eYethu: It's ours

Diverse socio-cultural values of nature in the Bathurst-Nolukhanyo Commonage

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1. INTRODUCTION

1.1. Overview

This research is based on diverse socio-cultural values of nature in the Bathurst-Nolukhanyo Commonage. It was conducted between March and September, 2023. This research was conducted and the report written by five 3rd year Environmental Science students at Rhodes University, namely: Nicholas Foxon, Thato Madiba, Moyo Nyalungu, Prelic Ngwenya and Bonolo Thamae. The report has been lightly edited by their lecturer and research supervisor Dr Jessica Cockburn.

We begin the report with an overview of the academic literature on cultural ecosystem services and urban green spaces (commonages are like urban green spaces, though they are often more peri-urban or even rural in nature). The literature review situates the study theoretically and makes of the case for its academic value. We then outline the methods used to conduct the research. This is followed by a presentation of the findings of the study, after which the implications are discussed by returning to drawing from the literature review. We conclude with some key insights and recommendations. We note that the structure and emphasis of the report is very much of an academic nature, which may not necessarily be of interest to the people of Bathurst.

We kindly urge the reader to keep in mind that the primary purpose this research is teaching and learning activity for Environmental Science students. Nonetheless, we sincerely hope the findings are of interest to and will benefit the people of Bathurst and Nolukhanyo.

A note on the use of **'Bathurst', 'Nolukhanyo'** and the **'Bathurst-Nolukhanyo Commonage':**
These two adjacent settlements tell the typical story of segregated apartheid-era spatial planning in South Africa. Bathurst, also referred to as 'the village' was previously demarcated for use by 'white', mostly English-speaking, higher income residents during apartheid. Nolukhanyo, also referred to as 'the township' was demarcated for use by 'black', mostly isiXhosa-speaking, lower-income residents (important to note that we have adopted the terms 'village' and 'township' upon hearing local residents using these concepts to describe the two distinct settlements). As in many other towns in the Eastern Cape and South Africa, these settlements have distinct socio-economic and cultural conditions which portrays the apartheid spatial planning which is still visible to date. The commonage is usually referred to as the 'Bathurst Commonage', however given that it is an area of land meant for the benefit of all residents of this small rural hamlet across the socio-economic and cultural divides, we prefer to refer to it as the Bathurst-Nolukhanyo Commonage.

1.2. Cultural ecosystem services in the Global South

Ecosystem services are the benefits individuals and households derive from ecosystems (McMichael et al., 2005), and are an indication of the ways in which humans value nature. They are usually categorised into provisioning, supporting, regulating and cultural services. Cultural services are largely considered 'non-materialistic services' but are nonetheless interconnected with other ecosystem services (Elwell et al., 2020). A definition of **cultural ecosystem services** is that they are "the nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences" (Sarukhán and Whyte, 2003). Despite their contribution to human well-being, the economic and other benefits provided by cultural services are frequently under dispute (Plieninger, 2013). Moreover, research on cultural ecosystem services is limited to the Global North, yet cultural ecosystem services are an essential resource in the developing Global South, and hence more research is needed in this context (Mensah, 2014).

Through the lens of cultural ecosystem services, this research aims to contribute to the literature on the use and management of commonages in the Global South and Africa. This research will do so by examining the cultural ecosystem services derived from the Bathurst commonage in the Eastern Cape.

We believe participatory mapping will provide a spatial perspective that will expand our understanding of the role played by cultural ecosystem services in the community, illustrating what cultural values these commonages provide for them and how they can sustain these for future generations.

Key terminology used in this report

Ecosystem services:
the benefits individuals and households derive from ecosystems.

Cultural ecosystem services:
nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences.

Commonages:
commonages can be described as land that is state-owned and made available to a user group or communities for individual or collective benefit. In a South African context, commonage areas are defined as land that is/was provided to communities for the use and benefit of the

1.3. Should we rethink how we conceptualise and valuate cultural ecosystem services?

Tangible cultural ecosystem services refer to instrumental values such as tourism and education, whereas intangible cultural ecosystem services demonstrate more relational values (Mowat and Rhodes, 2020). In today's profit-driven society, indigenous and local knowledge is often neglected or underutilized in decision-making about commonage and landscape management. This may contribute to losing heritage values and cultural landscapes (Tengberg et al., 2012). Tengberg et al. (2012) state that more research is required to develop non-monetary methods for valuing cultural ecosystem services.

Some studies, however, suggest removing cultural ecosystem services from the framework, recognizing the overlap between cultural and the other three ecosystem services (provisioning, supporting, regulating). Tengberg et al. (2012) argue that there needs to be more collaboration between conservation, heritage planning, and management within standard planning processes instead of operating as isolated elements. An example of such an approach is in Sweden, where the National Heritage Board analyzed opportunities for monetary and non-monetary valuation of cultural ecosystem services and introduced it to cultural landscape conservation practices (Tengberg et al., 2012). In the South African context, the value of landscapes from a cultural perspective can be found in Cocks et al. (2016), who describe how the Xhosa residents in Makhanda derive personal inspiration, reflection, and healing from the green spaces in Makhanda. In a similar vein, Stickler (2010) notes that the commonage is essential to Bathurst culture, with locals reporting that the majority of their common resources—both material and immaterial—are only accessible within the commonage. Furthermore, despite the predominant land use historically being livestock production, residents across the socio-economic spectrum of inequality, derive numerous intangible cultural services such as aesthetic beauty and spiritual connection with nature and their ancestors (Stickler, 2010).

It is therefore important to find ways of capturing and communicating the value of ~~cultural~~ ecosystem services in places like Bathurst and Nolukhanyo, even where these might not necessarily be of economic value or any quantitative value. We will need to think carefully about the categories of different ecosystem services to be able to identify if they provide the much needed value or not for the people of Bathurst and Nolukhanyo.

1.4. Urban green spaces and commonages

Urban green spaces are public and private open spaces in an urban setting that are mostly covered by vegetation and are either directly or indirectly accessed by people (Haq, 2015). Examples of urban green spaces include parks, rooftops, gardens, and commonages. The role of these spaces is to create a livable, sustainable environment and provide environmental quality within the cities. They provide a multitude of advantages to people on both a local and national scale (Baycan-Levent and Nijkamp, 2009).

Commonages can be described as land that is state-owned and made available to a user group or communities for individual or collective benefit. In a South African context, commonage areas are defined as land that is/was provided to communities for the use and benefit of the urban poor with the aim to redress spatial injustices of the past (Davenport et al., 2012).

Commonages and **urban green spaces** provide similar benefits. They both provide ecosystem services, which as stated previously, contribute towards human well-being. Concerning benefits related to cultural ecosystem services, both urban green spaces and commonages provide a greater variety of land uses and opportunities for a wide range of activities, support active lives, and benefit health. An example of a cultural ecosystem service in commonage would be using the space for spiritual purposes, finding a sense of place, and for different events or ceremonies (Milcu et al., 2013). According to Baycan-Levent and Nijkamp (2009), using urban green spaces for relaxation, exercise, and outdoor sports can be therapeutic. In addition to recreational opportunities, these areas also provide land uses that benefit children and their development (Mensah, 2014). However, commonage misuse can lead to gradual deterioration. Although our focus is on commonages, we also refer to urban green spaces' literature because commonages and urban green spaces provide similar functions in communities. The only difference is that the latter is found in urban areas and the former in peri-urban settings.

Appropriately managed and maintained urban green spaces foster social inclusion and social fairness by offering spaces for social interactions for everyone (Baycan-Levent and Nijkamp, 2009). According to Baycan-Levent and Nijkamp, 2009 and Mensah (2014), urban green spaces are disappearing at a rapid rate as a result of growing populations, a lack of institutional support for green spaces, a lack of priority given to green spaces, corruption, recalcitrant local attitudes, and political instability.
Green space currently only makes up a small part of the total area in many urban areas.

Studies in the Eastern Cape showed that the urban green spaces were poorly maintained, vandalized, and altered for development and other land uses (Shackleton and Njwaxu, 2021). These studies were conducted across eleven newly constructed and renovated parks, and change was monitored over three years. There was a gradual decline in all the parks, and the leading factor was poor maintenance due to poor community engagements and funds, damage to fences, and removal of trees, which was caused by both humans and livestock (Shackleton and Njwaxu, 2021). Similarly, commonage spaces, which are accessible to anyone like green spaces and urban parks, are typically associated with poor management by municipalities (Davenport et al., 2012).

Given the important benefits provided by urban green spaces and commonages, it is important to gather local-level data on how they are used and valued so that this information can inform effective and sustainable management.

1.5. Historical use and distribution of urban green spaces, commonages and their ecosystem services in South Africa and in Bathurst-Nolukhanyo

Urban Green spaces have a positive effect on human well-being (McConnachie and Shackleton, 2010; Venter et al., 2020). Consequently, this has resulted in the creation of public and private green areas (McConnachie and Shackleton, 2010). However, in South Africa despite the essential need for and value of urban green spaces, low-income areas either have a lower amount of these spaces or none at all (McConnachie & Shackleton, 2010).

During apartheid Black South Africans, which are the majority, were forced into lesser developed and sometimes substandard areas and were systemically excluded in commerce resulting in today's generally lower income level amongst black people in South Africa (Venter et al., 2020). This continues the segregation seen during apartheid, with only those with money being able to move away from the low-income areas demarcated during Apartheid era Group Areas Act planning that separated races in actual lived space (Davenport et al., 2010; Venter et al., 2020).

Generally, high-income, socio-economically advantaged neighbourhoods have more access to infrastructure such as park lawns and private lawns than their disadvantaged counterparts. This can be attributed to unequal power relations between residents and local government, segregation, and social inequality (Wilkerson et al., 2018). In South Africa, this can be seen particularly in old towns and cities as a legacy of apartheid. A study by Stickler (2010) on the study site Bathurst identifies historical issues of racial tensions between ratepayers who are mainly white, and the impoverished black majority of non-ratepayers in Bathurst. These issues also include bitterness towards the local government over perceived subsidisation of common services for the black non-rate payers by affluent white ratepayers (Stickler, 2010).

The Bathurst commonage was previously not accessible to black resident farmers during apartheid, access was only granted after 1994 (Puttick et al., 2011). The commonage was previously used for livestock farming and was only available to white farmers. This gave white residents more economic power, while black residents were left to fend for themselves (Davenport et al., 2011; Puttick et al., 2011). Post-1994 black people were granted access to the commonage area in Bathurst. However, there has been no clear legislation on how the area is to be governed in terms of what can be accessed and by whom (Davenport et al., 2012). The primary use has changed from livestock farming by white farmers to predominantly fuelwood and medicinal plant collection by black residents to supplement their livelihoods (Davenport et al., 2011). This fuelwood comes from the thicket that has grown larger since the original vegetation was removed during apartheid to make pastures for the white farmers' livestock (Puttick et al., 2011). The black urban poor in Bathurst have found a way to continue to live even though an environmental injustice was committed to them during apartheid by using whatever ecosystem services they can to preserve their culture and livelihoods (Venter et al., 2020).

The change in access to the Bathurst-Nolukhanyo commonage poses important questions for how the two distinct communities of Bathurst and Nolukhanyo use, benefit from and value the commonage.

Research aims and key questions for the study in the Bathurst-Nolukhanyo Commonage

This study aims to identify the cultural ecosystem services found in the Bathurst commonages, and how different socio-economic and cultural groups use them. The key questions are as follows:

1. What cultural ecosystem services do individuals derive from the commonage?
2. What is the spatial distribution of cultural ecosystem services in the commonage?
3. How has cultural ecosystem service use in the commonage changed over time, and what might be the drivers of change?
4. How are socio–economic divides portrayed through the use of cultural ecosystem services in the Bathurst-Nolukhanyo commonage?

2. STUDY AREA: BATHURST AND NOLUKHANYO, EASTERN CAPE.

2.1. Geography, jurisdiction and demography

Bathurst and the neighbouring Nolukhanyo are located between Makhanda (previously Grahamstown) and Port Alfred in the Eastern Cape Province (Figure 1). The Eastern Cape is the second largest and poorest province in South Africa and has the highest unemployment rate (47,1 %) (StatsSA, 2023). Bathurst and Nolukhanyo fall within the jurisdiction of the Ndlambe Local Municipality in the Eastern Cape. Ward 5 of the Ndlambe Municipality includes Bathurst, Nokukhanyo township, Freestone, and Wilson's party settlement (Stickler, 2010).

Based on the data from the last census conducted in 2011, Bathurst village (GPS Coordinates 33.4864 S, 26.7785 E) has a population of 737 people, the majority being White. Nolukhanyo (GPS Coordinates 33.488 S, 26.837 E) has a population of 5631 people, the majority being Black Africans.

Bathurst has a population of approximately 6,369 (StatsSA, 2023). Approximately 53.7 % are males and 46.3 % are females, and the major population group is black Africans followed by whites (StatsSA, 2023). Income levels are higher in Bathurst, where approximately 20 % of the population is estimated to earn an average household income of between R38 201-R 76 400 (StatsSA, 2023). In Nolukhanyo, approximately 28% earn between R9601 and R19 600.

According to the Ndlambe Municipality (2020), more than 46 % of households are headed by women, and 15% make less than R 800 monthly. As a result, there is a high level of poverty, and most household income comes from government social assistance (Sticker and Shackleton, 2015). Given that 38.6 % of the potentially economically active population is unemployed, income levels in the municipal region are low. Only 24.8 % of people are employed, and 23 % have a monthly income of less than R 1601.00 (Ndlambe Municipality, 2020).

2.2. Social-ecological characteristics of Bathurst, Nolukhanyo and the commonage

The Eastern Cape has a rich biodiversity constituting seven of the eight biomes in the country. These biomes are Forest, fynbos, grassland, Nama Karoo, Savanna, Succulent Karoo, and Thicket (Stickler, 2010). It is also home to endangered species, including birds, amphibians, and reptiles; it is also the richest in vegetation than any of South Africa's nine provinces

Previous studies conducted on the Bathurst Commonage

A fair amount of previous research has been conducted on the Bathurst Commonage by the Department of Environmental Science and others. Here we list a selection of some of these studies.

Davenport, N.A., Gambiza, J. and Shackleton, C.M., 2011. Use and users of municipal commonage around three small towns in the Eastern Cape, South Africa. Journal of Environmental Management, 92(6), pp.1449-1460.

Fabricius C, Cundill G, McGarry D (2006) Bathurst commons community conservancy project: Stakeholder engagement and feasibility study. South African National Biodiversity Institute, Grahamstown.

Puttick, J.R., Hoffman, M.T. and Gambiza, J., 2011. Historical and recent land-use impacts on the vegetation of Bathurst, a municipal commonage in the Eastern Cape, South Africa. African Journal of Range & Forage Science, 28(1), pp.9-20.

Stickler, M.M. and Shackleton, C.M., 2015. Local wood demand, land cover change and the state of Albany thicket on an urban commonage in the Eastern Cape, South Africa. Environmental management, 55, pp.411-422.

(Stickler, 2010). The type of vegetation dominant in Bathurst commonage is the succulent thicket that is part of the Albany centre of endemism.

Figure 1: Map indicating location of Bathurst and the commonage (Stickler & Shackleton, 2015).

Bathurst is a small town which is dominated by agriculture (a large pineapple growing area) and tourism economic activities (Sticker and Shackleton, 2015). Many naturally conserved sites in the commonage and town support wildlife. The commonage area is approximately 2900 ha and is located between the south and west of the village of Bathurst at 30°30'S, 26°46'E. The commonage is accessible to everyone but is not well managed due to a lack of municipal capability (Davenport et al.,

2011). The town is about 15 km from the coast (Port Alfred) (Stickler and Shackleton, 2015). The site has a subtropical climate with temperatures varying between day and night, winter and summer. It is situated 250 m above sea level with an annual rainfall of 717 mm (Stickler and Shackleton, 2015).

3.   METHODS

2.3. A responsive approach to environmental science research and teaching

This study was conducted in response to conversations with residents of Bathurst who are passionate about the commonage sustainability and equitable management for current and future generations. Elizabeth Milne of *Friends of Waters Meeting,* a voluntary community-based organization in Bathurst, approached us indicating an interest in having research conducted on the value of the commonage to the people of Bathurst and Nolukhanyo. Every year 3rd year students in the Department of Environmental Science conduct a year-long research project, usually under a central theme. In 2023 the theme was 'commonages of the Eastern Cape'. It was therefore apt for us to respond to the request by getting our students to do this research as part of their learning about how to conduct responsive, engaged research on environmental issues of genuine interest and concern to local communities.

2.4. Qualitative, inductive research design

This research study used a qualitative research approach. A qualitative research approach studies the social situations of people and their associated meanings to those situations (Azungah, 2018), in this case, the use and location of cultural ecosystem services to the community around the Bathurst Commonage. An inductive style is used in qualitative research (Creswell, 2014). The inductive style means that data is collected and analyzed, and then a theory is generated from the observations (Creswell, 2014). Furthermore, qualitative research is done in a natural setting (Azungah, 2018), such as a commonage as in this study. Also, qualitative research uses open-ended questions for unrestricted responses, creating a better understanding of the social situation as new insights emerge (Azungah, 2018). Additionally, the researcher uses the data to identify themes and patterns (Creswell, 2014).

4.2 Sampling and data collection: interviews and mapping

The research study used stratified, purposive sampling. This enabled us to obtain representation for the two distinct sub-communities of Bathurst village and Nolukhanyo township. Due to the scope and time constraints of the study (i.e. a student research project with limited resources), we planned to conduct a maximum of 20-30 interviews, and to divide this number in a proportional way among the two sub-communities based on population. We also had to be realistic and consider availability and willingness of participants. The purposive dimension of the sampling meant we were purposefully selecting participants based on their active use of the commonage, rather than just randomly selecting

anyone who lives in the area. Participants were recruited for the study by working closely with local community members who assisted us in identifying suitable and willing participants. In the end we interviewed 20 residents. Fourteen (14) from the Nolukhanyo township and six (6) from the Bathurst village.

The data collection method entailed conducting interviews, as well as participatory mapping which we incorporated into each interview (See interview schedule in Appendix 1).

Interviews:
An interview can be described as a qualitative method based on asking questions to generate and collect data. There are different types of interview methods, such as key informant interviews, focus groups, in-depth interviews, conversation and informal interviews etc. (Biggs et al., 2021). For the purpose of our research we used key informant interviews to gain insight into local people's relationships to the study site (Biggs et al., 2021).

The responsibility of conducting the interviews was spread amongst the group. Members divided themselves into groups of two and three, with one group conducting interviews in the village, and the other in the township. The group that was in the township had the assistance of a Xhosa translator. The length of the interview sessions ranged from about 20 minutes to an hour. The interview was semi-structured as it was conducted in an informal and open-ended manner, to make the respondents more comfortable. Before each interview session, interviewees were required to give informed consent through signing a consent sheet which was explained to them in their home language (Appendix 2).

Mapping:
The purpose of using participatory mapping was to get a clear understanding of the relationship between cultural ecosystem services and their spatial dimension, as well as to enhance the visibility of relational values. For example, in a recent study by García-Díez et al. (2020), participatory mapping of cultural ecosystem services in Madrid was used to promote and develop insights into landscape planning. Participatory mapping has the potential to enable deliberation, collective planning and decision-making. Our participatory mapping activity entailed providing each interviewee with a printed A3-sized map of the Bathurst commonage, on which they used to indicate and locate the part of the commonage they use for their respective cultural ecosystem services. The cultural ecosystem service was then drawn on the printed maps, and this was then converted into a digital map with all the drawings during analysis. The steps taken for the participatory mapping aspect are detailed in Appendix 1.

Feedback:
During the final phase of data collection, we had an opportunity during a community meeting for a short feedback process where we showed participants the maps which we produced from the

information we obtained from the interviews. We offered them an opportunity to comment confirming or disagreeing with the maps. There were no disagreements and residents who attended the feedback meeting seemed interested in the maps and the findings of the study.

4.3 Data analysis

Interview sheets from participants living in the township were assigned interview code 'T', and those in the village interview code 'V'. Interviews were numbered sequentially within each category (i.e., T1-14, V1-6). These codes are used in the findings to refer anonymously to individual interviews.

We used thematic coding and analytical memos to analyze the data collected. Thematic coding entails a systematic form of annotation where standardized codes are used to identify passages of text that share a common theme (Newing, 2011). This allows the research to index data into categories to easily and quickly find information on different topics (Newing, 2011).

When analysing the data, the students worked as a group to create a file with all the interview schedules and identified codes that were then written down in a separate codebook. Another separate document for analytical memos was also created for the researchers to write down notes about the thoughts and ideas that came to mind during coding (Newing, 2011). Concerning the data analysis of the maps made available to each interview, we were able to use ArcGIS to generate four layouts from the information the interviewees provided on the maps. From this data analysis, a narrative summary depicting the data was written down, tied to each key question.

4.3 Assumptions and limitations

Assumptions that were made/carried into the fieldwork include assuming that participants would answer the interview question honestly and factually. We assumed that there is a notable socio-economic divide in Bathurst and that this would be reflected in how participants use cultural ecosystem services in the commonage. Furthermore, we assumed that participants, with assistance from the researchers, would easily be able to indicate and locate on the map which part of commonage they derive and use the cultural ecosystems services. However, once in the field, the mapping process proved to be challenging. The challenge was that the maps were not clear enough in terms of area coverage and it was also difficult to access Google Earth in our laptops to assist in the mapping process. The other challenges is the sample size, it was too small to be considered a true representation of the entire population of the study area, but nonetheless gives some initial insight into the questions at hand.

Furthermore, Time constraints were also an issue, researchers had relatively little time for data collection and analysis. Moreover, none of the researchers speak isiXhosa as a first language, necessitating the need for a translator. There was also a risk of creating expectations amongst community members. Some participants assumed that the researchers would address issues faced by

the community. However, from the short feedback session we held in the community meeting we were invited to attend, we were able to clarify with the assistance of our translator and the community member we worked closely with that as third-year students we were ill-equipped to do so, and it would be ill-advised for us to do so.

4.4 Research ethics

Ethics in research can be regarded as the standard of behaviour, method and or perspective for deciding how to act and analyse complex problems and challenges (David, 2015). Ethics are important to consider because they promote the aims of research, and the values that are essential for collaborative work such as trust, they ensure that researchers are held accountable, they construct public support for research, and they promote other essential moral values (David, 2015). Therefore, we adopted general ethics of research. These are honesty, objectivity, integrity, carefulness, openness, respect for intellectual property, confidentiality, responsible publication, responsible mentoring, respecting colleagues, social responsibility, non-discrimination, legality, and human subjects' protection (David, 2015). Preceding data collection in the field we applied for ethics clearance from Rhodes University, which was approved (See Appendix 3).

4. FINDINGS

4.1. HOW do people use the commonage? *i.e., what cultural ecosystem services do residents of Bathurst and Nolukhanyo derive from the commonage?*

The residents of Bathurst village and Nolukhanyo township are aware of the ecosystem services provided by the Bathurst commonage to the community and use the ecosystem in the commonage in diverse ways (Table 1). Whilst we did not explicitly ask participants to identify 'cultural' or 'provisioning' services, we used these categories to label residents' use of the commonage ecosystems in our analysis. What is apparent from the findings is that many participants mentioned provisioning ecosystem services (e.g., collection of water, firewood and honey), these services have long since been practised and are part of their culture and are therefore deeply intertwined with cultural services. Most of the participants living in the Nolukhanyo use the commonage for **provisioning ecosystem services** and **cultural ecosystem services** related to **spiritual activities** of their lives, whereas participants from Bathurst generally use the commonage for **cultural ecosystem services** related to recreational **activities** as detailed in Table 1.

Table 1: Types of ecosystem services derived from the commonage by residents of Bathurst village and Nolukhanyo township.

Commonage activity or use	Description	Type of ecosystem service

BATHURST (VILLAGE):

Commonage activity or use	Description	Type of ecosystem service
Horse riding	People use trails in the commonage for horse riding.	Cultural
Sand mining	People use the commonage to mine sand for businesses involved in the construction of housing.	Provisioning
Off-road 4x4 driving	People use the commonage for recreational off road 4x4 driving.	Cultural
Camping	People use the commonage for recreational camping, primarily along the Lushington River.	Cultural
Picnics	People use the commonage for picnics with family and friends.	Cultural
Sight-seeing and enjoying nature	People use the commonage for sight-seeing. Several important landmarks and natural features are present in the commonage, and some residents also mentioned birdwatching.	Cultural
Walking and hiking	People use trails in the commonage for leisure walking and hiking.	Cultural
Mountain biking	People use trails in the commonage for mountain biking.	Cultural
Dog walking	People use the commonage to walk their dogs.	Cultural

NOLUKHANYO (TOWNSHIP):

Commonage activity or use	Description	Type of ecosystem service
Ancestral and spiritual ritual ceremonies	Traditional healers/*sangomas* use the commonage as a place to carry out spiritual and ancestral rituals.	Cultural
Lodge sites for *ulwaluko* (circumcision)	People use the commonage as sites for lodges used for *ulwaluko* (circumcision / rite of passage) rituals.	Cultural
Education	People take their children to the commonage to teach them about herbs, trees, and flowers present and their uses.	Cultural
Hunting	People hunt in the commonage using dog packs and/or snares.	Cultural / provisioning
Grazing livestock	People use the commonage for livestock grazing, for cattle, goats and sheep.	Cultural / provisioning
Collecting medicinal herbs	People use the commonage to collect traditional medicine or traditional herbs.	Cultural / provisioning

Collecting firewood	People collect firewood from the commonage for heating, cooking and building cattle kraals (enclosures).	Provisioning / cultural
Collecting water	People collect water from natural water sources in the commonage for drinking and washing.	Provisioning
Fishing	People fish in the Lushington River and in the quarry.	Provisioning / cultural
Collecting honey	People collect honey in the commonage.	Provisioning
Collecting water	People collect water from natural water sources in the commonage for drinking and washing.	Provisioning

A lot of participants stated that they have been using the commonage for livestock grazing (T1, T2, T3, T7-T12). In addition to livestock grazing, two of the most common cultural ecosystem services derived by participants from the township include collecting firewood and conducting traditional ceremonies (T6-T8).

One participant said: "Some of the trees in the commonage have cultural significance, we use them in *ulwaluko*" (T7). This refers to the initiation ceremony prominent in Xhosa culture, and which was mentioned in most of the township interviews. The commonage is also regarded as a notable source of medicinal herbs, particularly among those hailing from the township. Many of the participants from Nolukhanyo stated that they are always going into the commonage to collect medicinal herbs, adding that it is especially important for traditional healers (T6, T7, T9, T10). In contrast to Nolukhanyo where participants derive a relatively equal balance of provisioning ecosystem services to the classical cultural ecosystem services, participants from the village appear to lean more towards cultural ecosystem services, particularly recreational services (Table 1). For example, a lot of participants from the village stated that they go horse riding in the commonage (V2-V6), and some stated they do a lot of 4x4 racing in the commonage (V1, V3 and V8).

A common theme across both sub-groups is that the commonage contributes to social cohesion, improves social relations and is regarded as being therapeutic. A lot of the participants stated that they go picnicking and sightseeing in the commonage (T1, T2, T10-T12, V1, V3, V6, V8). One stated: "A lot of the young people go hang out there in the commonage" (T8). Another said: "My family go camping there once in a while" (V1). One participant said: "Unlike us here in Nolukhanyo, the people in the village go to the commonage for hiking, motorcycling and mountain climbing" (T8).

4.2. WHERE do people use the commonage? *i.e., what is the spatial distribution of cultural ecosystem services in the commonage?*

This study aimed to highlight the significance of cultural ecosystem services to society. As stated in the methods section, participatory mapping was used where a mapping process was incorporated into the

interviews. From the information provided by participants, four maps (Figure 2-5) were created to illustrate the spatial distribution of cultural ecosystem services in the commonage. Common features in the maps include the small quarry, the big quarry, the Lushington River and the commonage boundary. Each map also illustrates different cultural ecosystem services, namely: dog walking and horse riding (Figure 2), four-by-four racing (Figure 3), initiations, traditional ceremonies, fishing and medicinal herb collection (Figure 4) and lastly livestock grazing (Figure 5). Moreover, Figure 5 also illustrates the landfill site and the extent of rubbish in the commonage.
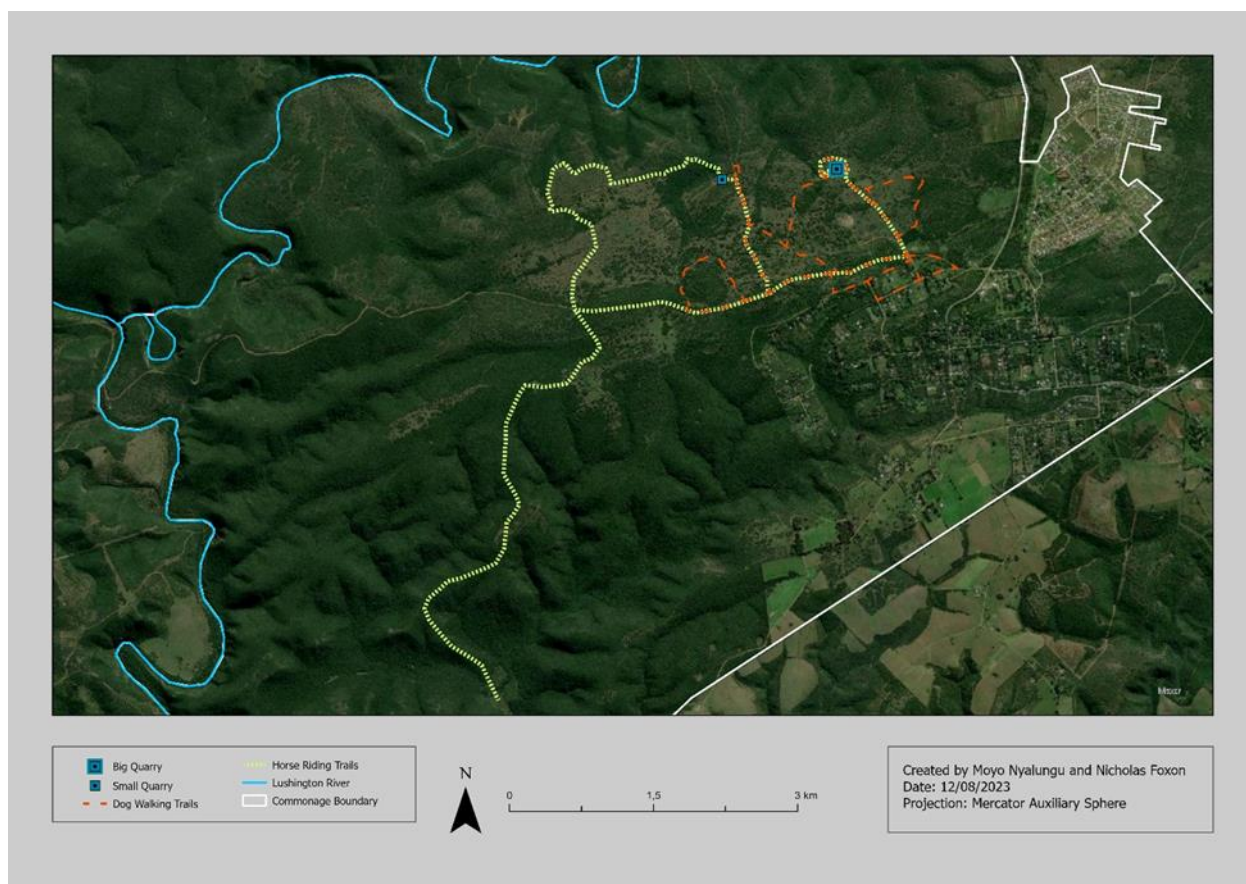

Figure 2: Map of the Bathurst Commonage illustrating dog walking and horse-riding trails (Map by Moyo Nyalungu and Nicholas Foxon).
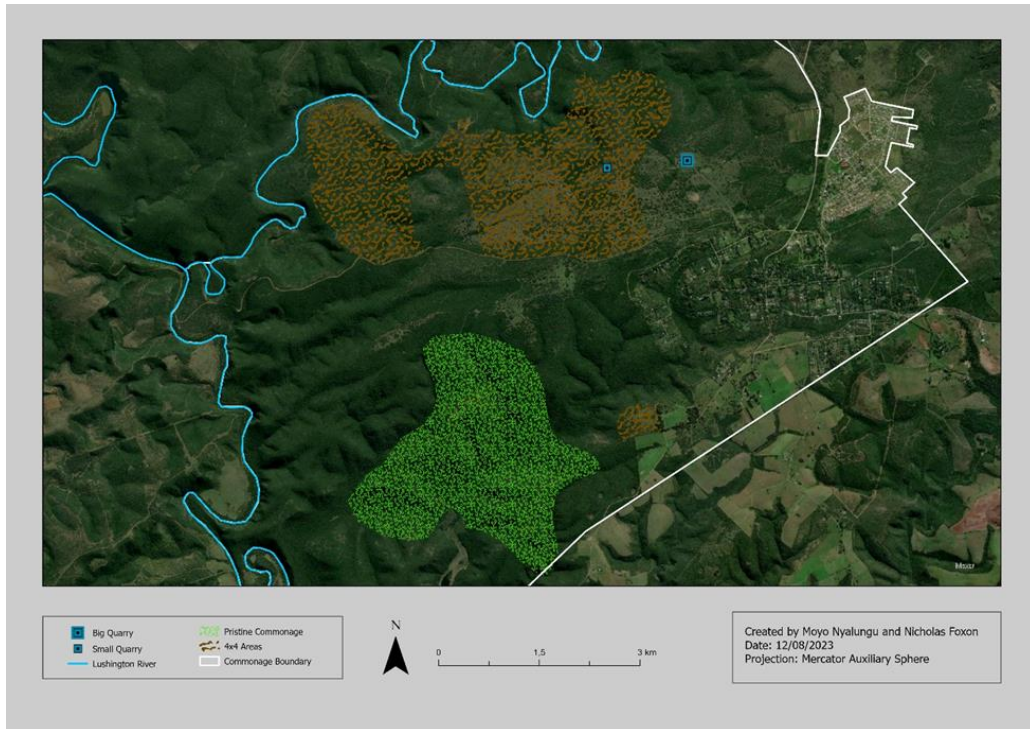
eYethu: It's ours
Diverse socio-cultural values of nature in the Bathurst-Nolukhanyo

Figure 3: Map of the Bathurst Commonage illustrating pristine commonage and four-by-four racing areas (Map by Moyo Nyalungu and Nicholas Foxon).
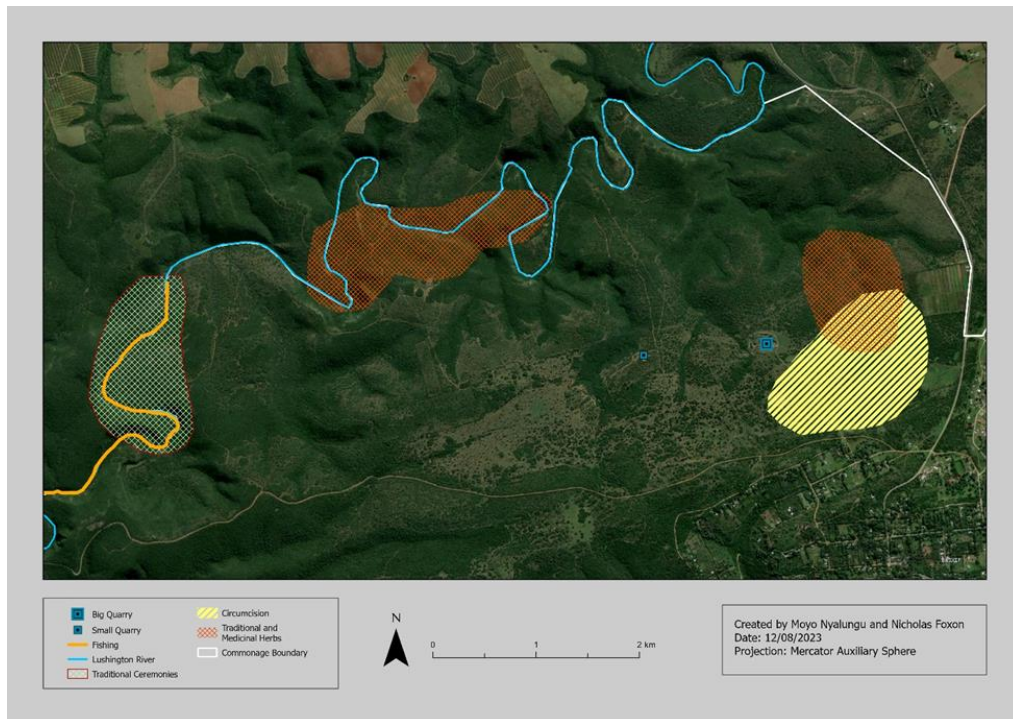

Figure 4: Map of the Bathurst Commonage illustrating areas where participants use the commonage for traditional ceremonies, medical herbs collection and initiations (circumcisions) and fishing (Map by Moyo Nyalungu and Nicholas Foxon).

eYethu: It's ours
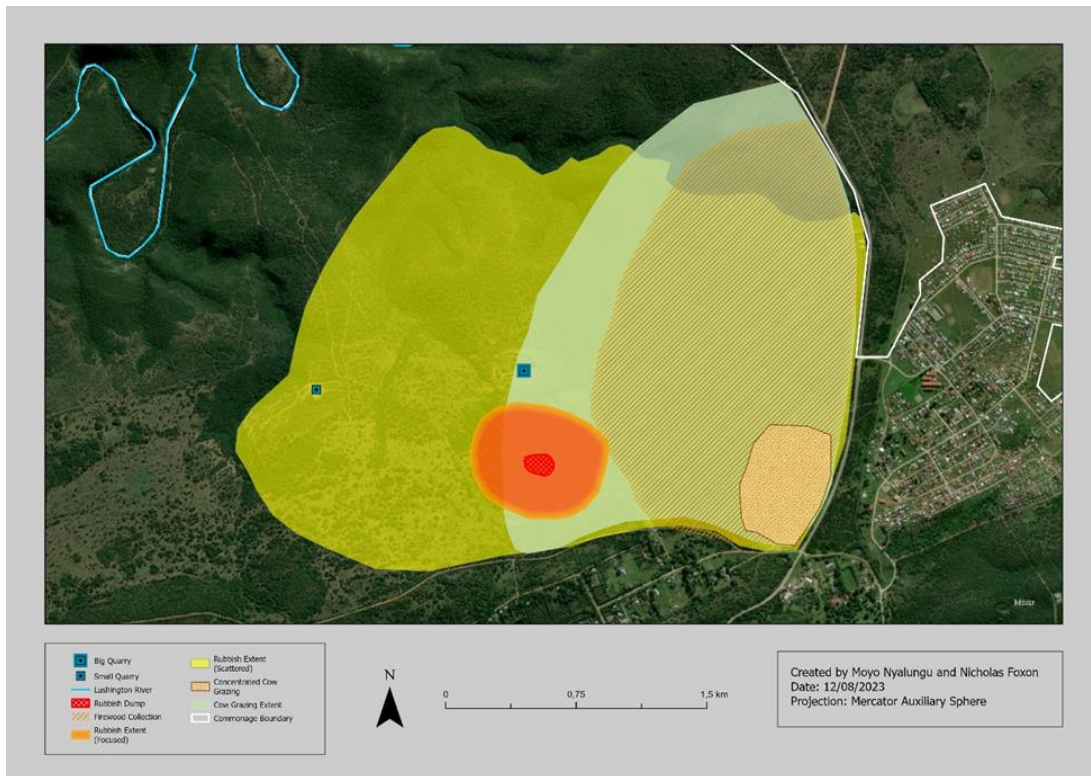Diverse socio-cultural values of nature in the Bathurst-Nolukhanyo

Figure 5: Map of the Bathurst commonage illustrating livestock grazing landfill site and the extent of rubbish in the commonage (Map by Moyo Nyalungu and Nicholas Foxon).

4.3. How has cultural ecosystem service use in the commonage changed over time, and what might be the drivers of change?

A few of the participants stated that they had not noticed any change in the commonage and its use (T7, T9). Although that may be considered difficult to ascertain considering the condition of the garbage extent (See Figure 5), one could also assume that that could be attributed to the condition of the Bathurst declining extensively over time. This alludes to the management of the commonage, which has been described as poor by many of the participants. One participant stated: "The municipality doesn't care about the commonage, the municipality have no input" (V4). For example, according to some of the participants (T8, T11, V3, V4), the municipality had built a sort of pipe network in the Lushington River to supply the community with water during the time they were facing water shortage crisis. They add that the municipality stated that it was a temporary measure, however, it is still there currently, and the tip of the water infrastructure collects rubbish which then ends up washed into the river. Concerning the tip, one participant said: "The tip disrupts water for wildlife, the horses are also harmed when they drink from the river" (V2). This is exacerbated by the poor management of the landfill site. Participants stated that the landfill site is poorly maintained and managed, such that rubbish now expands beyond the site (See Figure 5). Two participants stated that this has been harmful to livestock since cows end up eating rubbish from the landfill when grazing (T9, T11, T12). In

addition to the landfill site, other changes in the commonage include the growth and spread of lantana and illegal sand mining (T8, V1-V9). Collecting firewood appears to be a somewhat contentious issue, although acknowledged to be a historical practice, a few participants stated that it has contributed to a loss of natural vegetation on the periphery of the commonage. Despite this, many people continue to collect firewood in the commonage (T1). Two participants stated that this is due to load shedding (T12, V3). Another reason some participants were averse to collecting firewood is due to safety concerns. Two participants said: "It is not safe for women in the commonage, they have to go in groups" (T5, T6). In contrast, interviews conducted in the village revealed the opposite. Participants stated that they had no issue with safety when they go dog walking or sightseeing (V7, V6). One participant has also stated that there has been a change in accessibility to the commonage, and this can be seen in how initiates were moved from where they typically stayed during the initiation (T8). They provide that there were fears that initiates might be corrupted by criminals would lie in wait in the area.

The Bathurst commonage is highly valued by all members of the community. All the participants revealed that they wished for the commonage to be preserved. One said: "We are working on spreading information on how to best go about doing so" (V1). Moreover, many stated that they wished for the commonage to be preserved for future generations (T5-T11). A few stated that there was nothing they would do to enhance the commonage (T6, T8, V1, V2, V3, V8). However, this is due to the fear of inadvertently harming the commonage whilst attempting to enhance and protect it. "It is impossible to make any meaningful changes to the commonage on my lonesome, collective action is needed" (T8). Furthermore, the interviews revealed that there have largely been no initiatives (T5, T7, T10, T11, T12, V2, V3, V4, V7), the exception being the fencing that was implemented by the municipality around the commonage (T6, T9, T11, T12). However, the fencing has either been stolen or destroyed to such an extent that livestock leave the commonage and stray into the town (T11, T12). This has resulted in a lack of faith in the municipality by the participants, who have stated that the whole community agrees.

In the interviews conducted, participants have also offered suggestions on how to improve and sustain the commonage. One participant stated that the municipality should allow the communities to have most of the responsibility for managing it (V4). Some stated that the municipality should employ people to safeguard the commonage (V7, T6, T11), whereas others have suggested starting by removing the tip followed by the rubbish from the river (V1-V4).

4.4.
How are Bathurst's and Nolukhhanyo socio-economic divides portrayed through the use of the commonage?

As evident in Table 1, participants from Nolukhanyo derive a higher proportion of provisioning ecosystem services from the commonage than those from the village. In addition, participants from the village use cultural ecosystem services related more to recreation, as compared to those from the township who use cultural ecosystem services related to spiritual and traditional activities. Two

participants from the township stated that as far as they were aware, the people in the village used the commonage for recreation (T8, T11). Ecosystem services such as hunting and fishing, which the participants from the township regard as provisioning services, are characterised as recreational cultural ecosystem services by participants from the village. Three participants stated that poaching and trophy hunting is increasingly becoming a major issue in the commonage (V1, V2, V3). However, one participant said: "Although hunting is sort of a big problem here, I understand that it's an important activity for the township people's livelihoods, so we need a balance" (V8). In addition, most of the participants are aware that both groups use the commonage, some participants have stated that there is an equal use by both groups of the commonage and its resources with only a few clashes (V1, V3, V4), a few participants particularly from the township are unaware of how the people in the village use it or if they even use it at all. For example, four participants from the township stated that people from the village do not use the commonage (T5, T9, T10, T12). This is evidence of a lack of communication in the relationship between Bathurst village and Nolukhanyo, which could have implications for management.

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Key findings on the value of the Bathurst-Nolukhanyo Commonage

The Nolukhanyo township residents derive the majority of the provisioning and cultural ecosystem values that speak to their **isiXhosa identity** from the commonage.

The Bathurst Village residents' cultural ecosystem values from the commonage speak primarily to **leisure and recreation.**

</div>

5.   DISCUSSION

The results from this study show that the Bathurst Commonage and the ecosystem services derived from it are the lifeblood of Bathurst and Nolukhanyo. Moreover, from the results, we were able to identify overarching themes which this report discusses below, namely the management of commonages, cultural ecosystem services as a heritage and how commonages relate to relational values.

5.1. How commonages relate to relational values

Relational values can be described as values and or importance given to meaningful relationships between humans and nature as well as between humans and humans through nature (Skubel and Maranto, 2019). Commonages can have an instrumental impact on how humans value nature and how they interact with one another (Baycan-Levent and Nijkamp, 2009), and notably, relational values can arise from the ecosystem services derived from commonages. Regarding relational values, commonages promote and encourage social capital in the form of social cohesion, trust and conflict resolution (Ostrom 1990), as well as assist in fostering cultural identity and sense of place (Berkes et al., 2000). Berkes et al. (2000), state that commonages have cultural significance that enhances relational values as they often act as deposits of traditional knowledge, rituals and customs that strengthen the relationship between individuals and nature. This can be seen in the Bathurst community. For example, many participants have stated how they conduct traditional ceremonies and initiations in the commonage, and they wish to preserve such heritage and tradition for future generations (see sections 5.2 and 5.3). According to Ostrom (1990), commonages also necessitate collaboration between members of communities, as trust plays an important role in ensuring resources are equitably and sustainably without conflict. An example of such a case is the common pastures in Mongolia (Fernandez-Gimenez, 2002). However, this contrasts with our results. Although participants have stated that there is an equal use of the commonage and its resources without any notable conflicts (see section 5.4), this is not due to any strong collaborations between the user groups. There is a visible lack of collaboration and communication between the groups as some participants from the township stated that the people from Bathurst village do not use the commonage (see section 5.4). Nonetheless, the commonage is a good source of social capital. It is a hub for social interactions and community engagement. Many of the participants stated they go to the commonage for camping, picnicking, sightseeing and four-by-four racing with friends (see section 5.2). Notably, however, the two user groups do so in isolation from one another.

5.2. Inequity and access to cultural ecosystem services

Although cultural services are often less tangible than material services, they remain highly valued by communities. Mowat and Rhodes (2020) argue that neoclassical valuations of ecosystem services have been a disservice to cultural ecosystem services. Keeping that in mind, we can pose questions such as, 'Would urban green spaces such as commonages be deteriorating if we could quantify intangible ecosystem services? Would the Bathurst Commonage be in its current state if we could quantify instrumental and relational value? The truth is we cannot answer these questions, however, from our data, we can infer that participants want to preserve the commonage because of the cultural services they benefit from. Participants in this study have stated that they wish to preserve the commonage for future generations, due to intrinsic, instrumental and relational values. We suggest that this can be compacted into two words, 'cultural heritage'. For example, many of the participants indicated that they desired the commonage to be preserved for future generations (see section 5.3). Daniel et al.

(2012), states that natural features, such as the commonage in this case, tend to be associated with the identity of a community and society. They go on to state that such landscapes can be regarded as cultural heritage because of the long-term interaction between site conditions and human activity, and thus there are intangible/tangible properties of a community inherited by previous generations, maintained by present generations and passed onto future generations. Cultural services derived from the commonage such as traditional ceremonies, initiations as well as recreational activities such as fishing and four-by-four racing can be categorized as such. Participants share a common desire to preserve the commonage because it is an integral part of the town's identity, preceding the town itself with a culture not found in many places in South Africa.

5.3. Management of commonages

One common theme arising from the interviews is the poor management of the commonage by the local municipality. Effective management of a green space such as a commonage, means maintaining, enhancing and protecting it in such a way that it can achieve all the components of human well-being without deteriorating (McMichael et al., 2005). McMichael et al. (2005) refer to these components as security, basic material for a good life, health, good social relations such as recreational values, spiritual values and freedom and choice. However, the current nature of the Bathurst Commonage hampers the provision of each of these components. For example, evident from the data (Figure 6), vegetation has been cut down and rubbish has spread beyond the boundary of the dumpsite which affects the aesthetic beauty and social capital of the commonage. In addition, participants stated that livestock and wildlife are harmed by consuming the rubbish (see section 5.3). These two factors relay that components of human well-being such as good social relations and basic material for a good life are negatively affected. Davenport and Gambiza (2009) state that one of the biggest challenges to the governance of commonages can be attributed to one use of commonage, namely agriculture, which notably contributes to administrative difficulties. Similar Atkinson and Buscher (2006), who argued that inadequate management systems of commonages result in poor management of infrastructure, loss of vegetation etc. The current state of the Bathurst Commonage indicate that agriculture is not a prominent activity in the commonage. This suggests that the administrative difficulties in the management system are due to other factors. From the data collected, it is difficult to point out what these factors are, however, one of the contributing factors we suggest is a lack of unified understanding of how the commonage should be used and preserved. This could be attributed to the socio-economic divide between Nolukhanyo and the Bathurst village. Although participants know that both the village and the township use and value the commonage, there is a distinct lack of communication and collaboration between the two settlements. One participant stated: "I don't know what the village uses it for, probably walking or hiking" (T7). Most of the participants stated that the commonage should be managed as a common pool resource primarily due to poor municipal management. Martens (2009) states that effective management of a natural resource requires a high degree of monitoring and communication. Consequently, it is important to consider other causes of

poor municipal management excluding administrative difficulties, such as low capacity, especially when the municipality is faced with more pressing issues such as service delivery (Martens, 2009).

> ## Key recommendations for the management of the Bathurst-Nolukhanyo Commonage
>
> **Collaboration:** There is currently a lack of collaboration between the users. There is a need for users of the commonage to communicate and collaborate with each other, which will require coordination and careful facilitation.
>
> **Management:** The commonage should be managed collaboratively due to capacity constraints within the municipality. This can be done through effective communication and monitoring amongst all users.

6.   CONCLUSION

Commonages are a type of urban green space. They provide a variety of services to local communities, one being cultural ecosystem services. These green spaces can be considered vessels of cultural values that contribute to the identity of communities. Such is the case with Bathurst, where the commonage is considered by all the participants as the lifeblood of the town. Consequently, effective management of the commonage is essential due to the intrinsic value, and relational values that are placed on the commonage. Despite this, the Bathurst commonage is poorly managed, which most of the participants attribute to the local municipality incapacity and failures. Moreover, although participants all wish to enhance and preserve the commonage, there is a lack of collaboration between the village and the township, which can partly be attributed to the socio-economic divide between the village and the township. Recommendations to optimize benefits from the commonage as well as improve the management system include adopting an adaptive co-management approach, developing capacity within the municipality, establishing a proper communication channel between the village and the township and assessing the condition of the commonage and the needs of the primary user groups.

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8. APPENDICES

APPENDIX 1: INTERVIEW SCHEDULE

Participatory mapping of cultural ecosystem services with diverse socio-economic groups in the Bathurst Commonage

Interview schedule

Schedule No.	
Date and place of the interview	
Interviewers' names	
Respondent information: Name, village/township, etc.	

Introduction: Good day. Thank you for taking the time to meet with us. We are grateful to you for sharing your knowledge and experience with us. We are going to ask you a few questions about how you interact with the Bathurst commonage.

1. Can you start off by telling us how long you have lived in Bathurst?

2. Do you use or interact with the commonage in any way? If yes, what do you use the commonage for, and which parts of the commonage do you interact with?

3. How has the use of the commonage changed in the last 5 years? (Both personal use and general use by everyone)

4. Can you tell us how the commonage provides any cultural value to you personally, or the community at large? If yes, how so? And can you tell us about any specific cultural or spiritual practices that are conducted in the commonage? (e.g. circumcision or other cultural or spiritual rituals).

5. Do you engage in any recreational activities within the commonage (e.g. hiking, camping, fishing or anything of the like)? If yes, what activities?

6. Do you feel as if the community of Bathurst is connected to the commonage in any way? If yes, is this connection, spiritual, cultural, provisional or another type of connection?

7. Do you think that preserving the commonage is good for future generations? If yes, how so, and what parts of the commonage should be preserved?

8. Have there been any initiatives aimed at protecting the commonage or enhancing natural environment in the commonage? If yes, what initiatives and when were they done and did you personally participate?

9. Is there something that you would personally change in the commonage that could both change and protect the environment within the commonage? If yes, what specifically?

10. Can you tell us how you think different socio-economic or cultural groups living in Bathurst use the commonage in similar or different ways?

11. **Mapping cultural ecosystem services:**

Now we will be locating the ways in which you use or interact with the commonage on a map. We will do this in two steps.

Step 1. We will begin with general orientation of Google Earth, i.e. by helping you to identify the venue where the interview is being held, and other well-known local landmarks such as schools, clinics, etc. Please help us to identify some of these local landmarks to make sure you are comfortable with the mapping process.

Step 2. Now, let's Identify and map the ways in which you use and interact with the commonage, focusing on cultural practices and activities. (Note to interviewers: ensure a common understanding of what a cultural ecosystem services is, using some examples and showing them on the map, e.g. a river site for contemplative reflection).

Add notes here on the cultural ecosystem services identified on the map, and any conversation or comments that might be useful from that process.

Closing: Thank you for your time. We really appreciate you sharing this important knowledge with us. We are considering hosting workshop with Bathurst residents to develop a map of the resources of the commonage together. Please let us know if you'd be interested in participating in this workshop? We don't yet know detailed information on date, venue, etc. If you're interested, please provide us with your contact details and we will keep you updated.

Even if you don't join us for the workshop, we would like to send you feedback including a summary of our findings. If you're happy to receive this feedback, please provide us with your contact details.

Name of respondent: _____

Contact details: Phone: _____ *Email:* _____

APPENDIX 2: CONSENT FORM

Participatory mapping of cultural ecosystem services in commonages

INFORMED CONSENT FORM

Research Project Title:	Participatory mapping of cultural ecosystem services in the Bathurst commonage. *Note: details of the research project aims and processes will be verbally explained to participants before they are asked to sign this form.*
Names of researcher(s):	Dr Jessica Cockburn, in collaboration with Nosiseko Mtati and: Prelic Ngwenya, Moyo Nyalungu, Nicholas Foxon, Thato Madiba, Bonolo Thamae (ENV 3 students from Rhodes University).

Participation Information
- I understand the purpose of the research study and my involvement in it   - Ndiyayiqonda injongo yoluphando kunye nokuthatha inxaxheba kwam kulo   - Rhodes University has given ethical clearance to this research project (Ethics Approval Number) and I have seen/may request to see the clearance certificate by contacting the Ethics Coordinator (ethics-committee@ru.ac.za/046 603 7314).   - Ikomoti yemigaqo yokuziphatha yaseRhodes University iyikhuphile imvume yoba le project ingasebenza nabantu kwaye ndivumelekile ukucela ukuyibona xa ndinoyicela ngokufounela uphathi walekomiti kulenombolo 046-603-7727.   - I understand the risks and benefits of participating in this research study   - Ndiyabuqonda ubungozi kunye nenzuzo yokuthatha kwam inxaxheba koluphando   - I understand that I may withdraw from the research study at any stage without any penalty   - Ndiyayiqonda ukuba ndingarhoxa nanini na ndifuna kwaye akusayi kubakho sohlwayo   - I understand that participation in this research study is done on a voluntary basis   - Ndiyayiqonda ukuba ndiyinxalenye yoluphando ngokuzithandela   - I understand that while information gained during the study may be published, I will remain anonymous and no reference will be made to me by name, site or village name

- Ndiyayiqonda ukuba nangona olulwazi lungapapashwa akukho nto iyakuthi ibhalwe ngegama lam okanye ibhekise kum nangeyiphi na indlela
- I understand personal information may be used
- Ndiyayiqonda ukuba ulwazi ngesiqu sam lungasetyenziswa
- I understand and agree that the interviews will be recorded electronically and stored on a computer
- Ndiyayiqonda kwaye ndiyavuma ukuba oludliwano-ndlebe luzakushicilelwa lugcinwe kwi-computer
- I understand that outcomes of the research will be shared with me after the analysis
- Ndiyayiqonda ukuba kwakwabelwana nam neziphumo zoluphando emveni kohlalutyo lwazo
- I understand that I may ask to be acknowledged as a contributor to the study
- Ndiyayiqonda ukuba ndingacela ukubandakanywa njengomntu obenegalelo koluphando
- I confirm that I am not participating in this study for financial gain
- Ndiyaqinisekisa ukuba andithathi nxaxheba kuba ndijonge inzuzo eyimali
- In terms of the Protection of Personal Information Act, it remains my right to request the Researcher to provide me with a detailed explanation of exactly how confidentiality and anonymity will be achieved. I may request to know how my personal information will be stored securely, for how long it will be stored, and whether it is likely to be used again in further research.
- Ngokomthetho wokhuselo kolwazi loBuqu, ndivumelekile ukucela umphandi andicacisele ngokuthegabalala malunga nokukhuseleka kwenkcukacha zam kwaye zizakufihlwa njani. Ndingakwazi nokufuna ukuyazi ukuba inkcukacha ezibhalwe ngam zizakugcinwa njani, ixesha elingakanani kwaye zingaphinda zisetyenziswe kolunye uphando na.
- In terms of the Protection of Personal Information Act, I possess the right to receive feedback about this research. This will take the form of workshops, booklets and/or tools produced from the research, unless I elect not to receive feedback.
- Ngokomthetho wokhuselo kolwazi loBuqu, ndinegunya lokufumana ulwazi oluphume koluphando. Olulwazi luyakuza ngendlela eziquka intlanganiso nabantu ebathathe inxaxheba, iingcwadi nezixhobo eziphume koluphando, ngaphandle kokuba ndikhethe ukungalifumani.

Information Explanation
The above information was explained to me by:_____ (Insert Field Researcher's Name) Olulwazi lungasentla ndiluchazelwe ngu:
The above information was explained to me in English [IsiXhosa]and I am in command of this language:

Lonke olulwazi lungasentla ndicaciselwe ngesiXhosa njengolwimi lwam lokuzalwa

Voluntary Consent
I,
hereby voluntarily consent to participate in the above-mentioned research.
Ndinika imvume ngoluhlobo yokuba ndiyinxalenye yophando olubhalwe apha ngasentla ngokuzithandela

Signature:	Date: / /
Sayina	Umhla

Investigator Declaration
I, _____) (Insert Field Researcher's Name) declare that I have explained all the participant information to the participant and have truthfully answered all questions ask of me by the participant.
Ndiyazivakalisa ukuba ndicacise ngokunyanisekileyo lonke ulwazi kulomntu othatha inxaxheba kwaye ndiyiphendule yonke imibuzo

Signature:	Date: / /
Sayina	Umhla

CONTACT DETAILS

- Lead Researcher: Dr Jessica Cockburn. Cell: 072 1022875.
- Facilitator and translator: Ms Nosiseko Mtati. Cell: 064 758 1860
- Ethics chairperson and coordinator: Dr Janet Hayward; Janet.Hayward@ru.ac.za; 046 603 7314

APPENDIX 3: RESEARCH ETHICS APPROVAL LETTER

Rhodes University Human Research Ethics Committee
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https://www.ru.ac.za/researchgateway/ethics/

27 June 2023
Dr Jessica Cockburn
Email: J.Cockburn@ru.ac.za j.cockburn@ru.ac.za

Review Reference: 2023-7261-7739

Dear Dr Jessica Cockburn
Title: Participatory mapping of cultural ecosystem services with diverse socio-

economic groups in the Bathurst Commonage Researcher: Dr Jessica Cockburn

Supervisor(s): 0 ENV 3 Group 4 (See names on motivation page) Environmental Science,
This letter confirms that the above research proposal has been reviewed and **APPROVED** by the Rhodes University Human Research Ethics Committee (RU-HREC). Your Approval number is: 2023-7261-7739. Approval has been granted for 1 year. An annual progress report will be required in order to renew approval for an additional period. You will receive an email notifying you when the annual report is due. Please ensure that the ethical standards committee is notified should any substantive change(s) be made, for whatever reason, during the research process. This includes changes in investigators. Please also ensure that a brief report is submitted to the ethics committee on the completion of the research. The purpose of this report is to indicate whether the research was conducted successfully, if any aspects could not be completed, or if any problems arose that the ethical standards committee should be aware of. If a thesis or dissertation arising from this research is submitted to the library's electronic theses and dissertations (ETD) repository, please notify the committee of the date of submission and/or any reference or cataloguing number allocated.
Sincerely,

Janet Hayward.

Dr Janet Hayward

Chair: Rhodes University Human Research Ethics Committee, RU-HREC

cc: Ethics Coordinator