

Giving increased value to invertebrates through ecotourism

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Invertebrates are suffering the greatest species loss in the current biodiversity crisis. These animals perform essential ecosystem functions upon which humanity depends, yet they are largely overlooked in mainstream conservation planning. The main challenges facing invertebrate conservationists, in terms of raising public awareness, are to change common negative perceptions regarding invertebrates and to apply some form of value to invertebrates. This has potential to be achieved through ecotourism. One hundred and twenty-one tourists were interviewed, and 95% of them responded positively to the idea of including information on invertebrates in ecotourism activities. Current levels of inclusion of invertebrates in ecotourism activities, and attitudes to this concept were investigated through interviews with tour guides and other service providers, and through observations of guided walks and drives. Further, the response to the concept of the inclusion of both western/scientific and indigenous knowledge of invertebrates into current and planned ecotourism activities was assessed. The findings revealed that there is currently negligible information on invertebrates in ecotourism activities. However, the positive response to the concept from ecotourism service providers showed that there is potential to increase levels of information. Recommendations on how to address the lack of invertebrate information in ecotourism are provided and examples of the types of invertebrates to include in specific ecotourism activities are given. Including a focus on invertebrates in ecotourism will serve the multiple purposes of placing value on invertebrates; raising public awareness and hence the conservation status of invertebrates, and finally will increase the quality and competitiveness of ecotourism services and products.

Key words: biodiversity, ecotourism, invertebrates, conservation, awareness.

INTRODUCTION

The majority of organisms in the Kingdom Animalia, in terms of both abundance and species, are invertebrates. Invertebrates form an estimated 73.5% of life on earth (Hammond 1995) and are often considered to be the most significant component of biodiversity in terms of their diversity and role in ecosystem functioning (Horwitz *et al.* 1999). Wilson (1992) suggested that insects and other land-dwelling arthropods are so important that if all were to be removed, humanity would probably only last a few months. Invertebrates perform irreplaceable ecological functions including pollination, waste disposal, soil nutrient recycling and they are a major component of most food chains.

Scientists have estimated that roughly 30 000 species of plants and animals are lost every year

due to human activities, and most of these losses are invertebrates (Eldredge 1998).

South Africa has an extremely rich biodiversity. Natural resources contribute significantly to the country's economy and are the basis of millions of people's livelihoods, yet South Africa's biodiversity is one of the most threatened in the world (Wynberg 2002). South Africa's invertebrate species richness is estimated at twice to three times the present described number which is around 70 000 species (60 000 inland and 9000 marine species) (Le Roux 2002). Forty-three thousand five hundred and sixty-five insect species are known (Scholtz & Chown 1995). Conservation measures for invertebrates are largely inadequate (Samways 1994; Gess 1996; Hamer & Slotow 2002) and conservation in South Africa has, to date, centred mostly on the needs of large mammals (Gess 1996). The recognition of inverte-

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brates as wildlife is essential to improving invertebrate conservation, both by conservationists and the general public (Butcher *et al.* 1994). Factors that need to be addressed in invertebrate conservation include raising public, educators' and conservationists' awareness of the diversity of invertebrates, their functions, and conservation needs (Samways 1994; Berenbaum 1995; Evans *et al.* 1996). That some invertebrate groups have extremely high levels of endemism (Le Roux 2002) is not widely known, nor is the fact that species are often confined to small areas making them more vulnerable to extinction (Hamer & Slotow 2002).

Negative perceptions of invertebrates contribute to the inadequacy of their conservation. Many people in developed first world countries view invertebrates, particularly insects, with disgust, perceiving them to be dangerous, poisonous or carriers of disease. There is also a general perception that merely because there appear to be so many invertebrates they cannot possibly be in need of conservation (Horwitz *et al.* 1999). It is widely believed that conservation and management of habitats based on vegetation and large mammals will automatically protect invertebrates, but there is little evidence for this (Evans *et al.* 1996; Hamer & Slotow 2002).

It is generally accepted that while conservation has become a global goal, it cannot be pursued without considering the development needs of the human population (Davis 2002). Tourism has emerged in many countries (particularly developing countries) as a means of providing the financial resources needed to conserve biodiversity, as well as increasing employment and providing foreign exchange (Goodwin *et al.* 1998). Within the international tourism industry, ecotourism is the fastest growing subsector, its growth rate being three times that of tourism overall (Burns & Holden 1995). In South Africa, the majority of foreign tourists are attracted by the natural resources, and ecotourism is one of the fastest growing sectors in the country (Holt-Biddle 2002). Although there is some criticism of ecotourism and concern regarding its impact on communities and the environment (Ebersson 1995; Nuttall 1997; Casagrandi & Rinaldi 2002), it may have a role in building public support for biodiversity and in helping to fund its conservation (Braithwaite 2001).

Samways (1994) suggested that people are becoming more interested in nature as a whole. For example in the Addo Elephant National Park in

the Eastern Cape tourists indicated an interest in seeing the flightless dung beetle (Kerley *et al.* 2003). Kerley *et al.* (2003) attributed this interest to the availability of information about the dung beetles in the form of brochures and road signs. Loubser *et al.* (2001) found that 67% of the visitors to the Namaqua National Park in the Northern Cape were interested not only in the flowers, which were the main attraction, but also wanted to know more about the herpetofauna. Boonzaier's (1996) study of tourism in the Richtersveld National Park in South Africa highlighted that recent publicity on the park focuses on the area's general scenic beauty, rugged isolation and rare succulent plants. This holistic type of thinking suggests that there is potential for the inclusion of a focus on invertebrates in ecotourism activities. The benefits of such a focus include increased awareness of invertebrates which will result in support for their conservation, and improved products and services offered by ecotourism operators, especially those in areas which do not have the 'Big Five'. This will lead to improved competitiveness and income generated for tour guides and businesses.

Globally the inclusion of invertebrates in ecotourism activities is rare. Where invertebrate-focused tours do take place it is inevitably to view a spectacular phenomenon created by a large collection of one type of insect. For example in Mexico there are tours offered to see the spectacle of the annual migration of millions of Monarch butterflies (*Danaus plexippus*) (Burton 2003). The Monarchs are also considered a tourist attraction in the United States where in Florida and California they are protected by state laws (Smart 1975). In Australia there are tours offered to see large collections of glow worms which create an impressive sight as they mass in canyons (Tread Lightly Eco Tours 2003), while New Zealand's Waitomo glow worm caves attract an average of 400 000 tourists annually (Tourism Holdings Limited 2003). There has recently been interest in creating dragonfly reserves in the northern hemisphere, particularly in Japan, mostly with the aim of promoting public awareness. Dragonflies, being conspicuous and attractive, provide good opportunities for arousing interest in invertebrates and the necessity to conserve them. (Suh & Samways 2001).

This study aimed to investigate the potential for including information on invertebrates in certain ecotourism activities. The objectives of the research were to determine the response of tourists to the

concept of including such information in current and planned ecotourism activities; to examine the opinions and attitudes of selected people working in the ecotourism field to the concept of including more information on invertebrates in ecotourism activities; to obtain an overview of the current levels of the inclusion of information on invertebrates in certain types of ecotourism activities and to provide recommendations on how to address the lack of invertebrate information in ecotourism.

METHODS

Attitudes of tourists to the inclusion of invertebrates in ecotourism activities

A structured, standardized questionnaire was used to assess the response of tourists to: (i) the integration of invertebrate-focused tourism into current tourism activities; (ii) ecotourism activities focusing almost entirely on invertebrates; (iii) invertebrate-focused walks for children, and (iv) inclusion of indigenous knowledge on invertebrates. The survey was conducted at Hilltop and Mpila Camps in Hluhluwe-Imfolozi Park, KwaZulu-Natal, South Africa. The same researcher conducted the entire survey, thus reducing the potential for differing influences on respondents. The questionnaire was administered over a three-day period (11–13 October 2001). All respondents were asked the same questions in the same order. This minimized the chances of differing external factors affecting respondents' answers in different ways. The researcher was aware of the potential for interviewer bias and attempted to reduce this by avoiding giving the impression of a 'right' or 'wrong' answer. The questionnaire was kept brief so as not to impose on tourists' leisure time and to increase the likelihood of completion. Wording was kept simple and scientific terminology was avoided to cater for non-English first language speakers. The responses to the questions were recorded in front of the interviewees as the survey was conducted. The questionnaire was administered to 121 tourists, who were interviewed individually. The responses to the four sections of the survey were categorized as positive, negative or undecided and then calculated as a percentage of the whole. Fifty-eight per cent of respondents were particularly interested in the topic and discussions ensued after the questionnaire had been completed, providing qualitative data for recording.

Ecotourism service providers' attitudes to the inclusion of invertebrates in ecotourism activities

A total of 25 open-ended interviews were held with a broad spectrum of people working in the ecotourism and conservation fields: ecotourism service providers; owners and managers of ecotourism ventures; employees of conservation agencies; ecotourism guides and trainers of ecotourism guides (Appendix 1).

Assessment of extent of invertebrate inclusion in existing activities

Data were collected by participating in: a guided night drive at Hluhluwe-Imfolozi Park, a guided game drive and a guided walk at Ndumu Game Reserve, and a guided wilderness trail at the Greater St Lucia Wetland Park. Observations were made regarding the type of information guides gave tourists, noting in particular any information on invertebrates. During these activities tour guides were questioned about some of the more obvious invertebrates seen, to ascertain their interest in, and knowledge of, invertebrates. This also served to enable observation of tourists' responses to invertebrates.

Development of recommendations for invertebrates for inclusion in existing ecotourism activities

A record was made of any invertebrates easily observed during the course of the guided walk and game drive in Ndumu Game Reserve. This was done in order to contribute toward assessing the feasibility of including a focus on invertebrates in ecotourism activities and to identify examples of invertebrates that could be included in ecotourism.

RESULTS AND DISCUSSION

Assessment of tourists' response to the inclusion of invertebrates in ecotourism activities

The response rate for the questionnaire was high, with only three refusals out of 124 tourists approached (2.5%). For the purposes of the analyses the total number of respondents has been taken as 121. The results of the tourist survey indicated a positive response to four aspects of including a focus on invertebrates in ecotourism activities (Fig. 1). Eighty per cent of tourists indicated that they are interested in learning about indigenous knowledge of invertebrates such as legends, uses and names. The key themes identi-

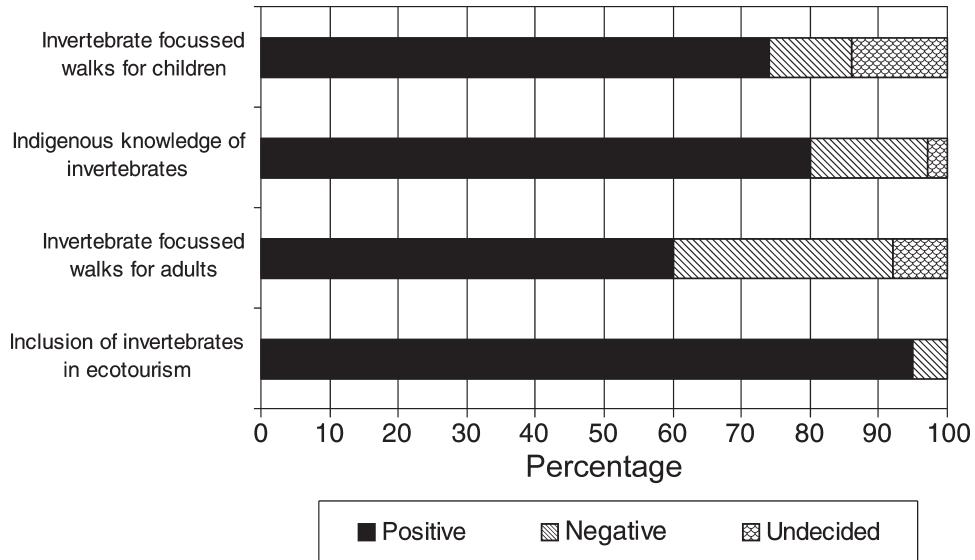


Fig. 1. Responses of tourists, expressed as a percentage, to various aspects of the inclusion of information regarding invertebrates in ecotourism activities.

fied through participant observation and informal discussions with tourists are presented in Table 1.

Ecotourism service providers and protected area managers: responses to various aspects of invertebrates in ecotourism

Two out of 10 ecotourism guides interviewed include information on invertebrates in their drives or walks. One guide takes specific invertebrate-focused walks, but he does so on his own initiative and out of his normal hours of employment. Another guide includes a focus on invertebrates during the course of his normal guided walks and

does so because he is interested in invertebrates and has some knowledge of them. When asked why they seldom include a focus on invertebrates, six of the ten guides said that the tourists' priority is to see the 'Big Five'. Four of the guides interviewed added that in addition they are under time pressure to find large mammals during the three-hour game drive or walk and there is little time to focus on anything else (Table 2). By contrast, one of the freelance guides noted that he is with any one group of tourists for as long as three weeks and that he does have the time to include some information on invertebrates. He stated that to

Table 1. Results of informal discussions with tourists: key themes.

Key themes	Number of tourists % (n = 121)
Priority of seeing 'Big Five' in the limited time available in a game reserve means any invertebrate-focused activity will be secondary	38.0 (46)
Duration of invertebrate-focused activity should be no more than one hour	33.9 (41)
Need for invertebrate activities, or points of interest in the camp area	26.5 (32)
The need for a more holistic approach to observation of the natural environment, which would include invertebrates	10.7 (13)
Children get bored and frustrated in vehicles	9.1 (11)
Children are interested in invertebrates	7.4 (9)
Tourists become weary of sitting in vehicles	6.6 (8)
Respondents feel cut off from local people	5.8 (7)
Some guides can be uncommunicative, tending only to point out mammals	4.1 (5)

Table 2. Summary of ecotourism service providers' response to inclusion of information on invertebrates in ecotourism activities.

Interviewees	No. of interviewees	Responses
Managers (<i>n</i> = 8)	7	Unaware of conservation needs of invertebrates
	8	Acceptance of need for ecotourism activities to include invertebrates
	6	Uncertainty regarding popularity of activities that focus entirely on invertebrates
Guides (<i>n</i> = 10)	8	Positive toward the concept in theory
	4	In practice time limits may curtail the ability to include information regarding invertebrates
	6	Seeing the big five a priority for most tourists
	8	Positive to indigenous knowledge on invertebrates being included
	3	Unaware that tourists would be interested in indigenous knowledge
Office and reception staff (<i>n</i> = 2)	2	Positive
	2	Indicated desire to learn about obvious invertebrates in camp area

date he had not done so because he did not know much about invertebrates. This point was echoed by four other guides.

A common point made by five of the 10 guides was that when any discussion regarding invertebrates did take place it would frequently focus on the perceived negative attributes of the animal in question. Guides noted, for example, that questions from tourists were usually about whether spiders, wasps or scorpions are venomous or harmful to humans. Three guides made the point that many tourists were afraid of invertebrates in general, even of totally harmless groups such as millipedes.

Eight of the 10 guides interviewed were receptive to the idea of learning about invertebrates because they realized that gaining access to more knowledge is beneficial, both for the guides' education and interest, and to use in the event of clients showing a particular interest in invertebrates. One bird-watching guide noted that he was occasionally asked about invertebrates and found it embarrassing to not be able to answer tourists' questions. Additional training was perceived as empowerment. The guides did not, however, know how to access knowledge on invertebrates, and said that they would need specialist assistance.

Discussions were held with management of organizations currently planning to train community guides. These organizations include Amafa, Ezemvelo KZN Wildlife, European Union Wild Coast Community Tourism Initiative and The Wildlands Trust. All organizations indicated that they would like to include a focus on invertebrates,

but would need to be given course material. The sites at which guides would be based would need to be surveyed to identify appropriate invertebrates. Most of the areas in which these tour guides would operate were not 'Big Five' reserves.

Observation of existing ecotourism activities: extent of inclusion of invertebrates and tourist attitudes

No information was provided on invertebrates in any of the observed ecotourism activities. The guides were all knowledgeable about large mammals, and the guides at Ndumu Game Reserve were particularly skilled at bird identification. Participation in guided walks and drives highlighted the fact that many invertebrates can be easily observed while walking and from a slow moving open vehicle. On the game drives frequent stops were made to allow tourists to view game or birds. A range of invertebrates were easily seen or heard when these stops were made, examples of which are given in Table 3.

Observation of tourists reflected that they do show an interest in invertebrates. Tourists on the wilderness trail in the Greater St Lucia Wetland Park commented on the abundance of dragonflies and millipedes and asked the guide about the observed behaviour of millipedes. Casual conversations with tourists in Tembe, Ndumu and Hluhluwe-Imfolozi Game Reserves also indicated an interest in invertebrates. For example in Tembe, tourists commented on the 'beautiful large butterflies' [green-banded swallowtails (*Papilio nireus*)]. The tourists said they wondered why the butterflies

Table 3. Examples of invertebrates that are suitable for inclusion in ecotourism activities based on observations at Ndumu Game Reserve.

Scientific name	Vernacular name	Features to highlight for ecotourism
Myriapoda Spirostreptida Various species	Millipedes/shongololos	<ul style="list-style-type: none"> • Harmless, critical for soil fertility. • A guide could induce the defensive behaviour – some species curling up, while others imitate snake-like actions to ward off predators, secretion of iodine-based compounds. • In traditional medicine used to treat a variety of ailments, for example earache, linked to the secretions which have anti-fungal/antibiotic properties.
Mollusca <i>Rhachistia sticta</i>	Porcelain tree snail	<ul style="list-style-type: none"> • Beautiful colourful snails, easily observable at eye height.
Araneae <i>Nephila</i> species	Golden orb web spiders	<ul style="list-style-type: none"> • Large conspicuous spiders. • Spin huge golden webs that can span a road, and can trap prey as large as small birds. • Poison generally harmless to humans. • Female large — can weigh as much as 1000 times as much as the males.
Neuroptera Genus <i>Palpares</i>	Antlions	<ul style="list-style-type: none"> • Adults are large and conspicuous, and look like dragonflies, but are much slower flying, and have club-shaped antennae. • Larvae are known as antlions and make a conical pit in sandy soil, which they use to trap prey.
Hemiptera Family Cicadidae	Tree cicadas	<ul style="list-style-type: none"> • Shriill call in the heat of the day in summer. • Explanation can be given of how the males only make their call using specialized plates on the abdomen. • Some species can be caught without causing them any harm and could be shown to tourists. • Some may require as long as 20 years to emerge as adults, and the moulted skin or exoskeleton of the young that have climbed out of the soil can often be found on tree trunks.
Lepidoptera Family Saturniidae	Emperor moths	<ul style="list-style-type: none"> • Large colourful species that are attracted to light at night. • Adults generally only live for 4–8 days, and during this time they do not eat or drink. • Caterpillar larvae are usually found in large groups, and have distinctive rows of hairs or spines along their body.
Lepidoptera <i>Papilio nireus</i> and species in the family Pieridae	Green-banded swallowtail, whites and sulphurs	<ul style="list-style-type: none"> • These large colourful butterflies are very beautiful. • They are easily observed as they sit in groups on the road on patches of elephant urine, which they drink to obtain nitrates.
Diptera Family Calliphoridae	Blue bottle or blow flies	<ul style="list-style-type: none"> • Female flies lay eggs in carrion, eggs hatch within 12 hours in hot weather, larvae are maggots that feed on the rotting meat, and break it down — they are critical in the decomposition control of wastes. • The maggots were used in the First World War for cleaning deep wounds which made the wounds heal more quickly. • These flies can be used in forensic entomology for establishing age of corpse. • On close inspection the adults are brilliantly, usually metallicly coloured.
Coleoptera Family Buprestidae	Jewel beetles	<ul style="list-style-type: none"> • Stunning, large, metallicly coloured beetles that are sometimes incorporated into jewellery. • The larvae are wood borers, and the adults are often found on flowers where they feed on pollen.
Coleoptera Family Scarabaeidae	Dung beetles	<ul style="list-style-type: none"> • Some species roll animal dung into balls and can frequently be seen on the roads. In some species there is a 'nuptial ball', that the male rolls and takes into an underground chamber. The female beetle follows him, and they eat the dung ball together. They then make a 'brood ball' into which an egg is laid. The egg hatches into a larva — a grub which feeds on the dung ball. • Other species are easily seen in a fresh pile of elephant dung where they work on breaking up the dung, taking it underground where they lay eggs. • Ecologically dung beetles play a vital role in breaking down and distributing animal waste.
Hymenoptera Family Agaonidae	Fig wasps	<ul style="list-style-type: none"> • Where fig trees are in fruit, fig wasps can be found inside the figs. • Fully-grown adults only measuring a few millimetres perform vital pollination functions for the fig trees, each being host specific.

'sit in groups in the roads' [This behaviour of *Papilio nireus* was frequently observed in Tembe where the butterflies sit on patches of elephant urine in the roads. They drink the urine to obtain nitrates.] The same group of tourists also noted how hard it was to see game due to the dense bush. Tourists on a guided walk in Hluhluwe-Imfolozi reported that they enjoyed being shown various invertebrates by the guide. This walk was taken by one of the guides interviewed who indicated that he did include a focus on invertebrates.

Potential invertebrates for inclusion in ecotourism activities

A list of invertebrates that were easily observed or heard, either from the vehicle during a game drive or during the course of a guided walk at Ndumu Game Reserve is presented in Table 3. The criterion of ease of observation is used for practical reasons since guides are more likely to incorporate a focus on animals that they can easily find. Suggestions are made here as to the type of features that could be highlighted for each animal. As many taxa have different habits, life cycles and physical features, the type of information included regarding particular invertebrates would differ. It is suggested that information given be kept brief, bearing in mind that the majority of tourists stated that their focus is large mammals and that their time is limited.

While it would obviously be useful, interesting and appealing to include information on threat status to highlight Red Listed (globally threatened) invertebrate species, this presents several problems. Accurate identification to species level is required, which can be difficult for many invertebrate groups. In addition, threatened invertebrate species are often difficult to find and observe, and the number and distribution of those currently listed is limited purely because so few invertebrates have been assessed, and so many are poorly known.

The list of invertebrates presented in Table 3 is by no means exhaustive, but is intended as an example of the types of invertebrates that could be featured easily in ecotourism, and the type of information that could be included.

RECOMMENDATIONS AND CONCLUSIONS

Invertebrates are generally not included in ecotourism activities in South Africa. The results of the tourist survey and the additional comments made by tourists indicate that they are receptive to

invertebrates being included in existing ecotourism activities. Tourists' comments specifically indicate that the scope of ecotourism can be broadened from its current, rather narrow, focus on large mammals, to include birds, plants and insects. The main benefit of incorporating invertebrates into ecotourism activities would be to raise awareness of the crucial role played by invertebrates in a healthy environment, and to encourage positive perceptions of invertebrates. This would contribute to invertebrate conservation. Broad awareness of, and support for, invertebrates are essential to promote the inclusion of invertebrates in biodiversity conservation activities. In addition, the inclusion of invertebrates would enhance the quality of ecotourism services, and thus increase their competitiveness and sustainability. This is especially important in reserves where there may not be large mammals, or game viewing may not be productive.

The provision of accessible and interesting information is obviously a key factor in the success of any invertebrate ecotourism effort. This was highlighted by the findings of Kerley *et al.* (2003) in Addo Elephant National Park. The theme of the need for points of interest in the camp area was raised by 25% of respondents from the ecotourism sector. A self-guided walk with a series of information plaques is a possibility. With reference to the comments made by tourists regarding time constraints it is recommended that if walks are guided their duration be fairly short — a time period of one hour being suggested by 33.9% of respondents. Other ways of showing invertebrates to tourists could be used such as light traps at night and baited traps during the day. A guide could take tourists to the traps and discuss what has been collected.

It is worth noting that not only was there a high positive response rate to the concept of including indigenous knowledge in ecotourism activities, but that the respondents were very enthusiastic regarding the concept. It should, however, be recognized that the use of indigenous knowledge in ecotourism must be done with the sanction of the owners of such knowledge and due recognition must be given to any intellectual property rights. In addition, means must be sought for owners of indigenous knowledge to benefit from its use. Comments made by the owners of two of the private ecotourism organizations interviewed highlighted their awareness of the need to incorporate local communities in various aspects of

ecotourism development. Interviews with staff of the provincial conservation authority, Ezemvelo KZN Wildlife concur, indicating that there is good potential for sensitive and responsible incorporation of indigenous knowledge into ecotourism. Indigenous knowledge on invertebrates, such as cultural and medicinal use is usually area specific, so applicable information is likely to differ between ecotourism destinations. It is suggested that area specific indigenous knowledge should be perceived as an asset, as it contributes to an area's unique sense of place. Documentation of indigenous knowledge would also serve the purpose of increasing the value and awareness of invertebrates amongst local communities and of preserving local culture. There is currently little published information available on indigenous knowledge or use of invertebrates in South Africa (Herbert *et al.* 2003), and ecotourism could act as an incentive for the documentation of this information.

In terms of long-term biodiversity conservation, children are the conservationists of the future and thus it is crucial to explore various means of educating children regarding biodiversity and the need for conservation. The results of the structured survey section of the research, as shown in Fig. 1, indicates a strong interest in invertebrate-focused activities for children and it is recommended that this be seen as an opportunity to educate and raise awareness. The findings of the structured survey were further corroborated during the open-ended interviews, specifically the interview with the person responsible for the guided trails at the Botanical Gardens, Pietermaritzburg, who noted that the invertebrate-focused walks were particularly popular with children and that parents were drawn to the educational aspect of the walks as they perceived this to be beneficial to their children. Parents' awareness of, and appreciation for, invertebrates can also be raised through the education of their children.

Two related issues emerged from discussions with protected area managers and ecotourism managers: managers were in agreement that in terms of conservation and overall biodiversity awareness it would be beneficial to include a focus on invertebrates, however, they were unsure how to go about doing so. They were also unsure how tourists would respond to this inclusion. This research has highlighted the fact that there is a gap in communication between tourists and managers of ecotourism destinations, most managers being fairly surprised to learn that

tourists had indicated an interest in being shown the invertebrate fauna.

One of the major obstacles to the inclusion of invertebrates in ecotourism activities is the lack of appropriate capacity amongst guides, and the lack of appropriate literature. The National Diploma in Nature Conservation does include entomology courses, and several, but not all private ecotourism guide training companies state that insect identification is covered. It is, however, critical that these courses do encourage and enable ecotourism guides to confidently include invertebrates in their activities. The need for specialist assistance in the preparation of course material was highlighted by the organizations that plan to train guides in the future, which indicates that gaining access to appropriate information on invertebrates is perceived to be difficult. In addition, entomology is perceived to be too large and complicated to down-scale into a form that trainers and trainees can accommodate in a general ecotour-guide training programme. It is recommended that means are sought to overcome this obstacle. Several field guides to South African invertebrates have been published recently (for example Cooper & Cooper 2002; Picker *et al.* 2002; Tarboton & Tarboton 2002; Leeming 2003; Herbert & Kilburn 2004) and several other useful texts and guides are available (*e.g.* Skaife 1979; Migdoll 1987; Braack 1991; Filmer 1991; Weaving 2000). It is suggested that rapid invertebrate assessments be done in areas where guides will be based, to identify the types of groups that would be of interest to tourists. The focus should be on easily seen or found groups such as those listed in Table 3. Species which are especially prolific in an area, those that are endemic, those that have particularly interesting or unusual behaviours and those that perform critically important ecosystem services should be included in ecotourism activities. Vernacular names should be used where available, as this has been identified as an effective way of increasing public awareness (Czechura 1994; Samways 2002). Information on invertebrates should be kept fairly brief, bearing in mind that the main focus of many tourists is large mammals, and time is usually a limiting factor.

This paper proposes that a cost-effective and efficient means of raising awareness of invertebrates should be included in existing and future ecotourism activities. In the process some form of value will be applied to them. This, to date, has been largely unexplored. If the information given is

not only of a western, scientific nature, but also contains indigenous knowledge, this would generate more interest and would in addition highlight important aspects of local cultures. The inclusion of invertebrates in ecotourism services and products would also enhance the quality of these, and thus their competitiveness.

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Appendix 1

Representatives of organizations interviewed (2001)

Organizations that control protected areas visited by tourists

Ezemvelo KwaZulu-Natal (KZN) Wildlife: Hluhluwe-Imfolozi Park: Umfolozi section Officer in Charge and Office Staff at Reception.

Amafa (Heritage) KwaZulu-Natal: Director; Head of Archaeology.

Private ecotourism organizations: Thula Thula Game Reserve: owner/manager; Inyati Nature Reserve: owner/manager; Tembe Safaris: manager and owner.

Other conservation-related organizations

Wildlands Trust: CEO.

Trainers of tour guides

Birdlife South Africa: Manager and Trainer; Entabeni Environmental Training School and Education Centre: Director and Trainer; EU Wild Coast Community Tourism Initiative: Project Manager and NGO Trainers; Amafa (Heritage) KwaZulu-Natal: Trainer; Ezemvelo KZN Wildlife: Training Officer; Tribe Africa: Training Officer.

Ecotourism guides

Pietermaritzburg Botanical Gardens: guide; Birdlife SA: guide; Ezemvelo KZN Wildlife, Hluhluwe-Imfolozi Park: Umfolozi open vehicle drive guide; walking trail guide; Hluhluwe open vehicle drive guide; Ndumu Game Reserve: walking trail guide; open vehicle drive guide. Private Operators: Freelance guide; Private tour guide; Tembe Safaris guide.