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# A lens on national parks past and present: Bringing conservation and climate change into collective focus

Megan Phillips

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A Lens on National Parks Past and Present:  
Bringing Conservation and Climate Change into Collective Focus

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An Honors College Project Presented to

the Faculty of the Undergraduate

College of

James Madison University

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by Megan Cairns Phillips

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Accepted by the faculty of the School of Art, Design, and Art History, James Madison University, in partial fulfillment of the requirements for the Honors College.

FACULTY COMMITTEE:

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Project Advisor: Corinne Diop  
Associate Director of SADAH, Director of New  
Image Gallery, Photography Head, Assessment  
Coordinator, Professor of Art

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Reader: Bradley Striebig, Ph.D.  
Professor, Environmental Engineering

HONORS COLLEGE APPROVAL:

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Bradley R. Newcomer, Ph.D.,  
Dean, Honors College

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PUBLIC PRESENTATION

This work was accepted for presentation in part at the JMU College of Visual and Performing Arts Undergraduate Research Grant Presentation on October 11, 2018. The exhibition of my photography was April 8th to April 14th, 2019 at Grace Street Gallery in Duke Hall Gallery of Fine Art.

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Further, I would like to thank CVPA for the opportunity to present my research and photographs alongside other recipients of the grant in October 2018 and SADAH for the opportunity to exhibit my work in the Grace Street Gallery Space in Duke Hall in April 2019.

## I. Abstract

My Honors Capstone Creative Project, *A Lens on National Parks Past and Present: Bringing Conservation and Climate Change into Collective Focus*, examines the effects of climate change in Joshua Tree National Park, Glacier National Park, Assateague Island National Seashore, and Shenandoah National Park through the research of historical photographers who documented the parks in the past, interviews with key figures on the subject at each park, and my own photographic documentation of the parks. I was awarded James Madison University's 2018 College of Visual and Performing Arts Undergraduate Research Grant to travel and pursue my proposed research and photographic documentation in Arizona, California, Montana, Maryland, and Virginia.

I first traveled to the Center for Creative Photography at the University of Arizona in Tucson, Arizona in May 2018. I viewed relevant exhibitions and studied the original photographs and documents of Ansel Adams (1902-1984) and Mark Klett (b. 1952), who are renowned for their environmental activism and documentation of the national parks in the past. I then traveled, conducted current climate change research, and photographed Joshua Tree National Park in the Southern California desert in May 2018 and Glacier National Park in Montana in August 2018, both which stand to lose their namesakes and provide two very different visuals on the effects of climate change. I continued with similar studies in proximity to JMU at Shenandoah National Park and Assateague Island National Seashore in order to show local and regional climate change within parks closer to Harrisonburg. My project concluded in a solo exhibition to serve as a tool to educate and increase community awareness of this important

issue facing our public lands. This exhibition took place in the Duke Hall Gallery of Fine Art at JMU from April 8th to April 13th, 2019.

## **II. Creative Project Background and Climate Change Issues in 2019**

Our national parks represent the largest portion of natural heritage and undisturbed organic beauty in America. The National Park Service protects and manages all public lands including national parks, many national monuments, and other conservation and historical properties. They fight to preserve the incredible and breathtaking natural environments that are so quickly being destroyed throughout the world by human activities. I chose to pursue my creative project in order to support and bring awareness to the work of the National Park Service, environmental non-profits, and organizations who seek to protect these fragile places and to increase respect for the importance of stewardship.

Our public lands are a source of inspiration, creativity, happiness, and inner peace for so many people. They maintain our relationship with the natural world, one that is quickly shrinking as materialism and monetary obsession progresses everyday. Our actions will determine the future of humankind and the version of Mother Nature we wish to live in and call 'home'. In this perspective, we have two choices: a home that is full of industry and greenhouse gas emissions, or one that preserves all walks of life and is not a health hazard. It is our job as humans to stay environmentally conscious through protecting and preserving these resources and to educate others so that the delicate beauty we are fortunate to have on this planet is not destroyed in our increasingly industrialized world. In the wise words of John Muir, the co-founder of the Sierra Club whose activism helped to preserve the Yosemite Valley, Sequoia National Park, and many

other wilderness areas, “We all dwell in a house of one room—the world with the firmament for its roof—and are sailing the celestial spaces without leaving any track.”<sup>1</sup>

The topic of climate change and global warming is one that we hear every day on the news, social media, and discuss within our classrooms and at our family dinners. The consequences of climate change have become headlines on a daily basis. There has been more deadly heat, devastating hurricanes, rising sea levels, vanishing glaciers, and more species are becoming endangered. The National Climate Assessment report, one that is vetted by 13 federal agencies, found that human activity, particularly the burning of fossil fuels and deforestation, is in fact to blame.<sup>2</sup>

A new study was published in Fall 2018 by IOPscience. It concluded that temperatures in our national parks have increased twice as much compared with other parts of the country, while precipitation fell dramatically.<sup>3</sup> This is due to geographic differences that cause variations in the expected amount of warming in different locations. Further, the U.N. IPCC report, also published in Fall 2018, stated that “by 2030 temperatures will have risen to 2.7° F (1.5° C) above the average of the pre-industrial era—the threshold that has long been cited as the tipping point for calamity”, which should signal alarms that more extreme climate change effects are on the

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<sup>1</sup> Muir, John. Personal Journal, Alaska, 18 July 1890, copy, Center for Creative Photography, University of Arizona.

<sup>2</sup> Walsh, John, and Donald Wuebbles. “Climate Science Supplement.” *National Climate Assessment*, 2014, [nca2014.globalchange.gov/report/appendices/climate-science-supplement](https://nca2014.globalchange.gov/report/appendices/climate-science-supplement).

<sup>3</sup> Gonzalez, Patrick. “Disproportionate magnitude of climate change in United States national parks.” *Environmental Research Letters IOPScience*, 2018, <https://iopscience.iop.org/article/10.1088/1748-9326/aade09>.



horizon.<sup>4</sup> The rate and magnitude of change we are witnessing today has not occurred since in recorded history. Debra Roberts, Co-Chair of IPCC Work Group II stated, “This report gives policymakers and practitioners the information they need to make decisions that tackle climate change while considering local context and people’s needs. The next few years are probably the most important in our history.”<sup>5</sup>

Our environment has also been threatened by recent political action—or more accurately, inaction. In particular, our public and conserved lands have been threatened by current U.S. government policy. The National Parks Conservation Association gave an overview of how policy in 2017 affected our national parks. In 2017, there was short-staffing in parks, a deliberate change in the way parks could approach and manage climate change, a rolling back of water protections, a prioritization of energy production over park protection, pumping water out of previously protected desert lands, an attack and elimination of certain national monuments, and an opening of more land to drilling. The Environmental Protection Agency also moved to repeal the Clean Power Plan, which had previously reduced emissions from energy development and improved conservation measures.<sup>6</sup> The White House administration in 2017 has also cast doubt and promoted false facts about climate change particularly through an infamous Twitter account.<sup>7</sup>

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<sup>4</sup> “Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C approved by governments.” *IPCC*, 2018, <https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/>.

<sup>5</sup> “Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C approved by governments.”

<sup>6</sup> Kame’enui, Ani. “2017 in Review: The Trump Administration’s 10 Worst Actions for Parks.” *National Parks Conservation Association*, 2017, <https://www.npca.org/articles/1716-2017-in-review-the-trump-administration-s-10-worst-actions-for-parks>.

<sup>7</sup> Worland, Justin. “Trump Said 'We Need' Global Warming to Deal With Record Cold Temperatures. Here's Why That Doesn't Make Sense.” *Time*, 2019, <http://time.com/5515340/trump-climate-change-weather/>.

Our national parks will almost certainly be different in a century than they are today, but how different will depend on decisions going into this next decade. Unfortunately, many people choose to ignore climate change because it is likely not affecting their individual lives if they do not live in a vulnerable area or they are falling victim to false information. It is likely true that one individual's effort, such as switching to a more plant-based diet and using single-use plastic, cannot completely reverse the effects of climate change and will hardly make any difference at all. However, individual action can serve as an example for others leading to a domino effect and wave of collective action. Further, individual support of larger group efforts and goals in the form of non-profits, for example, can spur bigger change as well. This kind of collective effort can make a large amount of difference, particularly for the future generations who are in the path of destruction at our current rate.

### III. Research at the Center for Creative Photography: Ansel Adams and Mark Klett

As a recipient of JMU's 2018 College of Visual and Performing Arts Undergraduate Research Grant, I was able to pursue my research and photographic study of climate change through traveling to the Center for Creative Photography (CCP) at the University of Arizona in Tucson, Joshua Tree National Park in the southern California desert and Glacier National Park in Montana. As a double major in Studio Art and Art History with a deep love for the natural environment and the National Park Service, I began my artistic research at CCP. There, I studied the work of environmentalist photographers Ansel Adams and Mark Klett in the Laura Volkerding Study Center.

I had access to Ansel Adam's archive of more than 2,500 fine prints, along with correspondence, interviews, unpublished writings, and documents of his affiliation with environmental organizations.<sup>8</sup> I also viewed Mark Klett's exhibition titled, *Courting Failure, Embracing Risk: Mark Klett and Collaboration* which focused on re-photographic studies of our public lands being developed and affected by humans over time.<sup>9</sup> These two photographers created visual awareness of the struggle between preservation and development, wise use compared to consumptive use, stewardship versus destruction, and the ultimate need for collective responsibility. The following Ansel Adam's statement served as the creative premise behind my own photographic study of our national parks after concluding my research at CCP:

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<sup>8</sup> "Ansel Adams.", *Center for Creative Photography*, <https://ccp.arizona.edu/artists/ansel-adams>.

<sup>9</sup> "Courting Failure, Embracing Risk: Mark Klett and Collaboration." *Center for Creative Photography*, <https://ccp.arizona.edu/exhibitions-events/exhibitions/courting-failure-embracing-risk-mark-klett-and-collaboration>.

“Creating convictions through stirring of thought and emotions by accurate irrefutable images of the conditions (alone or in comparisons) might well be the most effective means of arousing essential public awareness.”<sup>10</sup>

Adams was a master of the view camera through the sharp focus and fine detail of subject matter in his photographs and was particularly known for his exceptional print quality within the darkroom. In the context of my own project, Adams was most importantly an activist for conservation and environmental awareness. His association with national parks began in 1916 with Yosemite Valley and shortly before the establishment of the National Park Service.<sup>11</sup> He sought to solve the great problem of appropriate use involving public lands and the need for a “concerted effort and devotion of every citizen” around the natural environment.<sup>12</sup> In this manner, Adams helped to lobby for creation of a number of national parks by showing members of Congress his photographs of these wild and natural places.<sup>13</sup> He helped to guide the National Park Service in policy direction and wisdom for their mission, which reads as follows: “The National Park Service preserves unimpaired the natural and cultural resources and values of the

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<sup>10</sup> Adams, Ansel. Draft of Letter to Mr. William Whalen, Director of National Park Service, Washington, D.C., 1 July 1979, Center for Creative Photography, University of Arizona.

<sup>11</sup> “Ansel Adams.” *National Park Service: Yosemite*, <https://www.nps.gov/yose/learn/historyculture/ansel-adams.htm>.

<sup>12</sup> Adams, Ansel. *Portfolio II: The National Parks and Monuments: Introduction*, 1950, Center for Creative Photography, University of Arizona.

<sup>13</sup> “Ansel Adams: The Role of the Artist in the Environmental Movement.” *The Ansel Adams Gallery*, <http://anseladams.com/ansel-adams-the-role-of-the-artist-in-the-environmental-movement/>.

national park system for the enjoyment, education, and inspiration of this and future generations.”<sup>14</sup>

Adams was selected as a photo muralist for the Department of the Interior in 1941 to show photographic documentation of present visibility degradation in selected parks as part of a research survey involving visitors, their values, and their perception of the visibility issue.<sup>15</sup> This particular project was terminated by World War II, but Adams continued it in spirit through two Guggenheim Fellowships on photography resulting in his books *Photography of the National Parks and Monuments*, *My Camera in the National Parks*, and *This is the American Earth*, as well as several solo exhibitions, all of which he believed served as vital educational tools.<sup>16</sup>

After reading a number of Adam’s handwritten letters within the archives at CCP, I have concluded that Adams was ahead of his time in this environmentalist mentality and called for a reduction of power plants to rescue the smog present in his photographs and, ultimately, all life forms from the harmful effects this air would destroy. He sought to create natural and clean sanctuaries and felt that the parks represent the intangible spiritual values and solitude so vital for individuals, yet found almost nowhere. He truly believed our public lands could advance society through transcending pride and self-interest motivations and serve as a resource for inspiration of all kinds.<sup>17</sup>

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<sup>14</sup> “NPS Entering the 21st Century.” *National Park Service*, <https://www.nps.gov/articles/nps-history-entering-21st-century.htm>.

<sup>15</sup> Adams, Ansel. *Portfolio II: The National Parks and Monuments: Personal Statement*, 1950, Center for Creative Photography, University of Arizona.

<sup>16</sup> Adams, Ansel. *Portfolio II: The National Parks and Monuments: Personal Statement*.

<sup>17</sup> Adams, Ansel. *The Meaning of the National Parks*, photo-book draft, year unknown, Center for Creative Photography, University of Arizona.

Climate change was not yet a known issue at the time of Adams, but the haze of industry affecting the scenic vistas and degradation of general visibility within the parks was an issue. There was developing awareness around the greenhouse gas effect and increasing support of regulatory processes among environmentalists.<sup>18</sup> Adams and those with a similar mindset did not believe that the original Clean Air Act presented enough regulations, particularly for our public lands. Adams and other photographers were vital to advocating for Clean Air Act amendments as they collaborated with other artists and scientists and developed a file of compelling photographs to document the hazy scenic vistas and other various forms of pollution to symbolize the greed of industry.<sup>19</sup> The 1977 Clean Air Act amendments in particular greatly helped the National Park Service authority gain responsibility through a system of reviewing proposals for power plants and other major emitting facilities in close proximity to what were known as the Class I parks.<sup>20</sup> Adams firmly believed to the end of his life that approaching nature with a reverential lens and showing authority figures in the areas of industry his photographs was one of the most effective tools he could employ as it provoked emotion beyond pure facts. Adams stated in *Authorities Speak Out on Visibility: Clean Air and Unique Natural Areas*, “We say we want to stop pollution, but we continue to demand power, comfort, and all the material things which produce pollution through the use of fossil fuels... how are we going to convince 200 million people that they

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<sup>18</sup> “Seven Authorities Speak Out on Visibility: Clean Air and Unique Natural Areas (Clean Air Act Amendments of 1977.” 1977, pamphlet, Center for Creative Photography, University of Arizona.

<sup>19</sup> “Seven Authorities Speak Out on Visibility: Clean Air and Unique Natural Areas (Clean Air Act Amendments of 1977.”

<sup>20</sup> “Protecting Air in Parks...It’s The law!” *National Park Service*, <https://www.nps.gov/subjects/air/npsresponsibilities.htm>.

don't need all that power and all the demand?"<sup>21</sup> Taking this statement one step further to the present day, if something is not done rather rapidly, as is the circumstance today in 2019, those who remembered what clean air or life without extreme climate fluctuations was like will not be around and people will learn to accept the degraded level as a baseline.

Mark Klett's exhibition titled, *Courting Failure, Embracing Risk: Mark Klett and Collaboration* featured a series of time studies within our public lands. Klett is most well-known for his large-scale panoramas of the American West. His photographs and collages primarily respond to 19th- and 20th-century historical imagery, displaying geologic change as well as the development of photography as a medium.<sup>22</sup> A few of the most relevant sub-projects, photo-books, and color-photography collaborations from this exhibition that I was able to view included *Yosemite in Time: A Place of Photographic Density*, *Water in the West: The Cumulative Power of a Collective*, *Re-photographic Survey Project (the American West)*, and *Drowned River: The Death and Rebirth of Glen Canyon on the Colorado*.

Through his photographic work, Klett continues to address the issues of the American landscape including industrial tourism, issues surrounding water in the American West, dwindling resources, and the restoration and development of landscape.<sup>23</sup> Klett's most well-known project has been the *Re-photographic Survey Project*.<sup>24</sup> He has redone the project more recently to create *Third Views*, *Second Sights*, offering new 2004 perspectives and triptychs from

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<sup>21</sup> "Seven Authorities Speak Out on Visibility: Clean Air and Unique Natural Areas (Clean Air Act Amendments of 1977.)"

<sup>22</sup> "Mark Klett." *Mark Klett Photography*, <http://www.markklettphotography.com>.

<sup>23</sup> "Mark Klett." *Mark Klett Photography*, <http://www.markklettphotography.com>.

<sup>24</sup> "Mark Klett." *Mark Klett Photography*, <http://www.markklettphotography.com>.

the original 1984 images he had rephotographed.<sup>25</sup> Within his triptychs and collaged images, he displays, for example, the astonishing human developments within previously untouched land, increased tourism in the Grand Canyon, and extreme heat affects on diminishing water resources such as Lake Powell.

The idea behind one of his most climate-change-based projects, *Drowned River: The Death and Rebirth of Glen Canyon on the Colorado*, was inspired by photographer Eliot Porter's book of color photography, *The Place No One Knew: Glen Canyon the Colorado*, published by the Sierra Club in 1963 primarily as a pro-environment political statement.<sup>26</sup> The driving force behind Klett's project was from the second section of Porter's book where environmentalist David Brower profoundly states, "We shall seek a renewed stirring of love for the earth; we shall urge that what man is capable of doing to the earth is not always what he ought to do; and we shall plead that all Americans, here, now, determine that a wide, spacious, untrammled freedom shall remain in the midst of the American earth as living testimony that this generation our own, had love for the next."<sup>27</sup>

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<sup>25</sup> "Mark Klett." *Mark Klett Photography*, <http://www.markklettphotography.com>.

<sup>26</sup> "Mark Klett." *Mark Klett Photography*, <http://www.markklettphotography.com>.

<sup>27</sup> Porter, Eliot. *The Place No One Knew - Glen Canyon on the Colorado*. Sierra Club, 1963.



#### **IV. My 2018 Photographic Study of Climate Change in National Parks: Joshua Tree National Park, Glacier National Park, Assateague Island National Seashore, and Shenandoah National Park**

Ansel Adams once said, “Possessions, both material and spiritual, are appreciated most when we find ourselves in peril of losing them.”<sup>28</sup> With this quote in mind, I traveled from Arizona to California in May 2018 and Montana in August 2018 to pursue my own photographic study of two breathtaking national parks which stand to lose their namesakes: Joshua Tree and Glacier.

Adams took many photographs of these parks himself. In Joshua Tree National Park, Adams made sure to capture the *Yucca brevifolia*, better known as the Joshua Tree. His images of the large and thriving flowering plant resemble something out of a Dr. Seuss book. His flourishing images present a stark difference from my own in which they are now clearly suffering from the increasing temperatures and droughts. When Adams was visiting Joshua Tree, he recorded in his notes that the main threat was air pollution due to power plants, energy, and mineral developments.<sup>29</sup> During this time, Joshua Tree was a national monument and was not considered a Class I park. Therefore, it was not protected by the 1977 Clean Air Act amendments. Joshua Tree was only recently named a national park in 1994 when Congress passed the California Desert Protection Act.

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<sup>28</sup> Adams, Ansel. *Our National Parks*. Little, Brown and Company, 1992.

<sup>29</sup> Adams, Ansel. “Survey on National Parks: Joshua Tree National Monument.” date unknown, Center for Creative Photography, University of Arizona.

I arrived at Joshua Tree in the middle of May 2018 and spent a week driving into the park through the Twentynine Palms entrance in the middle of the southern California desert. First, I interviewed a Joshua Tree ranger at the visitor's center who was well-versed on climate change. The ranger gave me a run-down of all the current threats that the park is facing, particularly in light of the current administration. In terms of management, the park is not allowed to use social media to speak about climate change due to a past controversy where the park had tweeted a scientific fact about climate change and former current administration Interior Secretary, Ryan Zinke, reprimanded the park head for doing so.<sup>30</sup> Further, the ranger told me that the park cannot talk about climate change or have diagrams within the visitor centers primarily due to the lack of visible climate-related changes in the park and the fact that the climate change studies are ongoing. The fact that climate change is often overlooked in Joshua Tree National Park can make sense if one sees a vast, dry, and barren landscape which they associate with a desert ideal. However, he did tell me that the park *is* visibly degrading, visitors just have to be educated on the issues, realize that the desert and its hundreds of plant species should not be this dried out, and know what to look for. I took his suggestions and sought out to photograph and document the climate change issues at hand.

This particular ranger found climate change important enough that he sneaks the topic into his talks at the campsites. Unfortunately, those talks, which have a topic usually related to the wildlife or night-sky typically seen within the desert, leave him with very little time to talk about climate change. Therefore, he only has time to make people curious. He told me that the

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<sup>30</sup> Cama, Timothy. "Zinke reprimanded park head after climate tweets." *The Hill*, 2017, <https://thehill.com/policy/energy-environment/364994-zinke-reprimanded-park-head-after-climate-tweets>.

national park rangers and National Park System at large have the ability to be a voice for the climate scientists and researchers within the parks, but sadly parks like Joshua Tree are being muted. If the visitors were educated on the changes in the park, the visual effects would be more evident and immediately seen. In many ways, there is no better place to talk about climate change than within our national parks.

Joshua Tree National Park is in fact suffering greatly due to climate change and global warming. As Adams had suggested early on, the park struggles with some of the most polluted and high levels of ozone and smog air of any parks in the nation, all of which has been scientifically noted as human-caused and, therefore, preventable and somewhat reversible if action is taken soon.<sup>31</sup> Joshua Trees have been placed as ‘threatened’ under the Endangered Species Act.<sup>32</sup> They only exist in Joshua Tree National Park, where the Mojave and Sonoran deserts overlap, as well as small areas in Arizona, Nevada, and Utah. Sadly, based on climate models using a 3-degree Celsius (5.4-degree Fahrenheit) increase, the range of Joshua Trees could be reduced by up to 90 percent by the end of this century, existing in only isolated refugia which are areas of cooler and higher elevation pockets.<sup>33</sup> The Joshua Tree usually grows up to 40 feet tall and lives an average of 150 years.<sup>34</sup> It co-exists with the *Tegeticula spp.*, the tiny yucca

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<sup>31</sup> “Polluted Parks: How Dirty Air is Harming America’s National Parks.” *National Parks Conservation Association*, 2015. <https://www.npca.org/resources/3137-polluted-parks-how-dirty-air-is-harming-america-s-national-parks>.

<sup>32</sup> Davidson, Osha Gray, “Climate Change Threatens an Iconic Desert Tree.” *National Geographic*, 2015. <https://news.nationalgeographic.com/2015/10/151028-joshua-tree-climate-change-mojave-desert/>.

<sup>33</sup> Davidson, Osha Gray, “Climate Change Threatens an Iconic Desert Tree.”

<sup>34</sup> Davidson, Osha Gray, “Climate Change Threatens an Iconic Desert Tree.”

moth, which is also threatened and forced to move to refugia.<sup>35</sup> If one goes extinct, the other will also cease to exist. Joshua Trees also face threats from other invasive species, such as the spread of *Bromus rubens*, also known as red brome. This invasive grass is driven by air pollutants like nitrogen and fuels wildfires that can incinerate even the largest Joshua Trees. In general, fires in the southwest and in California are becoming larger, more frequent, and more destructive.

With these facts in mind, I took hundreds of photographs to visually tell the story that the ranger, scientists, and rangers want the public to hear. While traveling on the winding road that goes through Joshua Tree National Park, I photographed pockets of younger Joshua Trees, which were clearly suffering and dying off due to the drought. The larger Joshua Trees just need one large rainstorm every other year to survive, whereas the seedlings need more consistent rain.<sup>36</sup> In some areas, there are no younger trees at all, which is particularly concerning to climate scientists researching within the park. I also noticed how dry and fragile the branches of the older trees had become, even breaking off in some places and splitting the trees in half.

The Joshua Tree ranger also gave me a list of the most threatened species of climate change in the park from an ongoing research study.<sup>37</sup> It is important to note that just because the desert is dry does not mean it is not diverse and full of life. Joshua Tree National Park is home to more than 800 plant species, 50 mammals, and 40 reptiles.<sup>38</sup> The number one most threatened species is the large Pinyon Pine, which typically had a lifespan that can extend beyond 1,000

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<sup>35</sup> Davidson, Osha Gray, "Climate Change Threatens an Iconic Desert Tree."

<sup>36</sup> Davidson, Osha Gray, "Climate Change Threatens an Iconic Desert Tree."

<sup>37</sup> "Joshua Tree Climate Change Action Plan." *National Park Service*, 2008.

<sup>38</sup> "Joshua Tree." *National Park Service*, <https://www.nps.gov/jotr/learn/historyculture/parkhistory.htm>.

years.<sup>39</sup> Pinyon Pine are dying off even faster than Joshua Trees due to drought and beetles with the higher winter temperatures.<sup>40</sup>

Joshua Tree National Park is a rock climber's paradise and an otherworldly landscape. I did almost every hike in the park during the morning hours before it got too hot and took photographs of the star-covered night sky. On a hike to Barker Dam, a dam constructed by early cattlemen in 1900, I photographed the waterline and how it has been lower than usual during the summer. This is due to the increasing droughts and the fact that the nighttime lows are nearly 8 degrees Fahrenheit above average, leading to higher evaporation rates.<sup>41</sup> This has exposed more of the naturally weathered rock within the dam and led to a multitude of issues beyond just climate change. Human vandals have attacked this particular dam with graffiti, and even more recently have cut down trees within the park during the 2018-2019 United States government shutdown.<sup>42</sup>

I woke up and photographed the sunrise at the iconic Cholla Cactus Garden where the hundreds of Cholla Cacti are lit up in warm hues by the rising desert sun. This is a moment I will cherish forever. Unfortunately, these cacti are also blooming and reproducing less due to the changing climate and this view likely be gone by the end of the century.<sup>43</sup> This also goes for the

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<sup>39</sup> Davidson, Osha Gray, "Climate Change Threatens an Iconic Desert Tree."

<sup>40</sup> Davidson, Osha Gray, "Climate Change Threatens an Iconic Desert Tree."

<sup>41</sup> Davidson, Osha Gray, "Climate Change Threatens an Iconic Desert Tree."

<sup>42</sup> Chiu, Allyson. "A travesty to this nation': People are destroying Joshua trees in Joshua Tree National Park." *The Washington Post*, 2019, [https://www.washingtonpost.com/nation/2019/01/11/travesty-this-nation-people-are-destroying-joshua-trees-joshua-tree-national-park/?utm\\_term=.028496221d57](https://www.washingtonpost.com/nation/2019/01/11/travesty-this-nation-people-are-destroying-joshua-trees-joshua-tree-national-park/?utm_term=.028496221d57).

<sup>43</sup> Burks, Megan. "The Cholla Cactus Didn't Bloom This Year — California Scientists Team Up To Find Out Why." *KPBS*, 2018, <https://www.kpbs.org/news/2018/aug/14/cholla-cactus-didnt-bloom-year-california-scientis/>.

wildlife, as many will have to migrate to cooler and higher elevations to survive and, eventually, have nowhere else to run. Sadly, every aspect of Joshua Tree National Park is threatened by the way that we have dealt with our surroundings and lived our everyday lives. We have put the fragile desert ecosystem at risk from the changing climate, as well as committed terrible acts of vandalism through a lack of mindful education and understanding.

Ansel Adams also photographed Glacier National Park which spans over Montana and the Canada-U.S. border. During his time, the primary pollution threats to the park included coal mining, logging, developments in the adjacent forests to the park, and general air pollution from adjacent industries. Adams took many photographs of the glaciers and perennial patches, which I was able to compare to my own photographs with their lack of snow and ice to show the shocking effects of climate change and global warming.

After talking to several different rangers and visiting the visitor centers within Glacier National Park, I became aware of the fact that the park management made the topic and education around climate change a priority. The visitor centers had a lot more information, interpretive programs, exhibitions, diagrams, pamphlets, and photographic evidence of climate change effects than Joshua Tree National Park. At first I was very surprised and also confused how two parks under the National Park Service could serve two very different messages to the public. I have concluded that this is because it is much more obvious to the everyday visitor that climate change is happening in Glacier National Park and it simply cannot be denied. In Joshua Tree, one has to know what they are looking for and studies are valid, yet ongoing. However, upon first visit to Glacier, the visitor just knows that the park is not what it used to be. The effects have been very pronounced—there is shrinking of glaciers and perennial snowfields, both

of which are symptoms of hotter and drier conditions in the summers and winters with highs now reaching above 90 degrees Fahrenheit.<sup>44</sup>

The landscape of the park has been dramatically altered due to the increasing temperatures and has resulted in less water, more intense fires, and big increases in problematic bug and noxious plant species.<sup>45</sup> This is all happening too fast for many species to adapt. I visited Glacier National Park in the middle of August 2018 for one week. This happened to be the same time an enormous wildfire, named the Howe Ridge Fire, was occurring and half of the park and half of the iconic ‘Going to the Sun Road’ were closed.<sup>46</sup> The park was covered in a blanket of smoke, reducing the visibility and making it hard to see the beautiful scenic vistas I was expecting while also being an enormous health hazard for humans and wildlife.

In just driving along the ‘Going to the Sun Road’, one can see the acres and acres of impaired forests. Fires are typical in the West and play an important role in shaping the ecology, but climate change has altered the nature of these fires and they have become more common at higher elevations—something nearly unheard of in decades past.<sup>47</sup> These fires have become more intense and in turn have changed the soil structures, damaged microorganisms, inhibited healthy forest regrowth, and replaced entire forest areas leading to the rise of diseases and tree-ravaging

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<sup>44</sup> “Climate Change and the Crown of the Continent” Glacier NP Newspaper 2018

<sup>45</sup> Reeves, Ulla-Britt. “What We Stand to Lose at Glacier National Park.” *National Parks Conservation Association*, 2018, <https://www.npca.org/articles/1813-what-we-stand-to-lose-at-glacier-national-park>.

<sup>46</sup> Franz, Justin. “Howe Ridge Fire Grows to More Than 13,000 Acres.” *Flathead Beacon*, 2018, <https://flatheadbeacon.com/2018/09/06/howe-ridge-fire-grows-13000-acres/>.

<sup>47</sup> Brown, Matthew. “AP Explains: Driven by climate change, fire reshapes US West.” *AP*, 2018, <https://apnews.com/333a833a02334f68b26e90745b46fa4a>.

insects.<sup>48</sup> This only fuels more intense future fires, as well as effects human air quality and leads to evacuations and destruction of structures. Further, the rising temperatures lead to a rising tree-line, which means that alpine areas are disappearing and so are the species that inhabit them.<sup>49</sup>

One of my top priorities at Glacier was to take the strenuous 6 mile incline and full-day hike to Grinnell Glacier, the park's most visited glacier. Grinnell Glacier has lost nearly half its footprint in 50 years.<sup>50</sup> Daniel Fagre, a U.S.G.S. research ecologist who led a study on the melting glaciers remembered, "I've been going there since 1991 and remember having to choose carefully how to climb up onto the glacier. It was 20 to 30 feet high at the edge, now it comes only up to your shins."<sup>51</sup> In 1850 there were 150 glaciers while today there are 25 with the largest having lost 75% of their size.<sup>52</sup> All of the glaciers in the park have either been drastically reduced in size or completely melted. Ice patches and perennial snow on the mountains have also melted away. This has led to warmer and smaller streams and more erosion, meaning suffering aquatic life and less resources for the mammals such as the iconic Grizzly Bear. The mountains, where the snow and glaciers reside, are often referred to as the 'water towers of the world' as they

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<sup>48</sup> Brown, Matthew. "AP Explains: Driven by climate change, fire reshapes US West."

<sup>49</sup> "Climate Change and the Crown of the Continent." *The Official Newspaper of Glacier National Park*, p. 13, 2018.

<sup>50</sup> Popovich, Nadja. "Mapping 50 Years of Melting Ice in Glacier National Park." *The New York Times*, 2017, <https://www.nytimes.com/interactive/2017/05/24/climate/mapping-50-years-of-ice-loss-in-glacier-national-park.html>.

<sup>51</sup> Popovich, Nadja. "Mapping 50 Years of Melting Ice in Glacier National Park." *The New York Times*, 2017, <https://www.nytimes.com/interactive/2017/05/24/climate/mapping-50-years-of-ice-loss-in-glacier-national-park.html>.

<sup>52</sup> "Glacier National Park: Climate Change Response Program." *National Park Service*, brochure, 2018.



provide life and give fresh water.<sup>53</sup> Humans depend on this for the majority of water supply in the west, so changes in precipitation patterns alter how people living in this type of topography survive as well.

Glacier has climate management and research strategies in place. In fact, nearly half of the research conducted in Glacier addresses climate change either directly or indirectly.<sup>54</sup> However, the current administration is causing some pause within this research as appointees have overruled federal officials with expertise in climate science whenever they refer to the anthropogenic causes. The current administration has questioned the validity of their reports, and has also scrutinized and curtailed climate change communication to the public through social media and more.<sup>55</sup> Believe it or not, scientists do expect all of the glaciers to disappear completely by 2030—so essentially you have about 10 years to see Glacier National Park’s breathtaking glaciers before they are all gone, and by the looks of the park, they definitely will be.<sup>56</sup>

In August 2018, I came back to the East Coast to photograph Assateague Island National Seashore in Maryland. Assateague has been greatly affected by climate change and is experiencing rising waters, beach erosion, and intense storms which have changed the shape of

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<sup>53</sup> “Glacier National Park: Water Towers of the World.” *National Park Service*, handout, 2018.

<sup>54</sup> “Glacier National Park: Climate Change Response Program.”

<sup>55</sup> Grandoni, Dino, and Juliet Eilperin. “Trump official said scientists went ‘beyond their wheelhouse’ by writing climate change ‘dramatically’ shrank Montana glaciers.” *The New York Times*, 2018, [https://www.washingtonpost.com/news/energy-environment/wp/2018/03/07/trump-official-said-scientists-went-outside-their-wheelhouse-by-writing-climate-change-dramatically-shrunk-montana-glaciers/?utm\\_term=.71c484438393](https://www.washingtonpost.com/news/energy-environment/wp/2018/03/07/trump-official-said-scientists-went-outside-their-wheelhouse-by-writing-climate-change-dramatically-shrunk-montana-glaciers/?utm_term=.71c484438393).

<sup>56</sup> Popovich, Nadja. “Mapping 50 Years of Melting Ice in Glacier National Park.” *The New York Times*, 2017, <https://www.nytimes.com/interactive/2017/05/24/climate/mapping-50-years-of-ice-loss-in-glacier-national-park.html>.

the island and their ecosystems. Assateague is visibly getting narrower with the sea level change, island over-wash, and rollover.<sup>57</sup> According to the *Assateague Island National Seashore Climate Change Projections*, the sea level is expected to rise from 3.5 inches to 9 inches by 2040 with increasing storm and rain intensity, and summer droughts.<sup>58</sup> These changes are threatening fragile species and vital resources for wildlife, such as those for the iconic wild ponies. The management within the park has created a variety of moveable shelters that can adapt to the changing island. They have committed to significant resources to enhance the resiliency of artificial salt marshes, created parking areas constructed from native clay and clamshell that can be reused in post-storm repairs, as well as introduced solar panels that provide 80% of the power at the new Maryland ranger station.<sup>59</sup> Ultimately, a vastly different landscape will exist in the near future, changing the access and experience that visitors enjoy today.

Finally, I photographed Shenandoah National Park in Virginia. I am a regular visitor to the park as it is in very close proximity to JMU and is a great escape to nature. Shenandoah is not as obvious in terms of visuals when it comes to climate change as the parks previously mentioned, but it is still being affected. There are a handful of threatened species in Shenandoah due to longer and warmer seasons. These milder winters with fewer frost days have led to warmer water in streams and altered environments for plants and animals. This includes an endangered species of bumblebees and the Shenandoah Salamander.<sup>60</sup> Overall, climate change is

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<sup>57</sup> "Assateague Island is Changing." *National Park Service*, handout, 2018.

<sup>58</sup> "Rising to the Challenge: Assateague Island National Seashore." *National Park Service*, handout, 2018.

<sup>59</sup> "Assateague Island is Changing." *National Park Service*, handout, 2018.

<sup>60</sup> "Shenandoah National Park: Climate Change." *National Park Service*, <https://www.nps.gov/shen/learn/nature/climatechange.htm>.

just as prevalent on the East Coast as it is the West Coast with some areas and ecosystems more vulnerable than others.

## V. Conclusion

In 1916, the United States established the National Park Service to protect our natural and cultural heritage for all present and future generations. The American people have come together to verbally condemn and physically protect public lands from all kinds of threats in the past and into the present including climate change, politically immoral motives, and vandalism. As Ansel Adams said in an interview, “It is horrifying that we have to fight our own Government to save our environment.”<sup>61</sup> Climate change, as well as political leaders, are challenging these places in unprecedented ways with consequences to species, ecosystems, natural forces, and structures that have defined and shaped each place in its own unique way. Humans are the cause and the solution to the problem of climate change. Our use of fossil fuels, particularly through transportation, increases the amount of greenhouse gases in the atmosphere, which traps heat and leads to warmer temperatures on Earth. At our current rate of greenhouse gas emissions, there will be irreversible impacts, but reducing and reversing those emissions is not quite yet out of our control.

National parks are places where the effects of climate change are particularly noticeable. This is due to their location and unique, protected resources and species. Most parks are a part of the Climate Friendly Parks Program which supports the National Parks Service’s Green Park Plan to ensure sustainable operations within the parks, as well as environmentally-friendly

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<sup>61</sup> Sheff, David. “Ansel Adams Interview.” *David Sheff*, 1983, <https://www.davidsheff.com/ansel-adams>.

education to the public.<sup>62</sup> Unfortunately, current political leaders have established doubt within the studies of climate change. This has altered park policy, particularly in the form of climate education to the public, something that is virtually non-existent in the parks I have studied besides Glacier National Park. Glacier National Park is ahead of the game in this way due to melting ice being a poster child for climate change. Sadly, those parks which lack the everyday associations with climate change, are left behind, and visitors must inquire park management for themselves if they want to learn anything about what is actually going on. A more proactive park policy needs to be lobbied for in order to create more educational programs within these parks. national parks are accessible to everyone and can serve as the most vital visual educational tool that the public needs in order to believe the climate change studies in this urgent time.

From the visible changes, such as disappearing ice and rising sea levels, to the less visible altered ecosystems and imperiled species, the next decade will almost surely decide the fate of these national parks and the world at large. That should empower us. I have a deep love for our environment and I think it is critical right now that we all come together to support it. My goal with this visual project is to make my viewers more aware of the issues these places are facing and to motivate them to support not only our public lands, but the Earth at large. We cannot singlehandedly fight any of the battles around our changing climate. Through my photographic documentation of the climate change occurring right now within these parks, I hope to encourage everyone to join the collective effort to reduce our own greenhouse gas emissions and model climate-friendly behaviors through sustainable operations and adaptation efforts. Everyone can help the organizations, the nonprofits, the park staff, the scientists, the researchers, and more.

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<sup>62</sup> "Climate Friendly Parks Program." *National Park Service*, <https://www.nps.gov/subjects/climatechange/cfpprogram.htm>.

These are the people who are fighting everyday for our beautiful environment and speaking out against the skeptics and industries escalating these issues. Through mindful education and action, spreading the message, and voting for the climate, collective global action can fight arguably the biggest of all problems we face today.

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