

# Photographing Roan Highlands: An Insight into Art and Land Conservation

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## Abstract

Roan Highlands is known for its unique endemic biodiversity, hosting a section of the Appalachian Trail, and as a beloved tourist destination. It is home to many threatened/endangered species and an extremely fragile ecosystem while supporting a thriving tourist industry. Because of this, overtourism and environmental degradation are significant issues facing the integrity and the many species of the Highlands. This project investigates the effects of tourism on the environment of Roan Highlands, how photography can be used for land conservation, and discovering the biggest challenges and inspirations for creating good stewardship of public lands. These research questions were answered through a literature review and a survey that I distributed around Asheville, NC, as well as through the North Carolina Environmental Educators (NCEE) email newsletter. Photographs for the survey were collected during multiple site visits over the summer of 2023. Survey results indicate that most people believe that a lack of funding and ecological degradation are the biggest issues facing public lands. Nature-based tourists prefer pristine, untouched pictures of nature over “contaminated” photos, such as those with cars, trash, and litter. Results show that survey respondents want more art, accessible scientific information, and roaming naturalists available for communication to encourage good behavior on public lands. These results suggest that people want more sustainable community involvement to better engage with nature and public lands. Protecting public lands and wilderness is more important now than ever with the emerging climate crisis as public lands create valuable carbon sinks, habitats for wildlife and endangered species, provide a refuge for community health, and ensure that these beloved natural areas are intact for future generations.

# Introduction

Roan Highlands is a high-elevation mountain range straddling the state line between western North Carolina and eastern Tennessee. Roan Highlands is managed by multiple groups, including the US Forest Service, The Southern Appalachian Highlands Conservancy (SAHC), and The Appalachian Trail Conservancy (ATC). The Highlands are approximately 6,285 feet high, making it one of the highest elevation areas in the southeast United States. This high elevation has created a wonderful biodiversity hotspot. Roan Highlands is home to the best example of the rare grassy balds community in the world (Donaldson, 2016). These communities are some of the most threatened in the continental United States (Donaldson et al., 2010). The Roan Highlands is home to at least 27 rare globally plant communities and 33 federally or state-recognized threatened/endangered species, six of which are listed in the U.S. Endangered Species Act (Donaldson, et al., 2010). Roan Highlands is also a very popular destination for tourists, and hikers, as well as hosting a section of the Appalachian Trail.

Carver's Gap is the most popular area in Roan Highlands (M. Croquette, personal communication, May 13, 2023) because of its easy access from the parking lot to the top of Round Bald, which offers beautiful views and foliage with a relatively easy hike. This area receives heavy use compared to other areas of the Highlands, which causes extreme widening of the Appalachian Trail (Image 2), social trails (Image 1), and other damages caused by unprecedented tourist use. Social trails are defined as unauthorized trails created by people and animals leaving designated trails, which over time are widened by erosion and harm important microhabitats (Priess, 2020). Trail widening is a similar phenomenon, however, it occurs when a trail is poorly maintained and the trail becomes wider than it originally was by erosion and foot traffic. The majority of research and site visits for this project were located near Carver's Gap.

Non-consumptive human land use and wildlife recreation is defined as recreation that does not affect, harm, or remove species from their original habitat (Duffus, et. al 1990). However, recent research has found that non-consumptive human land use and recreation negatively impacts ecosystems, communities, and individuals despite being previously thought of as non-harmful (Larson et al., 2019). Human recreation, such as hiking, has been shown to have a negative impact on species richness and abundance (Larson et al., 2019). Recreation specifically negatively affects species richness, particularly with mammals, birds, and carnivores (Larson et al., 2019). Non-motorized recreation activities such as hiking had a significant cumulative negative effect on local species and ecosystems (Larson et al., 2019) compared to less frequent motorized activities (Dertien et al., 2018). Roan Highlands is almost exclusively non-motorized recreation, with hiking and the Appalachian Trail being the main attraction.

A study conducted by the Southern Appalachian Highlands Conservancy in 2022 found that Roan Highlands had an average of 306 visitors per day, with 266 of them being day hikers, 3.5 through-hikers on the Appalachian Trail, and 35 of them section hikers on the Appalachian Trail (Southern Appalachian Highlands Conservancy, personal communication, May 27, 2023). Day hikers are defined as people who visit a recreation site for a single day, whereas through-hikers and backpackers do not have a car with them and tend to pass through the area in a single day. Parking is an issue in the more crowded areas of Roan Highlands. Because of the lack of parking, people will

park their cars in non-designated areas, which can be harmful to microhabitats and soil. Social trails (Image 1) are a big issue, as well as camping in non-designated areas, trail widening (Image 2), litter, and illegal fire rings.

Overtourism is the phenomenon in which tourism negatively impacts the environment, local residents, and other social, political, and environmental factors (Honey et al., 2021). Because Roan Highlands is one of the most popular nature recreation destinations in Western North Carolina, the species and habitats face many issues associated with overuse and overtourism.

Protected lands have globally increased in visitation and popularity, particularly with the impact of the COVID-19 pandemic. Public lands and outdoor spaces were the only areas available for people during the pandemic, which caused a huge increase in visitors and first-time visitors with less understanding of leave no trace principles and other pro-environmental behaviors. Protected lands not only serve as a protected space for species, communities, and natural resources but are also public spaces for human recreation (Dertien et al., 2018). Protected lands are also essential for fighting climate change, protecting threatened species, and supporting biodiversity



**Image 1.** A drone photo of social trails in Roan Highlands.



**Image 2.** An example of trail widening on top of Round Bald in Roan Highlands.

## Literature Review

### 2.1 Impacts of Tourism in Roan Highlands Review

Roan Highlands contains many special and endangered ecosystems because of its high elevation and climate status as a temperate rainforest. Roan is a part of the Appalachian Trail which attracts certain user groups not present at other similar outdoor recreation areas. Roan is a biodiversity hotspot and contains many threatened species – supporting at least 800 known plant species (Donaldson et al., 2010). It is home to two of the most threatened plant communities in the continental United States- grassy balds and red spruce-Frasier fir forests (Donaldson, et al., 2010). Roan Highlands is home to 28+ globally rare plant communities (Donaldson, 2016), 27 rare plant communities, and 33 federally or state-recognized threatened/endangered species, six of which are listed in the U.S. Endangered Species Act (Donaldson et al., 2010). Roan is home to more than 8 different threatened evergreen forest communities, as well as more than 7 different threatened deciduous forest communities (Donaldson, 2016). The Highlands is most famous for its bald communities, containing the most extensive and highest quality grassy bald communities in the world (Donaldson, 2016). Grassy balds are not only a very rare community but contain significant biodiversity – especially for high-elevation mountain ranges (Donaldson, et al., 2010). The green alder bald (*Alnus viridis ssp. crispa* / *Carex pensylvanica*) is mostly native to Pennsylvania and northern regions, with Roan Highlands being the only place in the southeastern United States

that this species is found (Donaldson, 2016). Roan is also famous for its rhododendron plants (*Rhododendron catawbiense*), and it is considered to have the largest rhododendron garden in the world.

Roan's grassy balds communities are 25% less than their historic extent as of 2010 (Donaldson, et al., 2010). This is mostly due to a lack of management and funding supporting the grassy bald communities (Donaldson, et al., 2010). Invasive species (such as blackberries) pose a big risk to Roan Highlands, particularly the bald communities as these invasive species threaten to out-compete already delicate and disturbed ecosystems. Management, such as the National Forest Service, SAHC, and ATC, has made efforts to post signage in the area around Carver's Gap trailhead educating visitors about invasive species and prompting visitors to wipe off their hiking shoes before entering the bald communities to eliminate any potential invasive seeds attached to hiking boots.

Any large-scale human activities, specifically tourism, are linked to environmental degradation and negative impacts on the area's wildlife (Larson et al., 2019). Human recreation is shown to have a negative impact on species richness and abundance, lowering species richness by 70% on average (Larson et al., 2019). Birds and mammals are the most affected by tourism, with predators and specialists suffering the most (Larson et al., 2019). Large animals, especially predators, are shown to be signs of a healthy ecosystem (Del Rio et al., 2011). Frequent nonmotorized human recreation, particularly within a small spatial area and over a long amount of time, have detrimental effects on the ecosystem (Larson et al., 2019).

## 2.2 Environmental Knowledge and Tourism

Knowledge of environmental issues is linked to a higher amount of pro-environmental actions (Abdullah et al., 2019). Nature-based recreation is also shown to increase positive environmental consciousness and change behavior, particularly in children and for site-specific recreation, such as school field trips to local public lands. (Lee et al., 2015). Nature-based recreation, such as hiking, is shown to arouse emotions which encourages visitors to reflect on their behaviors and how they impact the environment (Ballantyne et al., 2011). Human nature-based recreation is essential to educate visitors on the environment and being a better steward of public lands. There is a linear relationship between knowledge, attitude, and behavior regarding positive environmental actions (Abdullah et al., 2019). Educating people about environmental issues and behaviors is essential to protecting public lands and offsetting the degradation that tourism and other human-land interactions inflict.

## 2.3 Photography and Land Conservation

Historically, photography has been used for land conservation efforts. Photography is associated with early land conservation efforts and inspiring the creation of multiple National Parks in the US, with Yosemite National Park being perhaps the most famous example of photography being used for land conservation. Carleton Watkin's photography of Yosemite Valley circa 1861 exposed the American public to stunning natural beauty and wilderness that most people would never have experienced firsthand (Casey, 2017). Watkin's photographs of Yosemite Valley inspired Abraham

Lincoln to sign the Yosemite Valley Grant Act of 1864, protecting Yosemite from private mining and tree-cutting (Casey, 2017). This act is sometimes referred to as the birth of the US National Park system, as it was the first environmental act of its kind – protecting wilderness areas indefinitely (Diamant, 2014). Carleton Watkins, W.H. Jackson, and artist Thomas Moran convinced Congress to establish Yellowstone as a National Park approximately 11 years after Watkin’s photographs of Yosemite (Whittlesey, 1999). Photography has been a catalyst to protect and create multiple National Parks and forests across the country throughout the past 150 years, including but not limited to Yosemite, Yellowstone, Kings Canyon, and the Grand Canyon.

Showing the American public photographs of otherwise inaccessible wilderness inspires not only protection but policy making to conserve these untouched natural areas. Photography as an artistic medium is inherently unique. Photographs can transcend language barriers and be widely understood and interpreted by almost any audience. Landscape photography in particular provides an insight into the natural world, macro or micro, that would otherwise be unseen to the general public. Landscape photography is directly correlated with the birth of environmentalism (Casey, 2017).

## Methods

The primary research goals of this fellowship were to visually document Roan Highlands through photographs and to connect with Roan’s community. My research explores the relationship between art, photography, conservation, sustainable tourism, and how community involvement can help protect public lands.

How is tourism affecting the biodiversity of Roan Highlands in Western North Carolina? This has been answered through a literature review and by researching the ecosystems and endemic species to Roan Highlands; researching how overtourism is affecting other similar areas, species, and communities; and speaking to officials from the US Forest Service as well as the SAHC.

What inspires and challenges people to protect public lands? This question was answered through an anonymous survey distributed in the Asheville area as well as to the North Carolina Environmental Educators (NCEE) newsletter.

How can photography be used in land conservation efforts? Historically, photography has been a catalyst for land conservation. This project investigates both the historical significance of land conservation photography through a literature review, as well as the contemporary impact of conservation photography.

From May to September 2023, research was conducted in partnership with the US Forest Service, as well as with help from the Southern Appalachian Highlands Conservancy (SAHC) and the Roan Highlands Visitor Use Management Committee (VUM). The VUM is a partnership between the US Forest Service, SAHC, ATC, and Roan Highland community members who collaborate to protect the Highlands and other similar areas. I photographed different aspects of visitor use as well as the natural beauty of Roan Highlands over the summer of 2023. The SAHC provided me with a cabin in June 2023 so I could spend more time at Roan and capture images. Carrie and Eric Tomberlin assisted me with drone photography to capture the scope of social trails, trail widening, and parking issues at the Carvers Gap area.

I also looked at historical photos of Roan Highlands provided by the Tennessee Virtual Archive and replicated these photographs to make visual observations of how the area has changed over time.

### 3.1 Survey

A survey was used to collect data in July-September 2023 to document reactions in response to different types of photographs of Roan Highlands, to better understand the inspirations and challenges regarding public land stewardship, and to receive anonymous feedback. I prepared for this survey by completing IRB training to ensure I conducted ethical research and was approved by the IRB Board in July of 2023 for exempt research. IRB (Institutional Review Board) is a committee that regulates research involving human subjects to ensure all research is conducted ethically. Flyers were posted in multiple locations around Asheville, NC with a QR code linked to a Google survey. Participants were all voluntary, anonymous, and above the age of 18. The data collected reflects how participants feel about different types of photography and which type(s) of photography inspires the most positive user change in regard to practicing sustainable tourism; what would inspire participants to be a better steward of public lands, how effective signage is, and certain demographic information. Different types of images included in the survey included “untouched” nature (natural beauty with no sign of human disturbance) versus “disturbed” nature (cars, litter, large groups of people, etc.). Participants were also allowed to anonymously write their own ideas, feedback, comments, and suggestions which I have utilized in this project with thematic analysis.

## Results

This survey received 110 responses in total from August 2023 to October 2023. Questions were divided into four categories- demographic questions, “pristine” images (Image 3 & 4), “disturbed” images (Image 5 & 6), and general questions. A Likert scale was used to measure responses for the majority of questions, which is a standard scale that assesses opinions generally on a range from 1 through 5. The results show that the majority of people visit public lands moderately (once a month), and the age range for public land users is evenly distributed from ages 18 to 70+.

Pristine images (Images 3 & 4) were defined as images of nature that are untouched and do not contain any sign of human interference with the environment. Questions regarding pristine images ask “How does this photo make you feel about visiting public lands?” and respondents were prompted to pick a number on a 1-5 Likert scale, with 1 being the most negative and 5 being the most positive. An overwhelming majority of people (84.5%) selected 5, the most positive option for image 3. Regarding image 4, 70% of participants selected 5.



**Image 3.** “Pristine” image of nature used in survey.



**Image 4.** “Pristine” image of nature used in survey.



Disturbed images (Images 5 & 6) were defined as images of nature that clearly show human presence, disruption, and degradation of the environment. These questions ask “How does this photo make you feel about visiting public lands?” respondents were prompted to pick a number on a 1-5 Likert scale, with 1 being the most negative and 5 being the most positive. For image 5, 50% of the respondents selected 1, 25.5% selected 2, and 21.8% of them selected 3 (Figure 1). For image 6, results were more varied, with 36.4% of participants selecting 3, 28.2% selecting 2, 24.5% selecting 1, and 10% selecting 4 (Figure 2).



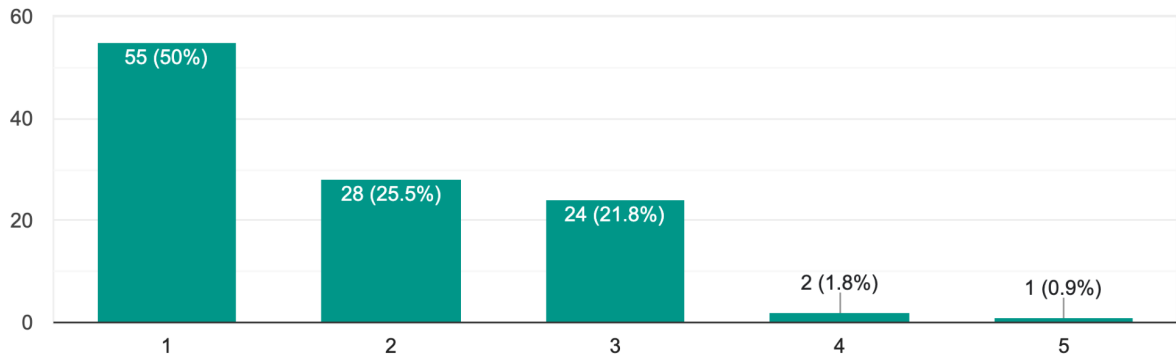
**Image 5.** “Disturbed” image of nature used in survey.



**Image 6.** “Disturbed” image of nature used in survey. (Photo Credit - Mike Wurman)

7. How does this photo make you feel about visiting public lands?

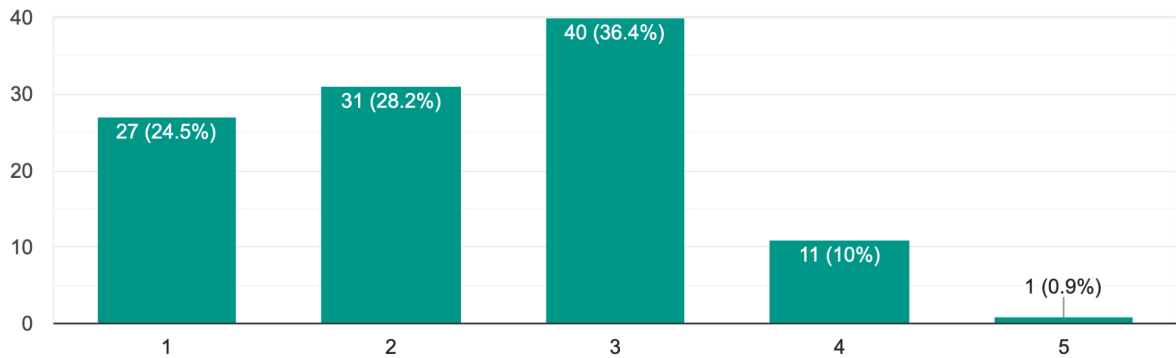
110 responses



**Figure 1.** A graph of survey results shows that survey participants do not want to engage with “disturbed” nature.

9. How does this photo make you feel about visiting public lands?

110 responses

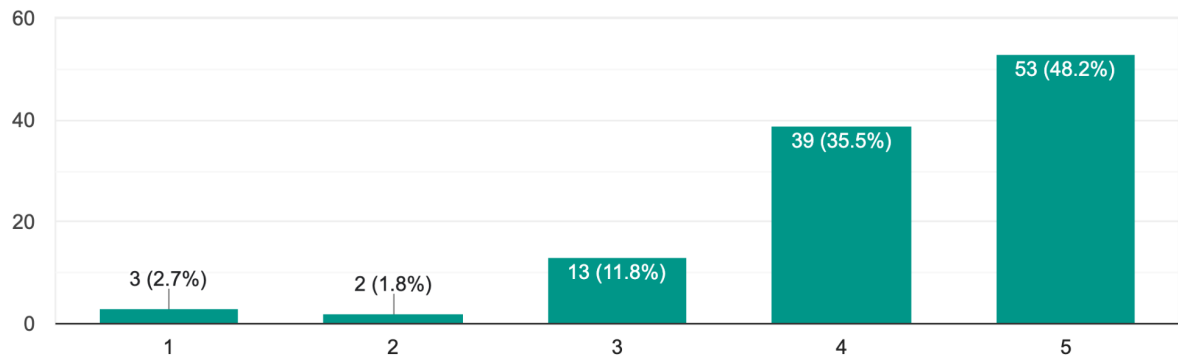


**Figure 2.** A graph of survey results shows that survey participants do not want to engage with “disturbed” nature.

The general questions category asked participants about their behavior and opinions regarding public lands. One question posits, “How effectively do signs change your behavior in relation to public lands?”. Participants answered this question on a 1-5 Likert scale, with 1 being the most negative and 5 being the most positive. A majority of participants (48.2%) answered 5 (Figure 3).

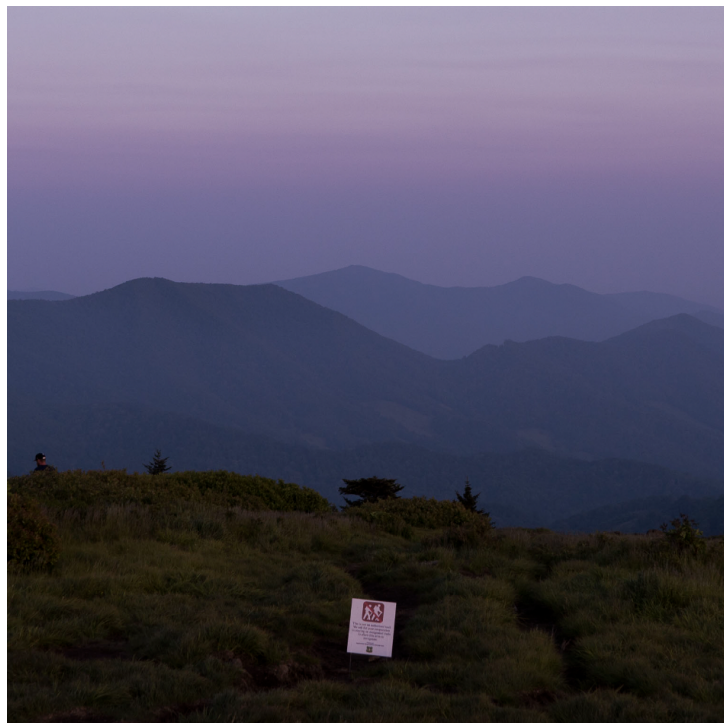
4. How effectively do signs change your behavior in relation to public lands? (image as example)

110 responses



**Figure 3.** A graph of survey results shows that survey participants respond positively to signage on public lands.

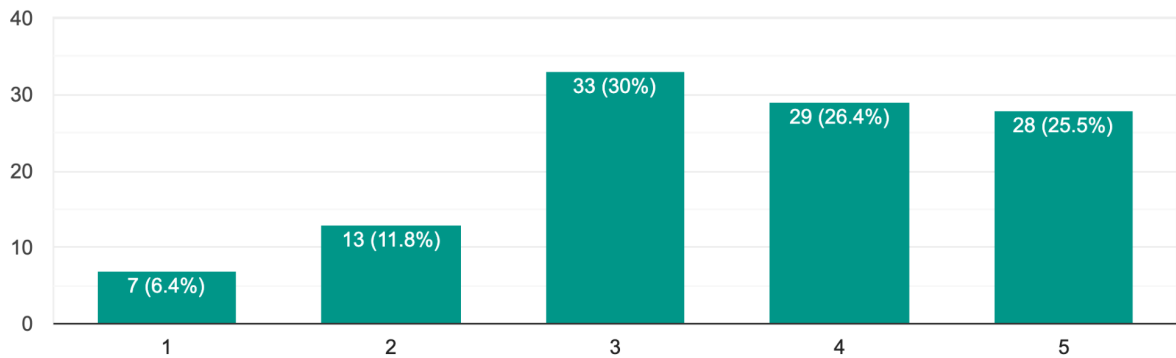
Another question (Image 7) asked “What is your opinion about the sign instructing people not to go beyond the designated trail?”. Participants were asked to answer this question on a 1-5 Likert scale, with 1 being the most negative and 5 being the most positive. Results were scattered, with the majority of participants (30%) answering 3 (Figure 4).



**Image 7.** A photo used in the survey used to assess opinions on signage.

6. What is your opinion about the sign instructing people to not go beyond the designated trail?

110 responses



**Figure 4.** A graph of survey results shows that survey participants have a mixed response towards signage on public lands.

Two related survey questions ask, “What would inspire you to protect public lands?” (Figure 5), and “What do you think [are] the biggest challenges facing public lands in NC?” (Figure 7). These questions allowed survey participants to choose as many different options as they wanted, as well as write in their own comments (notated as “Other..” in figures 5 and 7). Any comments were subject to thematic analysis and interpretation. I have ranked the answers based on majority. For the question regarding inspirations, “Naturalists and roaming forest rangers available for communication in public lands” was the most popular response, followed by “Art about public lands”, “Scientific articles and research about public lands”, “Social media/ad campaign”, and “More signage in protected areas/public lands” (Figure 6). For the question regarding challenges, funding was seen as the biggest issue facing public lands, followed by ecological degradation, [lack of] education, overtourism, management, and access issues (Figure 8).

10. What would inspire you to protect public lands? \*

- More signage in protected areas/public lands
- Social media/ad campaign
- Art about public lands
- Scientific articles and research about public lands
- Naturalists and roaming forest rangers available for communication in public lands
- Other...

**Figure 5.** Survey question referring to inspirations to help better protect public lands.

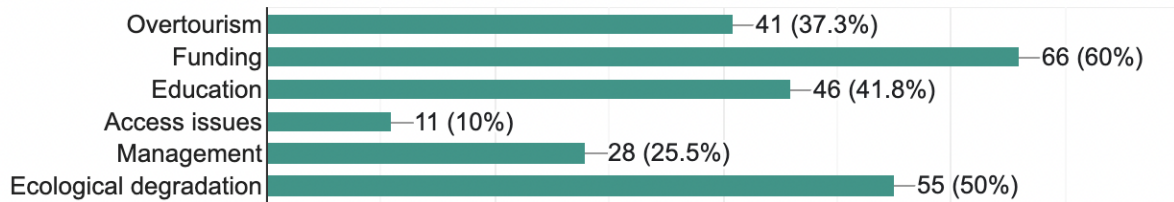


**Figure 6.** A graph showing results regarding inspirations to help protect public lands.

11. What do you think is the biggest challenge facing public lands in NC? \*

- Overtourism
- Funding
- Education
- Access issues
- Management
- Ecological degradation
- Other...

**Figure 7.** Survey question referring to challenges associated with protecting public lands.



**Figure 8.** A graph showing results regarding challenges associated with protecting public lands.

## Discussion

Survey participants were encouraged to submit their own responses, feedback, questions, and suggestions. These responses were evaluated using thematic analysis to find commonalities and themes. Responses reflect that the biggest challenges facing public lands are lack of ADA accessible areas, absence of trash cans, no public transportation options, and an overall lack of government funding and protections for wilderness areas and public lands. Survey participants also responded with their ideas and suggestions to promote better stewardship of public lands. Education is a common suggestion, specifically education about why public lands are valuable and need protection. An increase in environmental education, specifically targeted towards children and students, is essential for people to understand why public lands are so important. In agreement with section 2.2 of the literature review, it has been shown that environmental education and site-specific recreation increases pro-environmental actions and inspires people to protect the environment (Abdullah et al., 2019). Site-specific recreation has been shown, especially for children, to impact environmental behavior positively and inspire people to become better stewards of the environment (Lee et al., 2015). Increasing site-specific recreation, i.e. school trips to Roan Highlands and other local public lands, would have a positive impact on community engagement in these areas. Survey participants also want to see an increase in government involvement, on a local and national level, including more funding, pro-environmental policy, and leadership from politicians.

The survey also found that nature-based tourists prefer “pristine” images of public lands rather than “disturbed” images. People who choose a nature-based recreation activity do not want to see things not associated with nature, such as cars or trash, and often visit these public lands as an escape from other people and urban settings. There is no way to avoid cars, litter, signage, and crowds on public lands; however, promoting and funding public transportation to lessen the impacts of cars, and including trash, recycling, and composting services within public lands to help mitigate litter. Furthermore, educating visitors about proper trash disposal, leave no trace principles, “packing out trash”, and the impact of trash/litter on the environment would be a better solution to a systemic problem than providing these areas with more trash cans.

A survey question asks, “What would inspire you to protect public lands?”, survey respondents were allowed to pick as many answers they agreed with, as well as submit

their own answers to the question. “Art about public lands” and “Scientific articles and research about public lands” had a similar response rate. This is intriguing as art and science are typically seen as juxtapositions to each other, however, their similar response rates show that people want a balance to inspire them. Scientific articles and research support education and knowledge about public lands and how to alter behavior to lessen ecological degradation. Art about public land inspires people not only to visit public lands but to protect the natural beauty of these lands, which in turn promotes pro-environmental behavior.

In response to “What would inspire you to protect public lands?”, a majority of people answered “Naturalists and roaming forest rangers available for communication”. “Naturalists and roaming forest rangers...” was a more popular response than “More signage in protected areas/public lands” with more than double the response rate. Signage was the least popular answer, indicating that signage is less effective than other methods of communication. The results suggest that naturalists available for communication in populated tourist destinations are more effective than signage because naturalists are more personable, easier to understand, add a human element to conservation efforts, and prompt further education/questions. The Southern Appalachian Highlands Conservancy has a naturalist internship in place at Roan Highlands during the busy summer months.

A survey question asks, “What do you think is the biggest challenge facing public lands in NC?”, participants were allowed to select as many responses as they wanted as well as write their own responses. “Funding” followed by “Ecological degradation” were the most popular responses to this question. Lack of funding for public lands is an ongoing concern and is partially responsible for other issues that face public lands, such as accessibility, poor/underpaid management, dissatisfaction with facilities such as bathrooms, etc. The lack of community engagement within public lands causes a lack of funding which in turn causes a myriad of other issues associated with public lands, such as poor management and ecological degradation.

Photography has played a vital role in the development of the survey as well as this entire creative-hybrid research project. Photography is an accessible, approachable, and obtainable medium with most people in America having access to the internet as well as phone cameras. In a world that has become increasingly digital and image-based, photography with meaning and significance has become more important than ever. Survey participants responded positively to images, including multiple comments expressing their enjoyment of the images.

During the COVID-19 pandemic, Max Patch (Image 6) suffered from intense heavy use and overtourism. Max Patch is a mountain in North Carolina approximately 90 miles away from Roan Highlands, containing very similar fragile ecosystems to the Highlands. A photo (Image 6) taken by Mike Wurman of the degradation that Max Patch suffered activated the entire community of Western North Carolina to take action to protect Max Patch. This entailed the US Forest Service shutting down visitor use of Max Patch for a period of time, as well as restricting the number of visitors. The US Forest Service suggested Roan Highlands as a location for my project because of the overtourism that its sister location, Max Patch, had suffered. A single photo inspired an entire community to come together and protect a beloved public land.

Photography can be a very powerful tool for communicating ideas, including environmental degradation and conservation efforts. This research project has found that supporting local artists (including photographers) can have a huge positive impact on community involvement. Based on the survey, literature review, and the results of this project, we need an increase in funding, education, and community engagement to better support our public lands.

## Conclusion

From May through August of 2023, I conducted research regarding the impacts of tourism in Roan Highlands, NC and the importance of photography and community engagement to create better stewards of public lands. My research included traveling to Roan Highlands and capturing photographs, as well as a survey I posted around Asheville, NC., and distributed through the NCEE email newsletter. Survey results indicated that participants prefer pristine images of nature compared to disturbed ones, signage is moderately effective, and public land users want more funding, roaming naturalists, education, art, and ecological protection regarding public lands.

Photography has been essential to this research project and survey. Photography has deep roots in land conservation, inspiring one of the first environmental protection acts and the creation of the US National Park System, as well as current day conservation efforts, such as Max Patch, NC. Photographers and artists are indispensable to our communities not only to help educate the public about environmental challenges, but also in helping to cultivate an appreciation for nature, inspiring others to visit public lands, and documenting these places for future generations.

Based on the results of this research, further research should be done examining the role of art in community engagement, specifically within public lands. Research should be conducted to better understand how people can connect with public lands more, and the effectiveness of signs compared to naturalists.

Encouraging good stewardship of public lands is one of the most important things we can do as a society. Public lands and wilderness areas help to mitigate the emerging climate crisis by providing valuable carbon sinks, habitats, and refuges for endangered species. Protecting public lands is essential for human well-being, species richness and abundance, and the overall health of our planet. Designated protected natural areas ensure that these beautiful landscapes and species will be available for future generations to witness.

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