Role of the Visual Arts in Conservation Research

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Abstract

This project's purpose is to display the role of the visual arts in increasing accessibility to and engagement with conservation research. This project is working in coordination with the Global Vegetation Project (GVeg), which is an open-source, online global repository of vegetation photography. GVeg allows anyone worldwide to submit vegetation photography with accompanying information on the location and species contained within the photo. Climate and biome data are then added to accompany these photos. This form of citizen science displays an influential means to promote engagement with conservation research while celebrating the diversity of plant life worldwide. To supplement this body of research, the goal of this project is to provide GVeg with a significant contribution of Wyoming vegetation photography. In doing so, I will be creating a record of Wyoming vegetation in areas where photo submissions are currently lacking. Thus far, I have submitted 55 photos from June 2021 to March 2022 that are representative of several locations throughout Wyoming, with each submission requiring a classification of vegetation type and species identification. This contribution allows for a more complete representation of Wyoming vegetation that can be utilized by conservation researchers as a tool for tracking species migration, as well as increasing accessibility to Wyoming vegetation data. My photo submissions are supplemented by an artistic reflection that discusses how my photography became a meaningful way to display the diversity of plant life in Wyoming, engage in citizen science, and promote the role of the visual arts in conservation research.

Keywords: visual arts, citizen science, conservation, photography, vegetation

Project Background

I began pursuing a biology degree with the intent of aiding in global conservation efforts and bringing awareness to the issue of climate change. I had intended to achieve this goal through research, publication, and teaching in a higher education institution. However, as my college experience increased, I realized that if I want to make an impact in the field, I need my research to be seen by more than my peers and professors. I need my research to be seen by a broader audience. The answer to this conundrum presented itself as I began contemplating potential topics of interest to complete the Honor's Capstone project. When I discovered the creative options available for completing this project, I realized that my photography skillset held the key to reaching broader audiences in a meaningful way. This sentiment proved to be a shared ideal with Professor Daniel Laughlin's Global Vegetation Project.

Prior to starting this project, I had been introduced to the Global Vegetation Project during an Ecology course taught by Professor Daniel Laughlin. I was deeply inspired by the idea of a global citizen science project, as it showed me a very tangible way to promote engagement with conservation research in a large-scale and easily accessible manner. As such, I decided to align my interests with the Global Vegetation Project and complete a capstone project that would act in coordination with the goals of the Global Vegetation Project.

For background, the Global Vegetation Project is an open-source, online global repository of vegetation photography available through the University of Wyoming Biodiversity Institute website (https://gveg.wyobiodiversity.org/). The Global Vegetation Project allows for the submission and viewing of vegetation photography worldwide. Each photograph submission is accompanied by corresponding climate data (both historic and recent), as well as ecoregion classification. This form of citizen science as a means of supplementing climate change research

holds important implications. Namely, The Global Vegetation Project makes use of the visual arts as an influential means to display and celebrate the diversity of plant life worldwide. Furthermore, it provides an accessible way for anyone to take part in conservation-based research globally, both through photo submissions and from an educational standpoint.

The creators of the Global Vegetation Project place an emphasis on the educational uses of the application for remote viewing of global plant communities. The creators posit that the combination of photography and climate data make for an intuitive way to explore ecological patterns (Wessel et al., 2021). As an educational tool, the Global Vegetation Project could be used for K-12 as a way of sparking interest, as well as interacting with various biomes and seasonal changes in vegetation composition (Wessel et al., 2021). The project could also be used at the university level as a research aid or as an educational tool to explore data and photos associated with relevant course topics (Fleri et al., 2021). The implications of the Global Vegetation Project are extensive, however, there is one primary limiting factor; several more photos are necessary to create a more inclusive global experience. This limitation poses as the primary initiative behind my Honor's Capstone Project.

Methods

I expressed my interest in the Global Vegetation Project to Dr. Laughlin and offered my photography skillset as a means of expanding the current catalog of Wyoming vegetation. We established a goal of 50-100 photos, with the majority coming from local areas, such as Vedauwoo, Snowy Range, etc. I was limited by time constraints as to the number of long-distance trips I could take to more distant areas of Wyoming. However, Dr. Laughlin and I established the most important distant areas for me to photograph, so that I could focus my time

and efforts toward those select areas. In particular, photo submissions were lacking in the Red Desert Basin, the Sierra Madre Mountains, the Bighorn Mountains, and more northern areas such as Jackson. As I began this endeavor, I decided to utilize a case study approach to actively contribute to and discuss the implications of the Global Vegetation Project. In particular, I have sought to discuss the implications of the Global Vegetation Project in regard to the role of the visual arts in conservation research.

Prior to the start of my Capstone project, my photography skillset came primarily from my occupation as a social media content producer, as well as my own personal endeavors. As such, my skillset was largely based around product photography, portraiture, venue events, and creative urban photography. Throughout my social media career, I have utilized a Sony a7III camera body, with a combination of a Sony Carl Zeiss f/1.8 55mm lens and a Sony FE 28-70mm f/3.5-5.6 lens. I had built this camera setup with versatility in mind, so I was able to utilize this same setup for the completion of my Capstone project. I shoot all my photos using manual settings to ensure optimal exposure, focus, and white balance. I was also able to utilize the same editing platforms; Adobe Lightroom, Adobe Photoshop, and Luminar AI. As such, I was quite comfortable in my ability to use a professional camera and associated equipment. However, I quickly discovered the unique challenges posed by nature photography.

Creative Challenges and Rewards

Most prominent of these challenges was an almost complete lack of control of the subjects and the environment. In my past social media experience, the lighting was consistent, I could pose the subjects, and I could quickly make any environmental changes necessary to create an ideal photograph. In nature photography, the subjects, weather, and lighting are in a state of

constant flux. The time constraint posed by seasonal changes meant that waiting and planning for ideal conditions was not an option. As such, I updated my photography kit to include basic weather-proofing measures and more than once I found myself forced to shoot in challenging weather conditions. The learning curve for nature photography was steep, however I learned several new techniques to become a more versatile photographer. These techniques largely revolved around learning what time of day would correspond to the lighting I desired, as well as paying attention to geographical features that would enhance or reduce the intensity of light at a particular location. Furthermore, I learned various new editing techniques to further enhance the lighting of a given photograph and enhance the sharpness of small details to aid in species identification.

I was further challenged by the physical constraints of some locations simply being inaccessible to the public. The first step of my creative process for any outing was to identify areas of interest on a virtual map. I found that restrictions often were not indicated on these maps, or the areas were simply just inaccessible at the time due to road or trail blocks. This issue was especially prevalent during my excursion to Jackson, as public and private areas are interspersed seemingly at random. As a result, I was unsuccessful at cataloging vegetation in multiple areas of interest that I had planned to photograph.

The most challenging, yet most rewarding aspect of this project was adapting my creative process to yield photos that were both functional for cataloging species, as well as visually appealing and artistic for embracing the role of the visual arts. Prior to this Capstone project, my creative process involved identifying the subject (a product or a person), identifying what aspects of the subject were to be the focus of the photo (advertising or telling a story), choosing a location with conducive colors, lighting, and mood, and finally shooting the photos utilizing

various compositions to obtain variety for later editing. As most of my photos were utilized for professional social media, the main priority was creating aesthetically pleasing photos that would catch the eye of the viewer.

However, as I began nature photography, I had to take into account the uncertainty and chaos of creating the perception of an ordered composition within an inherently unordered environment. As such, I adapted my creative process to become more free form. I would arrive at a location with basic knowledge of the landscape and ecosystem. I would then spend a large portion of time exploring the location with the goal of finding diversity hotspots, where I could capture multiple species in one photo. I would then circle around these hotspots and identify directions that gave the most appealing light, and I would attempt to create a pleasing composition. In essence, most of the artistic work for professional social media came from building the set and thus being able to establish the exact composition I have in mind prior to even holding the camera. In contrast, nature photography inherently means that the "set" has already been established. The artistic work now comes entirely from where I position myself in relation to the subject, and how I use existing features to compose the photo.

The issue with creating composition is that it is largely dependent on what the theme/purpose of the photo is. For cataloging species, I found it best to use wide angle shots and utilize a deep focus to keep the majority of the frame in focus. However, creating visually appealing and aesthetic photos typically requires a separation of subject and background. This entails using a shallow focus and narrowing in on the subject. This posed as an issue due to the opposite nature of these approaches. To resolve the conflict, I would often switch between lenses or return to locations twice with my priority switching between cataloging species and creating aesthetic compositions. This aspect was absolutely the most rewarding part of the project as

practicing and balancing these two styles yielded significant learning progress in photography techniques.

Despite the challenges I faced during my goal of collecting and submitting photos for the Global Vegetation Project, the underlying theme of my Capstone project prospered. At almost every location I photographed, there was a moment of artistic serendipity in which the composition, lighting, colors, and mood of a photograph came together to embody the innate beauty of a given ecosystem. Those select few images would display the importance of the visual arts in conservation research as a tangible piece of nature that could touch the mind and soul of the viewer in a way that research literature simply cannot. Those photographs stand as preserved snippets of an ecosystem's balance, which can potentially inspire the viewer to become involved in conservation efforts, or at the very least, spark curiosity into the idea of conservation. That is the role of the visual arts after all; portray what words simply cannot, with the hope that such an experience will speak to the viewer on a deeper, more personal level.

Sharing the Work at Coal Creek

This critical role of the visual arts of course requires an audience to view and resonate with the art. As such, I decided that a public-facing venue to display and sell my photography would best suit the goals of my project. After exploring potential venue options, I decided to host my venue at Coal Creek Coffee Company. My reasoning for doing so is that Coal Creek Coffee Company often holds community events that bring light to important topics. Furthermore, Coal Creek already allows individuals to display and sell their art. These factors led me to believe that Coal Creek would be the best venue for my project.

After establishing a venue location, I began the process of editing, printing, and framing my photos in a professional manner. I decided to utilize local shops for both printing and framing; Digital Blues Print Shop and Gallery West & Frame Plant, respectively. This portion of the project proved to be both a challenge as well as an excellent learning experience. My prior experience with photography was exclusively based on digital formats, which meant that I never needed to learn the specifics of printing photography. I learned that the materials and ink used in printing can have a significant impact on the saturation and brightness of photos. With the guidance of the shop owners, I was able to adjust my photos in a manner that would preserve the level of saturation and brightness I desired for my final photos. I also had to learn how the level of gloss of the printing material would affect my photos and adjust my photos further to account for any potential aberrations.

I had a further learning experience when choosing the frames and glass for my photos. As with the printing, the type of glass used, and the color of the frames can affect the perception of clarity, color accuracy, and brightness. Unlike with printing, these differences are largely based on perception, so I was unable to just edit my photos as I had before. I now had to learn what frame colors and materials would best complement each photo. I then had to learn the difference between glossy and matte glass types and how each would affect different aspects of the photos. With the guidance of the shop owner, I was able to successfully choose the best combination of glass and frames to highlight the printed photos. This combination included minimalist style aluminum frames in varying tones and high-gloss, clear glass. In total, I chose to print seventeen of my photos, eight of which I had framed and the remaining nine I had placed in shrink-wrap. My reasoning for doing so was to highlight the most impactful photos with the frames, but also

provide some unframed options should potential buyers at the venue prefer to frame the photos themselves.

Through these challenges, I received boundless opportunities to become an improved and more well-rounded photographer. The choice to pursue a creative option for my Capstone project was incredibly intimidating. No matter the medium, every artist can relate to the pressure that comes with performing their respective craft in a setting that inevitably involves some form of critique. However, I realized that choosing the classic, scholarly approach would likely have been unfulfilling for me. Furthermore, the opportunities I've received in completing a creative capstone have strengthened my passion for photography and have given me a skillset to pursue professional photography endeavors. I now also have the skills and the knowledge to implement photography into my passion for conservation research. In doing so, I can effectively utilize the visual arts to supplement my future academic pursuits.

In particular, I can visualize myself applying these skills and knowledge as a way to garner support and engagement with my own conservation research. Through this project, I have cultivated a deep appreciation for the importance of citizen science. As with the Global Vegetation Project, citizen science allows participants to feel that their individual actions are meaningful in the furtherance of conservation research. This personal attachment brings a sense of motivation to continue engaging with conservation research in a meaningful way.

Especially with the Global Vegetation Project, engagement can be as minimal or as involved as the individual sees fit. Those with an appreciation or the aptitude for photography can follow a similar path as I, and endeavor to photograph locations that are missing from the repository or explore areas that are far off the beaten path. Those with an interest in botany can endeavor to photograph and catalog certain species or vegetation types. Or those with just a

blooming curiosity can use the Global Vegetation Project website to explore vegetation worldwide and gain an appreciation for the sheer diversity of vegetation the world has to offer. Citizen science offers a means to get involved in whatever capacity the individual sees fit, and I believe the skills and knowledge that I have gained in photography can foster this desire to engage in citizen science.

Results

In total, my Honor's Capstone project has contributed 55 photos to the Global Vegetation Project. These photos are representative of broadly six locations in Wyoming: Red Desert Basin, Vedauwoo, Snowy Range, Jelm, Jackson, and Grand Teton National Park. Given the time constraint posed by seasonal changes, I failed to photograph vegetation from the Sierra Madre Mountains or the Bighorn Mountains before the submission date of my Honor's Capstone Project. However, to fulfill my agreement with Dr. Daniel Laughlin, I still plan to photograph these areas following the completion of my Honor's Capstone Project. While these photos will not be included within this project, they will be available to the public in the form of submissions to the Global Vegetation Project.

Despite this shortcoming, this project has deepened my artistic knowledge and has allowed me to gain experience in using the visual arts in a conservation effort, and as a final step to this project I will be showing a selection of photographs that I had submitted to the Global Vegetation Project at a public-facing venue. In doing so, I will be demonstrating a meaningful collaboration between conservation research and the visual arts. This collaboration represents the bringing together of citizen science and the visual arts as a means of bringing widespread awareness of conservation research to a more diverse audience.

The primary objective behind this public-facing venue is to remove the precedent of this work being associated with a strictly academic audience. With my photos being the centerpiece of this venue, I am seeking to let the natural world speak through the photos. In doing so, I am demonstrating the collaboration between conservation research and the arts in a manner that allows for appreciation and engagement with the content regardless of the academic background of the audience members. My goal being that the audience can hold appreciation for the vegetation captured in the photos, which can foster curiosity about conservation research, and particularly citizen science projects such as the Global Vegetation Project.

Afterall, it is this goal that allowed the arts to influence my decision to pursue a creative avenue in the completion of my Honor's Capstone project. I sought a way to increase accessibility to conservation research in a meaningful way, and the arts held the key to doing so. In discussing my project with those around me, I have noticed a consistent theme of their intrigue and appreciation for my artwork transitioning into curiosity regarding the Global Vegetation Project. When they learned that they too could submit photos and play a role in conservation, their curiosity transitioned into motivation. I have yet to hear if any of these individuals have made photo submissions, however, simply being able to effectively use the arts as a bridge to introduce engagement with conservation research demonstrates a success in my goal.

The goals and theme of my project came together as a successful culmination in the showing of my artwork at my Coal Creek Coffee Company venue. The attendees were made up of students, recent graduates, professors, and largely the general public. This enabled me to foster conversation regarding citizen science and conservation research to a diverse audience with varying levels of academic background. In doing so, I was able to utilize my artwork as a

way to spark intrigue into projects like the Global Vegetation Project and discuss ways to get involved in varying capacities.

Importantly, I was able to converse with three undergraduate students who had an interest in photography, but felt that their experience and skills were not sufficient to engage in similar work as I. However, we looked through my selection of photos and I explained the creative challenges that I overcame during the course of this project, and that many of the skills I now have is due entirely to the experience this project has provided me. This interaction embodies a huge success in my project. I was able to successfully use the visual arts to inspire curiosity and action towards the furtherance of citizen science and conservation research. Furthermore, I have been able to successfully display the role of the visual arts in conservation research. Regardless of the challenges, setbacks, and shortcomings I've faced during this project, I have successfully inspired curiosity, garnered support, and promoted engagement with conservation research through my use of the visual arts.

Visual Arts and Conservation

Current research posits that the visual arts play a key role in the education of and awareness to the field of conservation research. Of primary importance is the use of the visual arts as a way to make scientific research more accessible to a wider audience. This idea is described in a research article by Corbett and Clark, in which they contend that "more is not better" in terms of scientific research in regard to engaging the public with conservation and climate change discourse. The authors argue that it is not simply a deficit of research that limits climate change engagement. Rather, the authors suggest that the method of communicating the

research is lacking. A more powerful statement is necessary to influence greater public engagement.

In addressing potential reasons behind limited climate change engagement, the authors propose that climate change is perceived as a massively complex threat. The sheer number of factors that play into the causes and the potential solutions of climate change can quickly demotivate individuals to act, as the problem appears too large in scale to address individualistically (Corbett & Clark, 2017). Furthermore, climate change is largely an "invisible" threat, as its effects are relatively slow and appear inconsequential or dissociated from the more tangible issues faced in daily life. Corbett and Clark suggest that the arts and humanities can be utilized to mitigate this "abstractness" of climate change in the public perception.

The ability to see and "feel" climate change requires modes of communication that portray the content in a more direct or personal way. One such mode of communication is the visual arts. Corbett and Clark assert that the visual arts, have the potential to spur social change in a direction that addresses climate change in a meaningful way. This is because the visual arts can reduce the dissociation from climate change by presenting the issue in a very direct manner. Reading a research paper about melting ice in the Arctic likely appears abstract and elicits little emotion from the reader. However, photos that show the rapid rate of ice melt and the affected species convey the severity of the issue more clearly and thus are more likely to elicit emotion in the viewer.

Beyond simply eliciting emotion, the visual arts can further act to simplify the abstract problem of climate change into a more comprehensible narrative, thus allowing viewers to relate the topic of climate change more readily into everyday life. When an issue is easier to visualize or comprehend, it can be easier to relate to on a personal level. Furthermore, research discussed

in a paper by Roosen et al., suggests that direct personal experience is central to enhancing the belief that individual action can aid in the problem of climate change. Viewing climate change related art can readily provide this direct personal experience. The visual arts in particular elicit the experience of personal relevance due to the lack of verbal information (Roosen et al., 2017). This means that viewers attach their own interpretations and narrative to the art, thus enabling a deeper personal connection.

Beyond the role of photography as a form of visual art, photography also serves a functional purpose in the field of conservation. Namely, photography can be used as a means of "preserving" a plant community for use by researchers. This practice of "rephotography" allows researchers to view photos that display the composition of a plant community at a given time and location and later compare it to the current composition of that location (Klett, 2020). In doing so, researchers can track the migration of species as climate change progresses. This yields valuable information about the rate of change within a given ecosystem in response to a warming climate.

Rephotography is typically very specific both spatially and temporally, meaning that a location is photographed repeatedly at exactly the same location at set time intervals (Klett, 2020). Despite lacking this careful specificity, the Global Vegetation Project can likely be used in a similar manner for future researchers. This is because photo submissions to the Global Vegetation Project require at least approximate coordinates of where the photo was taken. As such, researchers can use this global repository to identify areas or species of interest and return to the location that the photo was taken. Researchers can then compare the vegetation composition from the photo to the current composition. However, this facet of the Global

Vegetation Project is largely dependent on the contribution of photography by more individuals worldwide.

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