sun Rise" news on the weekdays (4:30 AM to 9 AM), the weekly evening news (5:30 PM to 6:30 PM, and 10:00 PM to 10:30 PM), and then the weekend news (5:00 PM to 5:30 PM, 9:00 PM to 9:30 PM, 10:00 PM to 10:30 PM). Each day was searched for the entire year of 2016. The segments usually contained the same various types of data, such as headlines of the segments, voice over transcriptions, time it was aired, length of segment, station, and other details depending on the nature of the segment. These records were easily searchable but often pulled up unrelated results based on text and so each had to be read and sorted carefully.

2. The coder vetted the stories for use-mention distinction to determine that the stories are actually about the keywords and not merely mentioning the keywords, which was done by reading the segment transcription.

**3.** After identifying which segments were relevant, notes of the dates they aired and how long these stories ran (omitting repeat news) provided the data necessary to construct an answer for the first research question by determining how many segments aired, when, and for how long. The runtime was not always precise, sometimes instead of the number of seconds it aired the archive just said "under one minute." There was a lack of consistency with runtime data in the archived reports, which is reflected in how some of the coded segments lack specific runtimes. These were therefor rounded to the nearest 30 second blocks. The total number of minutes was then compared to Media Matters data by their totals.

**4.** The segments were then carefully coded for language of climate change related topics, such as 'heat wave.' With the analysis of the data this made it possible to determine what segments that discussed climate change related topics excluded the use of the actual terms 'climate change,' and 'global warming.' After being accounted for, that data showed with certainty to what degree segments within the sample discuss topics directly related to climate change, but were neglecting to make that connection in the language of the coverage.

**5.** Segments were coded to determine what impact topics they can be categorized as. An open-ended option was available for possible impact topics that were not used by Media Matters in their study.

**5.** Segments were coded to answer the remaining questions. Reporting that contained climate change denial were coded, along with reporting that either interviews or quotes scientists in the segments. Both of these questions were provided with additional space for notes to be made. If the segment contained a quote from a

scientist for example, part of the quote was documented there. Similarly, if the article addressed climate change denial, the specifics of how this was done were entered in this section.

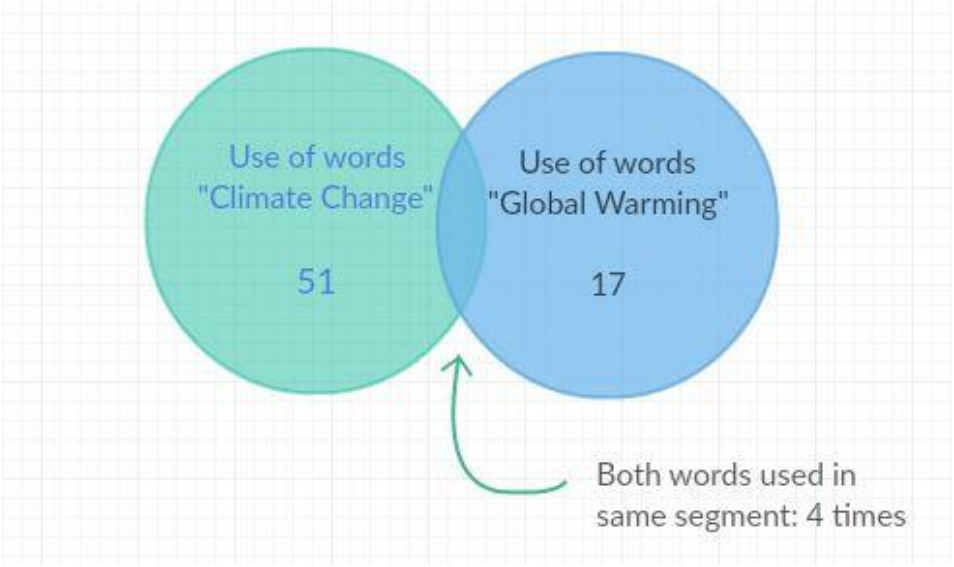
Since this study is also seeking to understand how climate change news might be covered inadvertently or with greater subtlety by lexical choice in a way that dissociates the subject being reported on specifically from the larger topic of climate change, the selection of coding language has been broadened to include events that have been scientifically shown to be related to climate change leading into a closer examination. Terms like *heat wave, coastal erosion, coastal flooding, drought,* and *coral bleaching* are good examples. The full list (see Appendix A) of key words has been collected throughout the literature review and are based on a scientific consensus of what effects / events climate change and global warming are contributing to.

This secondary aspect of the study required an element of qualitative analysis for "a context-sensitive and in-depth exploration" of meaning (Olausson, 2010, p 141). For example, a phrase like "coral bleaching" could be mentioned in a story about ocean reef health, but without looking more in depth at that story, there would be no way to determine if the coral bleaching being reported was due to a chemical leak from a damaged tanker, or because of ocean acidification levels, which is linked to global warming (EPA, 2016). Just depending on keyword search is not enough. Even if both "coral bleaching" and "ocean acidification" were searched for and found in the same story, there is still a chance of misinterpreting the number of hits that come up in the initial content analysis and this would skew the results when conducting a purely superficial data analysis, so a more hermeneutic approach needs to be applied for contextual purposes when searching for this broader language. Understanding some things, like tone of language about climate change denial, and other impressions taken from the data in the final analysis go beyond straightforward quantitative content analysis.

## 6. Results of content analysis

All of the research questions asked were able to be answered, including the comparison to the most recent Media Matters study on national network media coverage of climate change, published on their website on March 23, 2017. The direct answers are presented here, followed by a deeper analysis and conclusion in seriatim.

**Figure 2: Word Usage in Local Television News for 2016**




**RQ1-1:** What is the frequency of local television news segments in Hawaii dedicated to climate change?

**Result:** The total number of local television news segments were 68. This includes 51 total segments specifically using the words “climate change” and 17 segments using the words “global warming”, 4 of which mentioned both (Figure 2). The rounded total number of minutes for the segments on climate change and global warming was 77.5. This is significantly higher than the number of minutes national news spent covering: 50 minutes (Media Matters, 2017).

**RQ1-2:** What climate change impact topics are being covered in local television news?

**Result:** The impact topics of economy, national security, public health, plants & wildlife, and extreme weather, topics used by the Media Matters study as well, were all directly mentioned or alluded to based on the content of the segments (Figure 3 & Table 2). There were contexts in some segments that did not address impact topics, but were in reference to political campaigns, debates, policy changes, conventions, international agreements, and programs, and were coded as "other." This is covered more so in the following analysis, as well as a closer look at how the search terms were being connected to the larger concept of climate change. What can be seen is that for many of the climate change related events specified by the terms (heat wave, sea level rise, etc.), they are not associated clearly using the language "climate change" or "global warming." The numbers (Table 3) showed as follows:

-There were 18 segments that covered the topic of sea level rise, 6 of which were associated with climate change / global warming by the language of the segment.
-There were 10 segments that covered the topic of heat waves, one of which mentioned climate change.
-There were 8 segments that covered coastal flooding, one of which mentioned climate change.
-There were 14 segments that covered coastal erosion, 5 of which mentioned climate change / global warming.
-There were 9 segments that covered species decline, 6 of which mentioned climate change / global warming.
-There were 15 segments that covered coral bleaching, 5 of which mentioned climate change / global warming.

-One segment mentioned ocean acidification, which also mentioned climate change and global warming.

-There were 6 segments that covered greenhouse gasses, 4 of which mentioned climate change / global warming.

-The data from segments about drought was unavailable for two of the months due to text search issues with the TV station's text field. Over this duration of the summer there were recorded droughts in Hawaii. The incomplete data shows that of the 17 segments that were able to be collected, there was one mention of climate change.

-No segments mentioned melting glaciers and no segments mentioned ocean water inundation.

-Two stories mentioned "warming of the arctic", and both also mentioned climate change / global warming.

-Of the 80 segments on mosquitos, which were repeated *ad nauseum*, one mentioned global warming, and one mentioned climate change.

-There were 5 segments that covered sea ice melting, 4 which mentioned climate change / global warming.

-The search term "superstorm" was decidedly dropped due to issues with the word search method.

-The section labeled "other" in the codebook also yielded some results from the data, highlighted in pink in Figure 4. "Ocean warming" and "pollution" were the only terms that appeared more than once in association with climate change / global warming. The other relevant terms that appeared are as follows: extreme heat, ice cap melting, invasive species, ocean warming, climate shift, permafrost melt, rising ocean temperatures, water security, Antarctic ice melt. These words word noted because of their relation to climate change / global warming, and were spotted because they all contain words that were part of the text search (warming, melt, species, heat, etc.).

**Figure 3: Impact Data published by Media Matters (2016).**

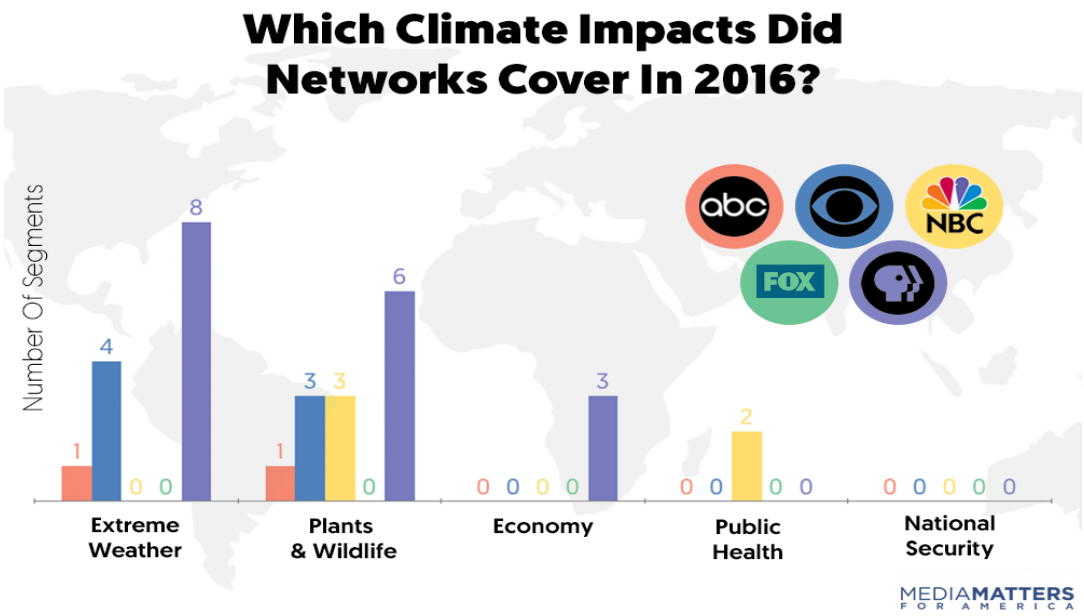



**Table 2: Impact Topics from Hawaii News Now Coverage (2016).**

| Impact Topics | Economic | Extreme Weather | National Security | Plants & Wildlife | Public Health | Other |
|---|---|---|---|---|---|---|
| Total Segments | 23 | 24 | 7 | 20 | 34 | 14 |

**RQ1-3**: What is the frequency of news segments containing climate change denial?

**Result:** Of the 68 total climate change / global warming segments, here were 8 stories that dealt with climate change denial in some fashion. This can be compared to the 5 segments that Media Matters found that aired in national television news by CBS, PBS, and Fox. However, they

specify that those 5 stories were all associated with Trump's presidential campaign at the time and featured no counter information on the veracity of those statements.

**RQ1-4:** What is the frequency of news segments containing interviews or quotes from scientists in regards to climate change related topics?

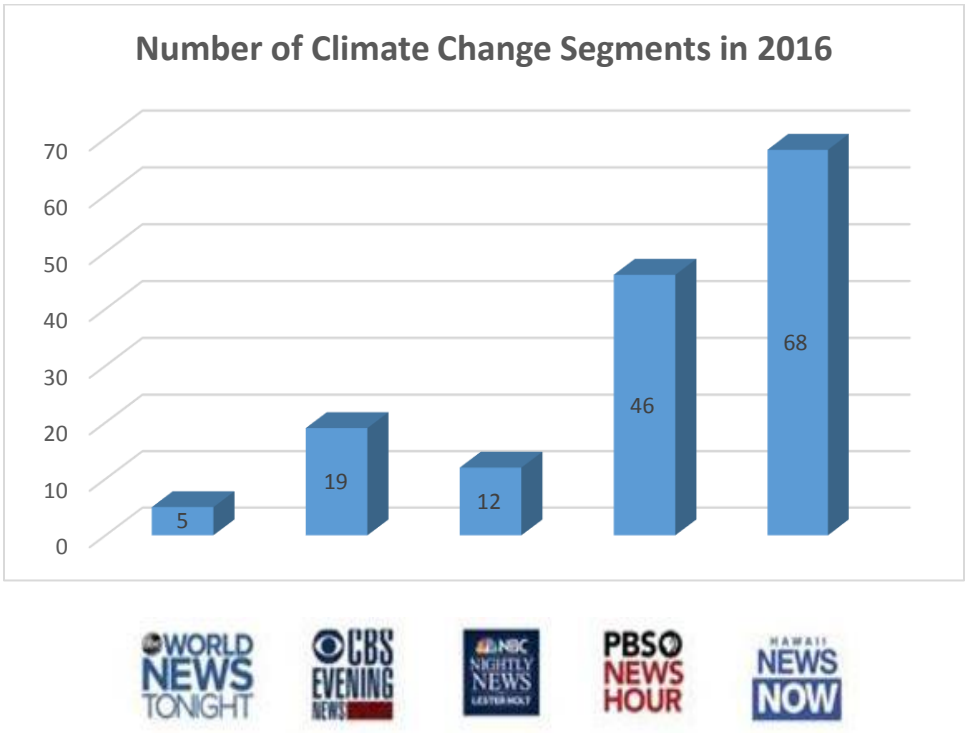
**Result:** Of the 68 total climate change / global warming segments, there were 9 segments that contained either interviews or quotes from the scientific community. This number is higher than most of the networks in the Media Matters report, but less than the highest (PBS aired 18 segments that consulted scientists).

**Table 3: Search Results / Number of Segments that Connected Events to Climate Change**

| Text Search Word | Number of Segments the Terms Appears | Connection to Climate Change / Global Warming in Segments | Percentage of Segments that Make Connection Between Events |
|---|---|---|---|
| Climate Change | 51 | - | |
| Global Warming | 17 | - | |
| Mosquitos | 80 | 2 | 2.50% |
| Sea Level Rise | 18 | 6 | 37.50% |
| Drought | 17 | 1 | 5.80% |
| Coral Bleaching | 15 | 5 | 33.30% |
| Coastal Erosion | 14 | 5 | 35.70% |
| Heat Wave | 10 | 1 | 10% |
| Species Decline | 9 | 6 | 66.70% |
| Coastal Flooding | 8 | 1 | 12.50% |
| Greenhouse Gasses | 6 | 4 | 66.70% |
| Sea Ice Melt | 5 | 4 | 80% |
| Arctic Warming | 2 | 2 | 100% |
| Ocean Acidification | 1 | 1 | 100% |
| Glacial Melt | 0 | 0 | 0% |
| Water Inundation | 0 | 0 | 0% |
| Ocean Warming | 4 | 1 | |
| Pollution | 2 | 2 | |
| Extreme Heat | 1 | 1 | |
| Ice Cap Melting | 1 | 1 | |
| Invasive Species | 1 | 0 | |
| Climate Shift | 1 | 0 | |
| Permafrost Melt | 1 | 1 | |
| Rising Ocean Temps | 1 | 0 | |
| Water Security | 1 | 1 | |
| Antarctic Ice Melt | 1 | 0 | |

Pink shading indicates that these were marked as "other" in codebook and then filled in.

**Figure 4: Media Matters Data (2016) Compared to Hawaii Data**




**RQ3:** How does local news reporting differ in frequency from national broadcast news reporting on climate change news?

**Result:** The national news coverage data differs significantly from the local news coverage data in regards to frequency, both in terms of the number of segments as seen in Figure 4 (local: 68; national: between 5 and 46) and the total number of minutes spent on the topic (local:77.5 minutes; national: 50 minutes).

## 7. Discussion about Results

The overall amount of climate change segments for the year of 2016 covered collectively by Hawaii News Now and its managed stations (KHNL, KFVE, and KGMB) amounts to 68 segments. This number might seem shocking to the average person, to think that out of an entire year of news reporting, only 68 stories were done on what has been declared one of the most pressing issues of our time, but this number is actually significantly higher in frequency that the national network coverage the topic. The total number of hits for all words searched for was 135 (climate change, global warming, heat wave, etc.), and in numerous cases more than one search word was used in a single segment. In terms of thinking about how this might fit in to the total number of stories HNN produces in an entire year, staff estimated that on average, they produce between 10 and 12 individual segments a day, excluding certain holidays, so over the span of a year there is a significant amount of coverage. Because there are very few (if any) studies on how local television news chooses to cover climate change, this number can be difficult to further contextualize without it being compared to national network broadcast news media data. These results show that actually Hawaii local television news had significantly more segments than that of ABC, CBS, NBC, and PBS. This data suggests that because of Hawaii's high level of vulnerability to the effects of climate change, the topic has been given more attention than the average nightly network news program. There are some issues and limitations to think about however when comparing this data, which is discussed in the following section.

Beyond the 68 segments mentioned, there were some stories that used different language to essentially talk about climate change and global warming by not using those specific terms. As can be seen in Figure 4, highlighted in pink, the words "climate shift," "ocean warming," "rising ocean temperatures," and "Antarctic ice melt" were all used either in the stead of climate change /

global warming, or simply without reference to those common labels. This fuzziness when using language slightly different to more official scientific labels could cause confusion for some audience members. People might be asking things like "What is the difference between 'climate shift' and 'climate change' exactly?" Generating questions can certainly be a good thing, but generating confusion not so much. The remaining terms in pink for Figure 6 were additional noteworthy words that were not used in the initial text search but appeared in context of climate change. The meanings behind the phrases "extreme heat," the "melting of permafrost and ice caps," and "water security" were all mentioned and further connected to the effects of climate change, which could be understood as responsible broadening of the climate change context.

Of those 68 segments mentioned, 23 were about research or studies dealing with climate change based on a deeper analysis. This can be compared to the combined coverage of ABC, CBS, NBC, and PBS nightly news airing total 22 segments about research (see Figure 5). When broken down further, this shows that Hawaii News Now aired more than twice the number of research segments PBS aired, PBS being the most prolific of the networks Media Matters collected data on. Also from those 68 segments, 12 covered major conferences like the UN climate-related summits, the meetings in Morocco, the Paris agreement, and the IUCN World Conservation Congress meetings. This coverage was more than double the number of segments covered by ABC, CBS, NBC, and Fox. PBS coverage was significantly more that the local coverage (Figure 6). Media Matters notes that the Keystone XL Pipeline, the Dakota Access Pipeline, and the Clean Power Plans were hardly covered at all within the context of climate change (para. 14), and the same can be said of Hawaii News Now. There were zero segments that addressed either pipeline in regards to climate change, and one story that mentioned the Clean Power Plan, but only in regards to Oklahoma Attorney General Scott Pruitt being a climate change skeptic who is against the plan (aired 12/8/2016).

**Figure 5: Data Compared from Media Matters and HNN (2016)**

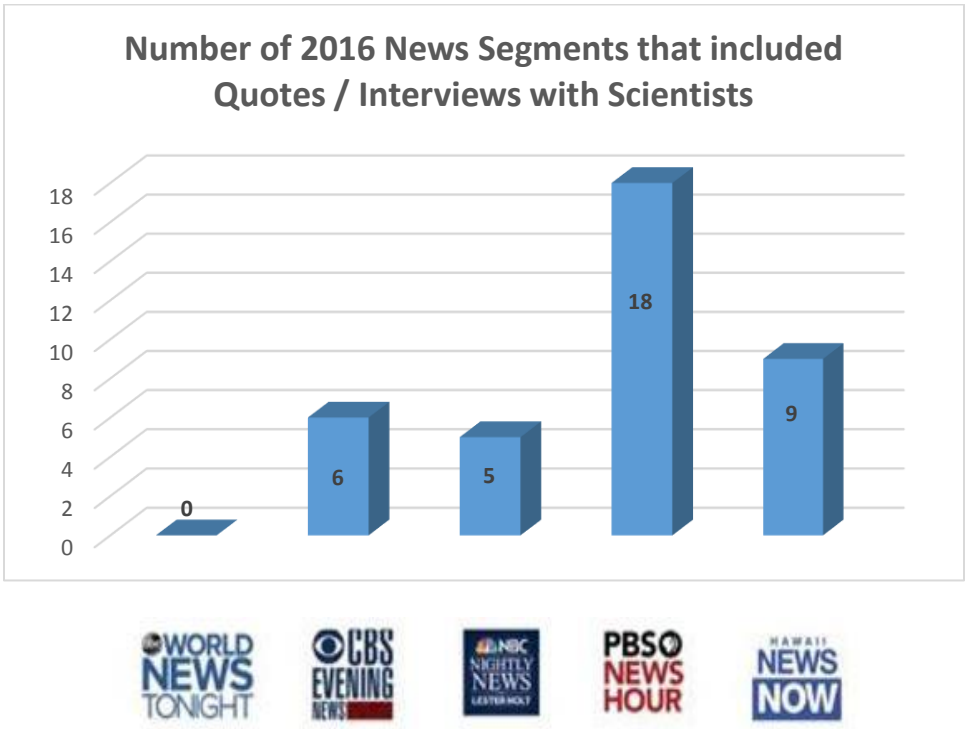
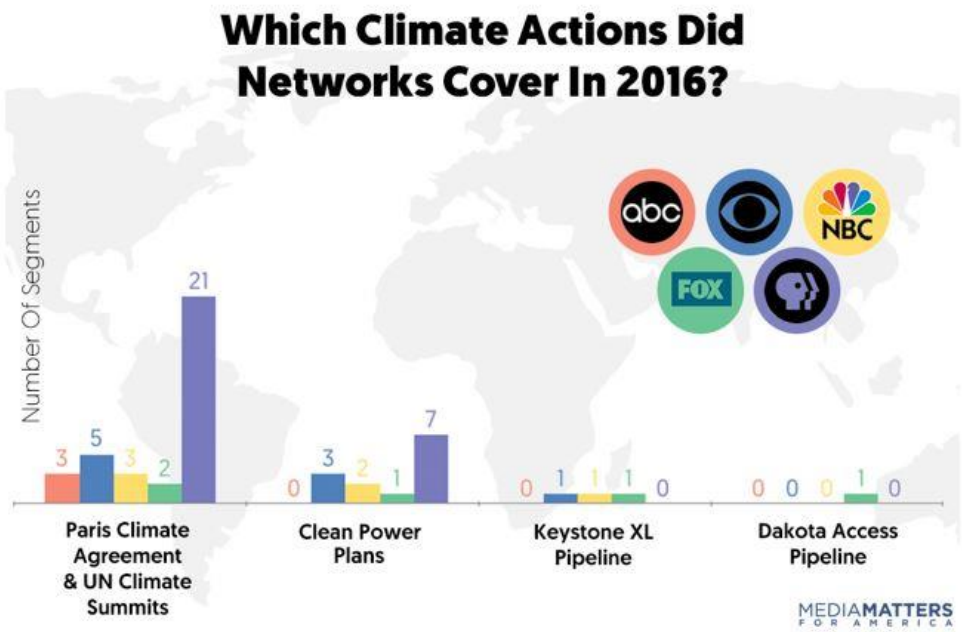



**Figure 6: Data from Media Matters (2016)**



In answering RQ 1-4, again we can see that Hawaii News Now interviewed or quoted more scientists than ABC, CBS, NBC, and FOX about climate change (Figure 8), but PBS was exactly double that of the local coverage (Hawaii: 9 segments; PBS: 18 segments). There were multiple occasions where HNN used statements like "experts say that," "scientists report," "scientists warn," and "scientists claim," without including actual quotes or interviews, which were not counted as part of those 9 segments. Dr. Chip Fletcher of the University of Hawaii Manoa School of Earth, Science, and Technology seems to be the go-to scientist on any number of environmental issues by local media. In the context of climate change, he was interviewed for 2 separate segments (9/6/2017 & 10/27/2016). Others included Dr. Dan Lafforley (9/6/2016), Dr. Compton Tucker (7/19/2016), Dr. Denise Konan (8/6/2016), Dr. Richard Zeese (3/22/2016), Dr. Robert Richmond (6/18/2016), Dr. Bradley Romine (8/6/2016), and Dr. Inger Anderson (9/6/2016). None of these scientists and scholars are climate change skeptics, but were confirming the importance and urgency of climate change related issues.

Climate change denial was a topic on numerous occasions. Eight segments in total mentioned climate change denial in some way. Four of these segments were products of the 2016 elections. This number is similar to that of the 2016 Media Matters data, which found 5 segments in the national news that were all related to the Trump campaign, which aired on CBS, PBS, and Fox (para. 22). Media Matters largely faulted this coverage as irresponsible because these climate change denial statements were not refuted in any way. This is certainly not the case for Hawaii News Now's coverage. The 4 segments I mentioned related to the elections were citing Marco Rubio, Donald Trump, Ryan Zinke, and Scott Pruitt. This coverage was very matter of fact and, like CBS, PBS, and Fox, did not challenge their views. The other 4 segments however did respond to denial by refutation. Two of those critical stories were about corporations, Exxon in particular, and the scandal about how they withheld research and knowledge of industrial exacerbation to global warming (10/27/2016), one commentator stating, "Corporate polluters have encouraged climate change denial. Because if you admit something is going on, you have to

do something, and that will cost money." Here the HNN reporter suggests that "something is going on…"

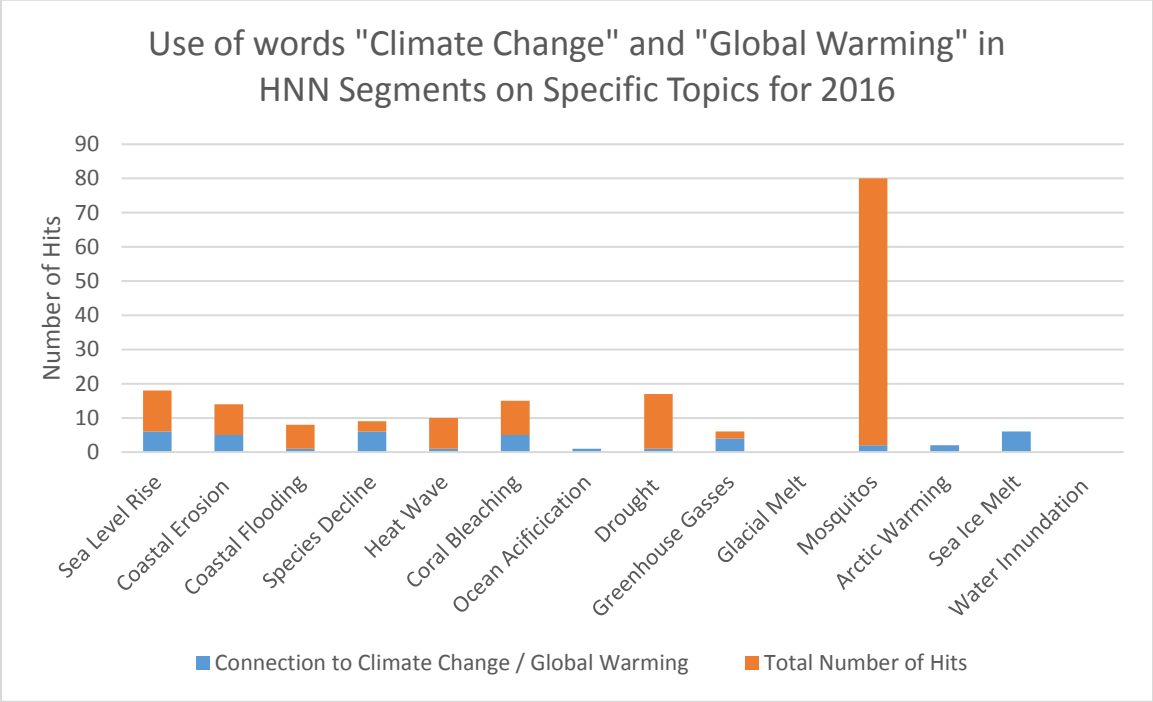
The other two occurrences were both from a regular segment of HNN programming called "Howzit Howard." These routine segments are created by Howard Dicus, who is a reporter and commentator for HNN. His coverage is often business related, but can be quite varied. One of those segments, which also respond to corporate misinformation, was delivered as such:

> I apologize for this next segment to the climate change deniers who find stories like this annoying. It can be irritating to have to listen to the media do another biased global warming report. Especially when it is this hot. Now, let me qualify that records only go back 137 years to 1800, the year my grandfather was born. I understand it was much hotter when the dinosaurs roamed the Earth. But NOAA has comparatively little in the way of records from the late Triassic Period. But go ahead, don't believe the scientists, believe the corporate polluters who benefit financially from your thinking global warming is bunk… (7/20/2016)

The clear tone, which could be interpreted as slightly antagonistic, is not that unusual for the "Howzit Howard" featurettes. While they often cover a mix of local and global subjects, many times they become more anecdotal and contain opinions of the reporter, like the commentary that takes place occasionally "on the couch" in the HNN news studio where people weigh in on different issues off script. In the other segment mentioned, he opens by stating, "If you are a global warming doubter, I've got a fact for you to wave about: one day in 1915, the temperature in Greenland went into the eighties" (6/15/2016). This is essentially the poorly-constructed climate change skeptic justification that has been called the "Greenland used to be green" defense, asserting that Greenland's previous temperature is evidence that Earth used to be much warmer but is now cooling, concluding that global warming is just alarmist hype (Beck, 2006). This segment is interesting for a number of reasons. First, it's confusing because of its

perceived sarcasm. Howard is calling out both the deniers and corporations for dismissing science, yes, but it's also confusing because it almost sounds like he is giving climate change deniers some credit. His report however goes on to describe 15 straight months of record-breaking temperatures across the globe.

**Figure 7: Ratios of Language Use (2016)**




Going back to RQ 1-2 that looked at impact topics, this study diverges in a major way from how Media Matters addressed impact topics in their report. In their methodology, they only counted a story as having an impact topic if it "substantially mentioned" the specific impact ("X will effect Y and Z"). For this study, I chose to have the coder assign impact topics based on the subject of the story for a more thematic understanding of the content. For example, in a story that aired on 9/15/2016, it was reported that 5 scientists were trapped by 10 hungry polar bears on a sheet of ice, which were also trapped due to "rapid melting of ice due to climate change." The intention was that the coders then ask themselves, "What is the climate change impact in this

story?" They chose from five options, but also had an "other" option. The coder selected two categories of impact, "plants and wildlife," and "public health," because the wildlife (polar bears) and the health of people (scientists working in the region) were impacted. Figure 3 and Table 2 show respectively the results of Media Matters and this study. In the case of this study, there were several instances of overlap, where segments were found to describe more than one impact topic. For the Media Matters data, in Figure 3, it can be seen that the least covered impact topic was national security, which is similar to the local HNN results. While Media Matters found that the topics of plants & wildlife and extreme weather were more common than the other impact topics, in the local news data the most common was also extreme weather, but public health as well. Although this indicates some similarities, again it should be emphasized that the method for the coding of impact topics between this study and the Media Matters study differs substantially.

There were numerous segments that covered events and topics that neglected to use the language "climate change" or "global warming," in some cases by large percentages (Figure 7) despite these subjects being related to this bigger picture. Some of the search words are worth discussing in more detail due to certain fuzzy contextualization. The word 'mosquito' was somewhat problematic because of the nature of much of the coverage when the word was used. During 2016, stories related to the mosquito-borne illnesses Dengue and Zika heavily saturated the local media, especially because Hawaii is within the vector of these pests due to its climate, and the fact that there were several cases of people in Hawaii that had contracted Dengue and Zika. The two stories that appeared in HNN that framed mosquitos within climate change / global warming realm were both about risks to species other than humans. A story that aired on 9/8/2016 was in regards to a study that showed climate change led to the expansion of mosquito vectors allowing for the rapid decline of native birds in Kauai, and the other story, which aired on 9/19/2016, was about how global warming and mosquitos are projected to cause native birds to be put on the endangered species list in the near future.

Virtually every other story about mosquitos focused on Zika and Dengue with no mention

of how climate change might affect the spread of these diseases, which was covered in 2016 by newspapers like the *New York Times* and *The Atlantic*. As the emergency responses by the Center for Disease Control (CDC) and the US government were ramping up, and the media issued warnings and updates on newly-found cases, the future spread of mosquito-borne illness in relation to climate change was ignored, or at least not prioritized in any way. I don't think the expectation should be that every time the media mentions mosquito risks, that it should also connect these risks to climate change, but the fact that this connection was never made over an entire year filled with a multitude of mosquito segments does not reflect well.

Another search word found to be problematic was "drought." Besides the term being used in a more metaphorical sense, often in sports reporting, there also seemed to be a glitch in the search mechanism of the HNN archives in at least two of the months during 2016, which appeared to be an internal coding issue. The use of "drought," referring to a prolonged lack of rainfall, is a common seasonal occurrence in many places that fits into routine weather patterns, including Hawaii. However, droughts can also be understood in the context of climate change. Climate change models show that rising global temperatures increase the severity of drought, and regions that are near each other where droughts are simultaneously occurring, these droughts can "merge" into massive dry spells, like in 2012 when 60% of the US was suffering from extreme drought conditions (Magill, 2017).

One word was ultimately dropped from the search, "superstorm." Although the word has been popularized in some coverage of major weather events, it was not pulling any relevant stories from the HNN archives. Furthermore, it was proving quite problematic because it would pull all references mentioning storms in general, which included endless weather reports, making it impossible to sort through in the time available for this study. It has been reported that previous media usage of the word was done purely for dramatization and thus thought of as irresponsible because such "proliferation of non-technical terms might…spawn confusion" amongst audience members (Shepherd & Maue, 2014, para. 10). "Superstorm" is not a meteorological term and

lacks a true definition. If the word had appeared during this content analysis initially, it would be important to mention for these very reasons, however as stated, searching for the word became extremely problematic. This does however emphasize the issue with using other terms, like "climate shift," as mentioned earlier.

The search word "sea level rise" was the most prevalent (other than climate change and mosquitos), appearing in segments more times than "global warming." Of the 18 times segments that addressed sea level rise, only six of those stories connected the event with climate change / global warming. Global warming is the primary cause of sea level rise today (UCS, 2013). There are other geological processes that affect sea levels, none of which are the subjects of any HNN coverage on the topic, so it's safe to say that when covering sea level rise, it is within the context of global warming and not the other geological activities where applicable. For seeing this many stories that address sea level rise, it is somewhat surprising that the majority of them to not directly connect it to the words "climate change" or "global warming."

There are cases where this seems unfortunate. For example, the story that aired on 5/5/2016 discussed the Honolulu rail project and the possibility that a new environmental assessment might be prudent in light of sea level rise projections, considering the high cost of the rail and its proximity to the coast. If this segment had been produced in a way that connected the relationship that climate change and global warming share with sea level rise, this would perhaps generate a deeper line of thinking in the public mind on how climate change and global warming will effect major construction and development projects locally. This really should be on the minds of residents when weighing their support for these types of projects. An example of one story that did make this connection was not covering a local situation, but one it Boston (3/31/2016). The segment explored how the city of Boston is planning ahead for sea level rise and coastal flooding due to climate change by using sustainable urban designs. The choice to associate climate change with sea level rise when talking about other cities and there development plans while avoiding this when reporting on local projects is reminiscent of Wapner's idea of

"ecological displacement" (2000, p. 358). If it is the case that local projects are in fact not taking sea level rise into consideration then that is extremely newsworthy. It would be a stretch however to say that this is a common theme for local coverage of sea level rise, because some of the segments that do make the connection linguistically have mentioned meetings for "adaptation strategies" (2/14/2016, 6/6/2016). However, what these strategies actually entail was not reported.

One segment that stood out as making a very strong connection between sea level rise, local effects, and climate change started with the reporter stating, according to local scientists, "if you want a good example of where climate change is happening today, look no further than Mapunapuna" (10/27/2016). Mapunapuna is a local neighborhood that has continuously seen more frequent flooding and has been in the news several times during 2017 as well for being inundated during the "king tide" effect. King tides have been a major local news topic in 2017, particularly how they are affecting local residential areas and businesses.

The results of this study show that heat waves are yet another example of a topic that was almost never framed using the specific language "climate change" or "global warming" in the local coverage during 2016. Climate Central has reported that heat waves are directly related to global warming via greenhouse gas emissions, with significant science to support this assessment (Thompson, 2017). The one segment that did mention climate change and heat waves in the same context (4/4/2016) was about a report on climate change released by the Obama administration that estimated a heat wave in 2030 could kill up to 11,000 people in the US. This projection, based on models from USGCRP, was later challenged by FactCheck.org. They argued that the White House had been cherry-picking from the original data (Schipani, 2016), which was not a story aired by local media.

The segments that did cover heat waves were primarily stories about places other than Hawaii where people were facing major heat waves, like Kumamoto, Japan (5/2/2016); India (5/20/2016); California (6/5/2016, 6/17/2016); Phoenix, Arizona (6/19/2016); and the "western mainland" (6/17/2016). The remaining segments covered reports that looked at record-breaking

temperatures for the planet, like one segment that described the Earth as “the hottest in has been in 120 thousand years...and could reach the hottest mark in more than two million years” (9/27/2016), based on data from Stanford University.

Coastal flooding and coastal erosion, which were sometimes mentioned together (1/6/2016, 2/23/2016, 9/2/2016), were also shown to infrequently be associated with climate change or global warming by lexical choice. This however could be because both are quite common natural events, especially in Hawaii. Both share complicated, but scientifically modelled relationships with climate change, as mentioned in one segment (3/31/2016) that linked sea level rise, climate change, and coastal flooding all in one story. The majority of the flooding segments were stories about major storms leading to events. The winter storms that flooded parts of the east coast (1/21/2016, 1/22/2016) were covered, along with Madeline (7/22/2016), Darby (8/31/2016), Lester (9/2/2016), and record El Nino conditions (1/6/2016).

Coastal erosion, which had a higher tendency to be associated with sea level rise (4/7/2016, 8/6/2016, 8/24/2016) was also more often associated with climate change and global warming than flooding was. Erosion segments on two occasions covered places other than Hawaii (4/7/2016, 6/6/2016), but primarily it was framed as a serious local issue, especially when it came to effecting infrastructure (1/25/2016, 2/25/2016, 3/1/2016, 3/2/2016, 11/8/2016). Coastal flooding and erosion, as effects of storms and high surf, are related to the ongoing discussion in 2017 about how major storms should now be included as part of climate change public discourse. Previously this was a hot debate, as President Obama stated during the announcement of the Clean Power Plan (2015), "While we can't say any single weather event is entirely caused by climate change, we've seen stronger storms, deeper droughts, longer wildfire seasons.” Criticism of associating weather events with climate change can now be met with statistical analysis and modeling from recent data which provide strong evidence for this relationship (Worland, 2017). Attribution of extreme weather to climate change is becoming part of the picture.

The majority of segments on the decline of various wildlife populations related these to effects of climate change and global warming. Of those, three were in relation to coral bleaching, which was widely covered by the local television news. These are evenly split into stories about local fauna, like the segments on native birds mentioned previously or the bumblebee making the endangered species list (9/22/2016), and that of global wildlife facing challenges to warming oceans and atmosphere. Only one story served as a specific example of wildlife decline outside of Hawaii (6/29/2016), which was a segment about a study suggesting that global warming could destroy the Adélie penguin population in the future. These results show that this has been framed as a local issue, and one that is connected to climate change. A couple of the segments were not about specific local species decline, but explained that this topic was being addressed at the World Conservation Conference held in Honolulu (8/31/2016) or as a research area that recently received major funding (9/22/2016).

Coral bleaching is yet another topic that for every two out of three times it was covered did not make a global warming / climate change connection through the wording of the story. One example is a story that aired on 6/20/2016, which included an interview with a scientist from NOAA that described a recent bleaching event as the most severe on record, due to high temperatures and severe El Nino conditions, but did not frame the story as a climate change issue. Four of the fifteen segments about coral bleaching were about the Great Barrier Reef, while the remaining stories were about local reefs. The one story that mentioned ocean acidification did however make the association (8/24/2016), which connected both climate change and global warming to sea level rise, coastal erosion, species decline, coral bleaching, and the spread of disease. Segments that mentioned increasing greenhouse gasses, which were also associated with species decline in one story (10/6/2016), were almost always reported on within the context of climate change, however only one of those stories was framed as a local issue (8/31/2016).

Some search terms had some very low results, as the numbers show. There were no mentions of sea water inundation or glacial melting. “Arctic warming” and “sea ice melting”

were two of the most infrequently used terms (other than ocean acidification). There were however two segments that used alternative wording ("Antarctic ice melt" and "ice cap melting") to report similar effects. Of the six stories that mentioned sea ice melting, all six were attributed to climate change or global warming. It's interesting to see that some subjects are almost always associated with climate change / global warming, while some have a tendency to not be, with 48.8% of the total number of search term hits being framed in a way that divorces the topic from the climate change context (excluding the data for mosquitoes).

The theoretical implications suggested by the exclusion of language shown in this study, specifically the terminology "climate change" and "global warming" when reporting on numerous issues and events that are deeply connected to climate change, are worth considering. Reporting on sea level rise as something that is happening without the context of global warming for example, despite being the scientific consensus, the local media is essentially framing the subject in an isolated way. This is most likely not intentional, however it is not enough to assume that the audience knows if and how sea level rise and global warming are in fact connected.

The use of the word "climate change" in 2017 by certain federal departments under the Trump administration has been noteworthy. While it has been stated that not using such specific terminology isn't always ordered top down, at times it has been a hard choice in order to preserve ongoing projects and funding from being cut by staying off the radar of an anti-climate change science administration, the solidarity of media to the facts should remain strong, if not compensatory. This further shows that the local media also applies non-technical terminology to refer to climate change and global warming in some instances, and this is likely not because the proper terminology is too unfamiliar or complicated, but probably a stylistic choice, which can have unintended consequences.

Based on the results of this study, some of the climate change communication challenges spelled out earlier in this paper are worth revisiting. Evolving from letting climate change denial occupy media discourse under the guise of "balance," mobilizing the public was highlighted as a

more relevant mission. An example of this type of public activation could be done by informing the community of things that they can do personally to lessen human contribution to global warming, although not necessarily a responsibility of the local news media, seems like a logical duty considering that a given local TV station is somewhat vested in its own place of operation. Despite this however, recommendations of this sort are scarce in the data. Reporting on climate change while not offering solutions might be considered "tantamount to climate porn, offering a thrilling spectacle but ultimately distancing the public from the problem" (Revkin, 2007, para. 7). By suggesting means to get involved and how actions can make a positive impact, the local news would be engaging with its audience on a deeper level where the climate is concerned.

It might also be worth noting that the challenges of visibility and distancing do not appear to be as problematic in the local media, or at least not routine. This was somewhat expected, because of the high stakes in Hawaii, but it is now confirmed that the local news programming does in fact frame climate change as a local issue effecting the community. The state government, perhaps knowing that the majority of voters in Hawaii are in support of climate action, made a bold move in the face of President Trump's stance on the Paris agreement, as Governor Ige signed two bills (SB 599, HB 1578) making Hawaii the first state affirming commitment to the international accord goals (Bromwich, 2017). Another challenge mentioned was that of conveying complex science to the public in an approachable way. As mentioned, many of the segments referred to results of studies, surveys, and research, but made very little effort in explaining much of the science it was reporting on. The handful of soundbites from scientists don't seem adequate enough despite being more than most of the national network stations (other than PBS).

## 8. Limitations and Future Applications

The data presented here in this study and the subsequent answers to the research questions were able to be done by using a personal source at the local news station, which was the only reason this was possible. The largest challenge to this type of research, on a local level, is access to data. All sorts of beneficial research on local television news, especially without lots of funding, are hindered by this. There is no public access to archives of local televisions news programs without paying an exorbitant amount of money to one company that stores and controls this access. When I had inquired about access to actual physical recordings of news stories from Hawaii News Now, I was informed that these types of records are not normally kept, they are only transcribed. When I asked why, they said it is their policy because it is far too cumbersome, not necessarily because of the storage of the records, but because authorities (such as police, or courts) regularly request footage as evidence, and this became "too burdensome" for the station. To avoid this, they destroy most footage after airing and transcribing it. Having the transcriptions saved and made public, like newspapers for example, seems like an important service to provide, not just for research, but for history.

Something to also think about when understanding the comparison of national frequency to local frequency, is allotted time for news programming. Media Matters looked at nightly news programs, which aired for one hour. Local news, under the wings of HNN, runs morning news programming and evening news programming multiple times every day. Although much of this coverage are repeat segments, with the exception of breaking news stories, local news in comparison to nightly programs, like ABC's *World News Tonight* for example, would technically have more time to run their segments. How commercials play into this could also be a factor. Because Media Matters rounded their runtimes to the nearest minute, I did the same for the

HNN segment runtimes, but if a segment was under or closer to thirty seconds (which many were), this was recorded at a rounded thirty seconds, padding the time.

Another important aspect that is not considered here but might be important to think about is audience demographics. The Pew Research data cited in this paper to emphasize the relevance of TV news as still a dominant source of American adult news consumption did collect some details, such as age groups. There are likely some differences between local TV news audiences and national network news audiences that could be examined further for a more nuanced understanding of climate change communication through this medium.

This study points to a lack research in climate change communication by local television, which could produce valuable data for multiple disciplines. Being able to compare different media coverage on the local levels from a diverse spectrum of places, those more at risk than others, could also be tested against local perceptions from both audience and members of the scientific community. For those that are particularly concerned about climate change and how it is effecting their local community, the local news is, as of now, not the most informative, clear, or consistent as suggested by this data, and those people are most likely to seek that information elsewhere. Where this leaves the local news watcher who is not yet motivated to seek out this information and relies on HNN for their climate change news will not be getting a very in-depth exploration.

## 9. Conclusion

What can be said is that as of 2017, Hawaii News Now appears to be making an effort to specifically cover the topic of climate change by dedicating a digital series within its regular scope to just that, which contains special reports on the impacts and readiness of Hawaii to deal with climate change. Engaging with staff at HNN about this study might have encouraged this development. The segments that are aired addressing climate change will be curated and made available through their app and website. As for 2016, Hawaii managed to cover climate change more often, spending more time on the subject than the average national TV network news programming. However, it is clear that for most topics that are directly connected to global warming and the "shifting climate," the specific language has been left out of the majority of the reporting to make that simple connection. Some major events and climate change actions were ignored by the local news, and sometimes alternative language was used, which can create confusion. Fortunately there was very little in the way to suggest that climate change denial was given any legitimacy in the local coverage, but again this was sometimes covered in a somewhat confusing way.

And although the local news is relatively engaged with the scientific community and covered numerous results of research (compared to national networks), I would also say that the science itself was often unexplored. The impacts themselves, sometimes indicated clearly and other times abstracted, covered a wide range, from economic impacts to public health and wildlife. One impact that appeared not to be covered at all, which was not part of the study, was indigenous culture. At a recent panel I attended discussing effects of global warming, a professor was there to share indigenous perspectives on climate change and how it has been effecting those of Hawaiian decent. Cultural practices, such as salt production (*pa'akai*, or "to solidify the sea")

and aquaculture (*loko i'a,* or fishponds) have been effected by the changing climate, but these effects are often left out of public discourse.

The overall coverage is there, and seems to be improving, but ultimately the media, both local and national, has much work to do. In order to cover our changing climate effectively, we need to call it what it is, as often as possible, to be clear about the science, stay consistent, spell out the impacts, go in-depth, and offer options and solutions.

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**Appendix A.**

**Codebook sample.**

**Coder:** Researcher or Intercoder (circle one)
**Date coded: 7/06/2017**
**Time Coded: 11:23 PM**
**Location Coded: UHM**

**I. Segment Details**

1. Date aired 01/08/ 2016

2. Time aired 5:00 PM

3. Runtime (mins) less than 1

4. Show that aired story news (KHNL)

Summary: **Tropical storm Pali is moving through the Pacific, a historic storm because it is the earliest named storm to ever form in the Pacific and might be a sign of global warming.**

**II. Segment Details**

1. Key words (circle all that apply)

a) Climate change

b) Global warming

c) Heat wave

d) Sea level rise

e) Coastal flooding

f) Coastal erosion

g) Species decline

h) Coral bleaching

i) Ocean acidification

j) Greenhouse gasses

k) Drought

l) Glacial melt

m) Artic warming

n) Superstorm

o) Mosquitos

p) Sea ice melt

q) Salt / sea water inundation

r) Other:

2. Does this news story mention any of the above key words but avoids specifically connecting them to the effects of climate change / global warming?

Yes No

If yes, describe:

3. Segment impact topics (circle all that apply)

a) Economy

b) National security

c) Extreme weather

d) Public health

e) Plants & wildlife

f) Other:

4. Does this segment address climate change / global warming denial in any way?

YES NO

If yes, please describe:

5. Does this segment contain an interview or quotes from a scientist?

YES NO

If yes, please describe:

**Appendix B.**

**Data Sample from News Archives.**

D5 6N Kauai Sea Level Rise Meeting-VO
Duration: 0:19

**[<mos>6N Kauai Sea Level Rise Meeting-VO_KHNL-**

**BCNLE06_20161230_144735.mxf</mos>]**
**[TAKE :VO]**

**[<mos>001 Lower Third L3 - Evening 00154327 –**
**| looking ahead | meeting to address sea level rise**
**| 6-8 p.m. ja n. 9 at the lihue civic center (00:00 - 00:00)</mos>]**

**{***VO***} Heads up on Kauai...there's a public meeting about rising sea levels...planned for January 9th. It's part of a statewide effort by The Department of Land and Natural resources to educate people about the impacts on each island...and how to prepare and adapt. Again…it's January 9th...at the Līhu'e Civic Center.**

**Appendix C.**

**Intercoder reliability:**

| | |
|---|---|
| N columns | 8 |
| N variables | 4 |
| N coders per variable | 2 |

| Variables | Question 2 | Question 3 | Question 4 | Question 5 |
|---|---|---|---|---|
| Percent agreement | 100 | 89.47368 | 100 | 100 |
| Scott's Pi | 1 | 0.870968 | 1 | 1 |
| Cohen's Kappa | 1 | 0.871622 | 1 | 1 |
| Kripendorff's Alpha | 1 | 0.874368 | 1 | 1 |
| N Agreement | 19 | 17 | 19 | 19 |
| N Disagreement | 0 | 2 | 0 | 0 |
| N Cases | 19 | 19 | 19 | 19 |
| N Decisions | 38 | 38 | 38 | 38 |

Notes:

ReCal 0.1 Alpha for 2 coders was used for this data.

Intercoder reliability data was based on codebook questions 2 through 5. The data was selected from the text search findings for "global warming" and "climate change" at random to code. About 25% of the total data was selected for testing intercoder reliability.