

# EXECUTIVE SUMMARY

**The results of this research report can be summarised as follows:**

## *Socio-demographic information*

Anglers were mostly male, in their mid-forties who speak either English or Afrikaans. They had furthermore obtained either a diploma or degree or a matric qualification. They were in managerial or professional occupations, or they were self-employed with an annual average income of between R20 001 and R221 000 or R670 001 and more. They mostly live in Gauteng, KwaZulu-Natal or the Western Cape, which corresponds with major markets and disposable income in South Africa.

## *Fishing behaviour*

Most anglers belong to either a sport fishing club, or social fishing club. Those who partake in marine fishing, mostly do rock and surf angling, while those who take part in river fishing, prefer to fish from an estuary shore. The preferred species to fish included cob/kabeljou, carp, bass, barbell, king mackerel and shad and they prefer to purchase the Stywe Lyne (Tight Lines) magazine. Bloemhof Dam was named as respondents' favourite fishing spot, but this can be ascribed to sampling bias. The majority of anglers were younger than ten years of age when they were exposed to angling by their families for the first time, and they prefer to go fishing in groups instead of alone.

## *Economic information*

When angling, they travel in groups of four, but pay for two people. They spend approximately 50 days angling per annum. Furthermore, they stay around six days per angling trip. On average, anglers spend R27 300 per group per overnight, holiday fishing trip. Furthermore, they spend R1 600 per annum on annual fees such as memberships and R26 120 on other annual fishing-related spending.

## *Fishing details*

Most anglers make use of 'catch and release' when fishing. The majority of respondents have not yet caught a tagged fish. About recreational fishing permits, the national marine license was more popular, compared to the freshwater permit. This can be because national marine licenses are easily attainable at the Post Office. Most freshwater licenses are held in the provinces of KwaZulu-Natal and the Western Cape. The majority of anglers have never been checked by fishery control officers. It was indicated that fishing is most anglers' primary recreational activity.

## *Fishing motivation*

Most anglers take part in fishing because they perceive it as fun and enjoyable, it allows them to relax as well as get away from their daily routines. They also enjoy the challenge of the sport, as well as the adventure and excitement generated by the activity.

## *Economic significance*

There are approximately 1 327 633 recreational anglers in South Africa with an annual spending of R19 billion and an economic importance (contribution to production) of R36 billion. This industry currently supports 94 000 employment opportunities.

# ACKNOWLEDGEMENTS

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- Mr AH Viljoen for porting the survey onto Google Forms.
- The anglers for their positive attitude and participation in the survey.
- Ms Cecile van Zyl for language editing.

## List of acronyms

SACRAA	-	South African Consolidated Anglers Association
SAFTAD	-	South African Fishing Tackle Agents and Distributors
THRIP	-	Technology and Human Resources for Industry Programme
TREES	-	Tourism Research in Economics, Environs & Society
SAIAB	-	South African Institute for Aquatic Biodiversity
ORI	-	Oceanographic Research Institute
UCT	-	University of Cape Town

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Saayman, M., Saayman, A., Zeelie, E., Potts, W., Mann, B., Weyl, O., Van der Merwe, P., Wood, A., Raemeakers, S., Cowley, P., Pledger, J., Bova, C. & Scholtz, M. 2017. *Economic significance of recreational angling in South Africa 2017*. Potchefstroom: Tourism Research in Economic Environs & Society.

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# 1. INTRODUCTION

This project, funded by the South African Fishing Tackle Agents and Distributors and the Department of Trade and Industry, is intended to provide policymakers with information on the socio-economic importance of recreational fisheries. This research provides evidence that recreational angling is important to the South African economy. Similar research has led to the formal recognition of recreational angling as a valuable industry in other countries, including Asia (such as Malaysia), Australia, Brazil, Germany, Great Britain, Mexico and the USA. This research will also assist fisheries' managers in understanding the consequences of changes to regulations and improve the planning and management of recreational angling.

Within the South African context, all recreational angling is conducted using hook and line. Therefore, within this report, all persons who engage in angling for recreational purposes are referred to as anglers or fishermen and - women.

## 2. RESEARCH AIMS

The main aim of this project was to determine the socio-economic importance of recreational angling. This aim was achieved by achieving the following objectives:

- To determine the socio-demographic profile of anglers
- To determine the spending patterns of anglers
- To determine the general behaviour of anglers
- To determine the reasons why respondents partake in angling
- To determine the economic significance of recreational angling.

## 3. METHOD OF RESEARCH

This survey was conducted in two parts. The first was an online questionnaire and the second a self-administered face-to-face questionnaire during which a total of 1 320 questionnaires were completed.

### 3.1 Online survey

The online questionnaire was created in Google Forms, after which a link was created that could be distributed to respondents. The questionnaire was distributed from August 2016 to January 2017 where it was advertised through a variety of channels, including angling magazines, and fishing tackle shops. The survey ran from January 2016 to October 2016, during which a total of 1 015 questionnaires were obtained.

### 3.2 Self-administered

A hard-copy questionnaire was also distributed at the Bloemhof Bonanza competition at Bloemhof Dam during the 29 April to 1 May period. The questionnaires were distributed by means of convenience/availability sampling. Five fieldworkers were trained to ensure that they understood the aim of the study as well as the questionnaire. The fieldworkers were then distributed among the various anglers. This only included bank anglers. The respondents were approached during the competition and were asked to complete the questionnaires. The fieldworkers were instructed to approach different types of participants, including different genders and age categories to limit bias. In total, 147 completed questionnaires were obtained at this site.

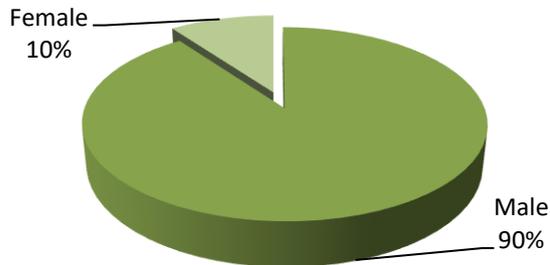
During May and September 2016, fieldworkers also visited various popular angling sites. In KwaZulu-Natal, popular coastal angling sites included Amanzimtoti, Brighton on Beach and Pier, the Bluff, Hibberdene, Isipingo, La Mercy, Port Shepstone, Richards Bay, Rocky Bay, Salt Rock, Southport, Tinley Manor, Tongaat, Umhlanga, Westbrook, Winkelspruit, and Umdloti. Freshwater sites included Albert Falls and Midmar. In the Eastern Cape, popular sites surveyed included: Bluewater Bay, Cape Recife, Kenton on Sea, Monwabisi, North End Lake, Port Alfred, Seaview, Sonwabi, and Swartkops. Furthermore, Gordon's Bay, Kalk Bay, Mnandi, Strand, and Strandfontein in the Western Cape were included. A total of 158 questionnaires were completed by anglers at these sites.

## 4. RESULTS

### SECTION A: SOCIO-DEMOGRAPHIC DETAILS

#### 4.1 GENDER

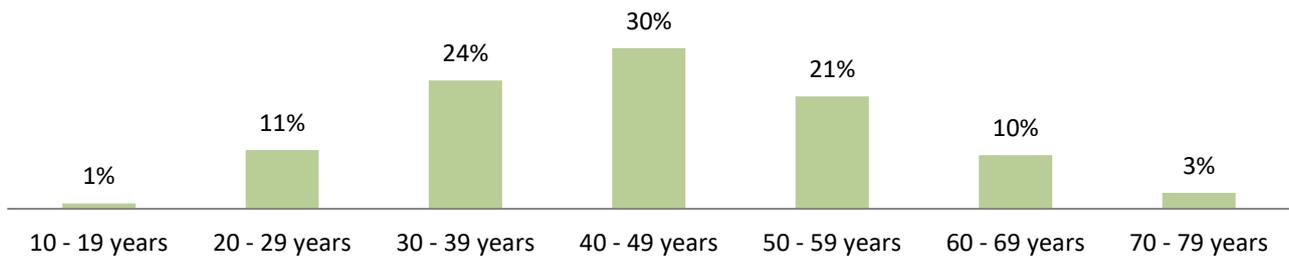
The figure below indicates that 90% of the respondents were male and 10% were female.



The majority of anglers were  
**MALE**

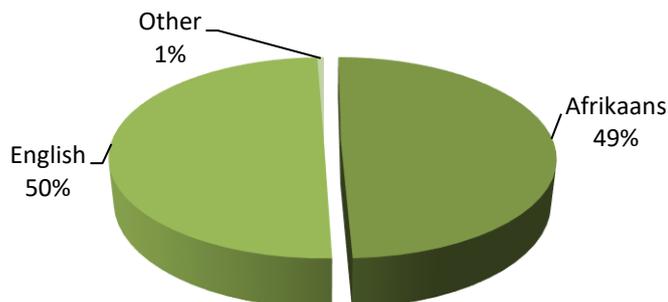
#### 4.2 AGE

The largest group of respondents (30%) were in the 40 to 49 years age range, followed by those between the ages of 30 and 39 (24%) and those between the ages of 50 and 59 (21%). The average age of respondents was 45 years.



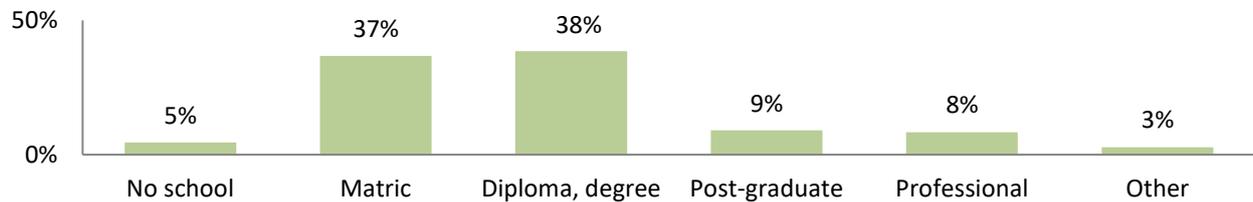
#### 4.3 LANGUAGE

Half of the respondents (50%) in the samples answered the questionnaire in English, followed by 49% who answered in Afrikaans and 1% in another language. This was done with the assistance of an interpreter where needed.



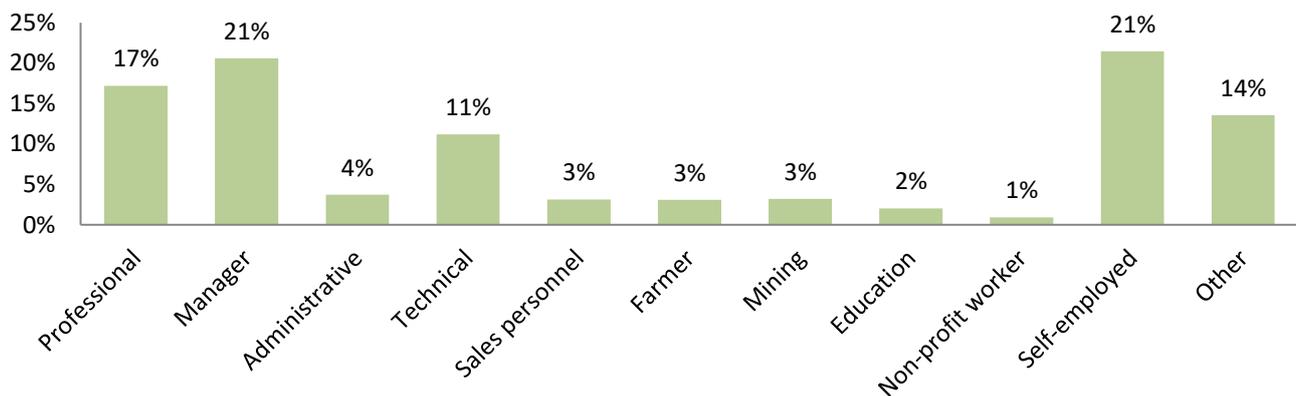
## 4.4 EDUCATION

The figure below indicates that 38% of respondents had obtained a diploma or degree, followed by 37% who had obtained a matric qualification. Nine percent (9%) indicated that they had obtained a post-graduate qualification and 8% a professional qualification (8%). The high levels of education can be attributed to the fact that more educated people were able to answer the questionnaire.



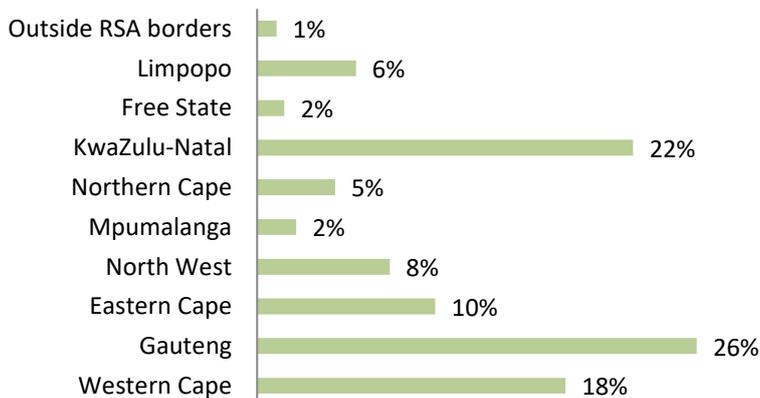
## 4.5 OCCUPATION

The figure indicates that 21% of respondents, respectively, were self-employed or in managerial positions, followed by 17% in professional positions and 14% who were in other occupations. It is possible that poorer, unemployed individuals were unable to complete the questionnaire.



## 4.6 PROVINCE OF RESIDENCE

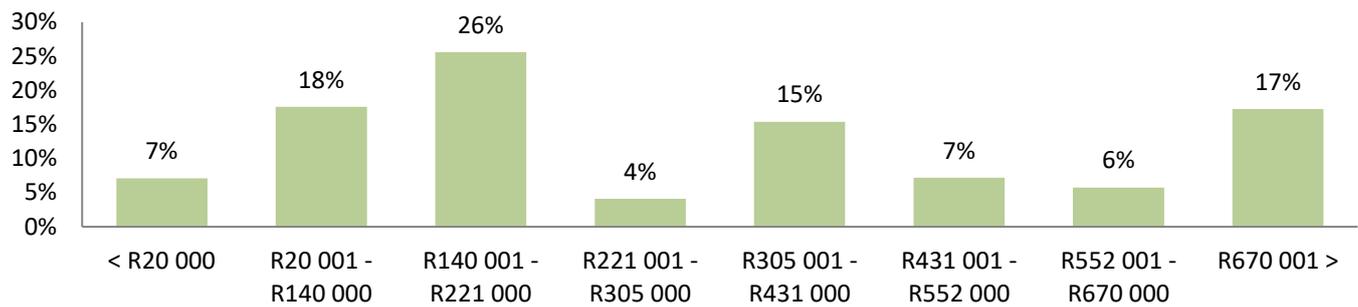
Twenty-six percent (26%) of the respondents were from Gauteng, followed by those who were from KwaZulu-Natal (22%) and the Western Cape (18%). Ten percent (10%) were from the Eastern Cape, 8% from the North West and 6% from Limpopo.



Anglers were mostly from  
**GAUTENG AND KZN**

## 4.7 LEVEL OF INCOME

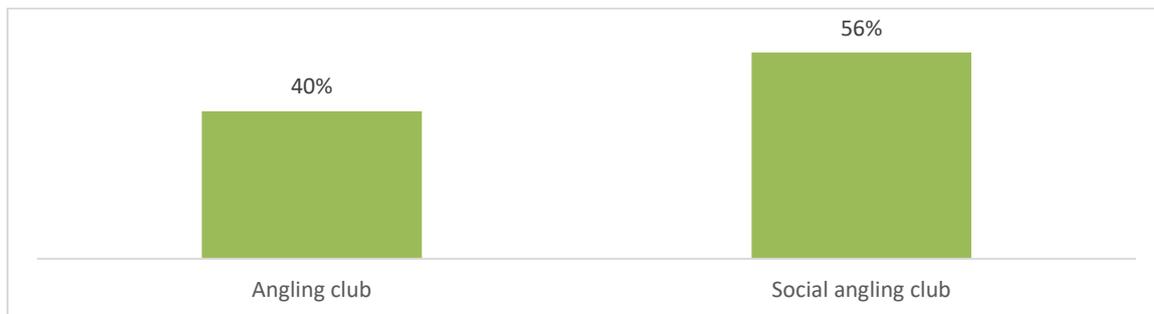
In the figure, it is revealed that 26% of respondents earn between R140 001 and R221 000, followed by 18% who earn between R20 001 and R140 000, and 17% who earn more than R670 001. In general, there is a good spread of respondents in the different categories of income.



## SECTION B: ANGLING BEHAVIOUR

### 4.8 ANGLING CLUB MEMBERSHIP

Most of the respondents either belong to an angling club (40%) or a social club (56%).



### 4.9 MOST PREFERRED MARINE ANGLING DISCIPLINE

Respondents were asked to indicate their most preferred angling disciplines within a marine, estuarine and freshwater environment. This was measured on a six-point Likert scale (where '1' = *I don't take part* and '6' = *Extremely important*). The following obtained the highest mean values (out of six) within each category:

Marine angling:

1. Rock and surf angling (3.77);
2. Deep sea angling (3.4); and

Estuary angling:

1. Estuary: shore (3.47); and
2. Estuary: boat (3.42).

Freshwater angling:

1. Tiger angling (3.42);
2. Boat angling (Carp, barbell, kurper, yellow fish etc. in a dam or river) (3.31); and
3. Bass angling (2.91).

Mean value	Level of importance
Marine angling	

Rock and surf angling	3.77	Important
Deep sea angling	3.40	Less important
Spearfishing: shore	2.13	Not at all important
Charter boat	2.06	Not at all important
Angling ski	1.98	Not at all important
Spearfishing: boat	1.80	Not at all important
Jet-ski	1.67	Not at all important
<b>Estuarine angling</b>		
Estuary: shore	3.47	Less important
Estuary: boat	3.42	Less important
<b>Freshwater angling</b>		
Tiger angling	3.42	Less important
Boat angling (Carp, barbell, kurper, yellow fish etc. in a dam or river)	3.31	Less important
Bass angling	2.91	Less important
Bank angling (Carp, barbell, kurper, yellow fish etc. in a dam or river)	2.63	Less important
Trout	2.57	Less important
Yellow fish	2.57	Less important
Estuary	2.40	Not at all important

## 4.10 FAVOURITE THREE FISH SPECIES

Respondents indicated the following fish species as their most preferred:

Freshwater:

1. Carp (8%)
2. Bass (6%)
3. Barbell (6%)

Marine:

1. Cob/Kabeljou (8%)
2. King Mackerel (4%)
3. Shad/Elf (4%)

## 4.11 ANGLING MAGAZINE

From the table below, it is clear that Tight Lines/ Stywe Lyne is the most popular angling magazine (28%), followed by Bank Angler / Oewerhengelaar (18%).

MAGAZINE	PERCENTAGE
Stywe Lyne / Tight Lines	28%
Bank angler / Oewerhengelaar	18%
Ski Boat	16%
Rock Surf & Deep	11%
Bass Angler	6%
SA Bass	6%
Complete fly fisher man	5%
Go fish	5%
Fly fisherman	2%
Carp Angler	2%
Angling EC	1%

**STYWE LYNE / TIGHT LINES**  
was the most popular magazine

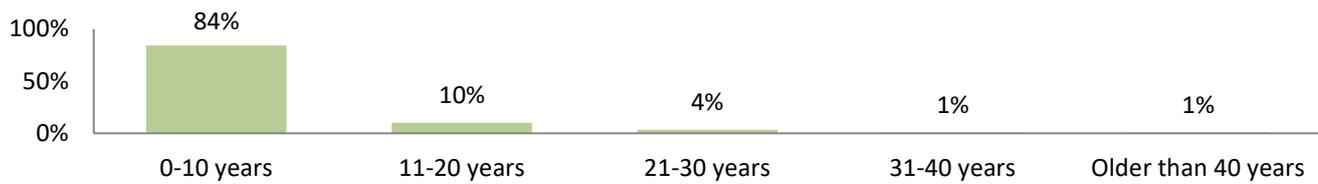
#### 4.12 FAVOURITE ANGLING DESTINATIONS

According to the results of the questionnaires, the favourite freshwater angling spots included Bloemhof Dam (25%), the Vaal River (12%) and the Vaal Dam (11%). Pertaining to sea or marine waters, the following were preferred: Durban (12%), Cape Vidal (10%), and Sodwana Bay (9%).

ANGLING SPOT	PERCENTAGE
<b>FRESHWATER</b>	
Bloemhof Dam	25%
Vaal River	12%
Vaal Dam	11%
<b>SEA/MARINE</b>	
Durban	12%
Cape Vidal	10%
Sodwana	9%
Richard's Bay	6%
Transkei	6%
Struisbaai	5%
Cape Point	4%

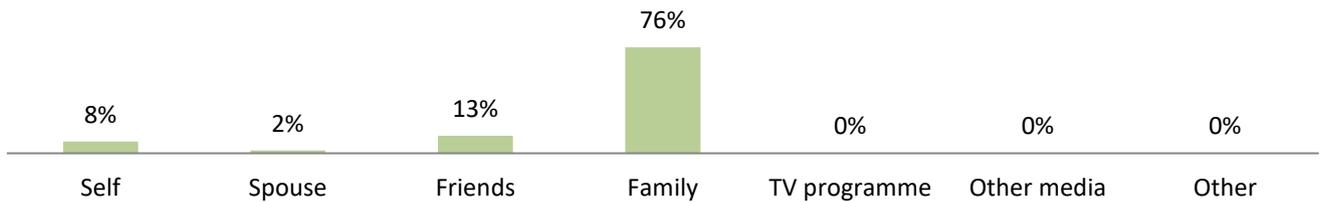
#### 4.13 AGE INTRODUCED TO ANGLING

Overall, respondents who were introduced to angling between the ages of 0 and 10 years accounted for 84% of the total, followed by 10% between the ages of 11 and 20 years. On average, respondents were 7.71 years old when they were introduced to angling for the first time.



#### 4.14 EXPOSED TO ANGLING

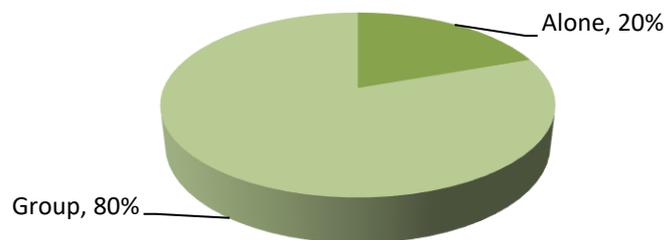
The majority of respondents (76%) indicated that they were exposed to angling by their families, while 13% were introduced by their friends and 8% decided for themselves.



### SECTION C: ECONOMIC INFORMATION

#### 4.15 ANGLING PREFERENCE

The majority of respondents (80%) indicated that they prefer angling in groups, while only 20% prefer to fish alone.



#### 4.16 GROUP SIZE

Respondents indicated that they either travel in groups of three or four people (26%, each), while 16% travel in groups of two people and 10% in groups of five. Respondents, on average, travelled in groups of four people. Most respondents tended to travel to fishing destinations in groups of two to five people.

GROUP SIZE	PERCENTAGE
1 person	2%
2 persons	16%
3 persons	26%
4 persons	26%
5 persons	10%

6 persons	9%
7 persons	1%
8 persons	3%
9+ persons	6%
Average	4.45 people

#### 4.17 NUMBER OF PEOPLE PAID FOR

Most respondents were financially responsible for one (37%) or two (24%) persons, while 20% did not pay for anyone. On average, respondents paid for between one and two people.

NUMBER PAID FOR	PERCENTAGE
No-one	20%
1 person	37%
2 persons	24%
3 persons	8%
4 persons	7%
5 persons	2%
6 persons	1%
7+ people	1%
Average	1.68 people

Did you know?  
 Respondents travelled in groups of 4 and paid for 2 people

#### 4.18 DAYS ANGLING PER ANNUM

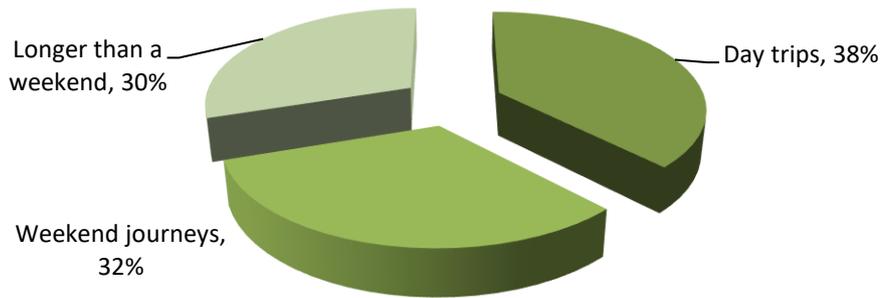
The largest group of respondents (21%) indicated that they fish between 21 and 30 days per annum, followed by 17% who spend between 11 and 20 days angling and 14% who spend between one and 10 days angling per year. On average, respondents spend approximately 51 days angling per year.

NUMBER OF DAYS	PERCENTAGE
1-10 days	14%
11-20 days	17%
21-30 days	21%
31-40 days	10%
41-50 days	10%
51-60 days	8%
61-70 days	2%
71-80 days	3%
81-90 days	2%

91-200 days	12%
201 and more days	2%
Average	50.8 days

#### 4.19 TYPES OF TRIPS UNDERTAKEN DURING THE LAST 12 MONTHS

During the last 12 months, 38% of respondents undertook day trips, 32% went on weekend trips and 30% went on angling trips for longer than a weekend.



Approximately half of the respondents (52%) indicated that they go on angling trips of between three and five days, followed by 30% who go on angling trips for six to 10 days. On average, angling trips last for six days.

NUMBER OF DAYS	PERCENTAGE
None	1%
1 day	2%
2 days	6%
3-5 days	52%
6-10 days	30%
11-20 days	7%
21-30 days	2%
31+ days	0%
Average	6.06 days

#### 4.20 AVERAGE SPENDING

The average amount spent on fishing trips was R27 265 per year

#### 4.20.1 Spending on angling trips

On average, a typical respondent spent R27 264.07 on angling trips. The highest spending categories were terminal angling tackle (R4 558.35), transportation (R4 359.74), boat fuel and oil (R3 949.66) and accommodation (R3 878.74) per year.

ITEMS	AMOUNT
Entrance fees	R691.25
Accommodation	R3 878.74
Transportation	R4 359.74
Food	R2 893.41
Alcohol & beverages	R1 670.20
Boat fuel & oil	R3 949.66
Terminal angling tackle (i.e. Hooks, sinkers, line, lures, etc.)	R4 558.35
Bait: Frozen commercially sourced	R1 264.51
Bait: Fresh harvested bait by local people	R340.15
Gillies	R292.79
Boat hire	R309.24
Competition fees	R880.67
Parking or entrance fees	R94.41
Charter or angling guide	R380.61
Fish cleaning and filleting	R64.84
Gifts	R585.95
Medical (suntan cream, malaria pills, etc.)	R435.23
Other	R614.32
<b>TOTAL</b>	<b>R27 264.07</b>

#### 4.20.2 Membership and licence fees

Of all the annual fees, respondents spend most on membership fees (almost R900) per annum. The total that respondents spend on annual fees amounts to R1 599.10.

ITEMS	AMOUNT
Membership fees	R 893.43
Angling permit fees	R 465.50
Affiliation fees	R 240.16
<b>TOTAL</b>	<b>R 1 599.10</b>

## SECTION D: ANGLING DETAILS

### 4.21 USE OF CAUGHT FISH

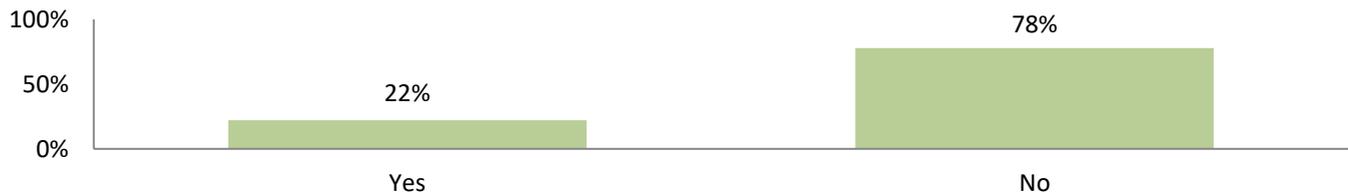
The majority of respondents (85%) only catch and release, while 59% eat the fish that they catch. Twelve percent (12%) sell the fish they catch and 6% donate it.

USAGE	2017
Catch and release	85%
Eat	59%
Sell	12%
Donate	6%
Other	2%

\*Please note: The percentages will not add up to 100% as respondents could indicate more than one option. Also, the sale of fish by recreational anglers in South Africa is illegal.

### 4.22 MARINE AND ESTUARINE FISH CAUGHT WITH A TAG

The results indicated that 78% of respondents had not caught a marine or estuarine fish with a tag. Of those who had, only 50% had reported it to the relevant authorities.



### 4.23 VALID RECREATIONAL ANGLING PERMIT

Seventy-three percent (73%) of respondents currently have a marine recreational angling permit and 65% have a freshwater recreational angling permit. It is important to note that in some provinces the licenses or permits are not required for freshwater angling.

RECREATIONAL ANGLING PERMIT	YES
Marine	73%
Freshwater	65%

### 4.24 PROVINCE WHERE RESPONDENTS HAVE A FRESHWATER ANGLING PERMIT

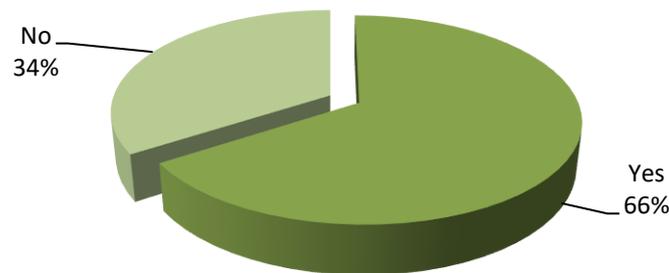
The province where most respondents have a valid freshwater angling permit was KwaZulu-Natal (31%), followed by the Western Cape (27%), Gauteng (22%) and the Free State (19%).

PROVINCE	2017
KwaZulu-Natal	31%
Western Cape	27%
Gauteng	22%

Free State	19%
Eastern Cape	17%
North West	16%
Mpumalanga	14%
Northern Cape	10%
Limpopo	8%
Outside RSA	10%

#### 4.25 CHECKED/INSPECTED BY FISHERIES CONTROL OFFICER

Sixty-six percent (66%) of respondents reported that they had been checked by a fisheries control officer, while 34% have never been checked.

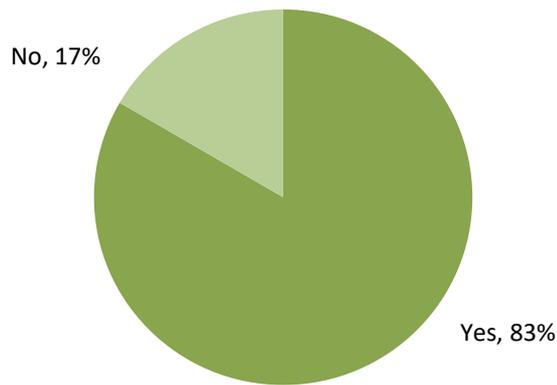


Those who have been inspected have been checked once (26%) or twice (16%) with an average of three times in the past year.

TIMES CHECKED	PERCENTAGE
Never	31%
Once	26%
Twice	16%
3 times	9%
4 times	4%
5 times	3%
5+ times	14%
Average	2.77

#### 4.26 ANGLING: PRIMARY RECREATIONAL ACTIVITY

Angling comprised 83% of respondents' primary recreational activity. Except for angling, respondents also indicated that they partake in hunting (24%), golf (9%), hiking or walking (4%), cycling (3%), and surfing (3%). Other activities that respondents partake in are summarised in the table.



ACTIVITY TYPES	PERCENTAGE
Hunting	24%
None	10%
Golf	9%
Hiking/walking	4%
Cycling	3%
Surfing	3%
Cycling	3%
Camping	2%
Mountain Biking	2%
SCUBA diving	2%
Bird watching	2%
Rugby	1%
Gym/fitness	1%
Cricket	1%
Running	1%
Soccer	1%
Motorcycling	1%
4x4	1%
Other	29%

## SECTION E: ANGLING MOTIVATION

### 4.27 MOTIVES FOR ANGLING

Respondents were asked to indicate on a five-point Likert scale (where '1' = *not at all important* and '5' = *extremely important*) how important various aspects are in motivating them to partake in angling. The following obtained the highest mean values:

1. For the fun and enjoyment thereof (4.39);
2. For relaxation (4.30);
3. To get away from the regular routine (4.20);
4. For the challenge of the sport (4.11); and
5. To experience adventure and excitement (4.05).

The top motives for fishing were:

1. For the fun and enjoyment thereof
2. For relaxation
3. To get away from the regular routine

MOTIVATIONAL ITEMS	MEAN VALUES	LEVEL OF IMPORTANCE
For the fun and enjoyment thereof	4.39	Very important
For relaxation	4.30	Very important
To get away from the regular routine	4.20	Very important
For the challenge of the sport	4.11	Very important
To experience adventure and excitement	4.05	Very important
Part of my lifestyle	3.93	Very important
To experience new and different things	3.84	Very important
To test my skills	3.84	Very important
For my well-being	3.66	Very important
For family recreation	3.63	Very important
To catch a 'trophy' fish	3.50	Very important
To be with people with similar interests	3.48	Very important
To be with friends	3.45	Important
To participate in competitions	2.81	Important
To catch fish to eat	2.24	Less important
To feed my family	1.41	Not at all important
To sell fish to supplement my livelihood	1.20	Not at all important

## 5. ECONOMIC SIGNIFICANCE OF ANGLING

The economic impact of an activity measures the change in economic activity due to this activity taking place in an economy and the aim is normally to determine how much money would be lost to an economy if the activity did not take place. An example would be the hosting of a mega event, such as the FIFA World Cup. The economic significance of such an activity is similar to the economic impact, except that it does not quantify the loss in economic activity if an event did not take place. It rather measures the size of the activity and its influence on other economic activities using tools similar to those used to conduct an economic impact analysis. Economic significance studies are especially relevant when local spending is included in the analysis, since a pure economic impact study only includes “new money” that comes into an economy.

To quantify the economic significance of an activity such as angling, three key inputs are required, namely:

- (i) An estimate of the number of participants in the activity.
- (ii) An estimate of their spending.
- (iii) The distribution of this spending through the economy and its effect on other economic activities.

The first two inputs, i.e. the number of participants and the spending per participant, provide an estimate of the spending stimulus that the activity creates. The spending stimuli are referred to as the direct effect that the activity has on an economy. This spending stimulus ripples through the economy as businesses buy stock from other businesses and pay their employees. These businesses and employees then spend money in the economy on various other goods and services, creating even more spending, and so it continues. These repetitive processes are referred to as the indirect and induced effects created by the initial spending.

There are various methods that can be used to determine how the initial spending stimulus is distributed throughout the economy. One of the most popular methods is the use of the multiplier analysis. The multiplier quantifies the indirect and induced effect and the total effect on the economy is then the sum of the direct, indirect and induced effects, calculated as the direct effect multiplied by the multiplier. To derive the multiplier, this research makes use of the 2012 Social Accounting Matrix (SAM) for South Africa and therefore the analysis is a SAM multiplier model.

The SAM is an extension of the basic Input-Output (IO) model, which shows the relationship between various activities and commodities in a country. IO models make use of matrix algebra to determine the levels of income, employment and production that are needed to satisfy a certain level of demand. The SAM extends the IO-model by including information on different household segments. The 2012 South African SAM distinguishes between 62 activities, 104 commodities and 14 household groups (van Seventer *et al.*, 2016) and is available from the United Nations University website (<https://www.wider.unu.edu/publication/2012-social-accounting-matrix-sam-south-africa>).

The next section explains the process followed in deriving an estimate of the number of anglers in South Africa. This is followed by a discussion on the spending by anglers, which is based on the surveys conducted during 2016. Finally, results of the multiplier analysis are discussed, which then present the results of the economic significance of angling for the South African economy.

## 5.1 The number of anglers

The number of anglers was estimated using a range of methods. Two methods were used to estimate the number of recreational anglers in SA including a multiplier based on affiliated angler information and a multiplier based on marine angling license information.

### 5.1.1 Affiliated angler method

The first method used information from the list of affiliated anglers for 2016 that was provided by the South African Sport Anglers and Casting Confederation (SASACC). Unfortunately, the sectors in the survey did not align completely with the affiliated angling bodies. For example, the anglers belonging to the South African Light Tackle Boat Angling Association (SALTBAA) participate in the estuary boat, marine deep sea, and freshwater boat sectors as part of their competitions. Therefore, all anglers who indicated that they participated in all three sectors in the survey were considered to potentially belong to SALTBAA. This was also true for the South African Deep Sea Angling Association (SADSAA), South African Flyfishing Association (SAFA) and the South African Underwater Fishing Federation (SAUFF) (Table 1).

**Table 1: Organised angling bodies, the sectors that they represent and the number (and percentage) of anglers who participated in the questionnaire that participate in these sectors**

Rank	Angling body	Sectors in questionnaire	Number of anglers from survey who participate	Percentage of anglers from survey who participate
1	South African Light Tackle Boat Angling Association	<i>Ski boat Estuary boat Freshwater boat</i>	987	92.1
2	South Africa Shore Angling Association	<i>Marine shore</i>	860	82.8
3	South Africa Deep Sea Angling Association	<i>Ski boat Deep sea</i>	805	79.3
4	South African Bass Angling Association	<i>Bass</i>	729	70.9
5	South African Flyfishing Association	<i>Marine fly Estuary fly Yellowfish fly Trout</i>	662	62.4
6	South African Freshwater bank Angling federation	<i>Freshwater bank</i>	654	66.3
7	South African Underwater Fishing federation	<i>Spearfishing boat Spearfishing shore</i>	317	38.1

The names and details (e.g. identity numbers, birthdate, email address or telephone number) of the affiliated anglers were matched up with those anglers who responded to the online and face-to-face surveys. This was used to calculate the proportion of affiliated anglers who answered the survey. The total number of anglers belonging to each sector was then estimated by multiplying this proportion by 1) the number of anglers that responded to the survey (this was thought to be an upper estimate) and 2) by multiplying this proportion by the number of anglers who indicated that they participated in the relevant sector in the questionnaire (this was thought to be a more realistic estimate). Participation was estimated for seven angling bodies: light tackle boat; marine shore angling; deep sea; bass; fly fishing; freshwater bank and spearfishing using this method. A proportion method was used to estimate the participation in the sectors that were not covered by the angling bodies. For example, the number of interviewees who indicated that estuary shore angling was either “very important” or “extremely important” was calculated and expressed as a proportion of those who identified marine shore-based angling as either “very important” or “extremely important”. The number of estuarine shore anglers (ESA) was then estimated as the product of the number of marine shore anglers and proportion of estuarine to marine shore anglers. The number of fishing-ski anglers was calculated using similar methods as the product of the number of deep sea anglers and the proportion of fishing-ski to deep sea anglers.

### *5.1.2 Marine angling licence method*

All marine and estuarine recreational fishers (including spear fishers) are required to purchase an annual marine angling license and this estimate therefore included marine shore anglers, deep sea anglers, deep sea anglers, jet-ski anglers, fishing-ski anglers and shore and boat based spear fishers. The details of all marine angling license holders for 2015/2016 were obtained from the Department of Agriculture Forestry and Fisheries. The names/telephone numbers/email addresses of the anglers who completed the questionnaire were used to identify and verify those individuals on the marine angling licence list. The proportion of respondents who indicated that they participated in any of the marine and estuarine angling sectors and had a valid marine angling licence during the study period was calculated. This proportion was then multiplied by 1) the number of respondents who reported that they participated in recreational activities that would require a marine angling licence and 2) the number of respondents who participated in the survey.

As there is no national licence for freshwater angling, the number of freshwater anglers was estimated by examining the ratio of marine to freshwater respondents who answered the survey. It was assumed that freshwater and marine anglers had an equal likelihood of completing the questionnaire and the ratio was estimated by categorising each angler, based on his/her sector and angling location and species preferences, as either a marine or freshwater angler. The ratio of marine: freshwater anglers was then used to estimate the number of freshwater anglers based on the marine angling licence estimate.

### *5.1.3 Final decisions on estimates*

Once the estimates were completed, the research group evaluated each of the angler population estimates based on their potential for bias in the methods and their realism. The final decision on the estimates was then made by consensus.

### *5.1.4 Results: Angler estimates*

The estimates of the total number of recreational anglers ranged between 878 079 (marine angling licence method 2) and 2 176 347 (affiliated angler method 1) (Tables 2 and 3). The research group discussed all of the potential methods and concluded that the most likely explanation for the lower estimates from the marine angling licence data was because most respondents (who were more likely to be dedicated recreational anglers) were more likely to be in possession of an angling licence than those who did not complete the survey. In addition, the upper estimates of both methods (which were based on all respondents) were considered to be less accurate because recreational anglers who did not participate in the formalised angling bodies (e.g. estuary shore and fishing-ski angling) were unavoidably included in the counts. This, in our opinion, resulted in an overestimate of the angler numbers. Therefore, we concluded that the most reliable estimate of angler numbers was considered to be 1 327 633 (Angler affiliation method 1) and the most reliable estimates of the number of anglers per sector are reported in Table 2. These numbers suggest that participation is highest in the freshwater bank angling, followed by the marine shore angling, light tackle boat and estuarine shore sector.

**Table 2: Estimates of the participation in the various angling sectors in the South African recreational fishery based on the proportion of affiliated/non-affiliated anglers who responded to the questionnaire**

Angling discipline	Respondents who reported angling in the relevant sector (Method 1)	All respondents (Method 2)
Freshwater bank angling	551 532	1 029 059
Marine shore angling	394 286	471 786
Light tackle boat angling	150 639	259 444
Spearfishing	33 616	116 248
Estuarine shore angling	79 667	95 327
Deep sea angling	67 603	85 540
Fly fishing	18 135	40 951
Art-lure angling	8 624	39 078
Bass angling	20 814	35 478
Fishing ski	2 716	3 437
<b>Total</b>	<b>1 327 633</b>	<b>2 176 347</b>

**Table 3: Estimates of the participation of recreational anglers in marine and freshwater environments based on the proportion of licenced/unlicensed anglers that responded to the questionnaire**

	All respondents (Method 1)	Respondents who reported angling in either marine or freshwater environments (Method 2)
Marine and estuarine anglers	547 799	478 132
Freshwater anglers	458 222	399 947
<b>TOTAL</b>	<b>1 006 021</b>	<b>878 079</b>

## 5.2 Spending of anglers per year

To determine the annual spending of a typical angler, appropriate questions were asked in the questionnaire. The angler survey assessed not only the spending of an angler on angling trips and excursions, but also the spending that they incur annually to sustain their angling activities. These include angling equipment, boat rentals, etc.

Altogether, 1 320 completed questionnaires were returned and each respondent was classified according to his/her relevant discipline, as indicated in Table 2. The spending per person for each discipline was subsequently determined from the results of the survey and to control for outliers, a 95% confidence interval was constructed around the mean. The data for each category was subsequently resampled to exclude outliers that lie outside the interval on the right side of the distribution. The average for each spending category was recalculated using this reconstructed sample. The weighted average spending per angler on angling trips is indicated in Table 4 below, where the weights are based on the distribution of anglers in each of the disciplines.

**Table 4: Spending per angler and total spending of all anglers on angling trips during a year**

	<b>Spend per angler (ZAR)</b>	<b>Total spend (ZAR million)</b>
Entrance Fees	241.69	320.879
Accommodation	1 134.42	1 506.089
Transport	1 823.87	2 421.423
Food	1 135.81	1 507.934
Alcohol and beverages	467.14	620.192
Boat Fuel and Oil	658.51	874.260
Terminal fishing tackle	1 484.74	1 971.182
Commercially sourced frozen bait	543.95	722.163
Locally harvested bait	114.81	152.420
Gillies	50.55	67.109
Boat Hire	44.96	59.693
Competitions	188.72	250.552
Parking	21.40	28.412
Charter or fishing guides	33.84	44.926
Fish cleaning/Filleting	6.05	8.027
Gifts	104.73	139.045
Medical supplies (first aid/sunscreen)	147.17	195.382
<b>Total</b>	<b>8 202.34</b>	<b>10 889.687</b>

From Table 4 above, it is evident that the average recreational fisherman spends R8 202.34 on his/her angling excursions per year. Spending on transport (R1 823.87) tops the list, followed closely by spending on terminal tackle (R1 484.74), food (R1 135.81) and accommodation (R1 134.42). The least money is spent on fish cleaning or fileting (R6.05) and parking (R21.40).

To derive total spending by all recreational fishermen, the weighted average spending per angler is multiplied by the total number of anglers, 1 327 633, as estimated above (see Table 2). The total spending on angling excursions of all recreational fishermen and -women in South Africa amounts to R10.9 billion per year (last column of Table 4).

Besides spending on actual angling trips, the survey also assessed recurrent expenditure due to the respondents' angling activities. These include spending categories such as annual membership fees, angling equipment, maintenance, clothing, etc. A similar approach was followed as explained above, i.e. all respondents were classified into a discipline and the average spending per angler in that discipline was determined based on the survey responses. Again, a 95% confidence interval was constructed to account for outliers and the average spending in each category therefore reflects the spending that lies within this interval. The weighted average spending per angler is again reported in Table 5, where the weights represent the proportion of the angling discipline in South Africa (see Table 2 above).

**Table 5: Spending per angler and total spending of all anglers on annual angling-related expenses**

	<b>Spend per angler (ZAR)</b>	<b>Total spend (ZAR million)</b>
Annual fees	475.05	630.696
Fishing Equipment (GPS, rods, reel)	3 289.35	4 367.049
Boat Maintenance	701.48	931.308
Boat Seaworthy and Safety Gear	195.53	259.592
Insurance on fishing items	667.04	885.581
Mooring fees	22.58	29.981
Fishing Clothing	517.11	686.526
Storage Fees	46.86	62.216
Other	135.40	179.763
<b>Total</b>	<b>6 050.41</b>	<b>8 032.712</b>

From Table 5, it can be seen that the average recreational fisherman spends an additional R6 050.41 on angling-related expenses per year. Most is spent on angling equipment (almost R3 300 per annum), followed by boat maintenance (approximately R700) and insurance (approximately R670). Mooring fees (R22.58) and storage fees (R46.86) are some of the lowest cost items for the average angler and this is expected, since a large proportion of recreational fishermen in the country do not own boats and therefore engages in shore or bank angling.

Using the same procedure as with the trip expenditure, total annual angling-related spending by all anglers in South Africa was determined by multiplying the weighted average expenditure per angler with the estimated number of anglers (1 327 633) derived in Table 2 above. Table 5 shows that altogether R8 billion is spent per annum on angling-related expenses.

In total, therefore, the average recreational fisherman or -woman spends a total of R20 000 on angling per year. Given the estimated number of recreational fishermen (1.327 million), the total spending by anglers in South Africa amounts to approximately R26.5 billion per annum.

### 5.3 Significance for the South African economy

As indicated in the introduction, the number of anglers and the spending per angler can be used to determine the spending stimulus that the activity creates. This spending stimulus is estimated on R18.9 billion per annum, as explained above. The final analysis needed is to determine how this spending circulates through the economy to create additional economic activity, i.e. production, income and employment. To this end, the SAM multiplier model was used. The SAM multiplier approach relies on distinct multipliers for each expenditure-related sector that converts expenditure into the associated increase in production, jobs and income. The results of the modelling process and therefore the significance of the activity for the South Africa economy are subsequently explained.

#### 5.3.1 Contribution to production

To determine the direct, indirect and induced contribution that recreational angling expenditure has on production in the economy, production multipliers from the 2012 South African SAM were used. Therefore, the direct contribution is not the expenditure, but the change in production because of the expenditure. The indirect contribution represents the linkages between firms and shows how production in other sectors of the economy increases because of an increase in production in a certain sector. The induced contribution measures the change in production due to an increase in demand caused by an increase in remuneration in the economy. The total contribution is therefore the sum of the direct, indirect and induced contribution. It is important to note that the contribution is not instantaneous, but that it takes time (i.e. years) for expenditure to circulate through the economy before the full effect is realised.

‘Production’ refers to the total turnover generated by each sector in the regional economy and it consists of two components: (i) demand for intermediate inputs (resources) by an activity (domestically produced and imported goods and services); and (ii) total value added generated by an activity. It differs from gross domestic product (GDP), which only measures the total value added and therefore production exceeds GDP estimates.

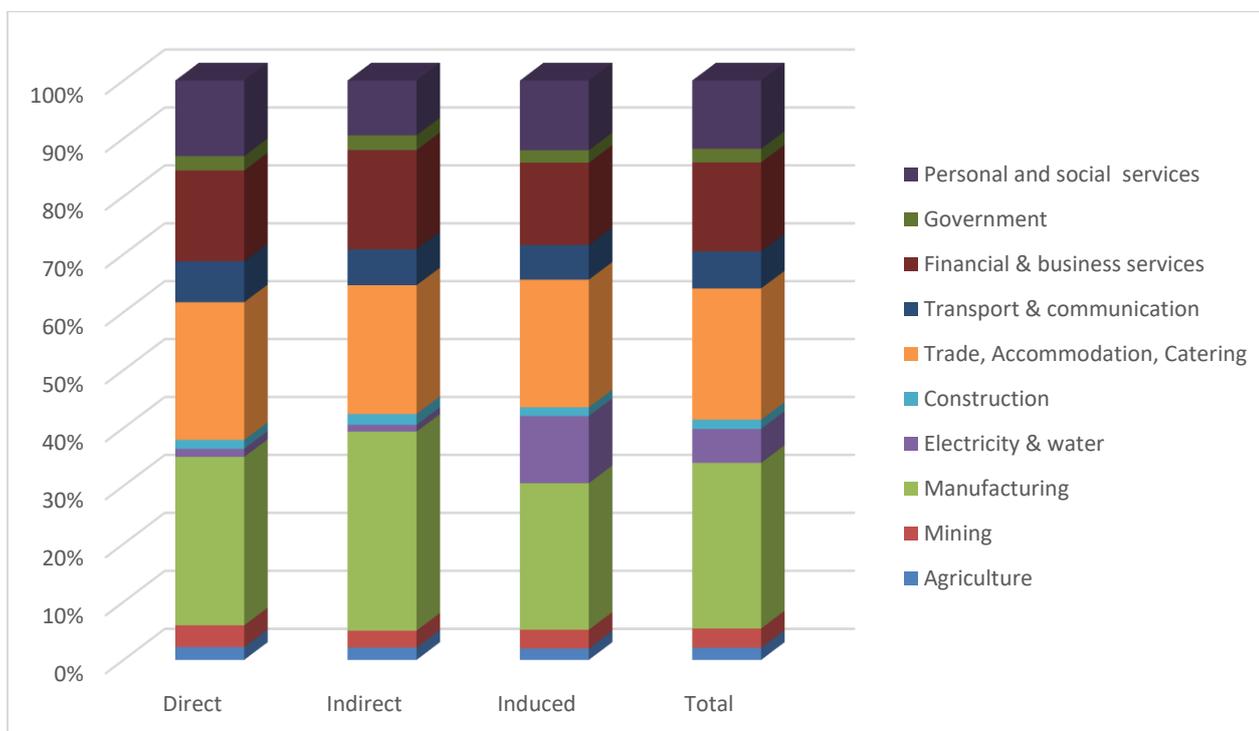
Table 6 below shows the contribution that recreational fishermen’s total expenditure makes to production in South Africa, using the basic sector aggregation as classified by the South African Reserve Bank and Statistics South Africa. It shows that the R18.9 billion spent by anglers contribute R12.1 billion directly to production. Through linkages between firms, an additional R8.079 billion of production is generated, while the increase in production due to an increase in demand amounts to R16.038 billion. The total significance of recreational angling for production in South Africa is

estimated on R36.185 billion. This implies a production multiplier of 3, which means that for every R1 direct change in production, an additional R2 is generated through indirect and induced spending.

**Table 6: Contribution based production multipliers (ZAR millions, 2012 prices)**

Sector	Direct	Indirect	Induced	Total	Percentage of total
Agriculture	266.170	171.147	314.424	751.741	2.1%
Mining	452.477	235.762	517.930	1 206.169	3.3%
Manufacturing	3 506.037	2 773.208	4 053.535	10 332.780	28.6%
Electricity & water	167.367	94.992	1 859.819	2 122.177	5.9%
Construction	187.098	151.247	240.715	579.060	1.6%
Trade, Accommodation, Catering	2 869.497	1 795.582	3 535.295	8 200.373	22.7%
Transport & communication	852.620	500.883	960.250	2 313.753	6.4%
Financial & business services	1 892.920	1 385.856	2 280.589	5 559.364	15.4%
Government	299.550	204.623	345.126	849.299	2.3%
Personal and social services	1 574.944	765.214	1 930.077	4 270.236	11.8%
<b>Total (ZAR million)</b>	<b>12 068.680</b>	<b>8 078.513</b>	<b>16 037.760</b>	<b>36 184.953</b>	<b>100.0%</b>

Table 6 above shows that the production sectors that directly benefit the most from angler expenditure in South Africa are manufacturing (R3 506 million), trade, accommodation and catering (R2 869 million), financial and business services (R1 892 million) and personal and social services (R1 574 million). Large indirect and induced impacts occur in these sectors, as well as in electricity and water, and transport and communication. In total, the sectors that benefit the most from angler spending in South Africa are manufacturing (28.6%), followed by trade, accommodation and catering (22.7%) and financial and business services (15.4%). This is also illustrated in Figure 1 below.



**Figure 1 Contribution of angler expenditure by activity sector**

### 5.3.2 Contribution to income

One of the elements of the additional value-added when production increases due to angler spending, is remuneration of employees that, in turn, affects household income. Again the multiplier model was used and the multipliers were derived from the 2012 South African SAM. The household income multiplier measures the magnitude of changes that will occur in household income if there is a change in production in a sector. In particular, the impact on low-income households can be highlighted, as this can be used as an indicator of the extent to which this activity contributes to poverty alleviation throughout the economy.

Since the 2012 South African SAM gives a very detailed breakdown of household groups in South Africa, based on their income and spending, it is also possible to estimate the contribution of recreational angling at the level of families' income. The 14 income groups are summarised into low-income, middle-income and high-income households and the income that accrues to each of these groups due to angling expenditure is summarised in Table 7.

**Table 7: Impact through income multipliers (ZAR millions, 2012 prices)**

Sector	Total production (ZAR million)	Low-income households	Middle-income households	Total households	Percentage
Agriculture	751.741	64.462	260.704	647.399	2.0%
Mining	1 206.169	91.118	469.673	1 164.878	3.6%
Manufacturing	10 332.780	764.010	3 559.620	8 618.663	26.5%
Electricity & water	2 122.177	28.669	167.312	428.362	1.3%
Construction	579.060	48.535	211.076	508.959	1.6%
Trade, Accommodation, Catering	8 200.373	697.261	3 343.377	8 103.324	24.9%
Transport & communication	2 313.753	157.911	819.747	2 036.986	6.3%
Financial & business services	5 559.364	403.885	2 448.962	5 999.637	18.4%
Government	849.299	55.132	323.769	803.604	2.5%
Personal and social services	4 270.236	542.512	1 741.047	4 238.168	13.0%
<b>Total (ZAR million)</b>	<b>36 184.953</b>	<b>2 853.495</b>	<b>13 345.287</b>	<b>32 549.980</b>	<b>100%</b>

Table 7 shows that, in total, families earn a total of R32 549 million in income due to the expenditure by recreational fishermen in the country. Of this, 9% goes to low-income households – especially those working in the manufacturing sector, trade, accommodation and catering as well as personal and social services. Middle-income households receive 41% of the income derived from recreational fishermen expenditure. In total, workers in the manufacturing sector, trade, accommodation and catering, financial and business services and personal and social services rely the most on angler spending to sustain their income. The aggregate income multiplier is 2.70, which indicates the increase in family income in South Africa for every R1 spent by a recreational fisherman.

### 5.3.3 Contribution to employment

Since labour is a key element of the production process, an increase in production also causes an increase in labour demand and therefore employment. This indicator measures the extent to which each sector contributes towards the creation of employment opportunities and, ultimately, each sector's contribution towards distributing salaries and wages between various types of labourers that, in turn, should positively affect the economy. Using the multiplier model, the contribution of angler expenditure to employment in the South African economy can be estimated. The labour multipliers are based on figures contained in the South African SAM and labour force relative to business volume and jobs per activity sector data from Statistics South Africa.

Table 8 below shows the results of the labour multiplier model and it shows that spending by recreational fishermen supports up to **94 070** jobs in the South African economy. Most of these jobs are in the trade, accommodation and catering sector (46.9%), followed by personal and social services (13.0%), manufacturing (13.0%) and financial and business services (11.4%).

**Table 8: Contribution based on labour multipliers (ZAR millions, 2012 prices)**

<b>Sector</b>	<b>Total production (ZAR million)</b>	<b>Multiplier</b>	<b>Total labour</b>	<b>Percentage</b>
Agriculture	751.741	3.95	2 972	3.2%
Mining	1 206.169	0.50	605	0.6%
Manufacturing	10 332.780	1.18	12 240	13.0%
Electricity & water	2 122.177	0.13	286	0.3%
Construction	579.060	5.54	3 208	3.4%
Trade, Accommodation, Catering	8 200.373	5.38	44 138	46.9%
Transport & communication	2 313.753	1.68	3 882	4.1%
Financial & business services	5 559.364	1.92	10 681	11.4%
Government	849.299	4.51	3 832	4.1%
Personal and social services	4 270.236	2.86	12 226	13.0%
<b>Total</b>	<b>36 184.953</b>		<b>94 070</b>	<b>100%</b>

## 6. CONCLUSIONS AND RECOMMENDATIONS

### 6.1 PROFILE OF THE PARTICIPANTS

The following table provides an overview based on the survey.

DEMOGRAPHIC PROFILE	
Gender	Male (90%), female (10%)
Age	Average age of 44.88 years
Language	English (50%)
Level of education	Diploma, degree (38%)
Occupation	Self-employed (21%) and manager (21%)
Province of residence	Gauteng (26%)
Preferred angling magazine	Tight Lines / Stywe Lyne (28%)
Income	R140 001-R221 000 (26%)
Member of angling club	No (60%)
Member of social angling club	Yes (56%)
Most preferred marine angling discipline	Rock and surf angling
Most preferred estuary angling discipline	Estuary: shore
Most preferred freshwater angling discipline	Bank angling
Most preferred fly angling discipline	Yellow fish
Favourite species to catch	Freshwater: <ol style="list-style-type: none"> <li>1. Carp (8%)</li> <li>2. Bass (6%)</li> <li>3. Barbell (6%)</li> </ol> Marine: <ol style="list-style-type: none"> <li>1. Cob/Kabeljou (8%)</li> <li>2. King Mackerel (4%)</li> <li>3. Shad/Elf (4%)</li> </ol>
Age introduced to angling	Average age 7.71 years
Introduced to angling	Family (76%)
Preference to fish	Group (80%)
Group size	Average of 4.45 people
People paid for	Average of 1.6 people
Average number of days angling in last 12 months	Average of 48.1 days
Average spending on day trips	R27 264.07
Average spending on annual fees	R1 599.10
Average spending on other annual angling-related expenditure	R26 118.07
Do with fish	Catch and release (85%)

Caught tagged sea fish	No (78%), 50% reported it
Valid recreational angling permit	Marine: Yes (73%) Freshwater: Yes (65%)
Province of angling permit	KwaZulu-Natal (31%); Western Cape (27%)
Checked/inspected by fisheries control officer	Yes (66%), twice on average
Angling as primary recreational activity	Yes (83%)
Motivation for angling	<ol style="list-style-type: none"> <li>1. For the fun and enjoyment thereof</li> <li>2. For relaxation</li> <li>3. To get away from my regular routine</li> <li>4. For the challenge of the sport</li> <li>5. To experience adventure and excitement</li> </ol>
Estimated number of recreational anglers in the country	1 327 633
Total annual spending of recreational fishermen in the country	R18 922 million
Economic significance in terms of production	R36 185 million
Support employment opportunities of	94 070 people

## 6.2 RECOMMENDATIONS BY RESPONDENTS

Respondents who completed the survey made the following recommendations:

### Conservation

- More effort needs to be made towards improving conservation of fish resources
- All angling license fees collected should go to the conservation of fish habitat and improved policing
- More fish species should have closed seasons coinciding with periods when they are most vulnerable to capture
- There should be more educational material available to anglers and the general public in order to enhance sustainability
- DEA and DEAF must consider all input from angling bodies and evaluate what the impact will be on the economy, human wellbeing and the angling industry if alien species of fish are to be eradicated (e.g. trout and bass). South Africa is being over regulated; however, the regulations cannot be properly enforced and this is leading to the public having little regard for the law.
- More anglers should be encouraged to catch and release.

### Law enforcement

- Greatly improved law enforcement is required to prevent illegal gill-netting both in estuarine and freshwater habitats
- Consistent and visible policing is needed to ensure greater protection of fish resources
- Improved fishing regulations are required such as scientifically-based slot limits to improve the sustainability of recreational fishing

#### Licence issues

- Make it easier for anglers to obtain both freshwater and marine angling licenses
- Angling licences should be waterproof
- Angling licence should be in card or “app” form
- Responsible government officials should be more 'hands on' as far as fishery permits and related conservation issues are concerned

#### Angling activities

- Allow bass and other recreational species to be released in public waters as the angling industry contributes hugely to local economies

#### Marketing

- Open advertising for trips to special angling waters with special first-time prices for licenses and accommodation
- Recreational angling opportunities in South Africa need to be better advertised abroad to encourage tourism

### 6.3 RECOMMENDATIONS BY RESEARCHERS

#### Marketing

- Recreational angling should be marketed nationally as well as internationally. This is an aspect that should not be left to individual fishermen or municipalities on their own; it should be done on a greater scale and more professionally.
- Make it easier for potential fishermen and -women to access the correct information about angling inland, on the coast, dams, lakes, etc.
- This is an activity that has huge tourism potential and that is currently not exploited as such.

#### Economic contribution

- In order to increase the contribution that recreational angling makes to the economy, it is important to address the following aspects:
  - Increase the number of anglers
  - Increase the length of stay during angling excursions
  - Create opportunities for them to increase their spending
- More should therefore be done to encourage angling activities and therefore angling tourism – especially in rural areas, where a number of good angling sites in the country is located.
- Acknowledge that this activity attracts visitors, which creates a spending stimulus in the region, leading to increases in production, income and employment. Getting locals involved in providing goods and services to fishermen can decrease the leakages and increase the economic benefits that a community derives from angling activities.