

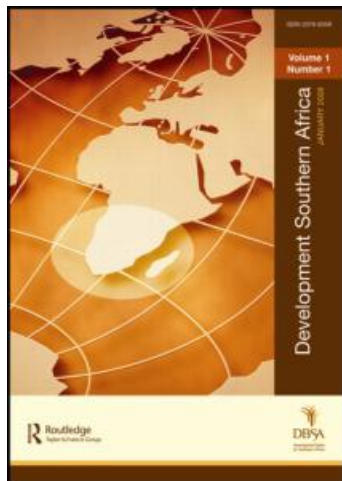
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The contribution of trout fly fishing to the economy of Rhodes, North Eastern Cape, South Africa

Mario du Preez & Deborah E Lee

Recent government legislation, which calls for the eradication of trout from ecosystems where they may cause harm, could damage the tourism appeal of many South African catchments. However, no South African studies have tried to quantify the economic impact of removing trout from rivers and streams. This study aimed first to value the Rhodes trout fishery, North Eastern Cape, South Africa, and second to assess whether the trout fly fishing industry in Rhodes could form the foundation for the implementation of a local economic development initiative. Overall, the study found that the trout fishing industry directly generates approximately R5 658 240 per annum, and sustains a minimum of 39 direct job opportunities for the community of Rhodes, and can therefore provide the impetus for the creation of a tourism-based local economic development programme.

Keywords: direct expenditure; local economic development; trout; tourism; fly fishing; job opportunities; Rhodes village; North Eastern Cape; South Africa

1. Introduction

Trout introduced to South African waters during the nineteenth and twentieth centuries have become a permanently established component of the biota in many upper catchments (Skelton, 2001; Bainbridge et al., 2005). Recent government legislation (i.e. the National Environmental Management: Biodiversity Act, No. 10 of 2004), however, calls for the complete eradication of trout from ecosystems and habitats where they may cause harm (see Aim (c) of Section 64 of the Act). More specifically, the Act states that trout will be managed by means of a zoning system. Within the declared zones, trout fishing and farming will be promoted but outside the zones they will be strictly controlled, which includes eradication.

It is alleged that the introduction of trout into South African waters has led to the extinction of populations of indigenous fish species, such as the Drakensberg minnow (*Pseudobarbus quathlambae*) (De Moor, 1987). Furthermore, trout are thought to threaten indigenous fish habitats and cause degradation and fragmentation, translocations, impoundment of rivers and water quality deterioration, and they have had negative effects on stream ecosystems, such as reducing the number of amphibians and invertebrates through predation, displacement and food competition (Cambray, 2003). The presence of alien trout, in most places, is also believed to increase the homogenisation of fish species. For example, introduced Rainbow trout have come to dominate many rivers and lakes in 82 countries (De Moor, 1987).

Regarding the eradication of trout and in keeping with aim (c) of Section 64 of the Act, three remarks can be made. First, there are few published studies that offer validated proof of the impacts which may be ascribed entirely to the introduction of alien trout

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in South Africa, since no pre-stocking assessments were conducted (Bainbridge et al., 2005). Second, the elimination of trout is feasible in a few limited closed ecosystems, such as small dams, but is highly impractical and untenable from an environmental and cost perspective where open and established river systems are concerned (Bainbridge et al., 2005). And third, the eradication of trout could damage the tourism appeal of many upper catchments in South Africa.

The South African trout industry is well established and, most importantly, generates both income and jobs in some of the poorest, most underdeveloped rural areas of South Africa. These areas are continually in search of economic revival through the implementation, by government, of pro-poor local economic development (LED) initiatives (Parhanse, 2007). The trout industry in the study area could provide an opportunity to implement such an initiative. The services provided by this industry are twofold: first, in subsistence as well as commercial food production; and second, as an angling resource (Bainbridge et al., 2005). The industry is also sustained by and couched in a sizeable infrastructure comprising tackle manufacturers, retailers, travel agents, professional guides and instructors and specialised accommodation services.

However, no South African studies have tried to quantify the impact of trout removal from rivers and streams in terms of lost tourism income and tourism-related job opportunities. The main objective of this study is to fill this gap. More specifically, the study attempts to value the trout fishery in and around Rhodes village, North Eastern Cape, South Africa, in terms of on-site expenditure by visiting trout fly fishers and the number of tourism-related job opportunities created and sustained by the Rhodes trout fly fishing industry. At the time of writing, South African trout zones had not been declared and it is thus impossible to predict whether the rivers and streams that make up the Rhodes fishery will be declared a trout zone. As a secondary objective, this study also considers whether the trout fly fishing industry in Rhodes could be the foundation of a tourism-based LED initiative.

The rest of the paper is organised as follows. Section 2 reviews the tourism and LED literature, Section 3 describes the study area, including the rivers and streams in and around Rhodes village and the fish species found there, Section 4 presents the data collection and sampling procedure, Section 5 analyses the collected data and presents the results, and Section 6 concludes and offers recommendations.

2. Review of tourism and local economic development literature

The change in the economic landscape of the post-industrial world, due primarily to globalisation, has inspired a quest for alternative ways of generating economic growth and employment at the local level, especially in the services sector. This is commonly referred to as local economic development (LED) (Rogerson, 1999; Binns & Nel, 2002).

2.1 Types of LED initiatives

LED strategies in sub-Saharan Africa are of three main types: community-based, business-based and locality-based (Helmsing, 2001).

Community-based development, whether urban or rural, aims to diversify household economic activity so as to alleviate poverty and improve living standards (Helmsing, 2001). Its broad objectives are to encourage a sense of community, improve living

and employment conditions, establish self-employment opportunities and community and public services, and give community members a sense of empowerment (Blakely, 1994). It provides safety nets and basic services, and stimulates local economies primarily by promoting micro-enterprises (Rogerson, 1999; Wils & Helmsing, 2001). Suggested ways to help develop micro-enterprises are programmes for providing credit, training, technical support and marketing assistance (Helmsing, 2001) and outsourcing of municipal services, such as waste removal or sanitation (Rogerson, 1999). The tourism and construction sectors are ideal targets for community-based development as they are relatively labour intensive and use mainly local content (Helmsing, 2001).

Business-based development aims to advance targeted groups of enterprises within a market framework (Helmsing, 2001). It is most relevant in local or regional settings where an economic or export base already exists. Economic activity in a region may, for instance, consist of agriculture, manufacturing or services, or a combination of these (Helmsing, 2001). The economic base usually comprises one or more enterprise clusters in a specific area. Specialisation within these clusters is the primary focus of business-based development and may create agglomeration economies or bring advantages for local producers, such as increased availability of specialised labour services and inputs, and positive knowledge externalities (Helmsing, 2001).

When an enterprise cluster has been established, three forms of 'active local efficiency' normally develop (Helmsing, 2001): intensified specialisation among small to medium-sized local producers (Schmitz, 1999), collaboration among local producers in establishing organisations which regulate and support them, and collaboration among local producers in petitioning local and national government to create official support structures and public infrastructure (Helmsing, 2001). Local enterprises can improve their participation in related product chains by attracting external investment or increasing their investment levels.

Locality-based economic development is a broader concept and can encompass community-based and business-based development initiatives. Moreover, it deals with the overall administration and material advancement of a targeted geographical area (Helmsing, 2001). This type of development is most applicable in urban localities. It is usually necessitated by rapid urbanisation in the developing world, which has placed an enormous burden on developing countries' governments to increase the levels of basic service delivery (Helmsing, 2001). Urbanisation has also led to the establishment of informal settlements and business ventures, which compete with formal settlements and businesses for urban space (Rogerson, 1999). Locality-based development therefore requires urban planning to be simplified and to take into account the needs and interests of all citizens. To attract developers and stimulate community-based initiatives, commercial areas must be improved and infrastructure provided (Helmsing, 2001). Moreover, the development of social and economic capital is imperative and should serve the area in question as a whole (Helmsing, 2001).

2.2 Tourism and LED

A paradigm shift has taken place in the application of LED strategies in the developed as well as the developing world. The more traditional manufacturing or industry directed LED has not delivered increased economic growth and job creation and has been replaced by service sector directed LED (Nel, 2000). With the advent of globalisation, many developed countries have realised that tourism is an important mechanism of

service sector directed LED (Agarwal et al., 2000; Rogerson, 2002; Nel & Binns, 2003; Briedenhann & Wickens, 2004). As a LED initiative, tourism offers benefits in the form of rural and urban economic growth and employment creation, the safeguarding of the economic and cultural welfare of the targeted community, participatory decision-making, and the preservation of the environment (Briedenhann & Wickens, 2004).

In the past, tourism-led LED, as practised in the developed world, was largely urban rather than rural (Telfer, 2002). For example, large cities such as Baltimore and Liverpool redeveloped their waterfront areas to attract leisure and business tourism. Recently, however, many rural areas in developed countries have seen people migrating to urban centres and a slowdown in economic activity based on agriculture and manufacturing (Briedenhann & Wickens, 2004). In response to this, these areas have started tourism directed LED initiatives because tourism is viewed as sustainable and it takes advantage of locally available resources (Cavaco, 1997). In Europe, for example, tourism directed LED programmes in rural areas have been endorsed by national policies as well as European Union programmes (Rogerson, 2003).

In South Africa, LED programmes initially focused on the manufacturing sector (Rogerson, 2000), but the stagnation of this sector in terms of creating economic growth and employment has prompted a shift towards tourism-led LED, as is happening internationally. Many South African cities, towns and rural areas have embraced tourism as the mainstay of their LED initiatives (Nel & Binns, 2003; Rogerson, 2003), particularly because these initiatives lend themselves to pro-poor and community-based development programmes. These programmes are created via partnerships between local representatives from the private sector, local government and communities (Nel & Binns, 2003; Rogerson, 2003).

Tourism directed LED activity in South Africa was first seen in Cape Town and Durban, which developed their waterfronts to attract local and foreign leisure and business tourism (Rogerson, 2000). At the time of writing, LED initiatives in these cities were still being driven mainly by the tourism sector (Nel & Binns, 2003).

As is the case in the developed world, smaller towns and rural economies in South Africa have experienced the effects of urbanisation, mechanisation of agriculture, and de-industrialisation, which has led to job losses and increased levels of poverty (Rogerson, 1999; Nel, 2000; Gibb & Nel, 2007). To deal with this, local governments have had to help people find alternative forms of employment in these smaller towns and rural areas, and they have favoured tourism directed LED programmes (Gibb & Nel, 2007). Two well-known examples of such programmes in small towns are the Grahamstown and Oudtshoorn cultural and art festivals (Nel & Binns, 2002). These programmes also promote tourist routes, game viewing, heritage tourism, ecotourism and township tours, and cultural villages and craft centres (Nel & Binns, 2003).

3. The study area

Rhodes is situated in the North Eastern Cape and falls under the Senqu Municipality (see Figure 1). This is the largest municipality in the Ukhahlamba district, with an area of 6772 km² and, according to the 2001 Census, a population of 135 141, of which 98 per cent were African (Parhanse, 2007). Just over half (53 per cent) were women, 58 per cent of them in the 35–64 age group. Of the working age population (age 15–64), 26 per cent had no formal schooling, 8.8 per cent had Grade 12, and only 4.9 per cent

area (those in close proximity to Barkley East are excluded). The WTA manages approximately 34 per cent of the beats of the above-mentioned rivers and streams (Steynberg, personal communication, 10 March 2009). The main fish species found here are Rainbow trout (*Oncorhynchus mykiss*) and Brown trout (*Salmo trutta*), Large-mouth yellowfish (*Labeo barbus kimberleyensis*), and Smallmouth yellowfish (*Labeo barbus arneus*) (De Moor, 1987; De Moor & Bruton, 1988).

4. Sample and data

Quantitative and qualitative data for the study were collected via a questionnaire, administered as a face-to-face interview, to visiting trout fly fishers in Rhodes village between September 2006 and September 2007. The sample was drawn from those who visit the WTA-managed rivers and streams annually and purchase WTA day permits. WTA records show that from 2002 to 2006 on average 700 visited the WTA rivers and streams annually. The minimum required sample size of 10 per cent (Fink, 2003) was exceeded – in total 96 respondents were interviewed (approximately 14 per cent). The non-response rate was zero and there were no incomplete questionnaires.

5. Analysis and results

5.1 Socioeconomic characteristics and trip information

Figure 2 shows the distribution of the respondents' ages. Most were male ($n = 88$) and white ($n = 94$), and there were two non-white males and eight women. Their ages ranged from 19 to 69 years, with a mean of 42. As Table 1 shows, most were well educated, with 86 having some form of tertiary qualification – 62 had a university degree, either at bachelor's or postgraduate level, and 14 respondents had a diploma.

Data from the survey suggest that trout fly fishing is primarily practised by high-income earners. The respondents' annual pre-tax incomes are shown in Figure 3 and Table 2. Figure 3 shows that 14 of the 96 respondents earn more than R1 500 000 per annum, while only nine earn R120 000 or less, and that most (approximately 62 per cent) earn more than R750 000. Table 2 shows that their mean annual pre-tax income was R848 020, with a minimum income of R60 000 and a maximum income of R1 500 000. This high mean (and median) level of pre-tax income earned may seem upwardly biased, but it is in fact in line with not only the average age of the respondents (42 years), but also their high levels of education. Table 2 also shows that fly fishers visit

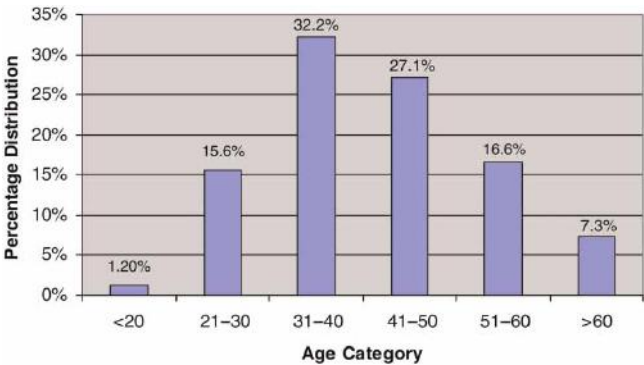
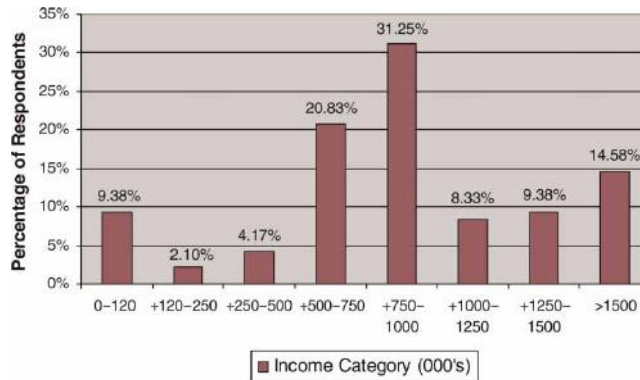


Figure 2: Respondent age distribution ($n = 96$)

Table 1: Education levels ($n = 96$)

Education level/qualification	Number	Approximate percentage
Matric	14	15
Post-Matric ^a	6	5
Diploma	14	15
Undergraduate degree	23	25
Postgraduate degree	39	40

^aOne extra year of basic foundational skills in order to qualify to register for a diploma or a degree.

**Figure 3: Respondent annual pre-tax income levels ($n = 96$)****Table 2: Descriptive statistics for selected variables ($n = 96$)**

Variable	Mean	Minimum	Maximum	Median
Income per annum	R848 020	R60 000	R1 500 000	R875 000
Catch rate per trip	34.67	0	205	17.75
Trips per annum	1.6	1	6	1
Days spent per trip	4.95	2	7	5

Rhodes on average 1.6 times per annum, spend an average of five days per trip, and catch on average 35 trout per trip, or seven per day.

Figure 4 shows where the respondents came from. Most of them ($n = 41$) were from Gauteng (mainly Pretoria and Johannesburg), 16 were from the Western Cape and 13 from the Eastern Cape, and there were a few from other South African provinces. Two respondents were from Zimbabwe, and there were nine from countries outside Africa – Finland, the UK, Switzerland, Canada and the US. An anonymous referee pointed out that domestic tourism appears to be more resilient than foreign tourism, and that every attempt should thus be made to sustain this domestic tourist base.

5.2 Economic aspects of the trout fishing industry

Spending by trout fly fishers has an important economic impact. Table 3 shows a breakdown of their expenditure on trips to Rhodes. It is clear that significant amounts of money

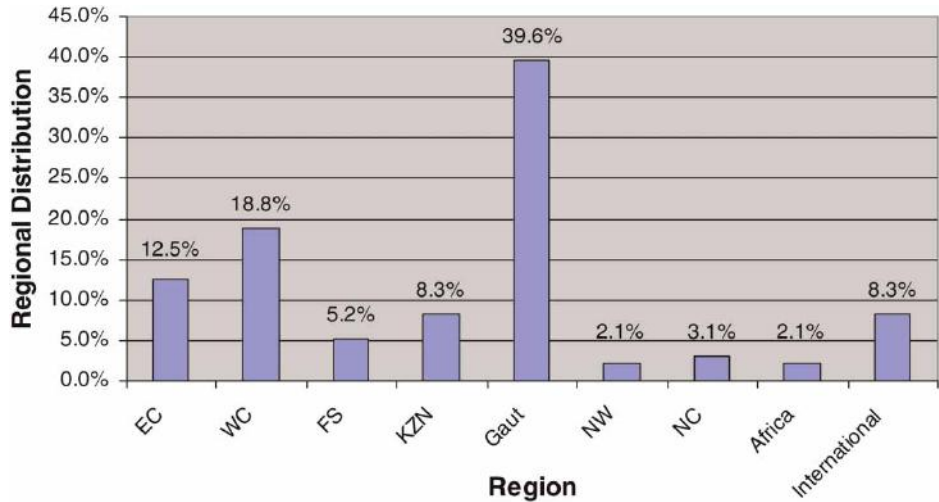


Figure 4: Home regions of the Rhodes fly fishers ($n = 96$)

Table 3: Expenditure by survey respondents ($n = 96$)

Item	Mean	Minimum	Maximum	Median
Transport costs per trip	R6964.70	R697.50	R29 420	R5991
Accommodation and food costs per day	R480.57	R200	R1450	R400.00
Access costs per trip	R1562.10	R0	R12 300	R950
Equipment costs per trip	R1087.20	R0	R7500.50	R750.00
Total costs assuming a 5-night stay	R12 016.85	R1697.50	R56 470.50	R9691.00
Percentage of annual pre-tax income	1.42%	2.83%	3.76%	1.11%

are spent annually – on average about R12 017 per trip. This includes transport (i.e. the full cost of motoring multiplied by the roundtrip distance travelled to and from Rhodes), accommodation and food (for five days per trip), access (for the beat permit, guide and instructor) and equipment. In the case of international respondents, the cost of international air travel was added.

Fly fishing guides in the Rhodes area charge up to R1600 per guiding day. Fly fishers must also purchase a day or beat permit at R100 per person to fish sections of the rivers and streams managed by the WTA. The riparian landowners receive R60 of each R100 paid by fly fishers, while the WTA retains the balance. The permit allows access to more than 200 km of WTA members' running water.

The types of accommodation used by visiting fly fishers during their stay in Rhodes include the Rhodes Hotel, a bed-and-breakfast establishment (Walkerbouts Inn), self-catering houses (some of them on neighbouring farms), and the Rhodes camping grounds. Many fly fishers are accompanied by their families, especially during school holidays, but this survey targeted only fly fishers themselves, so the accommodation and food costs in Table 3 may be an underestimate.

Considering only expenditure in Rhodes (i.e. excluding all transport costs), the average expenditure per fly fisher was approximately R5052 per trip – this amounts to about 0.5

per cent of the average gross annual pre-tax income of respondents. Based on a visiting rate of 1.6 visits per annum and a visiting population of 700 fly fishers, approximately R5 658 240 ($= R5052 \times 1.6 \times 700$) accrues directly to the local Rhodes economy (approximately 38 per cent of the total spend). This amount may seem quite small, but it must be seen against the background of rampant unemployment (only 15 per cent of the population are in formal employment) and an average per-capita income of less than R800 per month for a large majority (75 per cent) of the Rhodes population.

Overall, the Rhodes trout industry contributes approximately R13 459 040 ($= R12\,017 \times 1.6 \times 700$) per year to the South African economy. This includes the fly fishers' round trip transport cost, which suggests that the benefits of this industry are spread through many parts of South Africa. Clearly, the Rhodes trout fly fishing industry, although restricted to a fishing season stretching from September of one year to May of the next, is important to local economic activity and its benefits would not be realised if trout were eradicated from the rivers and streams.

5.3 The quality of the fly fishing experience in WTA-managed rivers and streams

When conducting tourism research, it is important to consider tourists' personal experiences (Pearce, 1982). The survey therefore gathered information on fly fishers' personal experiences – the number, size and condition of the fish caught, the level of visitor congestion, and the general condition of the rivers, streams and surroundings. On average, respondents regard the Rhodes fly fishing experience as a very high quality one. The average respondent caught 35 trout per five-day trip (see Table 2). On a 5-point scale, where 1 represents poor quality and 5 represents very high quality, respondents reported an average quality rating of 4.52 for the Rhodes trout fly fishing experience, followed by the Natal Midlands and Cape rivers and streams with 3.19 and 3.06, respectively. Table 4 compares the average ratings of various fly fishing destinations by survey respondents.

5.4 Respondents' fish species preferences

As shown in Table 5, the Rainbow trout is the species most sought after by fly fishers who visit the Rhodes fishery. It was awarded a rating of 4.70 on a 5-point scale, where 1 indicates poor quality and 5 indicates very high quality. The Brown trout was second with a rating of 3.81. The strong preference for trout, an alien invasive fish, is confirmed by Figure 5, which shows that in the absence of trout approximately 89 per cent of the

Table 4: Quality of fly fishing destinations ($n = 96$)

Ranking/destination	Mean response
1. Rhodes	4.52
2. Natal Midlands	3.19
3. Cape streams	3.06
4. Mpumalanga streams	2.33
5. Okavango Delta (Botswana)	2.08
6. Free State streams	1.96
7. Gauteng rivers	1.92
8. Troutbeck Sun (Zimbabwe)	1.38

Table 5: Respondents' fish species preference (*n* = 96)

Ranking/fish species	Mean response
1. Rainbow trout	4.70
2. Brown trout	3.81
3. Smallmouth yellowfish	2.30
4. Largemouth yellowfish	2.09

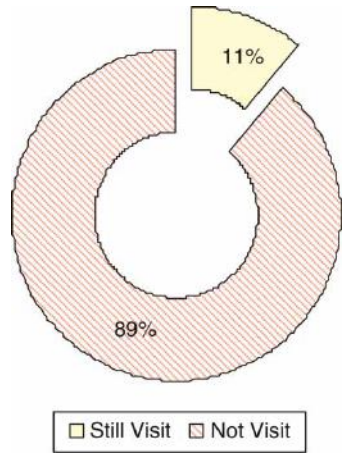


Figure 5: Respondent visiting without trout (*n* = 96)

respondents would not visit the Rhodes village (the other 11 per cent are indifferent). It is interesting to note that although trout are deemed alien invasive fish, it appears from the survey that fly fishers who visit Rhodes prefer to target them rather than the endemic yellowfish species.

If the Rhodes rivers and streams are not declared trout zones and all trout are eradicated, in accordance with the National Environmental Management Biodiversity Act, and approximately 89 per cent of the fly fishers choose not to visit the Rhodes village as a result, then the community will lose approximately R5 035 834 per annum ($= R5\ 658\ 240 \times 0.89$), assuming an annual visitor population of 700 fly fishers, an annual visiting rate of 1.6, and an average expenditure per fly fisher of approximately R5052 per trip (this amount excludes the costs of travel to and from Rhodes village). Alternatively, this figure can be calculated as follows: $(700 \times 0.89) \times R5052 \times 1.6 = R5\ 035\ 834$. The removal of trout from the rivers and streams in and around Rhodes village and the resultant loss of income to the community will also have a negative impact on tourism-related employment levels. This issue is discussed below.

5.5 Tourism-related employment¹

At the time of writing there were nine tourism-related employers in Rhodes, eight situated in Rhodes and the ninth on a farm which borders the village. Seven of these

¹Information in this section provided by F Steynberg, professional fly fishing guide, Rhodes Tourism Association, 10 March 2009.

nine businesses provided accommodation and catering services. Two private individuals provided arts and crafts employment opportunities. Collectively, these nine businesses provided employment to 85 individuals (approximately 14 per cent of the total Rhodes population).

A total of 138 tourist beds were available in the village. On average, these accommodation establishments have a 100 per cent occupancy rate for approximately 2.5 months every year, incorporating two peak periods – one in summer (around Christmas and New Year) and one in winter (around the month of July). In summer, fly fishers flock to Rhodes to take advantage of the world-class trout fishery, while in winter many snow skiers visiting Tiffendell Ski Resort make Rhodes village their home base. For the rest of the time, occupancy rates are low and average between 25 and 30 per cent. Apart from fly fishers, these establishments are used by general holiday-makers, motor bikers, mountain bikers, hunters, skiers, hikers, government officials, businessmen and 4 × 4 adventurers.

As mentioned above, the fly fishing season opens in September of one year and ends in May of the next, and approximately 35 per cent of all visitors to the Rhodes village during this time are trout fly fishers. Only 1 per cent of all tourists who visit Rhodes village during the winter season (June–August) are fly fishers. At this time of year they are not allowed to fish the rivers and streams because the trout are spawning, but may fish the dams and lakes close to Rhodes.

A spokesperson for the Rhodes Tourism Association estimated that in the absence of trout fly fishing, if the proposed removal of trout from the rivers and streams goes ahead, approximately 46 per cent of the employment opportunities (i.e. 39 jobs) in tourism-related businesses will be lost. Moreover, it is predicted that at least three of the nine tourism-related businesses will shut down if trout fishers stop visiting Rhodes village. Jobs will also be lost in the remaining six businesses – it is, however, difficult to predict how many. Once again, it is important to note that although these figures appear to be insignificant they should be viewed against the background of the very high unemployment levels and very low per-capita income levels in Rhodes village.

6. Conclusion

Trout introduced to South Africa waters over the past two centuries have become permanently established in many upper catchments. The tourism appeal of these catchments could, however, be negatively affected by the implementation of the National Environmental Management: Biodiversity Act, No. 10 of 2004, which calls for the removal of trout from ecosystems and habitats where they may cause harm. This study attempted to value the trout fishery in and around Rhodes village, North Eastern Cape, South Africa, in terms of on-site spending by visiting fly fishers and the number of tourism-related job opportunities created. The aim was to provide policy-makers with insights into the scale of economic trade-offs that would result from trout elimination.

The study concluded that Rhodes is one of the most sought-after trout fly fishing destinations in South Africa and that the majority of fly fishers visiting it at present would not do so if trout were removed from the rivers and streams. Most importantly, the Rhodes trout fly fishing industry directly contributes approximately R5 658 240 per annum to the local community and sustains a minimum of 39 job opportunities directly related to tourism. This conclusion is subject to one important qualification. Since this study focused solely on fly fishers who visit sections of rivers and streams

managed by the WTA, the on-site expenditure estimated may be an underestimation. Many individuals who were not captured as part of this study visit parts of the rivers and streams which are managed on behalf of riparian landowners by private individuals and the Moshesh's Ford Angling Club. The authors would, however, caution against the extrapolation of the results obtained in this study to the broader region, since the information pertaining to those fly fishers who choose not to fish the WTA-managed rivers and streams is unknown, and the margin for error is thus great.

This study also considered whether the trout fly fishing industry in Rhodes could form the foundation for a LED initiative. Given that Rhodes is situated in one of South Africa's poorest regions, the trout industry provides a rural community-based economic opportunity that could help revive the economy of the Senqu Municipal area. The trout industry's potential is underscored by its economic contribution, as well as its job creation contribution to the village of Rhodes. The importance of this finding should be clear when viewed against the background of government's aim of LED within poor, previously disadvantaged communities.

For a tourism-based LED initiative to be successful in Rhodes, the local government must ensure that community safety nets are established, that settlements are improved, that basic services are provided, and that the local economy is stimulated through the promotion of micro-enterprises (Rogerson, 1999; Wils & Helmsing, 2001). In addition, to assist the development of micro-enterprises, programmes which address the provision of credit, training, technical support and marketing assistance should also be initiated (Helmsing, 2001). Finally, all the relevant stakeholders from the local government, private enterprise and the community must participate in the decision-making and planning.

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