The Obscure Value of Nature within a Campus Setting: Unveiling Intrinsic and Extrinsic Stakeholder Values Concerning Native Flora Plots

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Abstract

The study of the effects of natural flora plots and their impact on the human body has been continuously researched. The published literature on this topic draws parallels between exposure to natural land and the effects on mental health restoration, emotional wellbeing, physical health levels, and a person's social development status. To gain a deeper insight on these different benefits, concluded in the published literature, we performed a study to evaluate how university stakeholders value natural grasslands. The study looked at this question from four separate lens mental, emotional, physical, and social. Through 6 individual interviews, data was collected to gauge stakeholder engagement surrounding the topic of natural grasslands through the perspective of a college campus. After the data was collected, clear correlations were drawn from the impact the natural ecosystem services, within the natural flora plot, provided stakeholder participants. Data were collected from the six interviews to determine our results using a coding system. The coding process reveals both positive correlations and a few negative correlations. The negative correlations appeared through maintenance and cost implementation, whereas the benefits overlapped all four lenses within the interview. The work provided was designed to contribute to future studies to understand further implementing natural flora plots at a university. Through past studies done on Natural Grasslands at Kansas State University and the potential for future contributions, the study of natural grassland implementation is a crucial tool when determining the value on a university level.

Keywords: Value, Stakeholder Engagement, Ecosystem Services

Introduction

Natural grasslands provide essential ecosystem services that support ecological diversity, crucial climate-controlling properties like carbon sinking abilities and contribute to an overall balance of the predator and prey cycle. Due to climate change and human activity, grassland ecosystems have dwindled worldwide. To counter the depletion of these ecosystems, different groups and organizations propose to implement natural grasslands throughout other urban areas. At Kansas State University, incorporating natural grassland landscape throughout campus has been discussed and considered multiple times. Due to community interest in dedicated campus spaces to natural landscapes, students in the Natural Resources and Environmental Science secondary primary dedicated their senior research projects to explore the possibility of implementing additional natural grassland spaces on campus. Past groups have pursued cost-benefit analysis, site selection, and outreach options to gain insight into the realistic prospects for natural grasslands to be implemented on K-States and other university campuses. A relative benefit of native flora spaces on campus compared to costs of non-native areas was revealed within the previous research. Although, the holistic value of tallgrass spaces to campus stakeholders is unknown. In this project, our group has worked to bridge the last group's study with a different perspective to create a comprehensive and complete body of research on natural grasslands in a college setting. Our research focuses on relating the impact of tallgrass plots and native flora on people through an explanatory case study.

The study focuses on the connection between humans and nature through four separate lenses, physical, mental, emotional, and social. Evaluating the individual lenses furnishes a unique view of how humans connect to nature and the outcomes in response to each special connection—breaking down the attributes involved in each individual's relationship with nature yields a more profound understanding that is unclear when viewed from a broad approach. Only when we evaluate the intrinsic and extrinsic factors from each lens can we determine the actual value associated with native flora plots and niches, revealing the benefit of tallgrass spaces and the value they have to the people.

According to Merriam-Webster Dictionary, value contains three different definitions. "Value is the monetary worth of something like the market price. It is also a fair return or equivalent in goods, services, or money for something exchanged. As well as the relative worth, utility, or importance of something" (Merriam-Webster, 2021). Value is a term that can be applied to a multitude of topics and has a variety of different meanings. When thinking through the influence natural plots of land have on university participants, the word value is brought up when discussing one's perspective of nature; how we determine value towards our surrounding environments shapes how we perceive the world.

To get a truly unbiased view of how university stakeholders perceive value within natural grasslands, our group conducted a series of six interviews. The stakeholder's perspective is represented by carefully selecting university participants to interview. Questions asked in the interview were designed to address how university stakeholders perceived the value of natural grasslands in the five lenses discussed above. From the interviews and extensive literature

research performed, our group was able to bridge the gap in the previous studies and examine 1) The impact on university stakeholders by the implementation of natural grassland on campus and 2) how university stakeholders perceive natural grassland and their value. These overall objectives allowed us to answer our overarching research question: How do staff, faculty, and students value native flora plots on the Kansas State University campus?

Literature Review

To understand the value people associate with native flora plots, they must first be defined. However, while the specific definition of native plants may be straightforward, the larger context of understanding how people, researchers, and philosophers understand nature, natural spaces, and how native flora fits into that understanding is much harder to articulate. Additionally, much of the research done that seeks to understand how people experience and describe nature, does not focus on one specific landscape or context. Thus, to fit this research into the larger picture of the literature on the impacts of, and values associated with, natural spaces, an understanding must be reached about how to define nature, native plots, and the larger discussions around nonnative versus native landscaping.

Defining nature has been a topic of debate dating back to the beginning of philosophical thought and continues today (Ducarme & Couvet, 2020). However, in the grand scheme of language, nature is a fairly new concept. Ducarme and Couvet write "most ancient records for this meaning are present mostly in classical texts, but never in archaic ones. Both the Greek and Latin words all seem to have come into use when all these languages had already reached their linguistic and philosophical maturity" (Ducarme & Couvet, 2020, p. 2). Modern definitions of nature in the western lexicon can trace their roots back to different schools of philosophical thought. The following table shares the most common definitions of nature and their philosophical origins.

Definition	Opposed concept	Close philosophical tradition[a]
The whole of material reality, considered as independent of human activity and history	Culture, artifice, rational intention	Post-romantic philosophy (Rousseau, Romanticism, Marx, transcendentalism, Muir...), often attributed to Christian tradition, and formulated by Mill. This definition is at the root of the "great divide" in Western academics.
The whole universe, as it is the place, the source and the result of material phenomena (including man or at least man's body)	Supernatural, unreal	Stoicism, Atomism, Epicurism, Taoism, Descartes, Bacon, Spinoza. Formulated by Aristotle and Mill.
The specific force at the core of life and change	Inertia, fixedness, entropy	Heraclitus, Hegel, Nietzsche, Darwin, vitalism.
The essence, inner quality and character, the whole of specific physical properties of an object, live or inert	Transmutation, denaturation	Alternate definition with distinct grammatical use ("nature of..."), too widespread to be assigned to specific traditions (see Aristotle and Mill)

[a]Related philosophical traditions are given as work examples, but their assignments are not definitive as most authors can be placed in several groups depending on the texts used as references (especially Aristotle or Hegel).

Figure 1. Definitions of Nature. Ducarme & Couvet, 2020 categorize three common definitions of nature found in western dictionaries and connect them to the main concept and philosophical origins.

Defining Nature

Working definitions of nature must go beyond dictionary definitions while still incorporating an array of philosophic ideas. For research not concerned with the more philosophical definitions of nature and rather the physical aspects, it is important to come up with a holistic definition. In a review of many studies looking at the affects of nature on people, Bratman et. al. defines nature as “areas containing elements of living systems that include plants and nonhuman animals across a range of scales and degrees of human management, from a small urban park through to relatively ‘pristine wilderness.’” (Bratman et. al., 2012, p. 120).

There is no single shared definition of nature in academic research, and thus when studying the impact of nature on people, researchers can use a range of conditions (Bratman et. al., 2012). For some, conditions may include showing pictures of natural and human made areas (Weinstein et. al., 2009). Others may put research subjects in physical locations (Bratman et. al., 2012). Due to the difficulty in defining nature, some researchers have tended to use the term “green space” to denote spaces that have varying degrees of biodiversity in the present flora (Irvine et. al.,2009).

Since the characteristics of a given green space can affect a person’s reaction to it, the different categories of greenspaces should be clearly defined. Located in the heart of historic native grasslands, K-State has many species considered native to the region. In an annotated checklist and categorization of Kansas tallgrass prairie species, Towne details the 576 species present at the Konza Biological station (2002). Towne finds “40.6% of Konza Prairie plants are characteristically associated with prairie grassland, followed by disturbed (22.4%), woodland (22.2%), and wetland (14.8%) habitats” (Towne, 2002, p. 274). Additionally, the biological station includes three taxonomic groups, some of which include nonnative (introduced) species.

Mental

A university attracts an array of individuals, but it is predominantly composed of students pursuing both academic and professional pursuits within this context. Traditional college students are more sensitive to specific stressors every day in a university setting—leading to increased mental health issues and illness. A systematic review of studies of depression within college student conducted within the Journal of Psychiatric Research found that depression affected nearly a third of university student bodies. The percentage of students with the depressive disorder was 21.6% higher than general population percentages (Ibrahim et al., 2013). Without outside intervention, research shows that individuals may start to feel alone. In students', feelings of isolation, depression, and anxiety lead to increased rates of failing classes and dropping out (Ibrahim et al., 2013). Since students spend much of their college life on campus, it is essential to understand how their everyday environment affects their wellbeing.

Throughout many studies, researchers have found benefits natural spaces can have on mental health. A study performed in 2021 at K-State continued to illustrate this correlation when evaluating students' stress and mental health levels with perceived auditory biodiversity. The

students experienced restorative impacts due to decreased stress levels after viewing the area with additional levels of auditory biodiversity compared to manicured landscaping. As a result the test revealed students viewing the videos with any biodiversity reported back noticeable improvements in their mood (Ha & Kim, 2021).

The usage of nature can also provide academic assistance in helping boost cognitive functioning. Over the years, teachers have become more attuned to the correlation between test anxiety and low-test scores. Positive mental health consists of a variety of indicators, including stress and fatigue levels which can influence how successful a student is academically (Lehtinen, 2008). Although these indicators are a small portion of what makes up positive mental health, they are examined in more depth due to their correlation to university life and mental health. Exposure to nature has already been proven to reduce stress and fatigue levels, but these results usually occurred when participants were surrounded by nature, not indoors, taking a test. To find a solution researchers studied students and their stress and fatigue levels when exposed to windows with views of nature compared to other classrooms without windows or without green views (Li & Sullivan, 2016). The study found that students exposed to the outdoor green space had a quicker recovery to stress and lower levels of fatigue. In a similar study researchers who wanted to examine the effects of individuals exposed to nature and cognitive abilities when diagnosed with Attention-deficit/hyperactivity disorder (ADHD) showed similar results (Taylor & Kuo, 2009). It was concluded that concentration levels were higher when participants were asked to walk through the park. In both studies the importance of nature on a college campus is illustrated in improved cognitive abilities in individuals with varieties of mental cognitive abilities and struggles.

When examining the results from multiple studies biodiversity plays a crucial role in how humans interpret nature. When biodiversity increases, mental health indicators also increase. However, the correlation between biodiversity and mental restoration levels in response can be puzzling considering people have varying degrees of understanding of biodiversity. One study estimated that over 90% of just the United Kingdom lived in urban areas with very little exposure to biodiversity (Dallimer et al., 2012). To better understand the innate human response to biodiversity Dallimer performed a study to determine the variables that contributed to this phenomenon. The study found that participants who had an understanding that they were amongst a great variety of species were able to experience the benefits of better mental health even without being able to name a single species. Through auditory and visual cues, individuals understood that they were experiencing a variety of species around them without having the past experience of this situation or the knowledge of the species. Another study replicated these results when researchers conducted a study to test their hypothesis that the student perceived greenness of their college campus would directly relate to their quality of life and, therefore, their mental restoration on campus. Using three different campuses with different levels of nature and greenness, they inadvertently tested each campus's biodiversity (Hipp et al., 2016).

Emotional

Under the umbrella of green spaces benefitting emotional needs of users, comes the idea of mental health and well-being. This term is often hard to define, since in academic literature "there is no universally agreed definition for mental health and well-being" (Wendelboe-Nelson 2019, 30). Nonetheless, this is still an important topic to be covered, because of the impacts it can have on each individual. The study itself aims to identify knowledge gaps and mapping connections that the more narrow-focused ideas of green spaces don't reach (Wendelboe-Nelson 2019, 2).

Putting aside a solid definition of well-being, there are still demonstrated positive impacts of natural spaces on mental health. Significant mood changes were reported after a 20 minute walk in a natural setting, negatively connotated emotions significantly decreased and positively connotated emotions strengthened (Abdul, 2021. Students are also found to use green space to "alleviate stress" and "wish they could visit green spaces more often" (Holt, 2019, p. 4), associating green spaces with students' health and well being. Lastly, they found a "significant positive coefficient path" using a structural equation modeling software to input data gained from self-completion surveys asking the effects green outdoor campus spaces have on them. It is found that what attracts people to green space is often for "recreation and exercise, finding a calm and relaxed place, and social relations" (Rahnema, 2019, p. 103). It is shown that "higher levels of neighbourhood green space were associated with healthier mean cortisol levels in women… while also attenuating higher cortisol levels in men."(Roe, 2013, p. 4087)

Physical

Exposure to natural spaces has also been shown to increase the physical health of individuals by a variety of measures. Cardiovascular health had moderate improvements based on the amount of long-term exposure to natural environments (Aerts et al., 2018). Diversity of greenery inside natural spaces also reduced asthma and trained the immune system, causing less allergies, both of which had an effect on cardiovascular health through improved breathing and reduced pollution (Aerts et. al., 2018). Cardiovascular disease risk was found to be reduced when neighborhoods contained greater than fifteen-percent "green space availability". This included a ninety-five percent confidence interval for neighborhoods that had thirty-three to seventy percent green space (Richardson et al., 2013). In a study using GPS data to map children's physical activity, close by green spaces greatly increased physical activity prompting an assumed increase in cardiovascular health (Almanza et al., 2012). Greening a space was found to statistically increase exercise and reduce stress, both of which play significant roles in overall cardiovascular health (Branas et al., 2011).

Hartig et al. (2014) discusses the psychological motivation of physical activity providing a perceived benefit in not only the long run, but also in the short run via chemical releases and a reduction in tension and stress. This correlates strongly to increased physical activity spent in natural environments, given natural environments are socially perceived as correlated to various

physical exercises. O'Brien and Forster (2021) research found a general increase in time spent outdoors in natural environments, the greatest correlation being walking. Almanza et al. (2012) found a strong correlation between increased physical activity and the availability of green or "smart" spaces in proximity to living areas of children. Triguero-Mas et al. (2015) however, found no correlation between physical activity and increased green spaces. Branas et al. (2011) found a correlation between greening vacant lots and the amount of recorded physical activity.

Hartig et al. (2014) examines the connected pathways that may or may not relate to direct and indirect causes of diseases, including coronary heart disease, CVD, and cardiovascular disease. The research suggests it is possible for different pathways of action to effect disease even without conscious and intentional engagement with natural spaces. The research warns of the multitude of factors and suggests it is very difficult to pin natural spaces to a direct and evidence-based conclusions about diseases, however research (including their own) suggests there is possible complex relations. Aerts et al. (2018) discussed reduced vector-borne disease in association with species and natural diversity found in previous studies and the association with chronic inflammatory diseases in children with reduced or little contact with natural environments. They also discussed the exposure to beneficial microbiota in 9 the environment and the resulting effects on disease in other studies. Their research concluded that while there are pathways of environmental microbiota affecting different diseases, there is limited and conflicting evidence about biodiversity and microbiota affecting infectious disease. Richardson et al. (2013) found a decreased risk of cardiovascular disease in all neighborhoods with greater than fifteen-percent green space availability, with the resulting confidence interval scaling upwards from ninety-five percent with increased percentages of green space.

Hartig et al. (2014) examines how stress reduction interacts with nature related pathways involving health. Stress was found to be a direct pathway connected to social contact, contact with nature, the natural environment, and health and well-being. Hartig et al. argue that through providing resources, increasing physical activity, and distancing from society, stress is found to be reduced in multiple studies in relation to increased green spaces. Pasanen et al. (2014) explores previous research's involvement in studying stress reduction at both physiological and psychological levels. It is argued that these findings intertwine with the general improved well-being and a variety of factors related to neighborhood greenery, including perceptions and distances. In the discussion section, Richardson et al. (2013) discuss the associations of living in a greener neighborhood and its mechanisms in correlation with reduced stress from other studies. Given their study is the first to find a positive relationship between general health and green spaces in New Zealand, they discuss a multitude 10 of other areas of needed further research, one of the most important of which they argue is stress associations.

Social

There were several social benefits found during the literature review: social interaction, education, tourism, safe communities, cultural impacts, reversing social decay, social outdoor activities, and solitude and relaxation.

There exists a long history of using green space for social gathering. From hay harvests to park visits, culture rely on outdoor spaces to build social cohesion (Bengtsson et al., 2019 and Dade et al., 2020). According to Bengtsson et al. (2019), protected grasslands can host important recreational sports like bird watching, hiking, and hunting. These activities can be performed alone or with other people. People could watch birds, hunt deer, or hike alone for some peace and quiet while doing a favorite hobby, or they could share that hobby with their friends and strangers and build stronger social bonds together. Dade et al. (2020) found that people are more inclined to use parks for social interactions which have a high number of public toilets, seating, barbeques, and playgrounds for children. Camps-Calvert et al. (2016) determined that natural spaces are particularly good for recreation because they don't cost any money or health, unlike other leisure activities like going to a bar. They also found that gardening is a great social outdoor activity that entire families and communities can participate in.

Dade et al. (2020) found that tree cover decreased the use of parks for relaxation while park facilities and amenities increased visits for the purpose of relaxation. Park vegetation characteristics, such as high tree cover and complexity in vegetation structure have been found to be associated with longer visits for more nature-based activities. Green et al. (2016) found that expanding and diversifying green spaces is an important aspect of linking the social ecological components of resilience in urban systems, and through repurposing vacant land as sites for urban green space, patterns of social and environmental decay may be reversed and bring with them an array of ecosystem services. In an urban mosaic of green spaces, connecting patches together is a great way to maintain or increase the flow of ecosystem services associated with the green spaces.

Methods

This non-research course project and the involved procedures were reviewed and approved through Institutional Review Board requirements (IRB #10879). The research team used an explanatory case study framework to answer the established research question: "What are the key intrinsic and extrinsic stakeholder values regarding native flora plots on Kansas State University's campus?". Within this section, descriptions concerning the employed qualitative research design involving an explanatory case study framework, initiated data collection processes, completed data analysis techniques, and associated methodological procedures to continuously address the importance of validity throughout all involved stages in our research are discussed.

Explanatory Case Study Framework

This research applied an explanatory case study framework due to its provision of opportunities in detecting or unveiling correlations between concepts in real-life settings that reflect a notable level of complexity and diversity in their existence and perceived experiences as completed by individuals (Yin, 2014). Specifically, an explanatory case study framework diminishes researcher control and allows for free-flowing of information from the phenomena

and/or the research participants (Yin, 2014). An explanatory case study framework also offers an ability for researchers to explore deeper connections while remaining inside appropriate legal and academic boundaries and guidelines (Ebneyamini, 2018) which was an overall effective and unbiased methodology that allowed us to better answer the focus research question.

Qualitative Research Approach

We chose a qualitative research approach to understand the multifaceted and complex facets K-State stakeholders value native flora plots on campus, including asking questions regarding social, physical, mental, and emotional connections to the native flora plots. Qualitative research allowed our research team to unveil both intrinsic and extrinsic values while also discovering meanings and connections between each "lens", which was afforded by the design and allowances of qualitative research (Merriam, 1998).

Research Design

This section discusses the participants, research setting, the process of conducting semi-structured interviews, and the analysis of data.

Research Participants

Participants were selected through intentional or purposeful sampling to create shared, applicable, and relevant information to answer the focus research question and acquire relevant information. Therefore, three specific sources were chosen to be involved in this research: 1) academic faculty, 2) maintenance staff, and 3) students involved in academic pursuits within a natural resource and environmental-based degree program. In each source, one to two participants were interviewed for a total of six interview participants.

These participants were carefully chosen to represent diverse viewpoints and stakeholder values of different teams and departments of K-State to gather an array of characteristics and values while also reflecting on shared commonalities and traits.

Research Setting

The research was conducted via interviews both on campus and using Zoom software. Participants were not asked to interview in a certain location- all in-person interviews were conducted in the environment on campus determined by the research participant. Zoom interviews were conducted in any environment decided individually by both the researcher and the research participant. The researcher and the research participant were alone or in some cases were joined by an additional researcher per IRB approved methodology. No audience or outside participants were involved in any interview.

Semi-Structured Interviews

Semi-structured interviews were used to pose core questions as determined by literature-based topics under each “lens” while also asking probing questions to the participants as needed. This interview style was chosen as most appropriate due to its nature of requiring a planned set of questions while also allowing a minor amount of flexibility to assist and gain further explanation and clarification from participants, which also fits into the explanatory case study framework (Yin, 2014). Given our qualitative questions were intentional and posed with no leading, assumptive, or coercive wording, this allowed us to further probe as appropriate when participants brought up an experience or answer without providing clarification or depth (Ebneyamini, 2018). Semi-structured interviews allowed us to pull rich depth and this descriptions or information from participants that might otherwise have never been studied (Strauss & Corbin, 1998).

Each interview occurred with each participant individually. First, participants were asked to provide a pseudonym prior to turning on the recording device. Participants' real names or identifying information were not used anywhere throughout the interview or the respective transcription document. participants were encouraged to never answer a question if they were uncomfortable or did not care to give a response for any reason whatsoever. participants were reminded of the purpose of the interview and were informed that they could terminate the interview at any moment at their discretion. Participants were also reminded that their identifying information is confidential and protected.

After approval, the recording device was enabled to begin recording and the interview questions were asked in order from the first section through to the last, with clarifying or probing questions asked as appropriate. Researchers wrote down notations during the interview as needed and appropriate. After asking the final question and receiving a response or not receiving a response, the interview was ended and the recording device was turned off. Data was then transferred from the recording device to an encrypted storage device (i.e. password-protected device) with the data then immediately being deleted off the recording device.

Interview duration ranged from approximately 30 minutes to one hour. Each audio recording was transcribed using the transcription module provided within the qualitative data management and organization software of NVivo (Version 12) to prepare the data for further analysis and assessment. Accuracy of the transcripts was then reviewed by each researcher through manual evaluation methods and corrected as needed per qualitative guidelines and processes (i.e., iterative review of the acquired data and use of trustworthiness processes, such as peer debriefing). Accuracy was established and progressed as a mainstay within this endeavor, as accuracy in transcripts is critical for overall credibility, validity, and proper interpretation of the interview to ensure the sentiments of the participants are appropriate and representative (Mishler, 1986).

Data Analysis

Data was analyzed using a deductive coding method. This process involved using the interview transcriptions to first count the appearances of a word or phrase to find commonalities and relationships throughout each individual interview transcription document. Initially, a single interview transcription was used to form an initial table code, with further interview transcriptions then being compared against the initial table code one-by-one in order to find matching words and phrases. This process was then repeated until all interview transcriptions were coded. Words or phrases that did not have a single match outside their own interview transcription were color coded and added to the bottom to show origin and differentiation.

Establishing Trustworthiness

To complete trustworthy and credible research, we used multiple qualitative methods while focusing on core qualitative approaches and criterion outlined from Krefting's *Rigor in Qualitative Research: The Assessment of Trustworthiness* (Krefting, 1991).

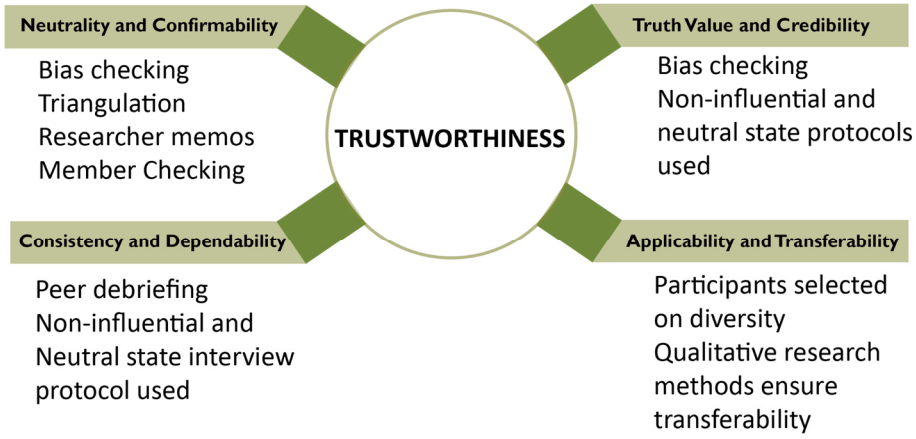

Figure 2. Comparing criteria of research based on the qualitative or quantitative approach, utilizing Krefting (1991).

To confirm *truth value* and establish *credibility*, researcher bias, opinions, and influence were consistently checked by other researchers in open review format. Inside interviews, researchers were not allowed to react with any body language or verbal communication that could influence answers from participants in any possible fashion.

To confirm *applicability* and establish *transferability*, participants were intentionally selected to be diverse and represent multiple viewpoints and departments within K-State. Qualitative research methods were followed strictly in order to ensure future related research has transferability and can draw upon findings and methods used within this research.

To confirm *consistency* and establish *dependability*, peer debriefing was iteratively utilized to ensure quality and accountability. Researchers executed all interviews following the protocols set forth to maintain a non-influential and neutral state (i.e., verbal and non-verbal) outlined in the methods chapter above and in alignment with qualitative guidelines through the employed framework.

To confirm *neutrality* and establish *confirmability*, bias was consistently checked by all researchers using triangulation and researcher memos. Member checking was utilized, which involved sending out the appropriate finalized interview transcription to each participant and receiving full validation of the document.

Results

Table 1: Demographics

Demographics		**Data (Percentage, Range)**
Mean Age:		38.3 (21-53)
Ethnicity:	Caucasian	100% (6)
Gender:	Male	50% (3)
	Female	50% (3)

Table 2: Natural Lens Code Words

Initial Code	Subcode	Frequency
Natural:		
	Plant(s)	65
	Native(s)	61
	Meadow	31
	(Eco)system	20
	Spring	10

Looking through a natural "lens," numerous codes were iterative in their presentation by participants to support the existence of significance, as shown in Table 2, while other codes were conveyed in a reduced frequency while still reflecting insightful sentiments.

On the question of how to define nature Lydia mentioned how, "... I think it's important to include people [in defining nature] because they are part of that ecosystem."

Stormwater, Natasha, Lydia, and Mike Lee were knowledgeable regarding the impact natural plots have on stormwater and runoff, with Stormwater saying, "You know, I think physically they make us safer. They reduce flooding. They improve the local habitat." Lydia said, "The other thing that I think is really neat is the ability of plants and soil combined to work together to help control flooding. And I think that's a really neat aspect to have…." Natasha said, "A native planting is often so much more in terms of handling rainwater and stormwater, in terms of offering habitat to all kinds of fauna, starting with insects and all kinds of fauna." Mike Lee mentioned the knock on effects of floodwater control, "Plus floods throw all the debris into the Manhattan Avenue drain, which causes flooding on that avenue, which causes flooding on Bluemont hotel, which causes flooding in Aggieville. And it just adds up. So the value of these would be huge."

Steve, Mike Lee, Stormwater, and Adam spoke about required maintenance associated with natural flora specifically. Mike Lee placed special emphasis on the different maintenance needs for lawns and natural flora and how they change through the seasons, saying, "You're doing a heavy pruning once a year [Spring] versus constant care for almost, you know, nine months of the year cutting grass and stuff."

All who were interviewed mentioned species diversity, for example, Adam mentioned it in this quote, "I know that you know lawns look great and you know they're nice to run around on, but you know prairies and like native flora like that, um, they provide so much for the ecosystem. Not necessarily just like as far as like to look at, because, like sometimes it is kind of

boring to look at, but as far as like energy productivity, um, habitats, um, habitat diversity, species diversity, because there's so many there's so many species that only live on the prairie. And that's a great thing for us to have so that we can have the species diversity and the net primary productivity coming out of the prairie is very high considering it's just grass."

Participants also referenced air and water quality. Stormwater discussed issues or concerns involving sprinkler systems and lawns in comparison to native flora plots, stating, "But I just see a waste of resources, right? I see the energy demand, I see the water, which is I mean, so, so how do I mentally feel? You know, it makes me feel more at peace because I don't feel like we're being wasteful, when I'm in the spaces that I know belong here." When referencing the value of native flora plots, Lydia states, "And so, when I see that, I see we're saving money. Oh, we're getting these benefits like the air quality, the water quality. We're going to benefit in different ways that might not necessarily, I guess, be noticed by a traditional passerby…" When discussing emotional benefits, Lydia mentions, "And so, I really like there's kind of that, you know, does provide that kind of relaxation kind of take a deep breath, clean air, you know, and then just kind of get a feel like you're part of it and be there in the moment." Later, when discussing the frequency of visiting spaces based on emotional state, Lydia states, "And it's kind of nice to hear that and see that and have that background and get some fresh air and sort of thing." In discussing the mental value of native flora plots, Mike Lee states, "...I value these because of what they can do and what they can bring as far as education, as far as retaining water, less water, less fertilizer, all that stuff goes along with the value of these plots." Adam discusses his physical well-being related to native flora plots, stating, "...I think also, I feel like there's more, the air is cleaner around a lot of plants, and so I feel like I breathe better around a lot of plants."

Table 3: Mental Lens Code Words

Initial Code	Subcode	Frequency
Mental:		
	Think	34
	Value	26
	Feel(s)	25
	Experience	13
	Learning Experience	7

The five most frequent codes of the mental “lens” are listed above in Table 3, while impactful quotes from those interviewed about the mental lens are listed below.

Steve said three times in his interview phrases like, “Spending my time outside is how I kind of recharge my battery.”

Lydia mentioned that, “I think it’s kind of up to people, especially, k-state students, professors, faculty, staff, to make sure that we do have native flora and fauna. Because I think that those more native plants can also be a learning or cultural experience that you can incorporate within the more cultural ecosystem services side of things.”

Adam mentioned how nature helps him think, saying, “that little courtyard at Throckmorton I just kind of sit out there, and I've done it a few times, when the weather's nice, I'll just sit there and kind of just like think about stuff that's, you know, going on or on my mind or stuff that I have to do. And it makes it a lot easier to think about rationally because the plants are just kind of there. You feel like you're in nature, you feel like there's, you know, kind of the stuff you have to do, it kind of goes away and you're just outside for a minute and it makes things a lot easier to think about.”

Mike Lee said, “I think I go there to check things out, just to do that, but also just kind of get in a different state of mind because you start thinking about different things other than, it's something that's bothering you or anything that you can go to these areas and, um, take your mind off of things.”

Stormwater said that resource use was at the top of their mind, “You know, it makes me feel more at peace because I don't feel like we're being wasteful, when I'm in the spaces that I know belong here.”

Natasha said, “If you're familiar with attention restoration theory, there's something called fascination. It's a part of that theory. Fascination means it's related to the ability of natural things to automatically softly command our attention. So, like the way when you're sitting in front of a campfire, you can't help but look at the flames. Right? That's fascination. And part of the theory there is that our minds being engaged to that soft fascination, that soft attention actually helps to restore what we lose from doing things like this, where we're looking at our screen and forcing ourselves to type, and you know, all those things so you can know that intellectually. But it's a different thing to experience in your body. And if you don't have the chance on a campus to sit on a bench with leaves rustling above you or beautiful shade patterns of shade shifting around you or rustling grasses with sunlight kind of dancing off of their seed heads, you don't have that, then you're not getting those opportunities for fascination. So, the idea of a turf lawn is a great foil to that. There's no fascination there. Right? So, it's not doing it for us in terms of what we need as people.

Table 4: Emotional Lens Code Words

Initial Code	Subcode	Frequency
Emotional:		
	Time	12
	Enjoy(ing)	8
	Concern of Pesticides	6
	Relaxation	5
	Peaceful	4

The five most frequent codes of the emotional "lens" are listed above in Table 4, while impactful quotes from those interviewed about the emotional lens are listed below.

Natasha commented on the calm and blood pressure decrease felt in natural areas, especially when insects are present, saying, "I feel instantly calmer when I am near those plantings. And I can tell I mean; I can feel it in myself. I'm fairly attuned to my blood pressure, so and I use breathing throughout the day like that when I'm stressed. So, I know I can, I can feel it, I can really feel it. And some of those plots, when they're large enough and rich enough, you also get the insect chorus. And I feel like that is a whole nother dimension of sort of the calming."

Steve talks about how native areas can improve the commute, "I'm, I have a blessing and a curse to be able to traversing through the flint hills every single day, twice a day, right. It's a curse because I hate the commute, It's a blessing because I like to get to take a couple hours being able to just gaze around at the nature, albeit in a car. So yeah, I think, I think, a lot of people use these experiences to their benefits. Probably depends on how the person admires nature, but you know it just kind of depends. Spending my time outside is how I kind of recharge my battery."

Lydia commented on the importance of relaxation, "I think just even like that relaxation, you know, students especially get really stressed and mental health is a big deal. I know that there's been several sad cases, especially within the college I'm in, and that is, you know, really sad. But I think that that is one way having those areas is one way to kind of. Help de-stress and kind of relax, even if it is just a five-minute walk from, you know, whatever building you're on to the union. I think that can make a big difference."

Lydia also mentioned the home feeling at native plots, "I just recognize kind of going back to, again, that cultural value, kind of getting to know the history, getting to experience nature and know that, hey this is, you know where I'm from. This is home. This is where I'm at.

And not necessarily feeling like I could be anywhere in the world at that point is kind of a nice way to think about it, I think. And kind of homey…. I really like being there and experiencing it and feeling like this home, this is nice."

Mike Lee made a distinction between the different seasons, saying, "During certain times of year, native areas not only provide a winter aspect, a winter look, like all the natives, they all turn brown and they all rustle in the wind. So it's kind of just soothing. It kind of breaks up the monotony of just sidewalks and streets. So it kind of gives you a different feel when you're walking through campus to see these areas. So it does kind of make you more, I would say, a pleasant experience, more, I guess, happy, because when you do drive by, when they're actively blooming, they're looking really good. It does take your eyes to it right away. I mean, just like the meadows or the green roof, you know, early summer when everything's blooming, you really notice it like this looks really good. And so it kind of, I think it makes me feel that it looks that what we're doing is the right thing, taking care of stuff right. And that other people will appreciate it."

Stormwater denied feelings but felt motivated to create more native plots nonetheless, saying, "I don't know that it hits my emotions so much as it triggers my desire to solve a problem. Again, I always say engineers, the fundamental definition of an engineer to me as a problem solver. Right? And so when I see natives, I view that as a positive solution. And that then feels like we're making progress, um, whether it's regardless of the framework around it. When I see non-native areas of campus, I feel like we have a lot of work to do."

Table 5: Physical Lens Code Words

Initial Code	Subcode	Frequency
Physical:		
	Walk(ing)	69
	Maintenance	17
	(Physical) Ability	13
	Function	8
	Run(ing)	5

The five most frequent codes of the physical "lens" are listed above in Table 5, while impactful quotes from the interviewed about the physical lens are listed below.

Adam said, "I think if I'm more motivated to go see plants, um, then you know I'll walk a little bit further or you know I'll get a little bit of exercise. Um, I don't know, I think I also, I feel

like there's more, the air is cleaner around a lot of plants, and so I feel like I breathe better around a lot of plants."

Mike Lee made a distinction between physical labor and physical demand for turf and natives, saying, "Maintenance of them, yeah, it is physical labor, but it's not a constant physical labor. It's just a one couple week period of time during the spring. There's more physical labor involved in turf and your general landscape based on, um, your pruning and weed control and all that stuff, but your native areas basically are something you want to look at. And so you tend to walk to those sites or go to those sites."

Natasha noticed physiological differences in natural areas, "They make me want to be outside more. So that has to be positive from vitamin D, sunlight, attention restoration, blood pressure, relaxing."

Steve did not have anything to say about the physical lens.

Stormwater didn't spend much time walking on campus native plots, "I spend a lot of time around outside of campus enjoying nature at Konza prairie, at top of the world, with my family, but on campus, no because it's part of my workday." However, they still noticed the impact on physical activity that native flora plots can have, "I think it, you know it, well, while I don't take that opportunity to do it, I think anybody that walks around them enjoys them. Right? So I think any time we can improve our outdoor setting for physical activity, it's a plus. And we like to walk where it's pretty more than ugly."

Lydia appreciated the air and water quality improvements native plants can bring, "Physical, I think that goes back to primarily air and water quality for a couple reasons, air, I think is a bit obvious because, you know, you have that fresh air, you get to go and you're not stuffed in the basement of a building somewhere, trying to breathe some stuff here. It's kind of nice to have that breath of fresh air and water quality, I think is significant for a couple of reasons that go kind of unnoticed sometimes one of which is, you know, oh, we're sending this off to a river or a sewer and it'll just be that much cleaner, and we won't have to worry about it quite as much."

Table 6: Social Lens Code Words

Initial Code	Subcode	Frequency
Social:		
	People	16
	Helping/Assisted	7
	Solitude/Alone	7
	Students	7
	Family	4

The five most frequent codes of the social "lens" are listed above in Table 6, while impactful quotes from those interviewed about the social lens are listed below.

Lydia talked about the meadow even while not there, saying, "Well, I am friends with many nerds like myself in my program. So, we get to talk and analyze all of those technical details that I talked with you, that I mentioned before. And I think that's one way I experience it with my friends is, you know, we all have that interest so we can all talk about it and say, well, we should do this instead, or maybe this would be better, or they did a really good job of this. And so that's really nice, especially because we might be getting to design something for a campus like that."

Adam said, "I think I definitely experienced it alone way more often than I experienced people, and it's just kind of like catch it on the way to class or on the way home from class or notice something or sometimes in one of our I have a natural resource-based tourism class, and sometimes we do that outside."

Mike Lee talked about how natural areas were better for most solo activities but turf was better for most large social activities, saying, "Yeah, I mean, turf, you know it's wide open. Typically you have a large group of people together on turf versus not very many people, you know, you can't really climb in or run through native very easily because it's either, you know, six feet tall or, you know, it's very difficult to see where you're going versus a wide open space that's manicured. And so, that's what based on what you want to do, if you're just looking at something, you would typically you draw you toward native areas, but if you wanted to run, have kids run around, dogs running around, you'd be, you know, be on turf. Just depends on what you're doing." However, native plots were still good places to socialize, "Just either with other co-workers, maintaining them throughout the year, and also with family, friends, or just walking by them casually on a walk or exercising or looking at them or coming to them when I know

they're blooming in full bloom, the flowers of the native flowers are blooming. That is, to bring people to those."

Steve was interested in the learning vs. prestige tradeoffs between native vs. lawn, saying, "think that campus is a learning environment, right. And so, you can, you can, use so many other wonderful places as a natural grassland, in my opinion. Not saying to replace that to augment with I think, I think this is a learning laboratory. I mean there are some areas that we designate and go, nope this is our show piece we're going to maintain this with sort of a state of industry standard sort of status quo kind of things, right?"

Stormwater talked about the social experiences that can only happen in native areas, "Outside of the volunteer days at the meadow, I don't think I have experience with social, truly social experiences in a native landscape on campus. And so those workday's, I guess I would need to use that as an example. And it's really fun to see people like discovering things, whether they get fascinated by plant or like a seed pod or there's always like interesting insects. Constantly, volunteers are the ones who are pointing out to the different animal things that are happening there. I remember the first time that, like somebody was raking and pulled the lid off of a baby bunny den in there and all the tiny bunnies with their giant ears, like, curled up together. That's really cool. To have experiences socially is really cool. Like, it's always fun when you see that alone. But when you can see that and hear like a bunch of five and eight- and 12-year-olds go "gasp", you know, I mean, that's like so fun. So, yeah, I think those are the social experiences that I really like."

Natasha said, "For me personally, if I were to see, like three other people sitting in the benches in the heart of the meadow, I wouldn't go in there even if there was another bench empty, I probably wouldn't walk in there to have my decompression moment because I'd be looking for somewhere that I really could be alone with my thoughts. But other than that, it's not a negative to me to be around other people while, we're experiencing those kinds of landscapes and in fact it could be like really fun…. I love to be in places where people are hammocking and relaxing and enjoying themselves, even if I'm not."

Discussion

Native spaces provide a variety of benefits, as mentioned through our interview process. Some of these benefits include ecosystem benefits, mental benefits, habitat benefits, biodiversity, and so many more. Of these mentioned, many were vague in explaining how native plots are beneficial. This led to some level of awareness that there are benefits to native plots, but little specificity is known. On the other hand, some interviews brought specific benefits to the table such as ecosystem benefits, habitat benefits, and biodiversity of both flora and fauna. Overall, participants see that there are a broad variety of benefits to including spaces like this, especially on a college campus setting.

Understanding Existing Native Plots

While discussing the topic of native flora plots, as expected, participants brought up their experiences with existing native flora plots, whether on-campus or off. Two of the main native plots on-campus mentioned include the self-guided tree walk through campus and the meadow near the Beach Museum of Art on the K-State Campus. The 1.5 mile self-guided tree walk includes signage on each tree to help students learn about what type of tree it is, including the latin name, average height of the type, and other information about over 100 species of trees. The Meadow is a natural learning landscape plot that provides many benefits to campus. It's used as a natural laboratory for research projects, explanatory about the benefits of natural systems, helping students learn, and provides an experiential component for visitors, helping them understand the regional landscape better.

While these two native plots were most commonly mentioned, the rain garden/courtyard west of Durland Hall and Konza were also mentioned. The rain garden was mentioned as being something visited occasionally, but is a bit out of the way, making it less accessible to passersby. This space houses native plants and assists in stormwater management. The Konza prairie, on the other hand, is frequently visited even though it's not on-campus at all. This seems to be the space that inspires so many students as for stewardship of the native tallgrass prairie. Although it is visited frequently by students and Manhattan residents, interviewers mention it's nice to have something closer to campus.

Ecosystem Services

Native plots and landscaping have been shown to have ecological benefits such as stormwater management and air quality benefits compared to manicured grassy lawns (Kermath, 2007). Participants noted that they value and appreciate the services. For many of the participants, it went beyond a general value of the ecological benefit of native platings and actually affected their emotional and mental wellbeing. One participant noted that with the presence of native bioswales on campus, large flooding events have a lesser impact on the physical landscaping which in turn can "take a lot of stress off of all the workers."

While the ecological benefits of native landscaping are well understood, little research connects the ecological benefits directly to emotional and mental benefits (Byrne, 2005). Though a small sample group, the participants interest in and connection to ecosystem services as they relate to well being warrants further study. Additionally, these benefits are important to consider when conducting cost benefit analysis for campus landscaping. While previous NRES teams have tried to place a value on ecosystem services, they focused only on a select few ecological impacts and the mental and emotional connections between them.

Physical Activity

Some of the participants mentioned that they visited the natural areas while doing other activities, such as biking, walking, running, and hiking. The Konza prairie just off campus was most often mentioned with hiking, since it is a large grassland prairie that has wonderful hiking paths through it that are two, four, and six miles long. The smaller grassland prairies on campus are better for biking, walking, and running past and through. Sometimes just to get from point A to point B on campus, while other times our participants sought out the tallgrass prairies in particular, going out of their way - just because they liked to be in and around them. Therefore, in their own small way, natural spaces can encourage exercise.

Mental change

Participants shared they sought out native flora spaces for feelings of solitude, relaxation, calm, motivation, and recharge. While previous research has suggested general interaction with and time in greenspace can provide these experiences (Abdul 2021, Holt 2019, Rahnema 2019), participants specifically discussed the ability of native flora spaces to deliver these experiences. One participant mentioned an intentional draw to natural areas when feelings of stress arose to recent mental restoration. "It's sort of my way of recharging. I spen[t] a lot of time outdoors this past year in the woods hunting… For me at least it's a… way to recharge my battery so to speak" (Steve, 2021). The last two years have been challenging for everyone globally as we emerge from a global pandemic. Through required quarantining, many people have found a reconnection to nature as a way to escape mentally and recharge. Our participants mentioned this correlation between mental tranquility and natural spaces. "I feel there are several areas with tall grass prairies or just several areas with prairies that I can go to have a deeper connection with these environments and utilizing the space" (Steve, 2021). Through the ability to become immersed in the natural environment around us by recharging from a mentally exhausting and overstimulating world university, participants expressed a desire to get outside of the confines of a building and connect with nature.

Maintenance Needs and Costs

Despite the value natural grasslands provide, some of the participants indicated there are some added challenges associated with maintenance of native flora plots. “It is often assumed that since the land exists in nature without human intervention it requires little to no resources, which is not accurate”. Natural spaces within an already manicured environment require a certain level of upkeep due to the environment the natural land is plotted within.

According to our participants pruning occurs once a year for the native plots but a daily occurrence for the trees, shrubbery, and other landscaping on campus. Native plots are pruned only once in the springtime, an arduous process that takes between a half-week and a whole-week for several maintenance workers. This pruning is more intense than pruning for more traditional landscaping, but once it is done there is no need to prune again for an entire year. Mike Lee much preferred this outcome. He said that even if the number of native plots on

campus were doubled or tripled, maintenance could keep up with either better tools, more workers, or, best of all, controlled burns. After the springtime burn or pruning, less total maintenance is needed throughout the year. He also said that there is a professor who uses the cuttings from the natural spaces to make a form of natural insulating foam.

When discussing the inputs and costs of native flora plots, one participant said, “there is no such thing as no maintenance. It's K-N-O-W maintenance.” This understanding demonstrates participants' ability to reflect on the challenges associated with native flora plots and contrast those costs with the values associated with them. While other research has suggested that landscapes using native plants and ecological management can cost less than manicured, pristine lawns, there are still important costs to consider with native plots (Byrne, 2005).

Conclusions

The goal of this research was to unveil intrinsic and extrinsic stakeholder values regarding native flora plots. The research question was explored using a qualitative approach, using explanatory case study framework and semi-structured interviews.

From the research, certain themes and topics were recurring throughout direct quotations from participants. Consistent references to ecosystem services- specifically those involved with regulating and cultural ecosystem services categories were present throughout. Multiple participants expressed a disconnect between K-State’s current use of non-native species and what they believed to be the most effective and natural solutions to green space issues presented to the campus. Participants each described different valuations of what native flora plots currently offer or could potentially offer to daily campus and personal use. One of the participants expressed a concern for implementation and maintenance of native flora plots, which is an important consideration and worth further exploration in future research.

Coding frequencies revealed deeper and complex thoughts had already been formed by participants before the interview questions were presented. Within the natural questions section, word frequencies of “plant(s)” and “native(s)” were extremely high, showing participants had already formed thoughts on the differences and importances of native versus non-native flora plots. When connecting these to direct quotations, participants frequently discussed both the problems with non-native flora and also the perceived benefits of native flora. Frequent words within the mental questions section, such as “think”, “value”, and “feel(s)” further indicate participants had complex thoughts and feelings revolving around native flora formed before the interview. The emotional, physical, and social sections saw more diversity in words and overall thoughts, with the only exception being “walk(ing)” within the physical section. Coding frequencies and quotations showed strong variability between uses and values of native flora plots individually. However, there were multiple connective themes and words that showed agreed-upon value categories between participants, such as ecosystem services, mental benefits, solitude space, and physical activity usage. In conclusion, there is a strong possibility that students and faculty consider issues and values regarding native versus non-native flora plots frequently. However, the topic is highly unlikely to present itself in average conversations or

social interactions. While the research reveals the numerous benefits of native flora plots from the viewpoint of K-State stakeholders, the discovery of the benefits is complex and therefore remains invisible in common discussion. This leads to the possibility of high individual valuation that fails to be expressed or communicated with others.

In an academic setting, these values between participants are highly likely to be shared by students, showing positive value potential in reaching a point of saturation, especially within K-State's student population. Beyond students, these values are considered universally important by most individuals and organizations within the United States. Overall, this research has proven strong potential value in expanding the original research question and continuing further research.

Limitations

Point of saturation

Since this study was performed within a traditional academic semester, the abbreviated time frame allowed for six interviews with campus stakeholders to take place. While important trends were captured, a point of saturation was not met. For this reason, further study and future research will be important to gain a broader understanding of the values associated with native flora plots on K-State's campus.

Interview Techniques

When collecting data from each university participant our group used a few different interview techniques and probing measures. To create a record of each interview each group member used recording devices either through their own personal phone or personal computer. The recording of the interview allowed our group to pull together all of our participants' responses to create a cohesive and comprehensive report on our research.

Demographics

See Table 1 in the Results section for demographic information. The ages of those interviewed skewed older than the general population of K-State, which according to Kansas State University Diversity: Racial Demographics, has a young student population of 21,000 and a smaller but older employee population somewhere between 1,000 and 5,000. 1/3rd of those interviewed were in their 20s, typical of the student population, while 2/3rds were in their 40s and early 50s, typical of the employee population though narrower than the true range. If the ages were representative then 85% of the participants should have been in their teens or 20s with only 15% older than that. This disparity in age is due to our intent to interview a diverse array of stakeholders. The older stakeholders are more likely to be employees and have different jobs that impact their views on natural spaces, while younger members of the K-state community are more likely to be just one type of stakeholder - students. Years on campus followed the same trend as age, with older employee stakeholders having spent more years on campus than younger

stakeholders, though there was a greater spread of years spent on campus amongst the older group than their similar ages would suggest.

Minority ethnicities were not well represented in our sample. K-State is 75% Caucasian, so even given our small sample size of six there should have been one or two people from ethnic minorities. This ethnic disparity cannot be explained, but is more likely due to random chance and background factors than to bias. The population of K-state is 53% male and 47% female, so our 50% male and 50% female ratio is representative.

Future research will aim to correct these minor problems, gathering a larger and more representative sample of the population of K-state.

Lens Assignments

Some lenses have far more words in them than other lenses, despite each lens being assigned the same number of questions. An example of why this happens can be seen in the quote by Mike Lee, "...they all turn brown and they all rustle in the wind. So it's kind of just soothing." This quote is in answer to an emotional question and is mainly about the word "soothing," but to convey that word the participant must also mention the natural aspects that make the experience soothing, the "turn brown" and "rustle in the wind." This is one of the reasons why the natural lens has so many more words and higher frequencies than the other lenses. The questions about the natural lens are also the first questions asked in the interview, so it is possible that some of the people interviewed began to grow tired or to feel like they had already said everything they wanted to say early in the interview, and by the end of the interview they weren't as thorough with their explanations, leading to a decrease in frequency for later lenses like social.

At other times, it was difficult to assign a word to only a single lens. In particular, the mental and emotional lenses were narrow and could be confusing to differentiate at times. For example, while "soothing" in the earlier quote probably belongs in the emotional lens, it could almost as easily be placed in the mental lens because "soothing" occurs in your brain and you can have "soothing" thoughts. To overcome this ambiguity words were given the benefit of the doubt and words like "soothing" were placed in multiple tables. Later, the data was analyzed and if a certain word was very common amongst the different lenses but fit best in one lens, we would assign it to only that lens for Tables 2-6 to prevent all the tables from being overrun by common and ambiguous words like "value," or "native." Certain words with common variations, like "Native" vs. "native(s)" were combined together into a single frequency for tables 2-6. The original values can be found in Appendix A.

Another reason Tables 2-6 couldn't be the entire results is that some quotes were only said once but were very insightful. "Native" is a very common word, and that is important to know, but it doesn't convey as much as the only once said, "leave the planet alone."

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Abstract

Initial code	Subcode	Frequency
Natural:		
	Native	43
	Plant(s)	34
	Meadow	24
	Native(s)	18
	Native flora	14
	Plant(s)	13
	Value	12
	Spring	10
	Weed	9
	Walk	9
	System(s)	9
	Maintenance	7
	Meadow	7
	Outside	7
	Flowers	7
	Landscape(s)	6
	Ecosystem(s)	6
	Ecosystem/Natural services	5

Stormwater runoff	5	Summer	4
Insect(s)	5	How to manage the land	4
Winter	5	Native plots	4
Trees	5	Native planting(s)	4
Predator/ prey	5	Area	4
Biodiversity	5	Lawn(s)	4
Natural	5	Manage	4
Konza	5	Inputs	4
Resource(s)	5	Sense of place	4
Love	5	Garden(s)	4
Attention restoration	4	Access to green space	3
Konza	4	Visual access	3

Bird(s)	3	Touch experience	2
Bioswale(s)	3	Experience sound	2
Green	3	Diversification	2
Rain	3	239 acres	2
Competition	3	Issues	2
Stormwater management	3	Diversification is important	2
Appreciate	3	Campus is not a pasture	2
Functional(ly)	3	Problem occurs	2
Courtyard	3	Maintenance of native grasses	2
Source of rich benefits	2	Reduce flooding	2
Beautiful setting	2	Architecture	2
Labor experience	2	Species diversity	2

Tree walk	1	Fall	1
Rain garden (engineering)	1	Brown	1
Perception has changed	1	Rustle in the wind	1
Cost effective	1	Tallgrass	1
Invasive species	1	Competitive landscape	1
Learning experience	1	Placement of natural land	1
Positive experience	1	Aesthetics	1
Habitat benefits	1	Walked through	1
Engaged	1	Beach museum	1
Access to native flora	1	Sustainably	1
Field mice	1	Manage rainfall	1
Sign(age)	1	Experience	1

Provide	1	Identifying plants	1
Valuable	1	PMC	1
Doesn't belong	1	Big oak	1
Creating spaces	1	Flora exposure	1
Resource intensive	1	Konza	1
Natural vegetation	1	Landscapes	1
Experiencing	1	Run around on	1
Covid	1	Energy productivity	1
Beautiful	1	Net primary productivity	1
Layout	1	Habitat diversity	1
Feels spread out	1	Prefer that much better to lawns	1
Relatively close together	1	Wilderness	1

Don't normally go	1
Man is more of a subtraction	1
Leave the planet alone	1

Initial code	Subcode	Frequency		
Mental:				
	Native	43	Value	12
	Plant(s)	34	Walk	9
	Think	34	Value	9
	Feel(s)	25	Prairie	8

Function	8	Value	4
Learning experience	7	Time	4
Experience	7	Lawn(s)	4
Enjoy(ing)	7	Home/homey	3
Time(s)	7	Calming noise	3
Outside	7	Visual delight	3
Ecosystem services/natural system	6	Recharging my battery	3
Looks good	6	Getting outside	3
Experience	6	Too many people, buildings / cant see out	3
Piece(s)	6	Deeper / good connection	3
Feeling engaged with native plants	5	Functional(ly)	3
Ecosystem service(s)	5	Courtyard	3
Enjoys it	2	Plant life	2

Feeling present	2	Cultural value	1
Native flora brings comfort	2	Purple flowers	1
Air quality	2	Tree walk	1
Water quality	2	Rain garden	1
Connected	2	See the benefits	1
Relax during immersion	2	Cost effective	1
Identify	2	Good for mental health	1
Purpose	2	Feeling immersed	1
Benefits	2	Unique place to be	1
Interface	2	Woody invaders	1
Mentally	2	Calm	1
Easier	2	Tactile delight	1

Thermal delight	1	Celebration	1
Reflection	1	Celebrating	1
Stress off	1	Tallgrass prairie	1
Different mental mind	1	Understand	1
Turned around and came back home	1	Wasteful	1
Not successful in an urban environment	1	Seasonal depression	1
Connection with nature / environment	1	Cold	1
Understand the purpose & benefits	1	Well-being (or well being)	1
Challenge & barriers	1	Correlation	1
Reluctance	1	You're in nature	1
Purple coneflower	1		

Initial code	Subcode	Frequency		
Emotional:				
	Time	12	Productivity	4
	Experience(d)	12	Specific positive activity	3
	Often	10	Priceless	3
	Plot(s)	9	Cool	3
	Enjoy(ing)	7	Get out	3
	Concern of pesticide	6	Emotions	3
	Understand	6	Ecosystem services/natural system	2
	Relaxation	5	Green=soothing	2
	Walk(ing)	5	Feeling present	2
	Peaceful	4	Loss from lack of mental health support	2

Reflection pool	2	Rain garden (eng.)	1
Air quality	2	They see the benefits (of native plots)	1
Lack of interaction	2	"fun" features	1
Visual access	2	Very important	1
Happy	2	Reduced interaction	1
Benefit	2	Wellbeing increase	1
Calm	2	Prevents despair	1
Appreciate	2	Enjoy	1
Blessing	2	Pleasant	1
Curse	2	Changes my mood	1
Accessibility	2	Soothing	1
Exposure	2	Beautiful	1

Native vegetation	1
Open spaces	1
Solve a problem	1
Likely to go back	1
Out of my way to see plants	1

Initial code	Subcode	Frequency
Physical:		
	Walk(ing)	57
	Maintenance	14
	Experience(d)	12
	Ability	11
	Walk(s)	9
	Function	8
	Meadow	7
	Controlling flooding	5
	Run(ing)	5
	Relaxing breath	5
	Air quality	4
	Pulling weeds	4
	Pruning/pruned	4
	Getting outside	4
	Physical(ly)	4
	Improve	4
	Impact	4
	Lower stress (blood pressure)	4
	They see the benefits (of native plots)	3
	Labor	3
	Impact	3
	Ecosystem services/natural system	2
	Relaxation	2

		Essential to wellbeing	2
Water quality	2	Enjoys it	1
Feels good here	2	Feeling immersed	1
Hunting	2	Home/homey	1
Outside of the confines	2	Native plots aid discomfort	1
Tree walk	2	Manhattan	1
Reduce flooding	2	Wanting more native spaces	1
Flood(ing)	2	Bike(ing)	1
Environment	2	Mowing	1
Accessible	2	Physical well-being	1
Air is cleaner	2	Trimmed	1
Legs	2	Exercise	1
Physical ability	2	Gaze	1

Utilizing the space	
Hammocking	1
Safe(r)	1
Appreciation	1
Moving	1
Natural setting(s)	1
Motivated	1
Walk a little bit further	1
Exercise	1
Breathe better	1
Move	1
Prospect refuge theory	1
Vitamin D	1

Initial code	Subcode	Frequency
Social:		
	People	16
	Time	12
	Walk(s)	9
	Workers/guys	7
	Helping/assisted	7
	Campus	7
	Outside	7
	Community building	6
	Student(s)	5
	Konza	5
	Enjoy(ing)	5
	Solitude	5
	Other people	4
	Garden(s)	4
	Learning experience	3
	Crowded=deterrent	3
	Take pictures	3
	Education	3
	Access(ible)	3
	Desire social native spaces	3
	Specific positive activity	2
	What can be done differently	2

Family	2	Controlling flooding	1
Professor/teacher	2	Makes me feel intentional	1
Alone	2	Getting exercise	1
Student recruitment	2	Individually	1
Democracy	2	Kids	1
Protest	2	Right appeal, fit, location	1
Enjoys it	1	Konza prairie	1
Tree walk	1	Family	1
Ecosystem services/natural system	1	Don't really go out a ton with people	1
Relaxation	1	Own thing	1
Air quality	1	Play	1
Water quality	1	Depends on who I'm with	1

Appendix B

A.1. IRB approval letter for this non-research class project focused on evaluating stakeholder values regarding native flora plots on the Kansas State University campus.

KANSAS STATE UNIVERSITY | University Research Compliance Office

TO: Shawn Hutchinson
Geography & Geo Sciences
Manhattan, KS 66506

Proposal Number: IRB-10879

FROM: Rick Scheidt, Chair
Committee on Research Involving Human Subjects

SUBJECT: Clearance for Non-Research Class Project

DATE: 10/13/2021

RE: "The Obscure Value of Nature within a Campus Setting: Unveiling Intrinsic and Extrinsic Stakeholder Values Concerning Native Flora Plots."

The University Research Compliance Office (URCO) has reviewed the proposal identified above and has determined that it is **Non-Research.** As described, the project does not meet the criteria in 45 CFR 46 for the definition of "research" involving human subjects, and therefore does not require review by the Committee for Research Involving Human Subjects (IRB). This letter constitutes clearance for your Oral History Project to proceed.

This clearance applies only to the project identified above. Be advised, any changes or modifications made to the activity that would change the project's Non-Research status must be approved by the URCO prior to implementation and may disqualify the proposal from its Non-Research status.

The URCO/IRB strongly suggests that all persons involved in the Oral History project complete the IRB training at http://k-state.edu/research/comply/irb/training. After evaluating the individual projects, it is ultimately your responsibility to determine which students should complete the suggested training modules.

Adverse events involving participants should be reported immediately to the University Research Compliance Office. Feel free to contact our office if you have any questions.

Electronically signed by Rick Scheidt on 10/13/2021 12:04 PM ET

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