

# The potential of frogging as an ecotourism product for South African National Parks



## Authors:

Zoëgné Luyt<sup>1</sup> 

Peet van der Merwe<sup>1</sup> 

## Affiliations:

<sup>1</sup>School of Tourism Management, Faculty of Economic and Management Sciences, North-West University, Potchefstroom, South Africa

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## Corresponding author:

Peet van der Merwe,  
peet.vandermerwe@nwu.ac.za

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Amid global biodiversity loss, it is important to find practical tools and solutions in order to protect biodiversity. Ecotourism is the fastest-growing sector of the international travel industry and can be a powerful conservation tool that encourages people to protect the natural environment. Traditionally, frogs have not generated much attention among ecotourists, partly because they are easily overshadowed by other more charismatic species or habitat attractions. With almost a third of the nearly 7000 known amphibian species listed as threatened by the International Union for Conservation of Nature (IUCN), their protection is crucial. Frogging is a well-known term within the frog conservation society, describing the activity of searching for frogs in the wild. This can be combined with other ecotourism activities to attract tourists and create an interest in the conservation of frogs while having fun at the same time. The aim was to determine the ecotourism potential of frogs in South Africa, primarily by distributing questionnaires to tourists to retrieve information on whether they would be interested in participating in frog-related ecotourism activities within the South African National Parks. For this research, a quantitative research approach was followed, namely non-probability sampling, to which convenience sampling was applied. An online survey (questionnaire) was designed to collect the data for the research. The survey outcome was satisfactory, as potential tourists indicated that they would like to participate in frog-related activities. The project offers the opportunity to conserve frogs, educate tourists, and create job opportunities within the local communities. It will also create a new tourism product for the South African National Parks.

**Conservation implications:** The contribution of this research to conservation lies in the opportunity to benefit frog conservation through ecotourism.

**Keywords:** frogs; ecotourism; conservation; frogging; South Africa; natural area tourism; SANParks.

## Introduction

One of the main reasons for travelling the world is to view the world's natural wonders and experience and use different features of nature for enjoyment. National parks and other protected areas play a pivotal role in providing tourists with nature-based attractions to visit (Newsome, Moore & Dowling 2013), and tourism worldwide plays an essential role in protected areas as a mechanism to promote and fund conservation in these areas, especially in Africa (Morrison et al. 2012).

South Africa's natural attractions, both fauna and flora, are vibrant and diverse and have led to a continuous increase in visitors to South Africa (Department of Environmental Affairs and Tourism [DEAT] 2008). In 2018, there were 29 million overnight trips within South Africa, with 18.6 million of these trips made by domestic tourists and 10.4 million by international travellers (South African Tourism 2019a).

Nature-based tourism products in South Africa have been exemplified by the Big Five, Cape Fynbos, wildlife safaris, bird watching and geological sites such as Table Mountain (DEAT 2008). These products are well promoted and established within the South African tourism industry and generate the same income as the combined total income of fisheries, forestry and farming (Metin 2019; SAT 2019b).

Among South Africa's most significant nature-based tourism products are its 19 national parks, which fall under the management of SANParks (2020). These national parks are spread over seven of the nine provinces of South Africa (covering an area of just over 4 million ha), represent

67% of the protected areas managed by the state (SANParks 2020) and receive approximately 6.3 million visitors per year (SANParks 2020). Statistics from 2016 to 2017 indicate that 1.8 million tourists visited the Kruger National Park, one of South Africa's flagship conservation areas (Brett 2018).

In South Africa, the national parks were created firstly to conserve natural resources (Thomas & Middleton 2003) and secondly to introduce tourism into these areas to create opportunities for tourists to learn about the natural resources and engage in nature-based activities, as well as to fund park operations (Van der Merwe & Saayman 2008). Therefore, income generated by tourism is used to manage and conserve these natural areas, as government funding for the national parks in South Africa has been reduced over the years; the funds generated by tourism services thus provide a vital supplementary income for conservation actions (Phillips 2009). Creating more ways to attract tourists to the national parks will increase the parks' revenue. However, the natural area tourism industry in South Africa needs to redevelop continuously to stay up to date with current trends, ensure return visits and expand the visits of nature tourists. 'Frogging' is a niche nature tourism product related to frogs, offering a unique attraction to the current range of South African wildlife and ecotourism products (Loubser 2016; SAT 2022). It describes the activity of searching for frogs in nature to admire and learn about these species and their relationship with humans, conserve the species and use this tourism product to sustain the local community's livelihoods (Carruthers & Du Preez 2011; SAT 2022).

South Africa's network of national parks represents a diversity of fauna and flora (coastal and inland), including (in many cases) a wide variety of frog species (Du Preez & Carruthers 2017; eds. Minter et al. 2004). Still, these smaller and lesser-known species are sometimes neglected and ignored within national parks (Fennell & Weaver 1997; Tisdell 2007; Tolley et al. 2011). Morrison et al. (2012) stated that frog tourism has significant potential to contribute to global frog conservation efforts and can be a drawcard for tourists visiting national parks or protected areas. Tisdell (2007) found that the public is more willing to get actively involved in conservation efforts of a particular species once the species becomes more endangered or well known (Tisdell & Wilson 2012). According to the Endangered Wildlife Trust (EWT 2018), frog species' compositions will differ between biomes across South Africa (Du Preez & Carruthers 2017; eds. Minter et al. 2004), and all the South African National Parks represent the nine different biomes of South Africa. Creating frogging hotspot destinations in these national parks could help put frogs and their conservation plight into the public eye and generate income for SANParks (the management body of South African National Parks) to manage their conservation operations. Therefore, this study aims to evaluate the potential of frog tourism in South African National Parks.

## Literature background

Natural area tourism provides opportunities for tourists to learn about and appreciate the natural environment

(Newsome et al. 2013; Weaver 2001). This type of tourism started because of the diversification of the tourism industry and the desire of tourists to experience wildlife and the natural environment (Wearing & Neil 2009). It consists of four key pillars: ecotourism, wildlife tourism, adventure tourism and geotourism (Mckinney 2016; Metin 2019; Roxana 2012). In this study, frogging tourism is placed under the ecotourism pillar of natural area tourism as a result of its educational, conservational and community qualities (Newsome et al. 2013).

Héctor Ceballos-Lascuráin (1992, 1996) defined ecotourism as visiting fragile, unspoiled, protected areas (Mckinney 2016; Saayman 2009). The complete experience helps in educating tourists (in this context, about frogs), provides funds for nature and cultural conservation and raises respect for the environments and cultures found in these areas (Newsome et al. 2013; Orams 1995; Tisdell & Wilson 2012; Von Solms & Van der Merwe 2020; Willemen et al. 2015).

Ecotourism is an alternative form of tourism that involves conserving resources (biological diversity), maintaining sustainable use of resources, bringing an ecological experience to tourists, conserving the ecological environment and gaining economic benefit (Mckinney 2016; Saayman 2009; Tisdell & Wilson 2012). Overall, ecotourism can be seen as a more responsible and sustainable form of tourism, if practised correctly (Metin 2019; Newsome et al. 2013).

## Importance of frog conservation

Frogs have been under severe pressure since the industrial revolution, with almost a third of the more than 7000 known amphibian species listed as threatened by the IUCN (Amphibiaweb 2017; Bishop et al. 2012; IUCN 2017). According to the Endangered Wildlife Trust (EWT) (2018, 2021), South Africa has 135 frog species, of which 30% are considered threatened by the IUCN. The EWT (2021) is currently running projects across three provinces (Western Cape, Eastern Cape and KwaZulu-Natal) to protect the nine most endangered frog species of South Africa. An entire class of vertebrates face a mass extinction spasm, and conservation actions are needed to save them. The first and primary threats to frogs are invasive species, problematic species and gene composition, affecting 37% of all South African frog species. This approximation is noticeably higher than the global average of 15.7% (Angulo, Hoffmann & Measey 2011). The second major threat to South African species is biological resource usage (46%), whereas pollution, together with residential and commercial development, are listed as the third threat, affecting 14% of frogs, which is almost a third of South African frog species (Angulo et al. 2011; EWT 2021; Harrison et al. 2000). The fourth factor affecting nearly 26% of all South African frog species comprises several natural system modification processes (fire, water quality and weather) (EWT 2018). Almost 50% of all frog species in South Africa are affected

by agriculture and aquaculture, which result in habitat loss (Angulo et al. 2011). It is imperative to protect frogs because of the ecological function they perform (EWT 2018). Frogs help control insect populations, keep waterways clear and serve as a food source in ecosystems (Angulo et al. 2011; Du Preez & Carruthers 2017; West 2018). To minimise the existing amphibian extinction crisis, the global community must respond with an innovative and multidisciplinary approach to protect amphibians at an unprecedented scale (Angulo et al. 2011; Mittermeier, Gascon & Andreone 2008).

Unfortunately, the conservation of frogs does not receive the same attention from the public and conservation authorities as does the conservation of more charismatic endangered species such as rhinos (Estren 2012). These attitudes are ascribed mainly to a lack of knowledge about frogs and to the negative connotations of most native folklore and mythology about frogs (Ceriaco 2012). The question can be asked whether the public might become more involved in the conservation of frogs once it is emphasised that they are threatened and need urgent conservation action. Frogging tourism can be a solution to this problem. With its thriving ecotourism industry and diverse environment, South Africa and its provincial and national parks provide the ideal opportunity to study the potential of frogs within ecotourism. By involving tourists in the conservation and education of frogs, it is vital to understand the market of ecotourism and the needs of tourists properly. Such information can be used to better plan and manage this supplemental frog conservation approach, thus contributing to its sustainability (Angulo et al. 2011; Mittermeier et al. 2008).

South African National Parks cover a wide area across South Africa (SANParks 2020) and provide the ideal destination for frogging activities, as numerous endangered and endemic frog species occur within these national parks (eds. Minter et al. 2004). The Western Cape hosts the highest number of endemic species in South Africa (Du Preez & Carruthers 2017; eds. Minter et al. 2004), for example, the strawberry rain frog (*Breviceps acutirostris*), Cape Mountain rain frog (*Breviceps montanus*), endangered Knysna leaf-folding frog (*Afrixalus knysnae*), near-threatened Cape Peninsula moss frog (*Arthroleptella lightfooti*) and the critically endangered Table Mountain ghost frog (*Heleophryne rosei*); some of these species are found within national parks situated in the Western Cape. The Kruger National Park, which is the most preferred park by national and international tourists (Van der Merwe & Saayman 2008), hosts a total of 28 known frog species (Du Preez & Carruthers 2017; eds. Minter et al. 2004), for example, the charismatic golden leaf-folding frog (*Afrixalus aureus*), water lily frog (*Hyperolius pusillus*) and banded rubber frog (*Phrynomantis bifasciatus*). With their unique colours and features, these species will pose great photographic opportunities for ecotourists.

## Frog-related tourism activities

Tourists constantly seek unique experiences, especially activities that bring them close to nature. Frogging is a fun and easy family or individual activity that can aid in the protection of wetland habitats and the species found within these ecosystems (NatureWatch 2022). Tourists will learn more about these beautiful creatures' lifestyles, calls and physical features by participating in frogging activities.

A desktop study was conducted to determine the size and scope of frogging tourism, specifically in South Africa. Table 1 summarises the eight frog-related tourism activities found during the study. Within South Africa, none of these frogging destinations is found within any of the South African National Parks. Currently, there are no known frogging activities hosted by national parks or at least listed on their websites as an activity (SANParks 2021). The closest to this is the privately owned Jock Safari Lodge next to the Kruger National Park (South African Lodges.com 2022). Out of the eight identified destinations listed in Table 1, two are managed by national nonprofit conservation organisations of South Africa (i.e. Birdlife South Africa and the Endangered Wildlife Trust), one by a local nonprofit conservation organisation (Matotoland Eco-Tourism Association), two by private nonprofit conservation organisations, two by public tour operators and one by the owners of the destination. This indicates a lack of national parks to develop frogging tourism activities that can conserve frogs in South Africa.

## Research method

The sampling and sample population, questionnaire and statistical analysis will be discussed in the research method section.

### Sampling and sample population

For this research, a quantitative research approach was followed, namely nonprobability sampling, to which convenience sampling was applied (Mathers, Fox & Hunn 2007; Patel 2009). The research sample population was tourists who had previously visited South African National Parks. Permission was obtained from the SANParks research office to conduct the investigation. The consent letter accompanying the questionnaire clearly stated that respondents should have visited South African National Parks in the past to participate in the research. The questionnaire was hosted on the South African National Parks website via a link to Google Forms. The questionnaire was accessible to the public for six weeks. The data were collected using Google Forms, which offered live and instant access to the feedback. For the period, 356 (*n*) completed questionnaires were received back.

### Questionnaire

The web-based questionnaire was developed in cooperation with the Tourism Research in Economics, Environs and Society (TREES) of the NWU, SANParks (2016a) and the African Amphibian Research Group of the NWU, in line with

TABLE 1: South African tourism destinations hosting frogging events.

Activity	Event date	Location	Itinerary	Host	Type
Amakhosi Safari Lodge: frogging safaris	Prebooked event from November to March each year	Pongola (KwaZulu-Natal)	Hosts game walks into the bush to search, view and identify frogs and to listen to their calls (Amakhosi 2022)	Amakhosi Safari Lodge	Private owner
Kenilworth Racecourse Conservation Area: frog walks	Annual event (starting date unknown)	Cape Town (Western Cape)	Evening guided tour to search for the many different endangered frog species that are found in the wetlands of the Kenilworth Racecourse Conservation Area (Khalo 2020)	Kenilworth Racecourse Conservation Area (KRCA)	Private conservation initiative
Mount Moreland Conservancy: Fabulous Froggers	The last event was on 05 March 2021 (starting date unknown).	Durban (KwaZulu-Natal)	This event is mainly to educate people about the <i>Hyperolius pickersgilli</i> (reed frog) that is currently listed as endangered on the IUCN Red List. Guided tour that takes tourists and nature enthusiasts through the wetlands at Mount Moreland (Gaisford 2021)	<ul style="list-style-type: none"> <li>EWT (Endangered Wildlife Trust)</li> <li>KZN Frog Route</li> <li>Fantasy Factory</li> </ul>	National NPO
Birdlife centre at Wakkerstroom: frogging evenings	13 and 14 January 2017	Wakkerstroom (Mpumalanga)	Richard and Candice McKibbin (The Lion-Heart Experience) and Nick Evans (KwaZulu-Natal Reptile and Amphibian Conservation) collaborated with the Wakkerstroom Centre to host an event where wildlife enthusiasts from all over South Africa came together for a weekend of frogging and birding (McKibbin 2017)	Birdlife South Africa	National NPO
St. Francis Bay: frogging safaris	2015 – last event update (starting date unknown)	St. Francis Bay (Eastern Cape)	A guide from the Dune Ridge Country House explains the amphibian crises and why it is necessary to conserve all amphibian species (kouga Baviaans 2022).	Kouga Baviaans Surf & Safari	Public tour operator
Matotoland Eco-Tourism: 'Paddanag' frogging evening	Since 1997, the frog festival has been held during the first weekend of December	Chrissiesmeer (Mpumalanga)	The town of Chrissiesmeer and the local community make it one of their top priorities to conserve frogs and their habitat throughout the year. The Matotoland Ecotourism Association hosts an educational and fun activity-filled frog festival weekend (Kotzé 2011)	<ul style="list-style-type: none"> <li>Matotoland Eco-Tourism Association</li> <li>Miss Chrissie's Country House</li> </ul>	Local NPO
Friends of Kloofendal Nature Reserve: frog evenings	Prebooked guided tour (starting date unknown)	Roodepoort (Gauteng)	Evening guided walk through the Kloofendal Nature Reserve's wetland where excursionists can experience the animals and sounds at night (Ormond 2022)	Friends of Kloofendal	Private conservation initiative
Jock Safari Lodge: frogging safaris	From March to November during the rainy season (starting date unknown)	Kruger National Park (Mpumalanga)	Tourists are taken on a guided frogging safari to admire the colours and the choir of sounds from the different frog species found in this region of the Kruger National Park (South African Lodges.com 2022).	South African Lodges.com	Public tour operator

NPO, nonprofit conservation organisations; EWT, Endangered Wildlife Trust; IUCN, International Union for Conservation of Nature; KRCA, Kenilworth Racecourse Conservation.

a study performed by Fricker and Schonlau (2002). The questions covered various aspects of frog conservation and ecotourism to generate information on how tourists feel about participating in frog-related activities. The focus of this questionnaire was on the demographic profile of frogging tourists, motivations for frogging, views on the protection and conservation of frogs and current frog identification and call identification knowledge. A five-point Likert scale was used to measure the degree to which tourists are aware of frog conservation, their perception of frogs and frog conservation, participation in frog-related ecotourism activities and their main reasons for visiting a destination.

## Statistical analysis

The data received from the questionnaires were captured in Google Forms and exported to a Microsoft Excel file format for further use and interpretation (Factor Analysis). An exploratory factor analysis was conducted with the Kaiser–Meyer–Olkin (KMO) test to measure if the data from the questionnaires were suited for factor analysis (Glen 2016). SPSS 24 (Statistical Package for the Social Sciences) was used to analyse the data.

## Ethical considerations

Ethical approval to conduct this study was obtained from the Ethics Committee of NWU, Faculty of Economic and Management Sciences (reference numbers EMS2016/11/04-0213 and EMS2016/11/04-0214 [online]).

## Results

The research results are presented in five stages: firstly, the sociodemographics of respondents; secondly, frog encounters; thirdly, the importance and interest in frog conservation and activities; fourthly, the travel motives of respondents; and lastly, possible activities for frogging tourism.

## Sociodemographics

The results (Table 2) indicate that the respondents were mainly female (56%), English-speaking, married and between the ages of 25 and 34 years (26%). The Gauteng province in South Africa was their main province of residence (41%). The most significant percentage (42%) of the respondents had a degree or diploma and were employed (54%), earning a salary higher than R552001 per annum (32%). Most respondents were South African citizens, with only 5% being international. The profile obtained from this research on travellers to national parks in South Africa is similar to previous research conducted in national parks by Engelbrecht (2011), Kruger et al. (2018), Mouton (2009) and Van Tonder (2012), who found that visitors to national parks are mostly married, English-speaking and residing predominantly in Gauteng, with an average age of 45 years and a university or secondary qualification.

**TABLE 2:** Sociodemographic information of the 356 participants.

Demographics	Percentage (%)
<b>Gender (n = 355)</b>	
Female persons	56
Male persons	44
<b>Age (n = 353)</b>	
18–19 years	0
20–24 years	9
25–34 years	26
35–44 years	20
45–54 years	15
55–64 years	21
65 + years	9
<b>Language (n = 355)</b>	
English	55
Afrikaans	41
Other	4
<b>Marital status (n = 355)</b>	
Married	51
Single	32
In a relationship	11
Divorced	5
Widow(er)	1
<b>Province of residence (n = 355)</b>	
Gauteng	41
Western Cape	14
North West	11
KwaZulu-Natal	15
Eastern Cape	3
Limpopo	2
Mpumalanga	5
Free State	3
Northern Cape	0
International (non-RSA)	5
<b>Level of education (n = 355)</b>	
No School	0
Matric or Equivalent	19
Diploma or degree	42
Postgraduate	32
Professional	5
Other	2
<b>Employment status (n = 355)</b>	
Student	14
Salaried employment	54
Retired	14
Self-employed	16
Unable to work	0
Currently looking for work	1
Volunteer	0
Other	1
<b>Income (n = 519)</b>	
≤ R20 000	11
R20 0001–R140 000	14
R140 001–R221 000	9
R221 001–R305 000	9
R305 001–R431 000	14
R431 000–R522 000	11
≥ R552 001	32

Note: Average age: 43.42 years.

Other languages include four official South African languages and nine European languages.

## Frog encounters

In this section, respondents were asked to respond to questions on when they were first exposed to nature-based

tourism, the feelings they experienced during their first frog encounter (if they had one), their preference when visiting a nature-based destination and their preferred holiday activity to participate in. These questions are needed to build the profile of potential frogging tourists to South African National Parks.

Most respondents (56%) started visiting nature-based destinations from the age of three; only 12% of the respondents indicated that they were exposed to natural areas for the first time as an adult (older than 20 years).

## Importance of frog conservation

Respondents were asked to indicate on a five-point Likert scale (where '1' = strongly disagree and '5' = strongly agree) to what extent they agreed with a list of frog protection statements (Figure 1). The following three statements obtained the highest values: frogs play an important role in nature (4.75); we must protect frogs and conserve their habitats (4.83); and future generations and your children will benefit if frogs are protected (4.68). Most of the respondents were aware that frogs play an important role in nature, that they should be conserved and that people should be educated about frogs. It is thus imperative to send out the message that the global community should get involved with the conservation of frogs and that it is not only the responsibility of the research and conservation community.

The following results discuss the participants' awareness and interest regarding frogs and participating in frog-related tourism activities (Figure 2). Questions were asked to determine whether the participants felt that frogging activities could be offered at nature-based destinations such as national parks. Again, respondents had to rate their response on a five-point Likert scale (where '1' = not at all and '5' = a great deal). Looking at the mean values of each question, the answers to the following five questions stood out:

- Do you think frogging activities should be offered at nature reserves and South African National Parks? (4.4)
- Do you think tourism, especially nature-based or ecotourism, can help conserve frogs? (4.35)
- If you have children or younger siblings, would you like to expose them to frog-related activities? (4.17)
- Do you find frogs interesting? (4.13)
- Would you like to become more educated regarding frogs? (4.07)

The results show that most respondents are aware that several frog species are endangered and that frog-related tourism activities can benefit from their conservation. What also stood out is that most respondents find frogs interesting, have been educated about frogs and would like to partake in frog-related activities.

When asked if respondents would travel to specific destinations for specific frogging activities, almost half of the respondents were unsure (54%) and 31% stated that they would. A significant percentage of respondents indicated that

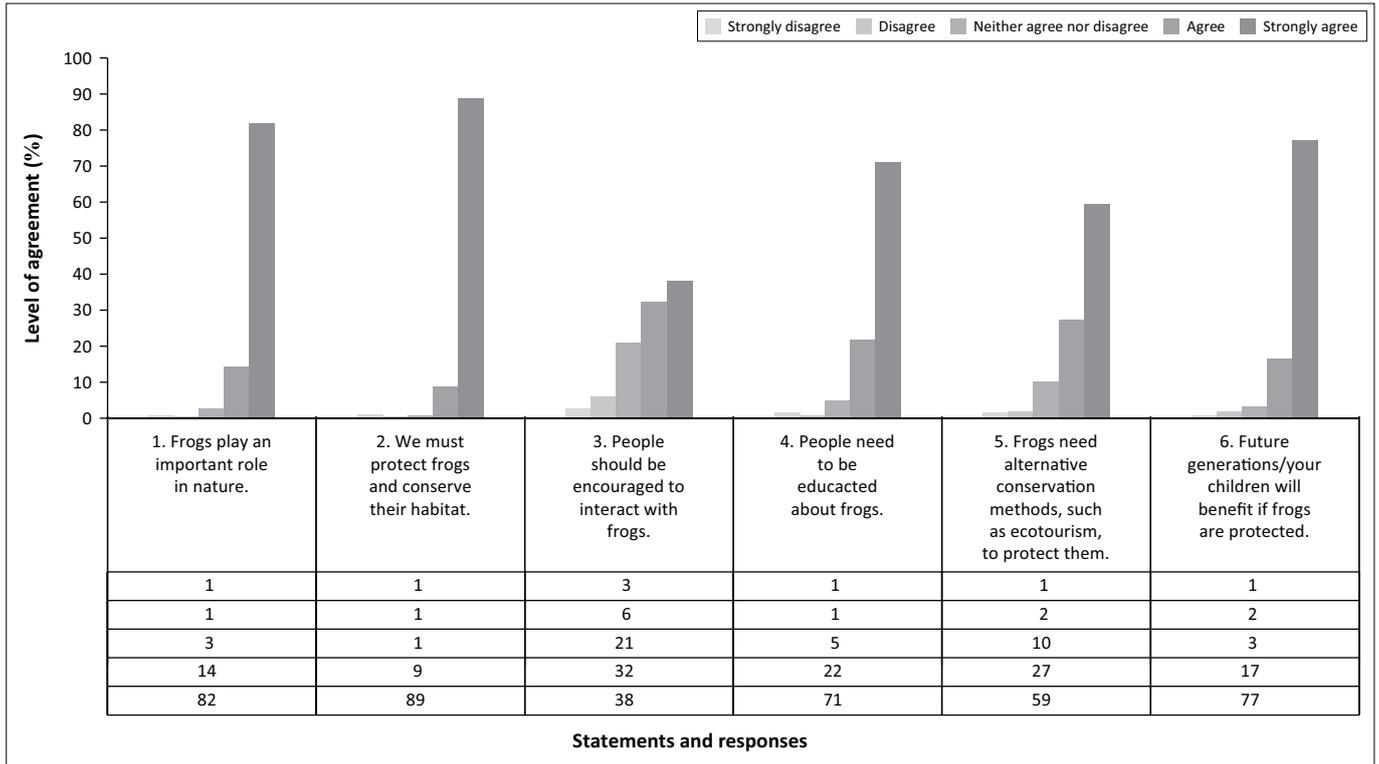


FIGURE 1: Conservation of and educational responses about frogs by respondents.

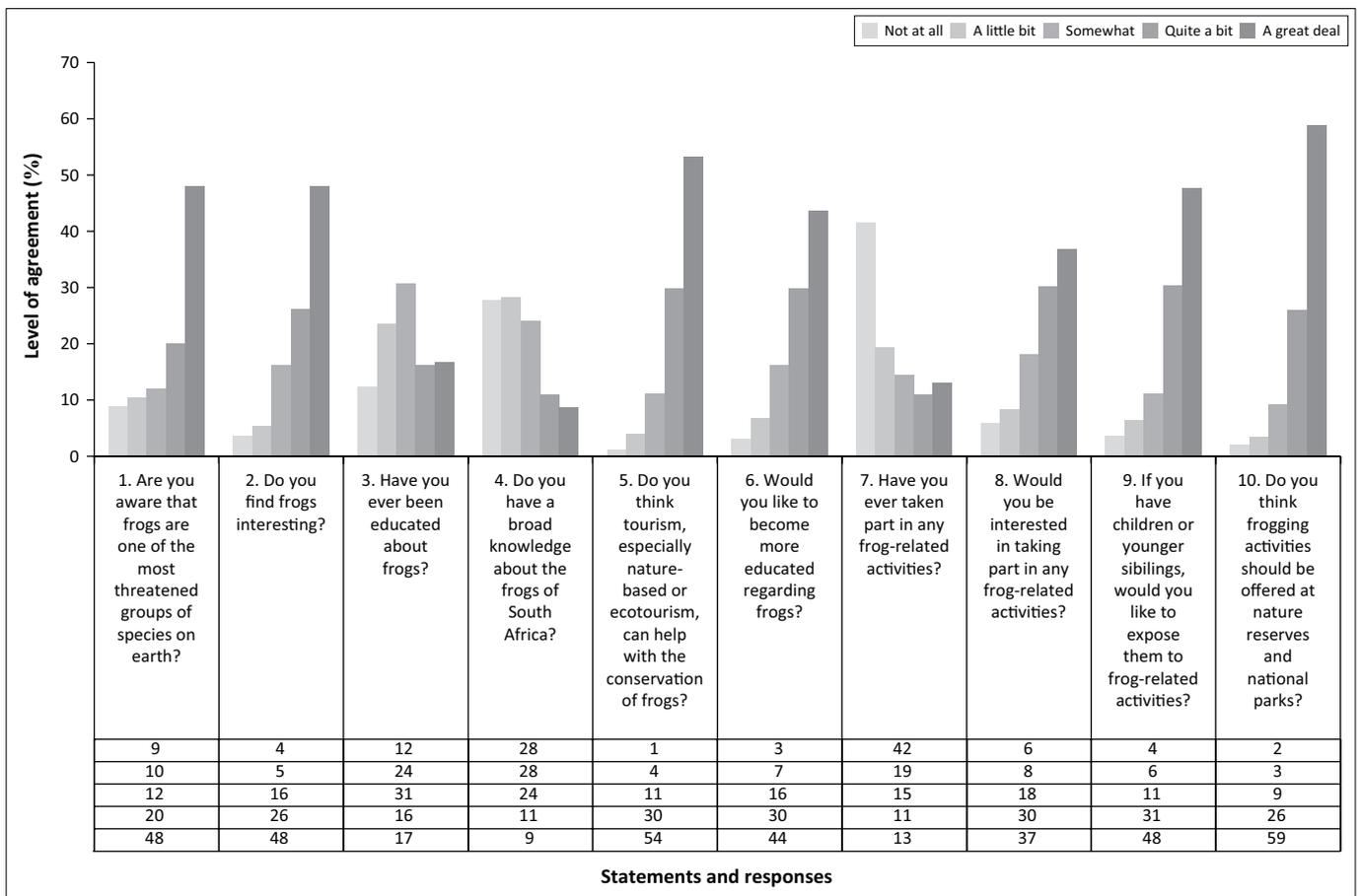


FIGURE 2: Respondents' awareness and attitudes towards frogs.

they would be willing to travel regionally (27%) to visit a frog-related tourism destination, whereas 22% would only travel locally. A total of 21% indicated that they would be willing to travel to neighbouring provinces.

### Travel motives of potential frog tourists

The following section discusses the results of the travel motives of the respondents of this research. An exploratory factor analysis was conducted with the KMO test to measure if the data from the questionnaires were suited for factor analysis (Glen 2016). The Cronbach's alpha score for the KMO tests was between 0.92 and 0.7 for the various factors, which is acceptable (Field 2006; Glen 2016). The 22 constructs delivered (Table 3) five factors: *social aspects, relaxation, biodiversity, conservation and new experiences*.

Inter-item correlations were also calculated and provided the following results (Table 3): the total variance declared was above 50%, which shows an appropriate fit of the selected components (Pietersen & Maree 2007). The mean value of each factor was calculated as the average of all items contributing to a specific factor to interpret the mean scores of the original five-point Likert scale and ranged from 3.13 to 4.26. Relaxation (Factor 2) and conservation (Factor 4) are

regarded as the most important travel motives, having a mean value of 4.21 (relaxation) and 4.26 (conservation) and a Cronbach's alpha value of 0.92 (relaxation) and 0.87 (conservation). The factors are discussed next.

#### Factor 1: Socialising

Socialising can be described as the degree to which participants like to socialise with family, friends or other enthusiasts during activities. Socialising is the least important motive for travelling, with a mean value of 3.13 and a Cronbach's alpha value of 0.82. The constructs for the social factors are the following: to make use of appealing accommodation, to meet new people and to socialise with other nature enthusiasts. These results are contradictory to a study performed by Kruger and Saayman (2010), in which it was observed that one of the most prominent motives for travelling is socialising. Nevertheless, as it is a motive, it can be used to attract tourists to frogging destinations, which can be advertised as social events where groups of people join and go on frogging excursions (Kotzé 2011; McKibbin 2017; Ormond 2022).

#### Factor 2: Relaxation

The relaxation factor is the second most important motive for travelling amongst the respondents, with a mean value of

**TABLE 3:** Pattern matrix and inter-item correlations for travel motives.

Kaiser–Meyer–Olkin (KMO) = 0.872

Constructs	Factors				
	Socialising	Relaxation	Biodiversity	Conservation	New experience
<b>Factor 1: Socialising</b>					
Make use of appealing accommodation	0.778	-	-	-	-
Meet new people	0.741	-	-	-	-
Socialise with other nature enthusiasts	0.620	-	-	-	-
Spend time with friends and family	0.614	-	-	-	-
Value for money	0.603	-	-	-	-
To see the Big Five	0.599	-	-	-	-
For the benefit of my children	0.559	-	-	-	-
For spiritual experiences	0.474	-	-	-	-
<b>Factor 2: Relaxation</b>					
To rest and relax in nature	-	-0.900	-	-	-
Find relief from everyday tension	-	-0.890	-	-	-
Escape from everyday routine	-	-0.872	-	-	-
Experience peace and tranquillity	-	-0.833	-	-	-
<b>Factor 3: Biodiversity</b>					
Birdwatching	-	-	-0.809	-	-
Look at smaller animals (e.g. reptiles, amphibians)	-	-	-0.690	-	-
Photograph animals and plants	-	-	-0.267	-	-
<b>Factor 4: Conservation</b>					
Contribute towards flora (plant) conservation	-	-	-	-0.789	-
Contribute towards fauna (animal) conservation	-	-	-	-0.774	-
Enhance my knowledge as a nature-based tourist (learn something new)	-	-	-	-0.655	-
<b>Factor 5: New experience</b>					
The unique location of the nature-based destination	-	-	-	-	-0.867
The unique experience that the destination offers	-	-	-	-	-0.831
To explore a new, exotic destination	-	-	-	-	-0.478
To experience culture and history	-	-	-	-	-0.317
<b>Inter-item correlation</b>					
Cronbach's alpha	0.82	0.92	0.70	0.87	0.75
Total variance declared (%)	35.19	46.02	54.80	60.86	65.70
Mean value	3.13	4.21	3.85	4.26	3.74

4.21 and a Cronbach's alpha value of 0.92. All the constructs' values are close enough to be significant and the constructs are to relax, find relief, escape routine and experience peace and tranquillity, primarily within a nature-based destination. According to Uysal, McDonald and Martin (1994) and Saayman and Saayman (2009), tourists travel to national parks to escape from their daily routine and to relax and enjoy the scenic beauty and wildlife that the park has to offer (Kruger & Saayman 2010).

### Factor 3: Biodiversity

With a mean value of 3.85, biodiversity is the respondents' third most important travel motive. It includes all the animals and plants, also known as destination attributes, which tourists can view when travelling to a specific destination. This is the first time frogs (biodiversity) were identified as a pull factor for travellers to natural areas and can therefore be used as a unique selling point for tourism.

### Factor 4: Conservation

The respondents indicated that conservation is the most important factor when making travel decisions. The mean value is 4.26 and the Cronbach's alpha value is 0.87. Tourists want to feel that they contribute to biodiversity conservation and practise sustainable tourism (Herzl 2019). Conservation is one of the primary components of ecotourism (Newsome et al. 2013; Tisdell & Wilson 2012; Von Solms & Van der Merwe 2020), and the finding that it is a factor is important as one would like tourists to visit protected areas to support conservation, which can improve frog conservation too.

### Factor 5: New experience

The factor has a mean value of 3.74, which indicates that it is also a deciding factor when tourists make travelling plans. For potential travellers to experience new adventures, they first need to be open to the idea of doing something new (Chaiken & Ledgerwood 2012). This is an important finding, as frogging tourism can provide ecotourists with new experiences.

## Frog activity

Respondents were asked to indicate on a five-point Likert scale (where '1' = not at all and '5' = a great deal) to what extent they would participate in specific frog-related activities (Table 4). The results show that 50% of participants were interested in doing night walks during which they could look for and listen to frogs, and 40% of participants were interested in doing a frog identification-related activity.

**TABLE 4:** The top five frogging activities represented in a Likert scale.

Activities	Likert Scale
Night walks to look for frogs and listen to their calls (sound identification)	4.17
Night drives to look for frogs and listen to their calls (sound identification)	3.97
Frog identification course	3.95
Day walks to look for frogs	3.90
Photography	3.85

The participants were not very keen on doing frog-related activities where entertainment for children was included or where they must watch educational films. Their additional suggestions for activities included assisting with the re-establishment of frogs in nature and combining frogging trips with other nocturnal animal expeditions. The activities that obtained the highest mean values out of five are presented in the following table.

## Discussion

This study identified frogging as a possible ecotourism product for South African National Parks. Numerous researchers (Amakhosi 2022; Gaisford 2021; Khalo 2020; Kotzé 2011; Kouga Baviaans 2022; McKibbin 2017; Ormond 2022) have concluded that frog tourism and research about critically endangered frog species are important. Morrison et al. (2012) indicated that frogs are much less common or popular than tourism products focusing on, for example, mammals or birds (Biggs et al. 2011). Furthermore, few protected areas in the world were established and explicitly managed for frog conservation and frog-related tourism. This is also the case within South African National Parks. For example, Mountain Zebra National Parks were established to protect the mountain zebra (CapeNature 2022; SANParks 2016b), and Addo Elephant National Park was found to protect the Addo elephants (SANParks 2015). Research by Morrison et al. (2012) confirmed that despite frogs not being focal species for nature-based tourism, their results indicated that tourism contributes to protecting more than half of the critically endangered frog species worldwide. Therefore, the South African National Parks' management body, SANParks, should consider a process of identifying possible parks for frogging tourism. It is recommended that more scenic parks be used, for example, Golden Gate Highlands, West Coast and the Garden Route National Park or parks where endangered frog species and nonendangered species will sell as a niche product. These parks do not offer traditional wildlife and Big Five products that can compete against frogging tourism.

Morrison et al. (2012) also indicated the need for tourism, as responsible tourism funds conservation. Their study revealed that tourism represents a significant proportion of protected areas' budgets, particularly in developing regions such as South Africa. Developing countries can potentially increase the contribution of tourism to protected areas by introducing new products such as frogging. In the case of South African National Parks, frogging tourism can also be used to generate extra funding. From a conservation perspective, frog tourism in South African National Parks must not negatively impact the environment. Possible negative impacts include facilities being built to observe frogs, litter, noise, direct killing or injury, disturbance of activities of frogs and habitat alteration, to name a few (Green & Giese 2004). Therefore, South African National Parks must ensure compliance strategies and regulations are in place before developing frog tourism.

The second finding of the research is that the frogging tourism market has not only similar (relaxation and socialising) but also different travel motives to those of the traditional

ecotourist market to South African National Parks. This is proved by the two new identified travel motives, conservation and biodiversity. When examining the research conducted on travel motives of visitors to protected areas (unrelated to frogging tourism), one sees that the primary motives are relaxation (also found in this research), socialising (also present in this research), to get away, photography of wildlife, novelty, activities, nostalgia and adventure, to name but a few (Kruger & Saayman 2010; Meng, Tepanon & Uysal 2008; Saayman, Saayman & Ferreira 2009).

Streicher and Saayman (2010) indicated that different destinations feed different motives to travel. Therefore, South African National Parks cannot use the travel motives determined for previous research, for example, in Kruger National Park and others (Kruger & Saayman 2010; Saayman & Saayman 2009; Van der Merwe & Saayman 2008) with a different market focus, namely the traditional ecotourist market for wildlife mammal species. Consequently, the implication is that if SANParks develop frogging ecotourism products, emphasis must be placed on the education of tourists on frogging conservation, the biodiversity of these species and their habitats. Education of visitors in protected areas remains a key aspect of protection; as Baba Dioum (1968) stated, 'in the end, we will conserve only what we love, we will love only what we understand and we will understand only what we are taught'.

The last finding is the identification of potential activities for frogging ecotourism. Night walks, drives and frog identification were essential activities (Table 4). This research concurs with Menbere and Admassu (2020) and Sánchez-Prieto et al. (2021), who identified nature walks, hiking and night drives as important ecotourism activities. These activities can easily be introduced into some of the parks mentioned here as a niche market, such as birding, where people travel thousands of miles to see certain species (U.S. Fish and Wildlife Service 2011). It can further assist in new skills development for South African National Parks, as field guides will be needed to guide and educate tourists on frogging. Field guides can be recruited from communities adjacent to these protected areas, which will assist in poverty alleviation and skills development in these communities. Research by Saayman et al. (2009) determining the socio-economic impact of Karoo National Park on Beaufort West communities found that national parks benefit adjacent communities in various ways, such as employment and upliftment of communities.

The element of activities is essential. Tourism-related activities in national parks have different roles: firstly, a conservation role; secondly, an educational role to educate visitors on specific animals or species (in this case, frogs); thirdly, to generate income; and lastly, to support the existence of protected areas. It is well known that South African National Parks' primary income source lies in tourism-related activities (SANParks 2020). Research by Bunghez (2016:8) expressed that the sum of tourism commitment to a protected area's economy depends mainly on the activities provided at the destination.

## Conclusions

This research aimed to evaluate the potential of frog tourism in South African National Parks. South African National Parks are spread all over the country and already host most of the frog species found in South Africa (Du Preez & Carruthers, 2017; eds. Minter et al. 2004), therefore making it favourable for frogging tourism.

The main contribution of this novel research is that this research identified frogging tourism as a potential tourism product in South African National Parks. This was also the first time research in this regard was conducted in South African National Parks.

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## Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

## Authors' contributions

Z.L. is the master's student (currently PhD student) whose research was published and involved in the draft article. P.v.M. is the study leader, who was responsible for writing, review and editing and who wrote the findings and implications.

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## Data availability

No data are available, as they belong to NWU.

## Disclaimer

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors.

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