

Hollywood's Hidden Cost: The Environmental Impacts of the Movies

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In today's highly digitized world, we are constantly consuming media. We watch so many movies and TV shows, listen to so much music, and scroll through so much social media that we have become numb to it. Just as we are numb to how much time we spend on these things, we also are numb to the impact they are having. Every movie you watch costs thousands, if not millions, of dollars to produce, but it also costs a significant amount of fossil fuels, natural resources, and in some cases it may even lead to direct ecological damage. In this thesis, I explore several examples of popular films to come closer to understanding the environmental costs of movies. This research is important because as we move into the future and try to create a more sustainable world, we need to examine every aspect of our economy and determine the environmental costs of products more accurately. This research on movies is just one small piece of the global sustainability puzzle, yet it is a piece that often is overlooked, so it is about time we focus more attention on it. This process includes not only examining the resources that were used to create a movie, but also the message of a movie and the impact that message has on the public. Some movies may have a large cost on the environment during the production phase, but have a positive message which encourages people to take environmental action. Therefore, we must consider both aspects when analyzing a movie. Ultimately, this thesis demonstrates that we can improve the film industry in the future and concludes that there are several methods we can use to make it more sustainable. I conclude that there are four key ways that we can make the film industry more sustainable: sustainability teams, less filming on location, recycling of sets and costumes, and CGI servers powered by renewable energy.

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Research Question: To what extent does the film industry in Hollywood and around the world have a detrimental impact on the environment, and how can we make it more sustainable?

Methods:

For this project, I have studied multiple different sources to determine the environmental impact of several key movies I have selected which I believe are relevant to my studies. First, to get a general sense of the impacts film production, particularly shooting on location, has on the environment, I have read several books on the subject, including first and foremost the book *Hollywood's Dirtiest Secret: The Hidden Environmental Costs of the Movies* (2019) by Hunter Vaughan. After discussing my topic with my advisor, he recommended this text, which he believes is the best resource available on movie production and its impact on the environment. Vaughan's book serves as a model for my thesis. I also studied the book *Environmental Management of the Media: Policy, Industry, Practice* (2018) by Kaapa Pietari, which provides an international take on the environmental impacts of film production, focusing particularly on Great Britain and the Nordic countries. In addition to these two books, I have also read several articles on the subject. These articles include newspaper and journal articles describing the environmental impacts of some of the movies I am researching. For example, one such article describes the aftermath of the filming of Fox Studios' *The Beach* (2000) starring Leonardo DiCaprio and how not only did the production cause significant destruction on one small island in Thailand, but also the film itself drew a horde of tourists to the island, who also had a devastating impact on the local environment. I have also read similar articles regarding *Mad Max: Fury Road* (2015) and the *Lord of the Rings* series, which were both filmed in national

parks. Then, I analyze *The Avengers* series by examining corporate sustainability reports from Disney, the parent company of Marvel and an article on environmental themes in the films. Lastly, I also analyze the impact of *A Room With A View*, a 1985 film from Merchant Ivory Productions, using archival resources from the University of Oregon's Special Collections Library as evidence.

To supplement this research, I also have read through several other sources that focus more on the messages of films and the environmental impact they can have on viewers. These include sources such as *Environmental Ethics and Film* by Pat Brereton, *Ecocinema and the City* by Robin Murray et al., and *Film Ecology: Defending the Biosphere* by Susan Heyward. These books provide me with more of a framework for how to view these movies with an environmental lens, considering not only what occurred in order to produce the images onscreen but also how a film can potentially impact viewers and cause them to take actions. Those actions may be either positive or negative: it could be, as in *The Beach* or *The Lord of the Rings* that a film causes environmental harm by inviting more people to visit a certain spot, or it could be that a film like *An Inconvenient Truth* (2006) makes people more conscious of their carbon footprint. These sources describe what environmental impacts look like in different settings: not just on an island or in a national park, but also in a city. My rationale for considering these sources is to explore further the less direct environmental impacts of movies and also to draw a contrast between the messages of films and their impact. For example, *Avatar* (2007), the highest-grossing movie of all time, does have somewhat of an environmental message and yet the creation of this movie consumed an incredible amount of resources. This methodology allows me to better answer my research question and decide whether one impact outweighed another or vice versa.

After reading these sources, I then moved on to the bulk of my analysis, for which I watched several movies with an attention to detail and examined specifically their messages and environmental impacts. The first of these is *The Beach* starring Leonardo DiCaprio, which was filmed on the island of Ko Phi Phi Le in Thailand. I discuss how, in the process of making this movie, the landscape of the island was bulldozed and altered to create the conditions that the script called for. I drew upon details from a Washington Post article by Jennifer Hassan as well as several other articles to then delve into how this island has remained altered in the years following filming and production. I then talk more about the before and after of that island and how the production of this movie changed things. Then the next movie I examine is *Mad Max: Fury Road*, which was filmed on location in Dorob National Park in Namibia. This film was particularly interesting to analyze due to the intersection between environmental law and film production. I asked questions like, why did they choose to film it in Namibia of all places? Was this decision motivated by a lax set of laws in that country which allowed the production company to take greater liberties? Then I consider all the resources used to create the images onscreen. While many films today utilize CGI and green screen technology to create fantastical images, *Mad Max: Fury Road* is a very gasoline-driven movie filmed in a physical location in which a lot of things get blown up. When you think about how much money and resources were poured into a movie like that, it becomes obvious that there must have been a substantial environmental impact. I also explore the message of *Mad Max: Fury Road*, primarily whether the dystopian images it shows encourage more progressive thinking about the environment. A similar case is the *Lord of the Rings* series, also filmed in a national park (except in New Zealand rather than Namibia). I break down in detail how production of this film impacted the environment, and the message it sends. For example, did the increase in tourism to New Zealand

sparked by the series have a significant impact or not? I found less information on the *Lord of the Rings* movies than the others, so it is difficult to say. However, I also included the *Rings of Power* TV series, and compared this to the original *Lord of the Rings* movies. In contrast to the *Lord of the Rings*, it is well-documented that the *Rings of Power* had a significant environmental impact. Then I investigate the *Avengers* series, which involves the use of CGI, and got a better idea of the impact these films had on the environment. CGI also has an impact, since it requires an incredible amount of processing power and uses vast servers of computers working at high speeds to create the incredible special effects we see onscreen. The *Avengers* in particular is known for these type of spectacular images and is also one of the highest-grossing series ever. After considering all these films, I conclude by suggesting some ways in which movies can become more sustainable going forward. These suggestions utilize not only existing research on the subject but also my own creative suggestions which are based on the conclusions I have drawn from each of these case studies.

Literature Review

Environmental cinema is largely a new field, pioneered in the past 20 years or so by film scholars who decided to take a closer look at the film industry from an eco-critical perspective. To this day, however, there is still a large emphasis within the field on the messages of films, and the production of films is not as heavily scrutinized. However, more information about the impacts of film production are gradually coming to light. Hunter Vaughan, a prominent scholar in environmental cinema, explores this in detail in his book *Hollywood's Dirtiest Secret: The Hidden Environmental Costs of the Movies*, which was released in 2019. Vaughan examines several films using archival research, including his prime example *Singin' in the Rain*, and

concludes that Hollywood has an exploitative relationship with nature and natural resources. In movies across the board, there seems to be a tendency for film studios to treat the planet like their own canvas, altering the environment to serve their needs as if it were a movie set. Vaughan also examines the film texts themselves and the messages they send to viewers regarding environmental issues. Other sources examine similar concepts, however given the relevance of Vaughan's work to this thesis, that is the primary source I use as a model for my writings. Many other scholars have researched films that are explicitly environmentalist in nature, such as *The Day After Tomorrow*, *An Inconvenient Truth*, and others in the same vein. However, few scholars have specifically examined the production of films and how this impacts the environment. One other that has, though, is Nadia Bozak, with her book *The Cinematic Footprint*. Similar to Vaughan's book, Bozak discusses in detail the environmental impacts of film production and provides a framework for examining films with an environmentalist lens. Bozak divides her analysis into 5 different aspects: Energy, Resource, Extraction, Excess, and Waste. This provides a complete framework of the different ways in which film production has an impact on the environment, and demonstrates the blueprint for how to analyze a film. This book, in addition to Vaughan's book, gave me a lot of ideas as for how to analyze each movie and what angles to approach it from.

Leading scholars in the field of environmental cinema include Robin Murray and Joseph Heumann, who have co-authored three books which pertain to the subject. These include titles like *Ecocinema and the City*, *Ecology and Popular Film: Cinema on the Edge*, and *Film & Everyday Eco-Disasters*. These books each take a different angle on the subject of environmental cinema. *Ecocinema and the City* discusses the transformative power of nature in urban settings, and explores how this is present in both documentaries and fictional films (Murray & Heumann

2018). Ultimately, Murray and Heumann argue that cities have the potential to become more sustainable and interwoven with nature, as is explored in part 4 of the book, titled “The Sustainable City”. In *Ecology and Popular Film: Cinema on the Edge*, Murray and Heumann discuss representations of nature in mainstream film while also seeing film itself as a form of nature writing (Murray & Heumann 2009). They explore themes such as environmental politics and eco-terrorism and how those are represented in the cinematic world. Their work has offered insight for my analysis of *Mad Max: Fury Road*, which explores many such themes. Lastly, the third book *Film & Everyday Eco-Disasters* examines how films explore environmental-human conflicts by depicting the consequences of our overconsumption and dependence on nonrenewable energy (Murray & Heumann 2014). Together these three works exemplify Murray and Heumann’s extensive research within the field and contribute to a more well-rounded understanding of environmental cinema. This allows for an analysis of not only the impacts of production but also the message of these films.

Two other sources which have been invaluable in my research are *Ecocinema Theory and Practice* volumes 1 and 2, edited by Stephen Rust, Salma Monani, and Sean Cubitt. These volumes offer a compilation of the existing writings about environmental cinema, discussing everything from unsustainable production practices to the impact of the famous top-grossing film *Avatar*. The second volume in particular offers cutting-edge research on the subject, zooming out and discussing how ecocinema as a subject has evolved in the last ten years since the first volume was released. It also is the most up-to-date source available, since it was just released in January of 2023. It discusses environmental cinema with a global perspective and from the perspective of minority groups, providing context for the rest of my analysis, which largely focuses on traditional Hollywood films and films with a large budget. It also, like Vaughan’s

work, discusses the production side of environmental cinema in more detail, making it an ideal model for my writings.

Many other articles, archival resources, videos, and the films themselves have also been integral to my research for this project. These included a piece from The Washington Post discussing the environmental impacts of *The Beach* and an article in The Guardian about *Mad Max: Fury Road*. Examining newspaper articles from reputable sources gave me greater context for talking about these specific movies, and made it easier for me to apply the analytic methods used by authors such as Hunter Vaughan when discussing the impacts of film production. For the analysis of *A Room With A View*, I used a more hands-on method, since I had a greater amount of resources at my disposal. Inspired by Vaughan's archival research methods, I looked at sources in the University of Oregon's special collections archives, and in doing so I came up with my own conclusions based on the data I could find in receipts and logs from the film's production. However, the most important sources I examine which ground the rest of my research are the films themselves. While watching, I picked out specific moments in the film which were worth noting for their environmental impact, and looked for specific moments which matched what I had read in articles and books.

Film Reviews: Introduction

As consumers, nearly everything we consume has an environmental impact, some things small and others large. Many people are aware that throwing things in the trash has an environmental impact, as these items will likely end up in a landfill someday. Most, if not all, are also well aware that driving their car burns gasoline, which causes pollution. However, it is likely that nearly no one is thinking about environmental impact while they are watching a movie. But the

movie has an impact, too - both in terms of the multitude of resources that went into creating it and the message it imparts on viewers. Movies are an oft-ignored part of the equation when it comes to analyzing the carbon footprint of various industries. While some may deny or ignore it, “the way we make and use art actually does change the world, physically and compositionally” (Vaughan 2019).

There are many aspects of a movie which can have an environmental impact, beginning with the production. In Hollywood, there are many movie studios located on large lots, each of which burns some amount of fossil fuels to operate. In the most basic version of films, filmed on set in Hollywood, people drive to and from the studio each day, and use resources to create the materials needed for the set, and then these materials are usually discarded once production is completed. However, many films in recent years have not been so simple in terms of production; in fact, many films, including action films, adventure films, comedies, dramas, and romances, are filmed on location in a particular place which matches what the film calls for. It is this dynamic, this desire to create the backdrop the story calls for, that leads to the most effect on the environment.

One film that illustrates this dynamic better than many others is *The Beach* (2000), starring Leonardo DiCaprio, in which a production company significantly altered the environment of an island in order to create the conditions called for in the movie. However, this film is just one example of many that have had a significant environmental impact. *Mad Max: Fury Road* (2015) and the *Lord of the Rings* series were both filmed in national parks, creating a slough of issues surrounding environmental law. *A Room With A View* (1985), like *Singin' in the Rain*, Vaughan's prime example, typifies a film which uses a large amount of water to simulate rainy conditions. But ultimately every film has an environmental impact. With the advent of

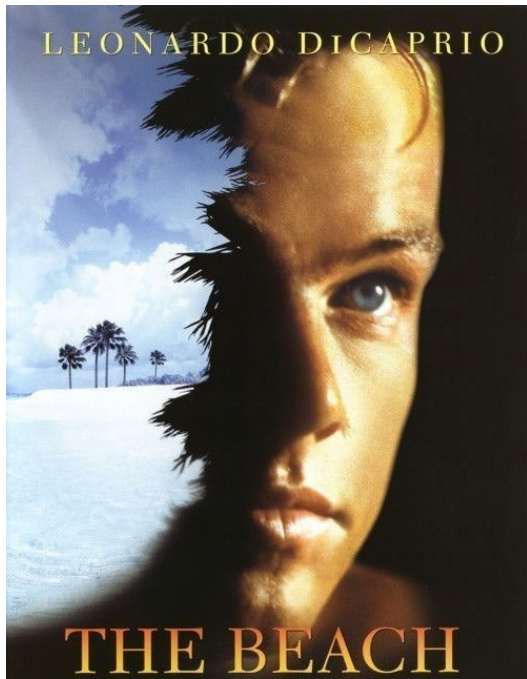
green screen technology and CGI, we have options at our disposal to reduce environmental impact, although even these are not perfect solutions. Ultimately, filmmakers in Hollywood must begin to consider more thoroughly the impact they are having on the environment and avoid harmful practices which negatively affect the natural world.

The Beach

To many, Leonardo DiCaprio is known today as Hollywood's foremost environmentalist. The media "wallpaper[s] the Internet with images of Leo DiCaprio filling up his Prius at the gas pump," contributing to an image of Leo which paints him as one of the heroes of the environmental movement within Hollywood (Vaughan 2019). On DiCaprio's Instagram account, you can see that his entire feed contains posts relating to environmental activism, including images of monkeys, lizards, forests, and oceans. His bio reads, "Leonardo DiCaprio: Actor and Environmentalist". His profile picture shows him speaking at a prominent climate conference, dressed in a suit and tie. He is widely celebrated as a hero; in fact, he even has been designated as a Messenger of Peace by the United Nations, and serves on the board of several prominent organizations, including the World Wildlife Fund, the Natural Resources Defense Council, International Fund for Animal Welfare, Pristine Seas, and Oceans 5 (United Nations). Indeed, it is true that DiCaprio is a prominent activist, and has done many things which have created a positive change and galvanized the climate justice movement. While this is all true, and should be celebrated, what often goes unnoticed is the environmental impact of the movies DiCaprio has starred in. *The Beach* (2000) starring DiCaprio, was of the most environmentally damaging films of all time. Filming took place on the island of Ko Phi Phi Le in Thailand in 1999, an idyllic location which was pristine and remained mostly untouched by human influence at the time. However, there was one small problem for Fox Studios: the beach did not naturally look like the

beach in Alex Garland's novel of the same name. So in order to get the right look for the movie, all the native trees and vegetation on the beach were bulldozed, and non-native palm trees were planted. To Fox Studios, "film sets and the real environment functioned the same way," meaning that they could simply treat the island like a Hollywood set (Yilmaz 2016). However this attitude did not come without its consequences. When the storm season hit the island, the lack of vegetation caused the sand dunes to collapse immediately, destroying the nearby coral reef in the process. Then, in the years following this, the hordes of tourists visiting the island made matters even worse, as hundreds of tourist-packed boats leaked oil into Maya Bay, killing marine life such as blacktip reef sharks (Hassan 2021). In addition tourists threw plastic litter throughout what was remaining of the beach, which then washed out into the bay, hurting the ecosystem even further (Hassan 2021). This caused the Thai government to suspend tourism to the island for three years because the environment was so heavily damaged by human activity (Hassan 2021). All this extensive damage to the island can be traced back to the movie, starring Leonardo DiCaprio. This is not to say that the damages were directly DiCaprio's fault, since he was quite young at the time, and ultimately these decisions are up to the studios. However, it is intriguing to notice that even an environmentalist like DiCaprio has been involved in an unsustainable and destructive film production. In interviews, DiCaprio has never publicly

commented on the destruction caused by this film, but undoubtedly he has at least some



The Beach Poster

awareness of what happened. Perhaps *The Beach*

even inspired him in part to become an activist.

In contrast to the way the movie was made, the story of *The Beach* promotes a stronger connection with nature. The main character Richard, played by Leonardo DiCaprio, discovers his true identity by returning to his roots and living among a tribal community on the Thai island. While he starts off as a young man trying to discover himself by traveling to Thailand, he lets go of his happy-go-lucky lifestyle once he reaches the island and becomes more

disciplined. He earns the respect of the “tribe” with

his superb fishing abilities as well as his charm and charisma. It seems to be the perfect world for Richard, as he lives in harmony with nature, and it is implied that the reason everyone gets along so well is due to the plentiful marijuana groves across the island. However, as the characters get back to nature and live in harmony with the island, their flawed human nature is exposed when tragedy strikes and a shark devours one of the members of the cultish tribal community. The tribe’s leader denies medical care to the Swedish man and his friend who was also injured by the shark, and the other members of the tribe silently move on with their lives rather than addressing the elephant in the room. Eventually DiCaprio’s character Richard also becomes a victim of the cult atmosphere when he is exiled for having previously given a map of the island to some fellow tourists. The cult is destroyed after the local Thai island natives forcibly kick them off the island

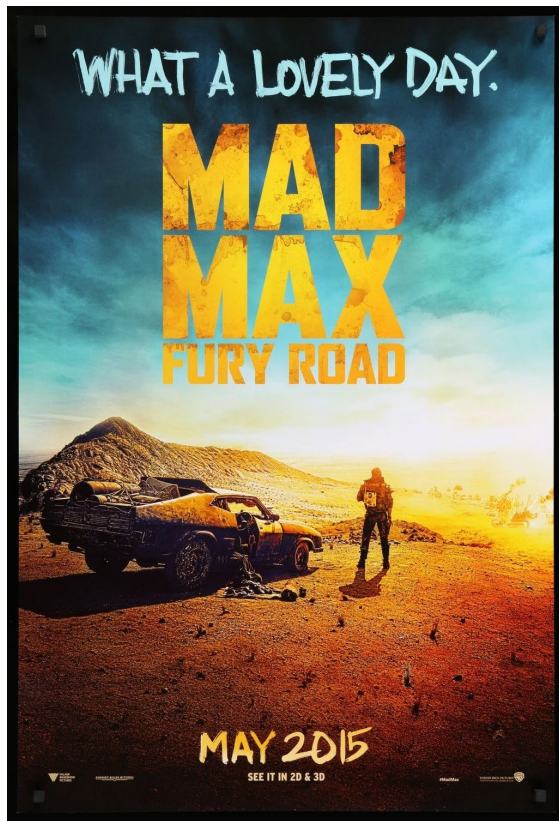
with AK47s in hand, but still even after all this Richard feels a sort of nostalgia for his experience on the island after he returns to New York to work as a desk jockey at a large corporation. All in all, the movie sends the message that even while nature is dangerous, forming a deeper connection with it is the only way to find a spiritual connection with oneself. This is something worth considering, and adds to the complex nature of *The Beach* in terms of both production and message.

Mad Max: Fury Road

Following the release of the original three Mad Max films in the 1970s and 1980s, many fans of the films desired to bring back the iconic franchise. The film was a long time coming, after Australian director George Miller originally came up with the idea for the film in 1987 (Jentzsch 2020). The film spent many years in development limbo, and then dealt with several complicating factors, including the September 11 attacks and the Iraq War, which led the film to be scrapped until 2009, when Miller announced filming would begin in 2011 (Jentzsch 2020). These many complications the film faced in the nearly 30 years since the previous trilogy led to filming taking place in Dorob National Park in Namibia, as opposed to Australia, where the original trilogy had been filmed. This decision was popular with some locals due to the economic boost it would bring to the country, and indeed it is estimated that the film brought in 370 million Namibian dollars (the equivalent of around 35-40 million US dollars) to the local economy (Tay 2013). However, the film had many other costs on the environment which were not accounted for initially. Filming took place without an environmental impact assessment, a standard process when filming in a location such as a national park (Tay 2013). This oversight makes it difficult to tell what the impact of the film specifically was, however it is clear that it did have a large impact. To create the most authentic movie possible, director George Miller elected to use a

minimal amount of computer-generated imaging (CGI). Instead, he shipped 150 cars, trucks, and other vehicles to the pristine Namibian national park in order to create the dramatic post-apocalyptic action movie he had envisioned for years (Jentzsch 2020). In addition, he wanted everything in the movie to be physically possible, so he hired an experienced stunt team to enact his script, down to blowing up cars and everything (Jentzsch 2020). Unlike many other films where things are constantly blowing up, it was not just an effect; Miller and his production team blew up many of the 150 vehicles, including the large oil truck termed the “war rig” which creates one of the most climactic scenes at the end of the movie (Jentzsch 2020). These constant explosions during filming in 2012 had an effect on the surrounding environment, which was more sensitive than Miller and his production team may have realized. An environmental report from after filming took place claims that the “film crew damaged sensitive areas meant to be protected, endangering reptiles and rare cacti” (Tay 2013). In addition, the film crew drove over untouched areas of desert, but then tried to erase their tracks by sweeping the area clean (Tay 2013) In fact, the decision to permit filming in the park happened just before Namibia passed a law which would have prohibited the film from taking place there altogether (Tay 2013). However, at this point it is too late to reverse the damage done to the national park. Many

Namibians are very frustrated with what occurred, as the pristine national park now has been forever marred by the film's impacts.



Mad Max: Fury Road Poster

Watching the film, it is supremely obvious that it must have caused a significant environmental impact; however, the barren world it depicts may also inspire viewers to take action to avoid such a future. The film depicts a dystopian future in which the planet is experiencing a severe water shortage and warlords control the supply of water to the people. As dark as these images are, there is some truth to what is shown in the film, as humankind most likely will face droughts, water shortages, and wars if climate change continues unabated. However, ironically the making of the film in and of itself contributed to making that kind

of future a reality by blowing up vehicles and degrading the sand dune environment in Namibia's Dorob National Park. The film includes many sequences of large gasoline-powered vehicles driving over the sand dunes, as the characters in the film engage in a sort of mobile warfare, shooting at one another and setting off fires as they aggressively drive down the Fury Road. For the protagonists in the film, the goal is to escape the clutches of the evil warlord Immortan Joe (Hugh Keyes-Byrne) and reach the promised land known as the Green Place, where water is plentiful, plants grow, and flowers bloom, in contrast to the hot and desolate desert throughout the rest of the movie. Dodging various obstacles and sacrificing a pregnant woman along the

way, they finally reach the Green Place only to find that it is no longer green, and instead is now filled with dead trees, crows, and a desert environment just like the rest of the land. In this moment Emperor Furiosa (Charlize Theron) and Max (Tom Hardy) have a moment of environmental despair, as she realizes that there is no such promised land as she thought because the planet is now suffering from such severe droughts that nothing can survive. Here the film shows the horrific realities of what extreme climate change may look like, causing viewers to consider whether we as humans may be headed for such a future. In this sense, *Mad Max: Fury Road* can be viewed as an environmental film, even while it simultaneously had a destructive effect on the location where it was filmed.

The Lord of the Rings & The Rings of Power

The Lord of the Rings trilogy is a popular and acclaimed film series consisting of three movies that was released between the years of 2001 to 2003 based on the novels by J.R.R. Tolkien. Set in the fictional world of Middle-Earth, the films follow the protagonist Frodo Baggins in his quest to destroy the One Ring and its owner, the Dark Lord Sauron. Similar to *Mad Max: Fury Road*, it was shot on location in national parks, this time in New Zealand. However, the making of this series had some differences - it was not concentrated in one national park, and did not involve the same level of explosions and large gasoline vehicles. It did, however, involve a complex set of legal proceedings, as the film's production team needed special permission from New Zealand's government to film in these protected areas. Wingnut Films Limited, the production company for the trilogy, were granted a special permit or "concession" from New Zealand's Department of Conservation, which was something that rarely had been issued before. The fact that the director, Peter Jackson, was a native New Zealander certainly helped streamline the process. But ultimately, filming a three-part series in the national parks in the course of just

over a year did not go without its environmental concerns. Similar to *Mad Max: Fury Road*, the issuance of this permit was questioned and rethought shortly after the movies came out. It was discovered that the permits given to Peter Jackson and his team incorrectly allowed certain activities, such as fantasy battle scenes and off-road vehicles being driven at Tongariro National Park, which were not allowed under the park's management plans (Johnson 2002). Production of *The Lord of the Rings* in fact caused enough disturbance to certain areas of the park that contractors were hired years later to perform restoration work on areas where filming had taken place (Johnson 2002). One contributor to Forbes magazine also noted that in the years following the films' release, tourism to New Zealand increased by 50% (Pinchefskey 2012). This is a similar story to that of *The Beach*, where tourism to the island where that was filmed increased dramatically after the movie's release. In addition to tourism and related impacts on the environment, the Lord of the Rings series also consumed a great deal of raw materials, with 48,000 pieces of armor, 10,000 arrows, 500 bows, 10,000 orc heads, and 19,000 costumes created exclusively for filming of these movies (Sibley et al. 2002). However, despite all that we do know about the production of *The Lord of the Rings* in New Zealand, there still is so much we do not know given the fact that there never was an official environmental impact statement

created to document the impacts the trilogy had. But the original trilogy was just the beginning of the Lord of the Rings' adventures in New Zealand.



The Lord of the Rings Poster

Given the popularity of the *Lord of the Rings* film series, fans have clamored for a spinoff or sequel. In 2022, fans got their wish when *The Rings of Power* TV series was released. This series, while not a continuation of the original movie trilogy, does follow a similar storyline and is set in the same fictional world as the other series. In an effort to match the original movie series, it also was filmed in New Zealand's national parks. However the difference from the original movies is that *The Rings of Power's* production is contemporary, and thus had a sustainability team and even a sustainability report. For this reason, its environmental

impact has come under greater scrutiny, since the data is more available, and concerning issues with the series have come to light. A leaked memo from *The Rings of Power's* sustainability team offers relevant information on the show's impacts, including that the show had generated 14,387 metric tons of CO2 part of the way through its first season, which is equivalent to "three to four films," according to the British Film Commission (McClure 2022). In addition, a vendor reports collecting 11,433 cubic meters of landfill waste at that same point in the first season (McClure 2022). The memo also reads that "the environmental impact of this industry, and of this show, is enormous" and that "every single person we spoke to is concerned about the environmental impact" (McClure 2022). Workers from the show have expressed their discontent

to the press as well. One worker involved with Amazon Studios' production of the show came forward to say that "it's appalling what's happening" and that "if people knew how destructive the whole business is, they would think twice" (McClure 2022). Others have echoed this sentiment, saying that New Zealand's government "could be doing more to regulate the environmental impact of film productions" (McClure 2022). The comments of the sustainability team and workers on the film are concerning to say the least, however not surprising knowing that these sorts of issues are prevalent in many films. Regardless of whether it is films or TV series, the entire industry has a long way to go when it comes to sustainability. Hopefully in years to come, production teams will take sustainability more seriously.

The message of *The Lord of the Rings* and *The Rings of Power* TV series also can be analyzed from an environmental cinema perspective. Taking place in the mythical Middle-Earth, the franchise can be interpreted as sending a message about our own planet. Frodo's quest to destroy the One Ring and its owner can be seen as a metaphor for our quest as humans to stop climate change or other environmental disasters that threaten us. The entire series can be seen as a binary between good and evil, with coexistence with nature representing the good and industry and production representing the evil. One scene in which this comes to the forefront is in the second film, as the protagonists overlook Isengard and can see the visible destruction of the forest which has occurred as the result of industry. In contrast to the death and destruction of Isengard, the scenes which take place at the Shire appear much more bright and hopeful by contrast, as humans live in harmony with nature rather than exploiting it for its resources. Other example of this are the leaf-shaped clasps given to members of the Fellowship as the highest form of honor, and Gandalf's staff, which in reality is an altered tree branch. While never explicitly stated, this "quiet environmentalism" persists throughout the original film series (Our

Changing Climate). In *The Rings of Power*, this form of environmentalism also is visible in the lifestyle of the Harfoots, who live off the land as foragers, wear plants in their hair, and go barefoot (Stine 2022). This type of environmental message is reminiscent of *The Beach*, where living in harmony with nature is pictured as good, while living in the city or an industrial area is seen to be evil. However, just like *The Beach*, it is an ignorant and ironic message, given the fact that the production teams did not live up to the standard they set for the characters in their movies.

The Avengers

The Avengers series, which is a subset of the larger Marvel franchise, has been incredibly popular in the United States and around the world, and includes some of the top-grossing films of all time that also had some of the largest budgets. The series has featured legendary actors such as Robert Downey Jr., Chris Evans, Mark Ruffalo, Scarlett Johansson, Paul Rudd, and the late Chadwick Boseman. To make the iconic Marvel comic books come to life onscreen, the film's production team largely used Computer-Generated Imaging (CGI), with some filming taking place in Atlanta, New York, England, Scotland, and other physical locations. Every film in the series has had a massive budget, with the latest two films in the series, *Avengers: Infinity War* and *Avengers: Endgame*, racking up a combined \$1 billion budget, making these two movies the most expensive of all time (Crowley 2022). The series has been incredibly profitable, with these two films raking in \$4.8 billion at the box office (Crowley 2022). But while the monetary costs are accounted for, it is more important to account for the unseen environmental cost that these movies also had. Marvel Studios is a subsidiary of Walt Disney Studios, which happens to be one of the only large movie studios that releases yearly sustainability reports. In these reports, Disney accounts for their carbon footprint in an effort to be more transparent with

the general public. While it is difficult to say exactly how many metric tons of CO₂ were created by each individual film, one significant data point that is available is Disney's total carbon emissions for the years 2017 and 2018, when filming of *Infinity War* and *Endgame* took place. These emissions totaled a whopping 3.8 million tons of CO₂ in the two years that these films were created (Iger et al. 2019). For context, Roland Emmerlich's 2005 film *The Day After Tomorrow* generated 10,000 metric tons of CO₂, and it cost \$229,000 to buy enough carbon offsets to make the film carbon-neutral (Bozak 2012). By that same scale, it would have cost Disney 87 million dollars to offset their emissions from these two years. So while we cannot say exactly what share of those 3.8 million metric tons were generated by the Avengers, it is safe to

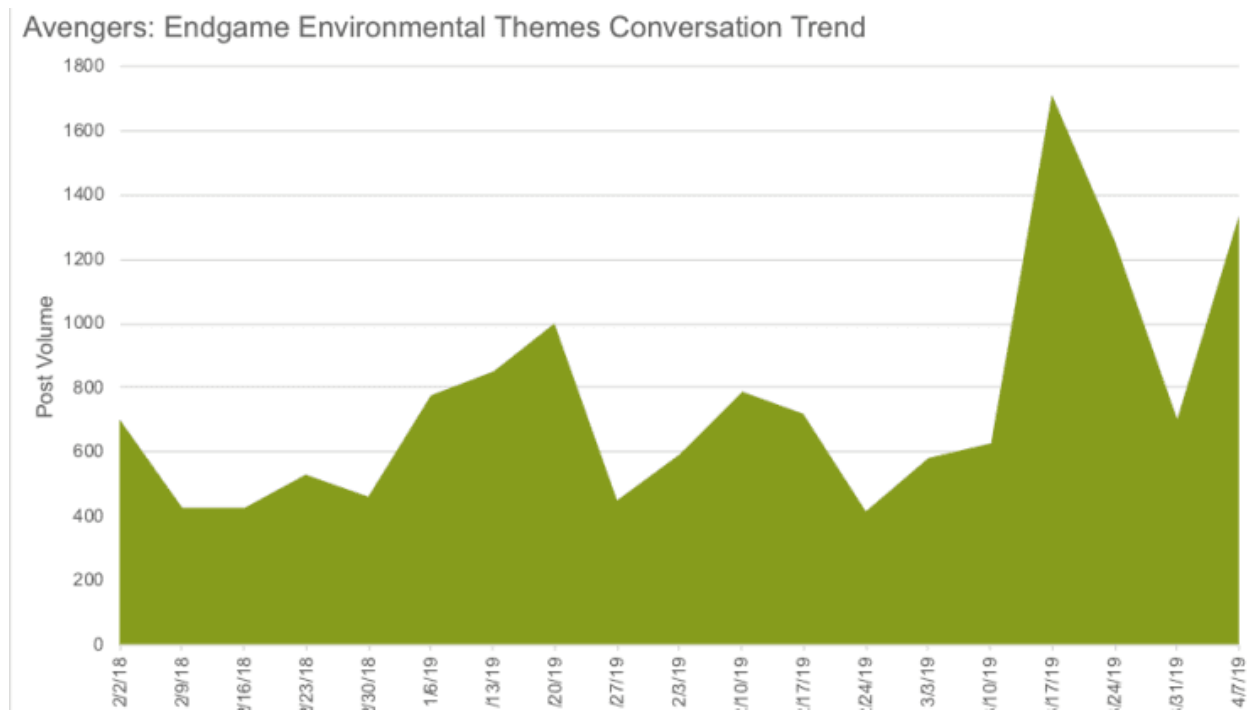


Avengers: Endgame Poster

assume it was a sizable percentage given that they were the two highest-budget films of all time.

While the Avengers movies did have a large carbon footprint, the films simultaneously offer an intriguing commentary on environmental politics. One film in particular where this stands out is the latest installment in the series, *Avengers: Endgame*. Symbolically reflected in the movie's plot are concerns about adequate supplies of freshwater, population booms across the developing world that will require much greater food production, and the broader debate over human-caused climate change in the industrial era (Russo 2019). In addition, Thanos' collection of infinity stones is ultimately motivated

by his own planet, Titan, running out of resources and ultimately being destroyed (Russo 2019). Thanos’ snap of the fingers to wipe out half of all living creatures in *Avengers: Infinity War* can be viewed as a commentary on environmentalism as well. Paul Anastas, director of Yale University’s Center for Green Chemistry and Green Engineering, views *Infinity War* as “a commentary on the simple and flawed approaches that believe you could solve complex, interconnected issues by a snap of the fingers” (Russo 2019). Given the reach that a series like the Avengers has, grossing billions of dollars at the box office around the world, it therefore has the potential to be quite impactful in impacting viewers’ perception of environmental issues. Indeed, the series has sparked “a pop culture conversation that otherwise might not have had



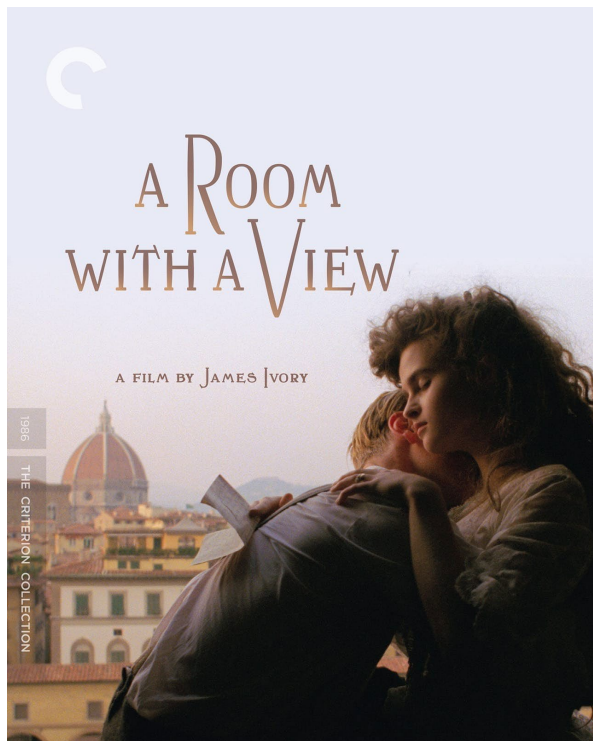
such a massive footprint or exposure,” according to Paul Dergarabedian, senior media analyst at Comscore (Russo 2019). A study found that in the weeks following the release of the latest installment, *Endgame*, there was a trend of viewers posting about the film’s environmental themes online (See graph [Russo 2019]).

In this sense, the Avengers series, similar to other films, had the ironic effect of both inspiring viewers to think about environmental issues while simultaneously costing billions of dollars and creating a large carbon footprint.

A Room With A View

A Room With A View, based on E.M. Forster's novel of the same name, is a 1985 film by Merchant Ivory Productions which takes place in Italy and the UK. The film's director, James Ivory, is also a well known graduate of the University of Oregon. In contrast to some of the other films that have been discussed, this one offers a unique example since it was made by a smaller production company internationally rather than the typical big-budget Hollywood production. However, despite these differences, many of the same themes ring true as with the other movies. The central premise of the movie is the complicated love story between the main characters Lucy (Helena Bonham Carter) and George (Julian Sands), who encounter many obstacles but eventually fall for one another. It was filmed on location both in Florence, Italy and in Kent, United Kingdom at a historic house known as the Foxwold house. While it may not be directly

visible from simply watching the film, the making of *A Room With A View* had many unseen environmental impacts.



A Room with a View Poster

The first part of the film takes place in Florence, Italy, and was filmed there at a variety of locations around the city and in the surrounding countryside. To create this part of the film, 9 of the 12 main cast members were flown out to Italy in addition to the crew, including James Ivory, Ismail Merchant, and roughly 30 other crew members (James Ivory Papers, Box 26, Folder 8). Many of the actors flew in from London-Heathrow, a 55 minute cross-continental flight, however the crew largely came in from New York, where the

Merchant Ivory Productions offices were located (James Ivory Papers, Box 26, Folder 8). Once in Italy, actors stayed at six different hotels, meaning at least six cars were needed to transport them to the filming location on a typical day of shooting (James Ivory Papers, Box 26, Folder 8). Typically, the most high-profile actors, like Helena Bonham-Carter and Julian Sands, would each get their own car with a driver to get the ‘star’ treatment (James Ivory Papers, Box 26, Folder 7). Combining the carbon emissions of flying to Italy, actors staying in their own hotel of choice, and stars getting their own private cars, things already begin to add up before filming has even begun.

During the initial filming of the movie in Florence, extravagant measures were taken to create the conditions called for in the movie. One of the main scenes within the first part of the movie is the fight scene which takes place in the town square in Florence. For this scene, producer Ismail Merchant hired around 40 extras and several private security officers. These officers then forcibly shut down some of the main streets of Florence without permission from the city, creating large traffic jams throughout the city for an entire day as they shot this scene (James Ivory Papers, Box 26, Folder 7,8). Another scene in the countryside called for it to be a rainy day, so on another day of filming, Merchant would go on to hire the Florence Fire Brigade to simulate rainy conditions since they were not patient enough to wait for a rainy day. According to Simon Callow, who played a character called Mr. Beebe, they went on to spend 8 hours filming this same rain scene over and over, but all this ended up resulting in under one minute of film (James Ivory Papers, Box 26, Folder 1). This illustrates the conflict between environmental conditions and the desire of the filmmakers to create a certain scene.

In the second part of the film, which takes place in the UK, filming practices also led to environmental consequences which are not immediately visible from watching the film. For this portion of the film, the 12 main characters were flown out to London if they were not already there and then driven out to the filming location in Kent. Once again, the 69 actors and crew members stayed at six different hotels while in the UK, with the exception of a few who had separate arrangements (James Ivory Papers, Box 27, Folder 3). Also similarly to in Italy, at least six vehicles were required to transport cast and crew on a typical day of shooting, with each vehicle being a 16-seater (James Ivory Papers, Box 27, Folder 3). Filming primarily took place at the Foxwold House, which was used to represent the Honeychurch family home. The Foxwold house is a historic house which was chosen for the film because of its reminiscence to the house

described in E.M. Forster's book of the same name. However, the house did not completely match the specifications that were called for, so to make the house a better match for the description in the book, crews were hired to renovate the house, replace all the furniture and decor inside, and replant the garden (James Ivory Papers, Box 27, Folder 3). This was rather wasteful, as all these materials were used and all this work was done solely for the purpose of the movie. Another aspect of filming in Kent which was wasteful was when they dug a large ditch in the ground to create the pool of water for the skinny dipping scene near the end of the film. Rather than going to a nearby lake to film this scene, Merchant Ivory Productions decided instead to take the environmentally damaging action of creating an artificial pond, which is disruptive to the ecosystem. According to Simon Callow, this pond was filled with heated water rather than regular water, since the actors demanded that they did not want to get cold. However, there were some issues keeping the water warm, as it kept raining in Kent that summer (James Ivory Papers, Box 26, Folder 1). This meant they had to refill the pool repeatedly before they finally filmed the scene. This large pond was then abandoned after filming, permanently altering the environment in that area (James Ivory Papers, Box 26, Folder 1). Once again, just as in Italy, they wasted an enormous amount of water, but in addition to this they also undoubtedly used sizable quantities of fossil fuels heating up the water, and left a lasting impact on the environment.

Examining the filming of *A Room With A View* in Italy and the United Kingdom illuminates how even a small independent company like Merchant Ivory Productions can have a significant environmental impact when creating a movie, particularly when it is filmed on location. This impact comes from two main factors: traveling to the filming location via plane and then car, and altering existing environmental conditions to create those necessary for the

movie. This second factor can be quite significant, especially if the environment is altered in a way that leaves a lasting impact such as with the pond that was created. So ultimately, while we cannot quantify exactly how much this film damaged the environment, we do know that its impact was not as negligible as many would believe.

While *A Room With A View* is not an explicitly environmental film in nature, it still contains environmental messaging beneath the surface. The moment that Lucy and George feel their first significant connection is when they are traveling through the Italian countryside together, with beautiful poppy flowers blooming. As they embark from their carriage into the poppy field, it is in this moment that they have their first passionate kiss. Later in the film, Lucy and George once again share a passionate kiss in an outdoor setting, this time in the garden of Lucy's family home in England. This is one of the turning points in the story, and leads to them eventually getting married later on. Having these natural scenes as a backdrop is what makes these scenes stand out and gives them a greater weight within the story. Displaying these beautiful countrysides also helped this movie stand out from others like it, as it was nominated for eight Academy Awards and won three, including the award for Best Art Direction. Indeed, even the title of the film emphasizes the importance of the environment - it is not just the room the two stay in together, but the view of Florence's River Arno which can be seen from that room. This shows how nearly every film has some kind of subtle environmental messaging below the surface, even when it may not be immediately visible. And even a film with such a romantic view of the countryside as this one can still have a significant environmental cost in the production stage.

Hollywood's Hidden Cost: Conclusions

Breaking down Hollywood and the film industry at large, it becomes clear that movies have a larger impact on the environment than many would assume. Zooming out from individual movies, the industry in general has a carbon footprint which is far from negligible, whether for large budget studio films or smaller independent productions. One main reason for this is that “unlike most major industries, the film industry is not environmentally regulated” in the United States (Vaughan 2019). In fact, avoiding regulation is one of the things Hollywood is known for, as they have done so many times in the past, including during the Red Scare in the 1950s when they avoided censorship of content deemed to be communist in nature (Vaughan 2019). To continue to avoid regulation, Hollywood has adopted a strategy of greenwashing, or “surface nods to popular environmental messaging without actually changing the operations of film and media practice” (Vaughan 2019). In some rare occasions, films may even slap a tag of ‘carbon neutral’ in the ending credits; however, this often does not mean that they radically altered the filming process, but that they bought carbon offsets to plant trees or some other eco-friendly activity (Vaughan 2019). For all these reasons, the film industry is a sector of the economy worth focusing on more in the future when it comes to sustainability, since currently there still is little effort paid to such concerns when making a movie.

After all this analysis of what is wrong with the film industry currently, the next step is to figure out how we can improve the film industry so that it is more sustainable, in a future where global warming likely will continue to accelerate. As previously mentioned, one way that film studios in Hollywood and around the world have already begun to tackle this is by purchasing carbon offsets to account for the emissions they created in the process of film production. However, this is not ultimately a lasting solution, and is a band-aid of sorts. One example of a film that implemented the carbon offsets strategy is the 2004 film *The Day After Tomorrow*,

directed by Roland Emmerlich. Given the film's climate-conscious message, producers aimed to counteract the carbon emissions generated by the film. They did so by hiring a carbon offsets provider, and it ended up costing them a whopping \$229,000 to counteract the roughly 10,000 tons of CO2 emissions generated by the film (Bozak 2012). However, this concept of paying to offset carbon emissions is "questionable on several levels" according to environmental film scholar Nadia Bozak (Bozak 2012). This strategy does not lead studios to rethink their production with sustainability in mind, but instead simply allows them to continue operating the same way with an added cost at the end to appear "green". Films in the future that are truly carbon-neutral likely will look vastly different. There will be fewer special effects and less flying across the world to exotic locations, and instead the characters will wear real costumes and filming will occur all in one general area. To achieve this, every film should have an environmental impact statement, which involves accounting in detail for every step taken in the production of a film that may have had an impact, including flights to various locations, materials used to create film sets, and more. In addition, every film should have a dedicated sustainability team from the beginning of production until the end that monitors consumption and makes sure the film not only does not go over its financial budget but also its budget of natural resources. This will make movie studios more conscientious of the actions they are taking and cause them to make a greater effort to change the way they make movies.

In the analysis of many of these films, one pattern which seemed to ring true in many of them is that while the production of the film was often unsustainable, the story had a message which caused viewers to think about and discuss environmental issues. This was visible not only in *The Beach* but also in *Mad Max: Fury Road* and *Avengers: Endgame*. These movies make up part of a larger general theme in movies heralded for their environmental consciousness - the

production still had a large impact despite what the message might have been. In reality, nearly every movie has some form of an impact, since a large amount of resources are required to create it. But this is not to say that we cannot make movie production more sustainable as a whole. The first step toward doing so is regulating the entertainment industry, since as of now it is one of the only sectors of the economy not subject to environmental regulation. Just like movies have a financial budget, this would make it such that they have an environmental budget as well. Some critics may argue that regulating movie production will only serve to lessen the quality of movies, and we will no longer get to watch exciting action films with all the latest special effects. This is not necessarily true. If companies wish to continue pushing the envelope with massive budgets amounting to hundreds of millions of dollars, they are free to do so as long as they do not exceed a certain level of emissions. This may mean using data centers and servers for CGI which are powered by renewable energy, reducing the number of filming locations so that less international flights are required, or purchasing an extensive amount of carbon offsets. But beyond regulation from the government, the public can also play an important role in raising awareness of these issues. A perfect example of this is the Black Lives Matter movement, which catalyzed many businesses including film studios to take action in various ways. With leaders like Leonardo DiCaprio stepping forward within the industry to raise awareness of climate change, perhaps the focus can now turn inward, with DiCaprio and others like him campaigning to make the film industry more sustainable in the future.

Some studios and companies have already begun taking action in making their production more green. Disney Studios, Fox Studios, Warner Bros., Netflix, Amazon, and more have in recent years formed the Sustainable Production Alliance, which is “a consortium of the world’s leading film, television and streaming companies dedicated to advancing sustainability initiatives

through advocacy, education, and innovation while reducing the entertainment industry's overall environmental impact" (Green Production Guide). This Alliance has partnered with the Producers Guild of America to create the Green Production Guide, which is a comprehensive guide for film studios on how to practice greater sustainability. The Green Production Guide offers important resources for studios, providing everything from a carbon calculator to a sustainable practices checklist. All this information can be listed out on a helpful spreadsheet which is readily provided on the Green Production Guide website. This spreadsheet includes sections to document general production information, electricity, natural gas and heating, fuel, hotels and housing, commercial air travel, and charter and helicopter flights (Green Production Guide). From there the data can be used to come up with an official environmental accounting report, including metrics for all those categories. This allows the company filling out the report to come up with a carbon footprint summary. This can be used to figure out exactly what the impact of any given movie is, and how much consumption occurred. If all studios consistently used this, it would give us a much better idea of the production of each film, and would allow greater regulations to succeed.

Based on my research, I conclude that there are four key ways that we can make the film industry more sustainable. First, every film should have a sustainability team, as previously mentioned, which conducts an environmental assessment and creates an environmental impact statement based on their research. Second, the film industry must adapt to the threats posed by climate change and drastically reduce filming on location, which requires a great deal of international flights and can leave a significant mark on a natural space as was visible in *The Beach*, *Mad Max: Fury Road*, and even to some extent in *A Room With A View*. Third, CGI-based productions which rely primarily on servers should make efforts to use servers powered by

renewable energy rather than greenhouse gases. Lastly, film companies can make a greater effort to reuse and recycle the raw materials they use to make movies. As was visible in *The Lord of the Rings*, large-budget productions tend to utilize a huge number of costumes and props, however this can be less impactful if they are reused for multiple productions or recycled once they are done being used. While at the moment these are just suggestions, these could also become regulations once Hollywood is properly environmentally regulated just as nearly all other major industries are.

As for the first suggestion regarding sustainability teams, what this would look like in practice is something similar to what occurred on the set of *The Rings of Power*, however more attention would be given to the making of the movie before production begins as well. What we can learn from *The Rings of Power* example is that sustainability teams can effectively give an estimate of the total carbon emissions and waste caused by movie production, and hold companies accountable in other ways as well. However a sustainability team does not actually achieve anything unless preventative measures are taken prior to when filming begins. A model that can be used, in addition to what is outlined in the Green Production Guide, is the process the US government uses under the National Environmental Policy Act (NEPA). Under NEPA, each new proposed federal action must undergo a review before it goes into effect in which an environmental assessment is conducted and then an environmental impact statement is created. This same template for environmental regulation could be used for each movie in the pre-production stage - before being made, a movie must undergo an assessment to determine if it will consume a certain threshold of carbon emissions. Then, throughout the production process, the sustainability team has the power to hold filmmakers accountable and ensure that the plan is followed keeping the environmental impact statement in mind.

As for my second suggestion, film companies should reduce filming on location because this not only requires a significant amount of international travel but it also can have a devastating impact on the local environment. As was evident in *Mad Max: Fury Road*, *The Beach*, *A Room With A View*, and *The Lord of the Rings*, filming on location is one of the most common ways that movies impact the environment. However, while it is one of the most common problems, it is also the simplest one to solve. For many years, Hollywood operated primarily via filming on sets, and this produced some of the greatest classic movies we know and love today. Returning to this form of production would be fairly simple, and combined with today's modern CGI technology has the power to produce great movies. However, filming on location does not need to be eliminated entirely, just reduced. There are still some scenarios where it may be necessary to do a limited amount of filming on location, but strategies should be implemented to try to film in locations that are closer in distance to the studio, and locations approved and monitored by the sustainability team. However, for the most part filming should take place in such a way that requires as little transportation of people and materials as possible and risks the least possible damage to the environment. For *Mad Max: Fury Road*, for example, they had to ship out over 150 cars and trucks to a remote filming location. If they had instead done that in a more convenient place, it would have made things easier for everyone and more sustainable.

For my third suggestion, in combination with the other two, an effective solution for making movies more sustainably is to use Computer-Generated Imaging (CGI) servers powered exclusively or primarily by renewable energy. CGI as a technology is commonly used today in movies, however it tends to be outsourced to locations where energy is relatively cheap for the movie studios, since it is an expensive technology that requires entire servers of computers

running simultaneously. Therefore to make movies more sustainably we should move these servers to locations where using this large amount of energy would have less of a carbon impact. This would also likely involve using servers that are located closer in distance to the actual film studios. For example, Marvel Studios, who created the Avengers movies, are located in Burbank, California, and this is a location where the electric grid is powered entirely by renewable energy. However, in order to make this a cost-effective option for movie studios, further government regulation may be necessary in order to give production companies incentives to move away from distributed networks, or servers which are spread out across the country, and utilize servers which are close by and rely on renewable energy.

For my fourth and final suggestion, an effective solution for making more sustainable movies is for movie studios to recycle the raw materials used to create movies, including sets and costumes. As was visible in my analysis of *The Lord of the Rings* series, movies can use huge amounts of raw materials to create costumes and props, and these can create mountains of waste, as was visible in *The Rings of Power*. In order to address this, we should have a less consumptive attitude toward the way we make movies, and try to reuse many of the resources we use for each film in a series. In addition, many movies have scenes which take place in similar locations, such as restaurants, bars, and offices. If these sets are reused for multiple movies, it is much more sustainable. This can be done in conjunction with the previous suggestion of reducing filming on location. While filming on sets and using more basic costuming may feel less exciting, today's technology still gives us the power to make incredible movies.

Ultimately, Hollywood has a hidden cost that is not visible to many consumers watching movies. The film industry is a significant polluter and has a carbon footprint of which many are not aware. From action movies like the Avengers, to fantasy movies like the Lord of the Rings,

to dramas like *A Room With A View*, every movie has some kind of environmental cost. Ironically, sometimes these same movies also have a positive message which encourages viewers to think about environmental issues. But regardless of what the message of a movie may be, it has little meaning until the production of the movie itself is also working to advance a green agenda. For this reason more action is needed both on the legislative front and voluntarily from the movie studios themselves to make the industry more environmentally friendly. Once these greater actions are taken, the film industry has incredible power to inspire the public consciousness as well. Popular movies can reach more people than just about any other form of media or entertainment, and if they are made in a green way it will inspire the public to live a more sustainable lifestyle themselves. Because human life on this planet is like one big movie, and we have the power to tell our own story.

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