DOCUMENTARY – THE WEAPON OF CHOICE FOR BOTH SIDES OF THE
CLIMATE CHANGE DEBATE

by

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To my parents, Rick and Patti, this is the last one, I promise
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## TABLE OF CONTENTS

1. **INTRODUCTION** ............................................................................................................. 1

2. **DOCUMENTARY AS A MEDIUM OF TRUTH** .......................................................... 3
   - The General Belief of the Public .................................................................................. 3
   - How Documentary is Subjective .............................................................................. 4

3. **DOCUMENTARIES ON BOTH SIDES OF THE DEBATE** ........................................... 8
   - Support of Climate Change ....................................................................................... 8
     - An Inconvenient Truth .......................................................................................... 8
     - Before the Flood .................................................................................................. 12
   - Denial of Climate Change ....................................................................................... 14
     - Cool It ................................................................................................................ 14
     - Climate Hustle .................................................................................................... 16

4. **DOES IT MAKE A DIFFERENCE?** ............................................................................. 21

5. **A PATH FORWARD** ..................................................................................................... 24
   - How to Change Opinions ......................................................................................... 24
   - Towards a Cultural Consensus .............................................................................. 26
   - Science Animation and Documentary as a Vehicle for Climate Change
     - Information ......................................................................................................... 28

6. **CONCLUSION** ........................................................................................................... 30

REFERENCES CITED ......................................................................................................... 31
ABSTRACT

The climate change debate has been a hot button issue in the U.S. for at least the last decade. Both sides of the debate have used documentary film as a “weapon” to help create support for their side of the debate. In this paper, I examine two documentaries that support climate change, *An Inconvenient Truth* and *Before the Flood*, and two documentaries that deny climate change, *Cool It* and *Climate Hustle*. How do these documentaries present the actual science of climate change? Documentaries give filmmakers wide latitude in the presentation of facts, and both sides of the climate change debate have used them hoping to influence public opinion. In their efforts to change minds, the filmmakers often misrepresent the science, which I argue can cause credibility issues for the whole scientific community. Current research also shows that documentaries might not be an effective means of changing opinions, but rather are best suited for galvanizing action from supporters on an issue. Researchers also suggest that the general public looks to documentary content for both information and entertainment. My thesis films, a virtual tour of the Reynolds Creek watershed, aim to make dense peer-reviewed science more relatable through animations and entertaining narration. The whole library of climate change documentaries and science films may not affect an individual person’s opinion who is watching a single film, but it appears, it is slowly shifting the American and worldwide discourse on the topic, strengthening public belief and support of the issue. My hope is that my thesis films add a small piece to the larger puzzle of climate change science communication.
INTRODUCTION

Among scientists, climate change is settled science. It has been for the last 15–20 years. As the Intergovernmental Panel on Climate Change (IPCC) states in its latest report, “human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels, with a likely range of 0.8°C to 1.2°C. Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate” (IPCC, 2018, p. 6). The media narrative in the United States is vastly different, however, where climate change is still a topic for debate. In fact, many conservative lawmakers in America have spread the narrative that climate change is fake science (Davenport & Lipton, 2017). Documentary film has played a central role in the politicization of the climate change debate. It has been one of the preferred communication methods of both climate change supporters and deniers. Numerous movies, YouTube videos, TV shows, and web series have been devoted to the topic.

In the modern era, the ability to make films has become easier and the costs have become lower. This is primarily due to the digital revolution as more people have access to high quality film equipment. As a result, it is relatively easy for someone to make a film supporting a certain point of view. In this paper, I examine the unique history of documentary, and how this history makes documentary one of the “weapons” used by both sides of the climate change debate to help raise awareness about their particular viewpoint on the issue. How is climate change science presented in these documentaries? How does it compare to the actual science? And are documentaries
successful in changing minds about climate change? What does the future hold for climate change documentaries?
DOCUMENTARY AS A MEDIUM OF TRUTH

The General Belief of the Public

Average viewers watch documentaries expecting to engage with factual information. As noted documentary filmmaker Jon Else states, “viewers will believe certain things to be true and the filmmaker must shoulder responsibility for promoting those beliefs” (as cited in Nichols, 2006, para. 7). Cooper and Nisbet (2017), both professors of communication, also argue that audiences “approach these texts with two common assumptions—that the images shown originate in the historical world and that documentaries are perceived to go beyond merely portraying the historical world by making some sort of truthful ‘argument’ or ‘claim’ about it” (p. 6). Media creators know this, and as a result, documentaries are the movie style chosen to relate information and try to educate and persuade the viewer to support a certain point of view. Cooper and Nisbet (2017) speculate that one of the reasons the documentary genre is such a popular media form in the climate change debate is because it can cause viewers to engage with factual information through their emotions. The authors state,

Environmental documentaries have the potential to deeply impact audiences because these films promote learning while viewers are entertained, because engagement with the documentary narrative (story) can overcome biases such as politically driven motivated reasoning (conforming new evidence to existing beliefs) and can leverage biases such as the tendency to rely on affect (emotions) when estimating risks. Documentary storytelling can also enhance learning by connecting the causes and consequences of climate change in a sequential narrative. (Cooper & Nisbet, 2017, p. 1)

Because viewers often bring the assumption of truth to watching documentaries and are more receptive to the information being presented because of the emotional
aspect of documentary storytelling, documentaries are the perfect vehicle for trying to affect the audiences’ opinions about controversial topics such as climate change.

There is also a rich history of using documentaries to approach topics that need attention. As documentary theorist Bill Nichols (2001) states,

Documentaries lend us the ability to see timely issues in need of attention, literally. We see (cinematic)views of the world. These views put before us social issues and current events, recurring problems and possible solutions. The bond between documentary and the historical world is deep and profound. Documentary adds a new dimension to popular memory and social history. (p. 2)

Nichols (2001) further explains that documentaries “stimulate epistephilia (a desire to know) in its audience. [They] convey an informing logic, a persuasive rhetoric, or a moving poetics that promises information and knowledge, insight and awareness” (p. 40). Audiences subconsciously know this history of documentary and this desire to know leads them to engage with the medium expecting to learn about current issues, often assuming that a film will present solutions to these issues. Audience assumptions about truth and the historical framework of documentary films make them appealing to filmmakers looking to craft their own vision of the facts for any controversial issue.

How Documentary is Subjective

Despite the general public’s belief that documentary provides factual and educational information, film theorists have known for a long time that the medium actually presents the subjective truth of the filmmaker. Nichols (2001) states “documentaries represent the historical world by shaping its photographic record of some aspect of the world from a distinct perspective or point of view. As such they become one
voice among the many voices in an arena of social debate and contestation” (p. 43). Dirk Eitzen, professor of film and media studies, further reinforces the subjectivity of documentary:

Every representation of reality is no more than a fiction in the sense that it is an artificial construct, a highly contrived and selective view of the world, produced for some purpose and therefore unavoidably reflecting a given subjectivity or point of view. Even our "brute" perceptions of the world are inescapably tainted by our beliefs, assumptions, goals, and desires. So, even if there is a concrete, material reality upon which our existence depends (something very few actually doubt) we can only apprehend it through mental representations that at best resemble reality and that are in large part socially created. (Eitzen, 1995, p. 82)

Finally, Cooper and Nisbet (2017) note that the documentaries are “constructed representations of reality that incorporate stylistic and storytelling formats common to fictional media” (p. 5). It could be argued that this commonality to fictional media helps attract audiences to documentary storytelling. They can learn information, while also being entertained.

The subjective nature of documentaries, however, is also what makes them an attractive tool for media creators to use in influencing opinions. Science, on the other hand, is conducted using a peer-review process, ensuring that a scientific manuscript is experimentally and ethically sound, but also determining which papers sufficiently meet the journal’s standards of quality and originality before publication. Peer-review is now standard practice by most credible scientific journals and is an essential part of determining the credibility and quality of work submitted. (Kelly, Sadeghieh, & Adeli, 2014, p. 229)

Peer-review evaluates scientific research before the results are shared, giving other scientists in the same field a chance to vet the work. This self-policing mechanism strives to keep subpar work and personal theories out of
mainstream science. The hope among scientists is that published work is backed up by sound data that can withstand scrutiny. Also, one published paper in a field does not make a scientific theory. Science has a history of verification of any new findings by other scientists, and there is a continuing effort in science to make all published data available for verification and use by other scientists (Achenbach, 2015; McNutt, 2015). The idea of vetting published work also extends into the media sphere via journalism.

Journalists adhere to a code of ethics with the goal “to ensure the free exchange of information that is accurate, fair and thorough” (Society of Professional Journalists, 2014, para. 1). This code of ethics includes using multiple points of view, remaining as unbiased as possible, and providing sources when appropriate (Society of Professional Journalists, 2014). If followed, this code of ethics amongst journalists helps ensure that news stories contain both reliable and factual information. While not as rigorous as the scientific peer-review process, the journalism code of ethics does help reduce subjectivity in news media.

In contrast there is no official peer-review process or official code of ethics for documentaries. Nichols (2006) has suggested a simple documentary ethical code of “do nothing that would violate the humanity of your subject and nothing that would compromise the trust of your audience” (para. 10). However, Nichols (2006) acknowledges that such a statement is ambiguous, and the “history of documentary filmmaking is littered with the remains of debates of what might
violate subjects or deceive audiences” (para. 12) Finally, Nichols (2006) clearly notes that the “onus for determining the ethics of a given film [is on] the community of filmmakers, distributors and exhibitors, critics, scholars and audiences that has shared a vested interest in the form and future of documentary” (para. 30). While Nichols has tried to outline a ethical code for documentary filmmaking, it is clear that there is little framework for peer-review or self-policing to ensure that a filmmaker’s vision is both respectful of their subject and audience. This simple fact makes the documentary particularly suited as a “weapon” in polarizing debates such as climate change. Filmmakers can structure movies in the documentary style in an effort to present their subjective beliefs about climate change as truths to audiences. This can make the subject appear open to debate despite what science may say about it. More than likely, they will face little public backlash because there is no peer-review process for documentary films or code of ethics that the filmmaker could be violating with a subjective presentation of scientific findings.
DOCUMENTARIES ON BOTH SIDES OF THE DEBATE

As the climate change debate continues across America, there have been numerous documentaries from both sides of the aisle. The documentaries unabashedly support one point of view or another, but how does their presentation of science compare to the actual data from scientists? I will compare some of the facts presented in both types of documentaries to the current peer-reviewed scientific literature dealing with climate change. Are the facts presented accurate? Do they stretch the truth? How are the documentaries constructed? What does the scientific literature really say about the potential effects of and solutions to climate change? Particular attention will be paid to the publications of the Intergovernmental Panel on Climate Change (IPCC). IPCC publications are regarded by the scientific community as the standard of current climate science and projections of future climate change.

Support of Climate Change

In recent years, there have been plenty of documentaries about climate change and its potential impacts on both our society and the planet. I will focus on two movies that were popular with the general public, likely because of their famous hosts. While the movies both present the dangers of climate change, they do so in different ways. The first, and perhaps most well-known movie, is An Inconvenient Truth.

An Inconvenient Truth: An Inconvenient Truth is a 2006 Academy Award winning film following former Vice President Al Gore’s quest to educate the public
about the perils of climate change. The film centers on Gore’s well-rehearsed lecture, where he distills the complicated science of climate change for public consumption. The movie is arguably the most influential climate documentary of all time. It might not have been the first such documentary, but its notoriety and box office success brought climate change into focus for the American public and helped start the climate change documentary trend. There is plenty of science in *An Inconvenient Truth*, but is it accurate?

First, let’s look at sea level rise. In *An Inconvenient Truth*, Al Gore states that if the Greenland ice sheet were to melt then global sea levels would rise by 6 meters (20 feet). Gore then presents a doomsday animation in which many of the world’s coastal cities are inundated as a result of this large increase in sea level. So, what do the all the scientists on the IPCC think? Two IPCC reports, one published around the time of *An Inconvenient Truth* in 2008 and a more recent one published in 2014, suggest much lower sea level rise than Al Gore mentions in *An Inconvenient Truth*. In fact, under the worst-case scenario the IPCC (2008) predicted that sea level would rise only 0.59 meters (1.92 feet). This estimate was revised upward in 2014 but only to 0.82 meters (2.7 feet) by the year 2100 (IPCC, 2014). IPCC predictions from 2014 are worse than those from 2008, and moving forward in this paper, they will be used to judge the claims made by Gore in *An Inconvenient Truth*. It should also be noted that the IPCC provides numerous climate scenarios in its reports. These scenarios are based on predictions of future greenhouse gas emissions from countries around the world. Future greenhouse gas emissions are uncertain because of many factors, including more efficient and cleaner coal power
plants, more fuel-efficient vehicles, investment in renewable energy, and economic growth during the time period in question. The IPCC (2014) actually only predicts 0.63 meters (2.07 feet) of sea level rise for its two more reasonable climate scenarios based on moderate increases in greenhouse gas emissions.

While the IPCC (2014) report seems to suggest that Al Gore largely exaggerated the threat of climate change in *An Inconvenient Truth*, Gore’s statement about the potential for 20 feet of sea level rise is not completely unfounded. The IPCC (2014) report states “the threshold for the loss of the Greenland ice sheet over a millennium or more, and an associated sea-level rise of up to 7 m, is greater than about 1°C (low confidence) but less than about 4°C (medium confidence) of global warming with respect to pre-industrial temperatures” (p. 16). The IPCC (2014) is stating that the loss of the Greenland ice sheet is possible and could cause up to 7 meters (22 feet) of increased sea level. However, the time frame for such a loss is over 1,000 years. As a result, there is little evidence that sea level rise will happen as dramatically as Gore predicted. Gore’s misrepresentation the science of sea level rise is misleading to audiences and has the potential to cause public distrust of scientists on the issue.

Another example from *An Inconvenient Truth* centers around malaria. Gore states that many African cities, such as Nairobi, Kenya, and Harare, Zimbabwe were established at high elevations because of the lower prevalence of malaria due to colder temperatures. As global temperatures have warmed in response to climate change, malaria has become more prevalent in these cities. However, Gore’s statement about malaria is misleading.
According to Mudhune et al. (2011) there were 14,000 cases of malaria diagnosed in Nairobi, Kenya in 1913. Since Nairobi was founded in 1899, this suggests that the disease was prevalent and active in the city before climate change began to take effect. However, Mudhune et al. (2011) also notes that malaria is reduced at higher elevations because colder temperatures limit the development of the parasite itself (not the mosquito as Gore suggests). As a result, there is some evidence to suggest that climate change may increase the incidence of tropical diseases through higher temperatures. The IPCC (2014) report supports this claim, stating that “risks from vector-borne diseases are projected to generally increase with warming, due to the extension of the infection area and season, despite reductions in some areas that become too hot for disease vectors (medium confidence)” (p. 75). Gore was not totally wrong in his assessment that climate change might increase vector-born disease, but he greatly over-exaggerated the potential effect and used a poor example since malaria seems to have been highly prevalent in Nairobi since its founding.

In An Inconvenient Truth, Gore is seeking to educate the public about the very real dangers of climate change, and his movie includes a decent amount of actual scientific evidence. However, he often presents worst case scenarios that are unlikely to occur. While this has the effect of making people more worried about climate change, it does not represent the real scientific facts. As a result, he is misrepresenting science, and in the long term may be causing credibility issues for the whole scientific community. When Greenland does not melt and cause 7 meters (22 feet) of sea level rise, people are going to wonder if scientists are right about the dangers of climate change.
Before the Flood: Before the Flood was a highly successful climate change documentary that leveraged the fame of Academy Award winning actor Leonardo DiCaprio to bring awareness to the climate change debate. The film follows DiCaprio around as he meets with scientists, politicians, and climate affected citizens in an effort to learn more about how climate change is affecting people and the planet. He also aims to learn if we have current technologies to curb and even reverse the damage of climate change.

The hard science presented in Before the Flood is actually sparse. Most of the film centers around observational trips to see the effects of climate change firsthand and talk to scientists about the potential solutions. The scientific facts presented are true and rather basic. Carbon dioxide is a greenhouse gas, and methane is an even worse greenhouse gas. Coral reefs are dying in response to climate change, deforestation contributes a significant amount of carbon dioxide to the atmosphere, and beef production is a substantial source of methane. It is much better for the environment to consume chicken or be a vegetarian. Where Before the Flood runs afoul of contemporary climate science lies in its crimes of omission surrounding weather attribution and climate uncertainty.

The topic of weather attribution is a current hot button issue in climate science. It is universally accepted amongst climate scientists that no one weather event can be attributed to climate change. However, climate change could make severe weather events more likely and worse when they do occur. Thus, the presentation of extreme weather events in Before the Flood is not entirely inaccurate, but perhaps, a bit disingenuous. The
movie makes use of numerous montages depicting wildfires, hurricanes, drought, flood, tornadoes, severe storms, etc. It is true that climate change will likely affect the frequency and severity of these events, but the movie does engage in some fear-mongering, depicting them in an almost apocalyptic way. These events would occur without climate change, and just because a natural disaster happens to strike in a viewer’s area does not mean that climate change caused it or made it worse. Scientists have just begun to research weather attribution and how to quantitatively measure climate change’s effect on events. For example, Van Oldenborgh et al. (2018) do not attribute Hurricane Harvey, a devasting tropical cyclone that affected Houston, Texas, to climate change, but the authors suggest that climate change made the storm 15% worse (range 8%–19%). This field is new and nuanced, and its presentation is glossed over in Before the Flood in favor of doomsday predictions about natural disasters caused by climate change.

Before the Flood also largely chooses not to deal with the uncertainty about climate change predictions. It presents a host of scenarios that might happen if global temperatures continue to rise but fails to note that these are scientists’ best guess as to what will happen. There is uncertainty and varying degrees of confidence in all climate predictions, meaning we do not quite know what will happen. This is all glossed over in Before the Flood because it does not serve the film’s message of a climate crisis that we must solve now.

Before the Flood is a high production value documentary that uses the star-power of Leonardo DiCaprio to bring attention to the current state of the climate change debate and the need for immediate action if we are to curb the warming trend before it becomes
a runaway problem we can never solve. The movie contains a call to action at the end, and the question that remains hard to quantify is whether or not it attained its goals of making a difference in the climate change debate. It could seem hypocritical to some viewers that DiCaprio is telling them what to do with their lives, when he himself has limitless resources when compared to the average global citizen. Indeed, his star power brought attention to the film and gave the filmmakers access to some of the most prominent climate scientists and politicians, but did it make a difference? As I will discuss further in this paper, perhaps it did. But it likely did not change any minds about the climate change debate.

**Denial of Climate Change**

On the other side of the aisle, there have also been plenty of documentaries that deny climate change or at least call some of the current science into question. Unlike scientific research, documentaries are not peer-reviewed. As a result, anyone can release a movie claiming to present factual information about climate change. I will focus on two movies that aim to poke holes in the science of climate change, *Cool It* and *Climate Hustle*.

**Cool It**: *Cool It* is a rebuttal to films such as *An Inconvenient Truth*. In the film, political scientist Bjorn Lomborg argues for a common-sense rational approach to the potential effects of climate change. *Cool It* attempts to provide feasible solutions to climate problems, unlike *An Inconvenient Truth*, that often tries to scare some sense into people. How does Lomborg present the actual science in the movie?
On the hot button topic of sea level rise, Lomborg contends that sea levels will actually only rise by about a foot given current projections of global warming. He then goes on to mention that sea level has already risen by a foot in the last century and no one seemed to notice. Lomborg also notes that we already know how to deal with sea level rise. He cites the example of the Netherlands, who have invested in a series of mechanical gates that keep out the North Sea during storms and other periods of unusually high tides. His main argument is that we have the technology to combat rising sea levels now, and the change will be slow enough that we will have time to adapt to any changes that occur. The IPCC (2014) begs to differ, however, as they predict that sea level will rise 0.82 meters (2.7 feet).

Lomborg also spends a lot of time in Cool It exploring new technologies that have the potential to reduce greenhouse gas emissions by either using alternative energy sources or reversing climate change through engineered solutions. Many potential solutions are presented in the movie, but none of the new technologies appear to be mature enough to actually be viable. As Lomborg questions the scientists working on these technologies, it is clear that these technologies are still in the early stages of development. Not many of them have been actually built and tested to see if they are more economically feasible than current fossil fuel based energy sources.

For example, in Cool It, Lomborg interviews Jonathan Trent, a scientist doing research on algae for use in fuel production. Trent correctly points out that algae can be grown on wastewaters to produce oils, which can then be refined into gasoline and other fuels. In addition, he mentions one of the key drawbacks of algae for fuel use, space
limitations. He states that we would only need 10.5 million acres to grow enough algae to produce all the fuel for the aviation industry. However, 10.5 million acres is an area 128 miles by 128 miles or roughly the size of the U.S. states of New Hampshire and Massachusetts combined. That kind of contiguous space is nearly impossible to find in the U.S. today. A simple fact left out of Cool It.

Climate Hustle: Climate Hustle is a 2016 documentary funded by the Committee for a Constructive Tomorrow (CFACT), a non-profit organization based in Washington, D.C that has been at the forefront of skeptical climate change media. The movie is hosted by Marc Morano, who is former Republican political aide and a current employee of CFACT. The movie’s structure aims to poke holes in climate change science through seven different parts that focus on inconsistencies in the presentation of climate change or the science behind it. For the purpose of this paper, I will focus on science topics presented in the film for which there are published peer-reviewed papers. I will then compare the conclusions from the peer-reviewed literature with the those of Climate Hustle.

The first topic discussed is the scientific consensus on climate change. Many politicians and climate change supporters have claimed that 97% of scientists agree that humans are causing climate change. However, Morano argues the study that made the 97% assertion was based on a survey of only 75 scientists. There is no source cited for this study though, you will just have to trust Morano and the makers of the movie, and I could not locate the study. There were, however, two peer-reviewed papers that supported the scientific consensus. Anderegg et al. (2010) showed that the scientific
consensus on climate change does approach 97–98%. And interestingly, this research showed that those scientists who support climate change often have more expertise in the field than those who are climate change skeptics. The authors found the following:

“This method reveals large differences in relative expertise between CE [convinced of the evidence] and UE [unconvinced of the evidence] groups. Though the top-published researchers in the CE group have an average of 408 climate publications, the top UE researchers average only 89 publications...Thus, this suggests that not all experts are equal, and top CE researchers have much stronger expertise in climate science than those in the top UE group.” (Anderegg et al., 2010, p. 12108)

A paper written by Dr. Richard Tol (2016), who appeared in Climate Hustle, refuted this claim of consensus, but further publications about the consensus supported the work of Anderegg et al. (2010). Cook et al. (2016) showed that the scientific consensus on anthropogenic global warming is robust, with a range of 90%–100% depending on the exact question, timing, and sampling methodology. Furthermore, Cook et al. (2016) found that Dr. Tol’s work “obtains lower consensus estimates through a flawed methodology, for example by conflating nonexpert and expert views, and/or making unsupported assumptions about sources that do not specifically state a position about the consensus view” (p. 6). Climate Hustle does not provide sources on where it gets its information refuting the scientific consensus on climate change. It is clear, however, that the science of the scientific consensus is clear. An overwhelming majority of climate experts support the consensus on climate change.

Another point of contention in Climate Hustle centers on the fact that the planet has not been consistently warming since 1998, but there have been ups and downs. The filmmakers present a graph that shows no clear trend of warming between 1998 and
2014. While this may be somewhat true, the filmmakers chose to selectively edit their data. It may be hard to find evidence of warming since 1998 if one just looks at these 15 years, but when you look at global temperatures since 1960 until present (2017), the trend is unmistakable. The globe is warming (IPCC, 2014). The filmmakers chose to present the data in a way that furthers their version of truth, but in fact does not present the whole scientific picture.

One of the themes that keeps coming up in *Climate Hustle* is the idea of uncertainty. Scientists claim that there would be this much change in temperature, sea level rise, extreme weather events, etc., and that has not come to fruition as they predicted. So therefore, we should not trust their assessment that climate change is happening and measurable. The simple fact is that the movie uses scientific uncertainty to its advantage. All of our climate predictions are based on computer models. These models are carefully constructed based on our current knowledge of the climate system then carefully calibrated with data, but the fact remains that the Earth is incredibly complex. We simply cannot predict what will happen with complete certainty. For this reason, the IPCC presents all of its predictions with a confidence assessment – low, medium, or high (IPCC, 2014) These confidence indicators are supposed to help policymakers and other readers realize that there is uncertainty in their predictions. However, climate change skeptics, such as the filmmakers of *Climate Hustle* are using this fact to make the argument that scientists do not know what is going on and should not be believed.
Overall, *Climate Hustle* uses the conventions of the documentary genre to present a categorical denial of climate change. It is clear the filmmakers hope that these conventions will make their film more believable despite the presentation of “facts” that have no basis in scientific reality. The documentary conventions used are numerous. Marc Murano presents most of the film in style that is reminiscent of Michael Moore films. He hopes you will trust the information he is presenting, and he styles himself after Moore, often trying to surprise climate change scientists with impromptu interviews in the hopes of catching them off guard. He also hopes that their general unwillingness to engage with him will further his credibility with the viewer. The film also makes use of the documentary convention of the expert by interviewing numerous “experts” on climate change that refute the scientific consensus. Scientists that refute climate change are estimated to make up about 2% of all climate scientists (Anderegg et al. 2010). By cherry picking climate change skeptics, the filmmakers of *Climate Hustle* show the viewer that there is a consensus of scientific skepticism, when in reality these few scientists are at the fringe of climate science. Finally, *Climate Hustle* makes use of extensive graphical montages to entertain the viewer and suggest a lack of climate consensus by showcasing articles and information that are skeptical of the science. This convention of presenting information is common in many documentaries, such as *Before the Flood, Food, Inc., The Fog of War, Merchants of Doubt, Standard Operating Procedure*, and my five thesis films that showcase the science being conducted at the Reynolds Creek Critical Zone Observatory. The filmmakers of *Climate Hustle* are savvy and understand that if they use these and other standard documentary conventions, it may
make their film more believable to the average person who has a limited background in climate science, documentary film production, and the subjective construction of truth in documentary films. They have chosen to use the documentary genre as a way to promote their agenda even though the information they present is not supported by the actual scientific data.
DOES IT MAKE A DIFFERENCE?

As the number of climate change documentaries continues to rise, one large question continues to come up. Are they making a difference? Research from Kahan (2012), a professor of psychology, suggests that they are indeed having an effect, but not the one the filmmakers might have hoped for when they conceptualized these films. Kahan (2012) has shown that when people form opinions about controversial topics, they tend to form opinions that are consistent with their cultural commitments. Kahan (2012) says,

People whose beliefs are at odds with those of the people with whom they share their basic cultural commitments risk being labelled as weird and obnoxious in the eyes of those on whom they depend for social and financial support. So, if the cost of having a view of climate change that does not conform with the scientific consensus is zero, and the cost of having a view that is at odds with members of one’s cultural community can be high, what is a rational person to do? In that situation, it is perfectly sensible for individuals to be guided by modes of reasoning that connect their beliefs to ones that predominate in their group. (p. 255)

As a result, documentaries on climate change are likely not shifting the opinion of too many viewers. Instead, one of two things are happening. Either a viewer watches one of these documentaries, and if it is not consistent with the views of his or her cultural group, rejects the conclusions presented in the film. If, however, the film is indeed consistent with the person’s cultural beliefs, then the film is in effect preaching to the choir. It will only serve to reinforce the person’s beliefs surrounding climate change. Cooper and Nisbet (2017) take it a step further, noting that viewers may seek out advocacy-oriented documentaries that are consistent with their values. Meaning audiences can often be attuned to the ideological bent of a certain film, and they pick
films that align with what they already believe. They do this because the film “aligns with their ideological orientation, and these messages also serve to increase the confidence and strength” of their attitudes about the controversial topic (Cooper & Nisbet, 2017, p. 4). This research suggests that documentary might not be an effective tool to shift a person’s opinion about a topic.

However, there has been research to suggest that viewing a documentary about a subject can motivate people to action. Indeed, many documentaries that seek to have an impact now feature a “call to action” at the end of the film encouraging the viewer to help in some way, whether that is monetary, a donation of time, or contacting a politician or policymaker. These calls for action may be successful according to Janpol and Dilts (2016), who are an educational psychologist and behavioral scientist, respectively. In their study, they found that people were statistically more likely to donate to dolphin research after watching a documentary about dolphins when compared to controls who watched a documentary about bridges (Janpol & Dilts, 2016). Cooper and Nisbet (2017) agree with this idea, suggesting that “climate change documentaries that focus on risks should include information on what people can do about it; otherwise these films may cause audiences to avoid or deny the problems of climate change” (p. 5). Most climate change films, including the ones that I have critiqued in this paper, focus on the risk of climate change and urge audience intervention. This presentation of risks moves the audience into a threat control mode (Cooper & Nisbet, 2017). In this mode, audiences can be motivated to action, but only if given information about how to mitigate the risks presented (Cooper & Nisbet, 2017), otherwise audiences can become overwhelmed by
the enormity of the issue and view it as something that cannot be easily solved. This causes disengagement and runs countercurrent to the goals of the filmmaker. All of this research points to the simple fact that the best use of documentary is not to change minds. Instead, it can be effectively used to motivate the viewers who already believe in your side of the story.
A PATH FORWARD

How to Change Opinions

If research shows that most people do not respond to documentaries that feature experts telling them what to think, is there any hope of using documentary as a genre to influence the climate change or other debates in society? Scientists have been uniquely interested in this fact, and research from both Kahan (2015) and Hayhoe (2018) show that there are promising ways to engage skeptical audiences with climate change science in an effort to help shift opinions on the subject.

Kahan (2015) has suggested a potential solution based on his scientific surveys of climate change opinions among members of the general public across the ideological and political spectrum in the United States.

People, of all cultural outlooks, trust scientists and are eager to make use of what science knows to improve their lives. But the people whose orienting influence they need to observe are not scientists. They are the people in their everyday lives whose guiding example ordinary members of the public use to figure out what evidence of scientific belief they should credit and which they should dismiss. The communication of normal science, by scientists, is vital to practical decision makers—from insurance agents to farmers, from investment brokers to military leaders. But what needs to be communicated to ordinary members of the public, in their capacity as citizens, is the normality of using climate science. And they have to communicate that to themselves. (Kahan, 2015, p. 33)

In other words, if a filmmaker’s goal is to shift climate change opinions among rural, conservative Americans, they should make a conservative, rural American the main subject of their film. Using scientists or famous actors to convey the science information is not likely to affect a person’s opinion, but is more likely to further alienate rural, conservative viewers, and reinforce their
negative beliefs about climate change. Filmmakers hoping to shift opinions on climate change need to find relatable characters that believe in climate change and are part of the cultural communities the filmmakers are trying to reach with their work.

Kathryn Hayhoe, a noted climate scientist, has also suggested ways to talk about climate change with people that might be skeptical of the current science. She says that “scientists can be effective communicators by bonding over a value that they genuinely share with the people with whom they’re speaking…Instead of beginning with what most divides scientists from others, start the conversation from a place of agreement and mutual respect” (Hayhoe, 2018, p. 943). Dr. Hayhoe also notes that it is important for science communicators to offer potential solutions to the problem,

changing minds…requires providing practical, viable, and attractive solutions that someone can get excited about. Concerned homeowner? Mention the amazing benefits of energy conservation. Worried parent? Bring up the practical steps to take to make outdoor play spaces safer for kids, even in the hot summer. Business executive? Talk about the economic benefits of renewables. (Hayhoe, 2018, p. 943)

Using the information from both Kahan (2015) and Hayhoe (2018), if a filmmakers’ goal is to change minds about climate change, they should fashion documentaries that do more than just provide interviews with scientific experts. They should seek relatable characters that appeal to skeptical communities and provide measurable actions that those communities can take to mitigate climate change in their communities.
Towards a Cultural Consensus

While it is clear from the work of Kahan (2015) and Hayhoe (2018) that many climate change documentaries will not change any minds about shifts in climate, the overall viewership for climate change films can be high. *An Inconvenient Truth* brought in nearly $49 million at the box office, which is the 11th highest gross for a documentary of any subject in the U.S (Box Office Mojo). And *Before the Flood* reached close to 30 million viewers, which was the “largest sampling for a documentary in the world since 2000” (Gerard, 2016, para. 1). As with other issues in the country, the science of climate change seems to finally be reaching all Americans.

While no one documentary likely changed minds, the sheer volume of climate change documentaries has slowly shifted the narrative in America and led to a general acceptance of the basic science tenants. In fact, Cooper and Nisbet (2017) call this media agenda setting.

Advocacy documentaries can generate a wealth of news coverage that focuses on either the issue or on controversy around the film itself. Increased coverage by news media is referred to as media agenda setting, and when the media as a whole make an issue more salient they are said to drive public agenda setting…The media is especially critical in setting the public agenda for unobtrusive issues, like climate change, that may not have much of an impact on people’s everyday lives. (Cooper & Nisbet, 2017, p. 15)

An idea called quantity of coverage theory builds on the idea of media agenda setting. The basic principle is that there are central media that play an outsize role in determining what topics are of concern to both the American public and the world (Mazur, 2014). One of the central tenets of this theory is that the “rise and fall of widespread public concern and governmental action may be traced back to the rise and
fall of coverage by the central media” (Mazur, 2014, p. 209). Mazur (2014) conducted an analysis of the rise in fracking coverage and traced it back to the movie *Gasland*.

An important step for oppositional movement was the successful dissemination of the antifracking documentary film *Gasland*. With help from celebrity sources, it was produced and won a prize at the Sundance Film Festival by early 2010 and had an Oscar nomination by early 2011, in the meantime popularizing potent images of hazard including tainted aquifers that sickened people and animals, and ignitable water running from kitchen faucets.” (Mazur, 2014, p. 220)

The initial success of *Gasland* led to a central media interest in fracking, which in turn led to a New York Times series on fracking and its potential negative consequences. This led to even more media interest and the fracking story snowballed until it became an issue of worldwide concern with many nations re-evaluating their stance on the practice (Mazur, 2014). For example, France chose to ban fracking entirely in mid-2011 (Mazur, 2014). Quantity of coverage theory is supported by anecdotal observational evidence of the steady drumbeat of climate change documentaries that continue to be released. Each film helps ensure that climate change remains a hazard that is at the forefront of the public consciousness. This has helped slowly shift public opinion over time despite the fact that no one film is likely to change the minds of climate change deniers. When taken as a whole, the library of climate change documentaries is likely making a difference.

Also, films on the topic can be assumed to have helped spur individual action on the subject, helping convince climate change believers to do more to help mitigate effects, including lowering energy usage, buying more efficient vehicles, investing in renewable energy sources, etc. Documentary films might not have changed individual minds, but they likely helped focus climate change supporters on the problem and potential ways they could help with it.
Science Animation and Documentary as a Vehicle for Climate Change Information

After all this talk of climate change, how does my five-part video series on the scientific work at Reynolds Creek Critical Zone Observatory (RCCZO) fit in with the larger body of documentary media covering climate change? First, the science being done at Reynolds Creek is a critical component in our understanding of the world climate system. The primary culprit of climate change is carbon dioxide. Carbon dioxide traps heat, so as more is released into the atmosphere, more heat is trapped, leading to more global warming. Plants, however, use carbon dioxide during photosynthesis and transform it into organic material – their leaves, branches, etc. As a result, it is important to study them and the ecosystems in which they live to determine how much carbon dioxide they are sequestering from the atmosphere. This is precisely what the scientists at RCCZO are doing in their work. However, their work can be scientifically dense and hard to understand for the general public.

The goal of my work is to make the science of RCCZO more approachable for the general public through a five-video tour that features unique scientific animations and relatable narration. Videos using this style of combining animation and narration have been quite successful on YouTube. For example, videos from both Vox and Wendover Productions often have millions of viewers that watch them, suggesting that this style is especially relevant for sharing science. This viewership also suggests that the general public is interested in complex science topics and seeks out media that can help explain it to the average person. As previously noted, audiences expect documentary styles to both inform and entertain them, and it appears that they are actively seeking out content on
current media distribution platforms that meets both of these goals (Cooper & Nisbet, 2017).

While my work neither engages with climate change deniers in ways suggested by either Kahan (2015) or Hayhoe (2018) nor does it appeal to the emotions of its viewers, I believe it does help us reach a cultural consensus on climate change by bringing actual peer-reviewed scientific research to the average viewer in an entertaining and novel way. Having actual scientists share their own published work at their research sites makes them relatable to the viewer and humanizes them. I believe this makes the viewer more receptive to the scientific information they have to share. I chose to add animations and narration to help distill the science for the viewer and make it more understandable.

It is important for scientists to get their work to the general public, but the complex nature of their work, and their lack of filmmaking and media experience often makes that hard to accomplish. My hope is that my thesis will help provide a blueprint for one way other media professionals can present dense scientific topics. My work will also add to the cultural consensus forming around climate change, showcasing the actual science to viewers hungry to learn about it.
CONCLUSION

For the last 25 years, the public debate about climate change has played out in America. Unlike science and journalism, documentary film has no peer-review process or standardized code of ethics. As a result, documentaries have been a “weapon” used by both sides to bolster their particular views on the issue. In the process, both sides have misconstrued the scientific consensus on climate change causing credibility issues for scientists. Research suggests though that these films have done little to shift public opinion and have further polarized the debate by ensuring that people remain firmly devoted to their particular beliefs.

If documentarians hope to change opinions, scientists have offered ideas on how to approach divisive topics in ways that can make a difference. Despite the research that an individual climate change documentary is unlikely to change many opinions, research does suggest that these films can help set the media agenda in America and the world and spur individual action on climate change (both good and bad). Future documentaries should also make sure to include a call to action as viewers are often receptive to taking measurable steps to make a difference after viewing documentary films.

Overall, I believe a cultural consensus is forming around the science of climate change in America, despite the efforts of climate change skeptics. The sheer volume of scientific evidence and media in support of climate change is becoming hard to ignore. I hope my thesis films help add to this evidence by making complex scientific topics in climate change science understandable for the general public.
REFERENCES CITED


