

Environmental regulatory awareness of freshwater recreational bank anglers in South Africa

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Freshwater recreational angling is growing in popularity internationally. Due to the potential negative environmental impacts, various regulatory systems exist. In South Africa, freshwater recreational angling is regulated through a complex legal framework, consisting of national and provincial legislation dating back to the 1960s. The legislation also relates to historical and current provincial boundaries, adding to the regulatory complexity. Due to this complexity, the question arises whether freshwater recreational bank anglers in South Africa are aware of the regulatory requirements applicable to them. Low levels of awareness could lead to non-compliance, which would suggest an ineffective regulatory system. The aim of this research was thus to determine the environmental regulatory awareness of freshwater recreational bank anglers in South Africa. This was achieved through a literature review of national and provincial legislation, as well as the rules applicable to organised freshwater recreational bank angling. An online survey was completed by 100 members of the South African Freshwater Bank Angling Federation (SAFBAF). The results of the survey indicate that the regulatory awareness of the sample of SAFBAF freshwater recreational anglers is low in certain key areas, such as bag and size limits for specific fish species, catch and release requirements, as well as legal definitions for alien and invasive and TOPS species listings. However, the low level of awareness can be ascribed to the complex regulatory system and not unwillingness of anglers to comply per se. It is recommended that (i) a single consolidated and simplified regulatory system for freshwater recreational bank angling be developed, and (ii) that angling organisational and competition rules be aligned with relevant regulatory requirements, to improve overall awareness and promote higher levels of regulatory compliance.

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INTRODUCTION

Internationally, freshwater recreational angling is a popular pastime, with a tenth of the population in developed countries, and approximately 25 million participants in Europe and 30 million in the United States, engaging in recreational angling (Hickley and Tompkins, 1998). Given the popularity of freshwater recreational angling, the regulation thereof is necessary to manage and minimise the possible environmental impact. Generally, the regulation of freshwater recreational angling is affected by implementing bag and size limits, angling gear restrictions and seasonal angling restrictions (Rahel and Taniguchi, 2019). However, Arlinghaus et al. (2017a) argue that it is time to move away from a fixation with command-and-control-based approaches, as freshwater fisheries are complex ecological systems with many variables that have to be taken into account and, therefore, require a more adaptive management approach. Nevertheless, command-and-control-based approaches remain the foundation of recreational angling management (Arlinghaus et al., 2017a).

'Freshwater recreational angling' in South Africa refers to the pursuit of angling for fish using a rod, reel and hooks, and is usually done for recreational purposes with no commercial benefit (Van Zyl, 2010). Freshwater angling can generally be divided into bank angling, fly fishing, bass fishing and boat fishing. Bank angling typically constitutes casting baited hooks into the water in an attempt to catch fish. Despite the fact that participants do not pursue recreational angling for personal economic gains, the sport is an important contributor to the South African economy, with an estimated 2.5 million persons participating in recreational angling in 2008 (Van Zyl, 2010), collectively spending approximately 18.8 billion ZAR annually (Leibold and Van Zyl, 2008).

South Africa's unique fish diversity and exceptional range of fish habitats have contributed to the rich history and popularity of freshwater recreational angling and its subsequent economic importance for the country (Hickley and Tompkins, 1998; Smit et al., 2016). However, this combination of fish diversity and the popularity of recreational angling presents various management and regulatory challenges – in particular, designing and implementing an effective regulatory regime for freshwater recreational angling, which is the focus of this research. Britz (2015) indicates that, given the economic importance and popularity of freshwater recreational angling in South Africa, policy and legislation must be developed and implemented to ensure the long-term sustainability and viability of inland fish populations for recreational and small-scale fisheries. Despite the approval of the inland fisheries policy by Cabinet, these activities are still regulated by the environmental acts, ordinances and regulations that govern recreational fishing (Weyl et al., 2021). According to Grilli et al. (2019), awareness and certainty, in respect of the regulatory requirements applicable to freshwater recreational angling, would be an important prerequisite to successfully manage natural resources. Unfortunately, the current legislation relating to freshwater recreational angling in South Africa is highly fragmented,

residing under various governmental departments without being guided by a coherent overall policy (Weyl et al., 2007; Viljoen, 2010). The National Freshwater (Inland) Wild Capture Fisheries policy for South Africa (DFFE, 2021) states that national and provincial legislation should be promulgated to provide for permits and authorisations for, amongst others, recreational fishing, charters and guiding.

The question, therefore, arises about the extent to which freshwater recreational anglers are aware of the current regulatory requirements applicable to freshwater angling. Low levels of regulatory awareness could imply low levels of regulatory compliance and, ultimately, an ineffective regulatory regime. Kramer et al. (2017) found that marine shore anglers in KwaZulu-Natal generally had poor awareness of angling regulations, which begs the question whether awareness of South African freshwater recreational bank anglers would also be poor. This is something South Africa can ill afford, given the pressure on the country's already stressed freshwater resources from various users (Oberholster and Ashton, 2008), including recreational angling.

The aim of this study was thus to determine the regulatory awareness of freshwater recreational bank anglers in South Africa. The Oxford Dictionary of English (Stevenson, 2010 p. 111) defines awareness as "knowledge or perception of a situation or fact", also making the link between awareness and knowledge. In line with the latter definition, and for the purpose of this research, we understand the level of knowledge about regulatory requirements to be a measure of 'awareness'.

Freshwater recreational angling regulatory system in South Africa

Internationally, there are three general approaches to regulate freshwater recreational angling: (i) creel limits (or bag limits in South African legislation), (ii) size limits for fish, and (iii) angling gear restrictions (Rahel and Taniguchi, 2019). The gear is normally limited to the number of hooks and lines, as well as restrictions or prohibition of certain methods, such as the use of explosives, electricity and toxins. Arlinghaus et al. (2019) highlight a fourth regulatory approach, which is to introduce harvesting slots or angling seasons. The latter is commonly used to manage recreational angling in the marine environment in South Africa. However, the regulation of freshwater angling is mainly limited to bag and size limits (Sutinen, 1993). Typically, these requirements are regulated through a licencing regime mandated through specific policy and legislation. However, these regulatory approaches can become very complex, and anecdotal evidence suggest that many anglers are sometimes not aware of or do not understand the legislative requirements applicable to them (Schill and Kline, 1995; Viljoen, 2010; Cardona and Morales-Nin, 2013). The effectiveness of regulating recreational angling is further affected by weak enforcement by the relevant authorities (Paragamian, 1984).

The following discussion only focuses on the sections in South African legislation applicable to freshwater bank angling: Following the adoption of the Constitution of South Africa (Act 108 of 1996) (RSA, 1996), the provincial structure changed from the four provinces and homelands (Fig. 1A) to the current nine provinces and former 'homeland' areas such as Bophuthatswana, Ciskei and Transkei that were incorporated into the new provinces (Fig. 1B).

Despite these changes, not all legislation related to freshwater angling was updated and some legislation from the pre-constitutional era is still valid. Table A1 (Appendix) provides a summary of the legislation related to freshwater recreational bank angling in South Africa.

The current environmental regulatory context can be summarised as follows:

- Relevant angling legislation dating back as far as Provincial Ordinances from 1969, that applies to pre-constitutional provincial and homeland boundaries and is not aligned with current (post-1996) provincial boundaries (Fig. 1)
- Certain angling legislative requirements are contained in national legislation such as the National Environmental Management: Biodiversity Act, 10 of 2004 (RSA, 2004) and related critically endangered, endangered, vulnerable and protected species (threatened and protected species – TOPS) regulations, No. 151 of 2007 (RSA, 2007)
- Certain angling legislative requirements are contained in post-1996 Provincial Legislation such as the Mpumalanga Nature Conservation Act, 10 of 1998 (RSA, 1998) and the Limpopo Environmental Management Act, 7 of 2003 (RSA, 2003).

The following sections provide a brief discussion of the South African freshwater bank angling legislative regulatory approaches (i.e., licences, bag and size limits, equipment limitations and seasonal angling) that are prescribed in the various pieces of relevant provincial legislation, as well as the national legislation (with special reference to the alien, invasive and protected species), and should be read together with Table A1. Included in the discussion are the South African Freshwater Bank Angling Federation (SAFBAF) rules. These rules are only applicable to competitions hosted by SAFBAF or affiliates and are not enforceable for social anglers or even SAFBAF members angling socially.

Licensing

The possession of a licence is a basic requirement for freshwater bank angling in most provinces, with Gauteng and Mpumalanga requiring persons 16 years or older to be issued with a licence. Thus, a person younger than 16 years does not have to be in the possession of a licence in these provinces. However, in the Limpopo Province, a person does not need a permit to catch fish if doing it by means of angling with a rod and reel, unless angling in a provincial park. If, however, a person catches fish by means of a net in this province, a permit is required.

Bag limits

Recreational angling is freely accessible and, therefore, the number of fish caught and kept could potentially have a significant impact on fish populations and ecosystem health (Attwood and Bennett, 1995). For this reason, it is important to mitigate the impact of recreational angling on fish populations through bag limits. A bag limit refers to the maximum number of fish an angler is allowed to catch and keep per day, but is not necessarily applicable to all species, and also differs depending on the province or the exact geographical catchment area. Each province, therefore, has its own requirements regarding bag limits applicable to different fish species (Table A1). For example, certain provinces have general bag limits for the yellowfish species (large cyprinids of the genus *Labeobarbus*), while other provinces differentiate bag limits for different yellowfish species. Limpopo Province, however, does not make provision for bag limits at all, meaning that a person can catch any number and any size of fish of any species at any given time.

Size limits

The size limit restrictions in regulations refer to the minimum allowable size of a fish, measured from head to tailfin. If a fish is shorter than the allowable limit, it must be released. This aims to restrict fish mortality rates, increase the average size of fish, and improve the recreational angler's experience (Allen and Pine, 2000). This also allows the fish to reach fertility age and be given the

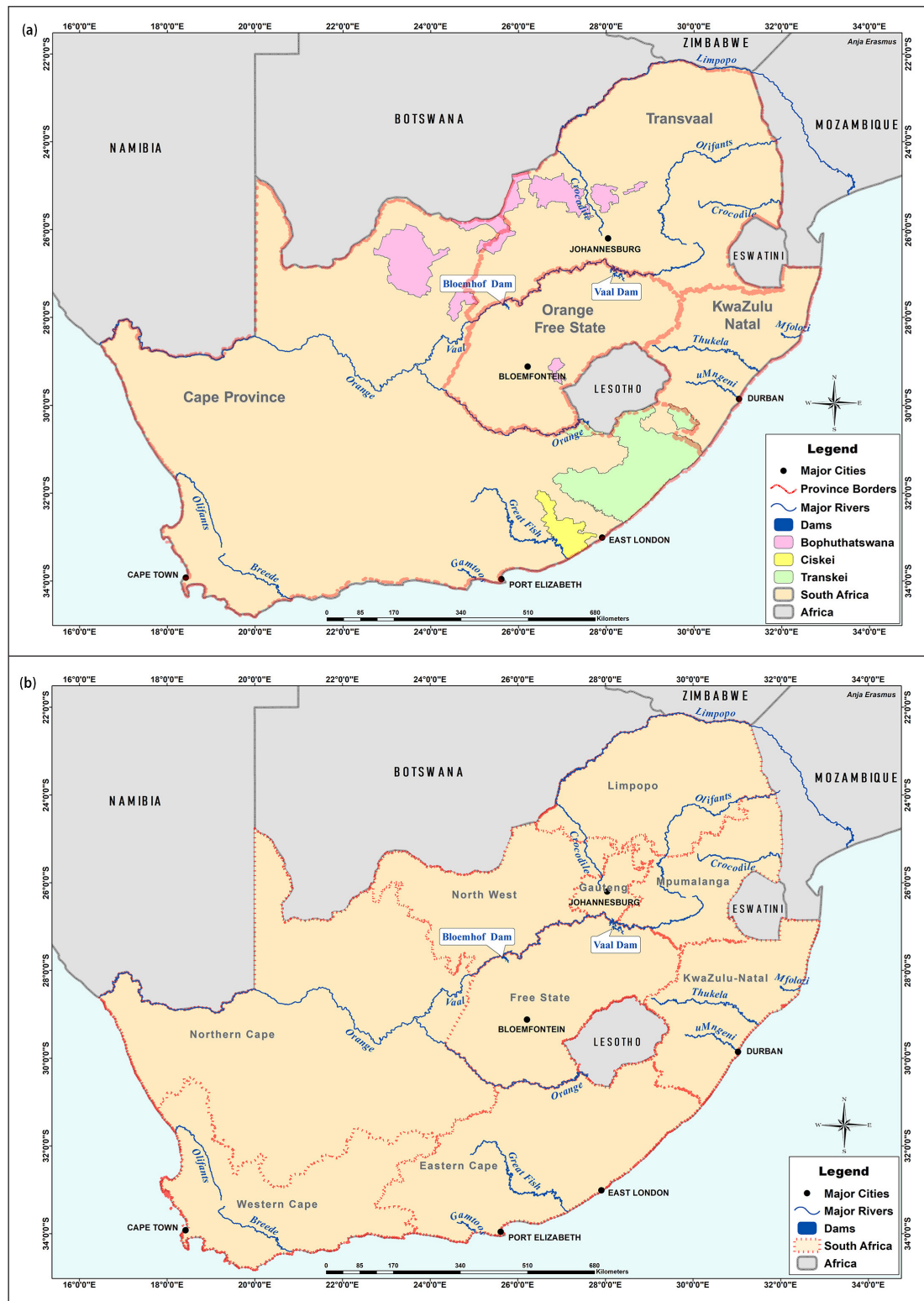


Figure 1. Provincial and homeland boundaries: (A) before and (B) after adoption of Act 108 of 1996

opportunity to reproduce. If the restriction is not applied and all the younger fish are caught, the population may decline as the fertile fish will disappear from the population. Size limit restrictions are a convenient management method, as it is easy to measure and implement (Gwinn et al., 2015). Similarly to bag limits, size limits apply only to specific fish species and therefore only the legislation applicable to species regularly targeted and caught by bank anglers are included in the research. Each province has its own description (and in some instances naming) of fish species, as well as its own requirements regarding size limits (Table A1).

Angling equipment specifications

The regulations that prescribe which fishing gear or methods are permissible, stipulates as a general rule that two lines with two single hooks are allowed per line per angler. The exception to this is the KwaZulu-Natal regulations, which also allows two lines per angler; however, it allows three single hooks per line (Table A1). Certain methods of catching fish are, as a general rule, either prohibited or require a special permit. These methods include using a net, a set line, a trap, spearing, explosives and electroshocking. The strict regulation of these methods is most

likely based on ethical reasons, but also on the basis of protecting the fish population and broader ecosystem as they may be more effective ways of catching fish. Arlinghaus et al. (2017b) further indicate that certain angling methods and equipment may have a negative impact on the targeted fish species. This impact is called the 'timidity syndrome' and is defined as "the emergence of fish populations that are consistently more timid when exploited compared to unexploited populations of the same species." (Arlinghaus et al., 2017b p. 361).

Seasonal angling

Legislation makes provision for a closed season, during which angling is prohibited, either in total or per species. However, the North West Province is an exception with the latest regulations not making provision for a closed season. Older legislation, such as the Transvaal Nature Conservation Ordinance, 12 of 1983 (RSA, 1983), Bophuthatswana Nature Conservation Act, 3 of 1973 (RSA, 1973) and Nature and Environmental Conservation Ordinance, 19 of 1974 (Cape Ordinance) (RSA, 1974), support this requirement and make provision for angling seasons. Although provinces make provision for open or closed angling seasons as a protective measure, no such angling seasons have yet been promulgated. This means that, nationally, anglers can fish at any time of the year for any species with no restriction other than bag and size limit.

Alien and invasive species

Alien species refer not only to species that did not naturally occur within South Africa, but also to indigenous fish species that occur in a catchment area they did not originate from (Section 1 of the National Environmental Management: Biodiversity Act, 10 of 2004 (RSA, 2004)). If alien species are not regulated, it may result in the species having a negative impact on the ecosystem (Weyl et al., 2015), which may result in such species also being classified as invasive. For this reason, regulations are implemented to control alien and invasive species by controlling the catching and releasing of such species, and include, in some instances, permit requirements. Such measures are common internationally and have been introduced in the USA and Japan, where regulations require an angler to remove certain species of fish from certain catchment areas, due to the fact that they are non-native and threaten indigenous fish species (Rahel and Taniguchi, 2019).

Threatened or protected species

The threatened or protected species (TOPS) regulations define certain species as endangered, vulnerable, threatened and/or protected. Such species need protection to prevent risk of extinction. These regulations are of importance to bank anglers mostly in respect of certain yellowfish species, that are often caught and that may require a permit (i.e. section 57(1) of National Environmental Management: Biodiversity Act, 10 of 2004) (RSA, 2004).

METHODOLOGY

Evaluations of environmental awareness have been conducted in relation to fields such as waste management, water management and sustainable infrastructure design (Zengerink, 2018; Tolsma, 2018; Roos et al., 2021). This research determined awareness of specific regulatory provisions in policy and legislation, and not the 'softer' levels of awareness that other studies have focused on, such as best practice requirements or community preferences, that are more difficult to measure. Simply put, recreational bank anglers' knowledge of regulatory requirements is considered a direct reflection of their level of awareness. A literature review of relevant policy and legislation was conducted, followed by a survey questionnaire of freshwater recreational bank anglers

Survey questionnaire design

The regulatory requirements for freshwater recreational bank angling, excluding boat angling (Table A1) provided the content for the survey questionnaire design, after ethical approval was obtained (NWU-01284-20-A9), and included the following aspects:

- Gathering of **basic information**, such as age and the province where respondents reside and angle (Questions 1 to 3), as well as assessing their abilities to identify fish species (Question 19).
- **Licence requirements**: The need to apply for an angling licence, and the applicability of angling licence requirements. Obtaining an angling licence is the first formal requirement that an angler needs to comply with; therefore, it was included as one of the first questions in the questionnaire (Questions 4, 5 and 18).
- **Bag limits**: Bag limit requirements differ provincially. It is therefore important to determine the anglers' awareness of bag limits applicable to targeted species, as well as their knowledge of bag limits for the geographic area where they are angling. Furthermore, only bag limits that relate to fish generally targeted and caught by freshwater bank anglers were included in the questionnaire. For example, species such as tigerfish (*Hydrocynus vittatus*) are not included, due to the fact that it is not targeted or readily caught using bank angling techniques (Questions 6 and 7).
- **Size limits**: Size limit requirements differ across different provinces. It was, therefore, necessary to assess anglers' awareness of these legislative requirements across provinces (Questions 8, 9 and 10).
- **Angling equipment**: There are specific requirements that anglers must comply with regarding angling equipment. Only two lines with two hooks each per angler are allowed, although KwaZulu-Natal allows three hooks. Angling methods such as nets, explosives and toxins, for example, are not allowed or require a permit (Question 11).
- **Alien and invasive species**: The national legislation regulating freshwater recreational angling impacts on freshwater recreational bank anglers due to the fact that certain species such as the common carp (*Cyprinus carpio*), which is an invasive species (Notice 3 of National Environmental Management: Biodiversity Act, 10 of 2004 Alien and Invasive Species Lists, 2016 (RSA, 2016)), is one of the main target species of bank angling. It is therefore necessary to determine the awareness of bank anglers in respect of alien and invasive species and the restrictions imposed (Questions 12, 13, 14 and 16).
- **Threatened or protected species (TOPS)**: Species on the TOPS list require a permit to be caught. It is therefore important that freshwater recreational bank anglers know which species are on the list and be aware of the permit requirement (Questions 15 and 16).

The questionnaires were dealt with anonymously to encourage participation and mitigate possible fears of individuals' lack of awareness being exposed to others. No personal questions were raised, except for age, and no response could be linked to an individual, as responses were completed anonymously. Furthermore, the questionnaire design was made as user-friendly as possible, using Google Forms, and consisted mostly of multiple-choice questions. The complete survey questions and design are included in the Appendix (Table A2).

Survey sample and analysis

It was decided to use convenience sampling as a method of collecting data, due to factors such as: (i) time, cost and resource

constraints, (ii) the potentially very large number of freshwater bank anglers, as well as (iii) the large geographical area covered by freshwater bank angling activities. Convenience sampling can be defined as: “a type of nonprobability or non-random sampling where members of the target population that meet certain practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate are included for the purpose of the study” (Etikan et al., 2016 p. 2). Subsequently, the questionnaire was aimed only at affiliated freshwater bank anglers. Of the more than 2.5 million recreational anglers in South Africa, only about 7 500 belong to or are affiliated with some form of angling organisation or association (Britz et al., 2015). Bank angling falls under the auspices of SAFBAF with some 5 800 members. All the registered SAFBAF anglers over the age of 18 were targeted for inclusion in the survey.

The survey questionnaire (Google Forms link) was distributed via the national SAFBAF management committee, with the request to circulate it to the various provincial structures. Respondents were required to complete their responses in electronic format on the Google Forms Platform.

The responses captured via the Google Forms platform were exported to Microsoft Excel for further analysis.

Data analysis and results

Ultimately, 100 members completed the survey questionnaires in full, and were included as part of the data analysis. Respondents were between the ages of 18 and 70, with nearly 80% of the participants aged between 31 and 60. All nine provinces were represented in terms of angling location. The responses to the questionnaire are discussed in relation to the survey questions (Table A2) and structured according to the different main regulatory approaches for recreational freshwater bank angling in South Africa.

Licensing requirements

The requirement for a freshwater angling licence is a basic regulatory measure in all of the provinces. In response to Question 4, 82% of respondents correctly indicated that an angling licence is required. The remaining 16% indicated that it is not a requirement or ignored (2%) the question. The fact that there are any respondents unaware of the need for a licence is concerning since it is such a basic and fundamental requirement.

To further determine anglers' awareness of the specific legislative requirements in different geographical locations, a scenario was presented of angling along the Vaal Dam (Question 5). This dam is located across three provinces and therefore presents an ideal example of the potential regulatory complexities facing anglers at such locations. Half of the respondents (50%) were aware that you need to follow national legislation, as well as the applicable provincial legislation depending on your angling location. This shows that even amongst anglers that are aware of the basic licencing requirements, there remains uncertainty as to which legislation is applicable and the complexities that exist. This is not an ideal state of affairs from a regulatory effectiveness perspective with less than half the respondents having a correct understanding of the licencing regime.

Bag limits

Bag limits refer to the maximum number of fish an angler is allowed to take home per day. According to the survey responses to Question 6, only 22% of the respondents know what bag limit is, with 74% of respondents wrongly indicating that it refers to the maximum number of fish that you can catch per day. In the context of freshwater bank angling, bag limits are most probably

not a significant or controversial issue. This is because (i) the majority of freshwater angling species are not considered edible (and therefore there is limited interest in keeping fish) and (ii) organised angling competitions rely exclusively on catch and release as confirmed by the SAFBAF competition rules. Thus, although the respondents are not aware of the actual meaning of bag limits, at least they are aware of the fact that it refers to the maximum number of fish to be caught.

The requirements for bag limits for specific fish species are not consistent across all the provinces. Some provinces refer to yellowfish in general, while other provinces specify the different yellowfish species and set a bag limit for each species.. The lack of consistency complicates regulatory requirements, which may lead to non-compliance. According to the responses to Question 7, 50% of the respondents are aware of the bag limits applicable in Gauteng and the Free State, i.e. for yellowfish (all *Labeobarbus* species) in Gauteng (61%), as well as smallmouth and largemouth yellowfish in the Free State (78%). For all the other species, less than 50% of respondents were aware of the provincial bag limits.

The bag limit for yellowfish in the Gauteng and Free State is 10 fish. This is also the maximum number of yellowfish that an angler is allowed to weigh at the end of a competition, as prescribed in the SAFBAF rules. However, the SAFBAF rules only make provision for smallmouth yellowfish. According to the SAFBAF ad hoc rules (2019) anglers are not allowed to weigh a largemouth yellowfish and must release it immediately, while smallmouth yellowfish can be weighed up to a total of 10 fish. SAFBAF rules do not prohibit the catching of largemouth yellowfish, as prescribed by the TOPS regulations; they only prohibit the weighing of the fish to discourage the catching of these species. However, it is difficult to understand how the catching of largemouth yellowfish could be prohibited, even if SAFBAF wanted to, because it is impossible to purposefully avoid catching them when targeting other fish. Notably, 78% of the respondents correctly indicated the bag limit of largemouth yellowfish in the Free State. The question remains if the respondents answered correctly due to their regulatory awareness, or due to their awareness of the similar SAFBAF rules?

A total of 23 different bag limit-related questions were asked (with a focus on different fish species), all sub-questions of Question 7. Only three of those questions were answered correctly by more than 50% of the respondents. For the other 20 bag limit questions, less than 50% of questions were correctly answered. It, therefore, seems that the respondents have limited regulatory awareness of the applicable bag limits for the freshwater species in the different provinces.

The results show that respondents are only aware of bag limits for yellowfish in the Gauteng and the Free State provinces, with their awareness of the bag limits applicable in other provinces being poor. For example, only 48% of the respondents correctly indicated that the North West Province requires catch and release of largemouth yellowfish. Clearly the pervasive practice of catch and release, promoted by SAFBAF, makes the low levels of awareness around bag limits less concerning in relation to specific SAFBAF competitions, as it results in a limited impact on fish populations. Nevertheless, bag limits represent an important regulatory approach that relies on high levels of awareness in order to be effective to protect fish populations.

Size limit

Size limit refers to the minimum allowable fish size to be kept. Responses to Question 8 show that 87% of the respondents understood the meaning of 'size limit' correctly, while only 7% incorrectly understood size limit as the 'maximum' size a fish needs to be before you can keep it, and 6% not responding to

the question. It is, therefore, reasonable to conclude that the respondents have a high level of awareness regarding size limits. Once the basic understanding of size limit has been established, awareness of the applicable size limit for different fish species per province was tested (Question 9).

The prescribed size limits per species vary across provinces. The only questions that scored above 50% correct responses related to yellowfish and kurper (tilapia) in Gauteng and Mpumalanga, as well as smallmouth yellowfish in North West. In relation to the rest of the species, the percentage of correct responses was below 50%.

It should be pointed out that, in respect of yellowfish species, the size limit is the same for the regulatory and SAFBAF rules (i.e. smallmouth yellowfish – 300 mm). This again begs the question if the correct responses are the result of the respondents' awareness of the provincial legislation or awareness of the SAFBAF rules? The latter suggest that incorporating regulatory requirements into organisational rules could be one way of improving regulatory compliance, because anglers are possibly more aware of local competition rules than national or provincial regulations. The responses to size limits for yellowfish in the Free State (450 mm) seem to support this view, because 62% of the responses indicated the prescribed size limit to be 300 mm, as outlined in the SAFBAF rules. Similarly, in Limpopo, where there is no size limit, 63% responded that the required size limit for yellowfish is 300 mm. In the Eastern Cape, Western Cape and Northern Cape, where the size limit for yellowfish is 400 mm, the majority of respondents also indicated the SAFBAF limit of 300 mm (Clanwilliam yellowfish – 36% responded 300 mm, largemouth yellowfish – 19% responded 300 mm).

Therefore, it is reasonable to conclude that the respondents are strongly influenced by the SAFBAF rules. Of the 23 size limit-related questions (sub-questions of Question 9) posed, only five questions achieved more than 50% correct answers. It seems that, although the respondents have a basic awareness of what size limit means, their actual regulatory awareness of size limits per species per province is poor.

Measuring the size of the fish is typically done from the nose to the end of the tailfin (caudal fin), also referred to as total length, as required in North West, Eastern Cape, Northern Cape and Western Cape (Table A1). However, Mpumalanga and Gauteng measure size from the nose up to the fork of the tailfin, referred to as fork length (Table A1). The survey responses to Question 10 show that 53% of respondents indicated that a fish is measured from nose up to the end of the tailfin (total length), 33% indicated that it is measured from nose up to the fork of the tailfin (fork length), while 13% indicated both measurements are used. According to the ad hoc SAFBAF Rules (2019), the SAFBAF anglers measure from the nose until the end of the tailfin. It again seems that the majority of the respondents answered the question with the SAFBAF rules in mind. However, the only respondents who correctly responded to the question, were the 13% who indicated both measuring methods to be correct.

Angling equipment

All provinces, except for KwaZulu-Natal, prescribe a maximum of two lines per person with two single hooks on each line. KwaZulu-Natal, however, prescribes a maximum of two lines, but allows three single hooks on each line. As previously indicated, the question refers to rods instead of lines, to avoid confusion amongst respondents given the specific SAFBAF rules relating to angling equipment. The respondents had an opportunity to mark more than one option in relation to Question 11 on angling equipment, as KwaZulu-Natal has different requirements.

In total, 98% of the respondents correctly indicated that you may use two rods with two single hooks each. Although other options were marked, none of the other options are correct, and interestingly, nobody marked the 'other' option that was actually correct, namely the requirement of two rods with three hooks each. Overall, it seems that the respondents have a high level of awareness of the regulatory requirement regarding the allowable angling equipment. This regulatory requirement also corresponds with Rule 5.1 of the SAFBAF Rules (2019) and therefore was probably an easy question for the participants.

Indigenous, alien, invasive and threatened or protected species

The terms alien, invasive and threatened or protected species are important for a freshwater recreational bank angler. All these definitions are applicable to the freshwater bank angling regulations and the angler should know what the requirements in terms of legislation are, and which are applicable to the fish caught or targeted. In addition, it is also important to know what 'indigenous species' means, as this relates to the other definitions. Anglers thus need to know the difference between and meaning thereof, as well as the species included under the various definitions.

All 100 participants responded to Question 12 (meaning of indigenous species), with 92% correctly indicating that it refers to a species that originated in South Africa. The respondents, therefore, demonstrated a high level of awareness on this topic.

An alien species can either be an indigenous species found outside its original distribution range, or a species imported into South Africa. Question 13 includes both these as options to the answer of what an alien species is (separately), as well as the option 'both', which was regarded as the appropriate response to the question. Only 21% of respondents indicated that alien species also refer to an indigenous fish species outside its distribution range, with the most common understanding of 65% of the respondents indicating that it refers to a fish imported from another country.

An invasive species is a species that is found outside its original distribution area, and which is threatening the ecosystem. The responses on the meaning of invasive species (Question 14), show that only 50% of the respondents had a correct understanding. Overall, it seems that the understanding of alien and invasive species is lacking amongst the angling community.

Threatened or protected species

When asked what actions are allowed if species are listed on the TOPS list (Question 15), 89% of anglers responded that the species may be caught, but then released. Only 9% understood that a TOPS-listed species may only be caught if in possession of a special permit. One of the species listed in the TOPS list, the largemouth yellowfish, is often caught by freshwater recreational bank anglers. To be allowed to catch it, the angler needs a special permit. The SAFBAF rules (2019) applicable to competitions, however, determine that an angler must release a largemouth yellowfish immediately once caught. Again, it seems that the respondents are guided by the SAFBAF rules rather than the actual regulations, and that in some instances the SAFBAF rules are not aligned with relevant legislative requirements.

The next question, Question 16, tested awareness of fish species listed in the TOPS regulations. The respondents were requested to select the correct category in which the species are listed, namely, 'invasive', 'alien' or 'TOPS'. Most of the respondents indicated that common carp and grass carp (*Ctenopharyngodon idella*) are alien species. However, in the promulgated list, those species are indicated as invasive species, as they are also threatening the ecosystem.

There seems to be a lack of awareness of the content of the TOPS regulations amongst recreational bank anglers. In terms of specific species, respondents were mainly aware of largemouth yellowfish as a TOPS species with 58% correct answers, with limited awareness of other TOPS-listed species.

As per the TOPS regulations, three actions are stipulated per species that is either allowed or not, namely: the transport of fish from one catchment to another (Action 1), catch and release in a national park or provincial reserve (Action 2), and catch and release in general (Action 3). Question 17 asked which of the three actions are applicable to grass carp, common carp, bass and kurper (Nile tilapia (*Oreochromis niloticus*)). The answer to Action 1 is that a person is not allowed to transport any fish from one catchment to another, irrespective of the species. Overall, the respondents are aware that fish may not be transferred. The percentage of anglers who responded correctly was as follows: grass carp: 78%; common carp: 51%; bass: 67% and kurper (Nile tilapia): 63%. Common carp is the species mostly commonly caught by freshwater bank anglers, yet it is in relation to this species that most respondents wrongly indicated that it may be transferred between catchments. The lack of awareness in relation to carp might be due to anglers considering carp so common and ubiquitous that the transfer thereof is assumed permissible.

In Question 17, it was asked whether catch and release of the same species may take place in a national park and/or provincial reserve. The correct answer to this question was 'yes', fish may be caught and released in a national park or a provincial reserve, except for common carp, which is not allowed to be released if it is caught in a national park or provincial reserve. Only 40% of the respondents were aware of the fact that one is not allowed to release a common carp in a national park or provincial reserve. However, a common practice during freshwater bank angling competitions in provincial nature reserves along dams (such as Bloemhof, Van der Kloof, Gariiep, etc.) is to release the fish post-competition, in what is most likely an unintentional contravention of regulatory requirements. The question (also Question 17) regarding the third action was if an angler may catch and release the specific species in general. In general, the respondents are aware that you can catch and release, as they responded as follows for different species: grass carp: 72%; common carp: 82%; bass: 76%; kurper (Nile tilapia): 82%. The last question regarding TOPS, Question 18, aimed to assess respondents' awareness of the requirement for a special permit to catch any species listed in TOPS. The results show that the respondents are not aware of the requirement for a special permit at all. A weakness of the TOPS regulations is that it provides no recourse if an angler catches a TOPS species unintentionally.

Finally, in Question 19, three photos were provided to the anglers for identification purposes. The three species in the photos were smallmouth yellowfish, largemouth yellowfish and grass carp. The reason for using these three species was because they are often misidentified. The following percentage of respondents identified the species correctly: smallmouth yellowfish: 82%; largemouth yellowfish: 85%; grass carp: 81%. It seems, therefore, that in this case the respondents had a high level of species identification awareness.

CONCLUSION AND RECOMMENDATIONS

The aim of this study was to determine the regulatory awareness of freshwater recreational bank anglers in South Africa by gauging their overall level of knowledge, which could influence regulatory compliance. The overall survey results suggest that regulatory awareness is low in certain key areas, such as bag and size limits for specific fish species, catch and release requirements, as well as legal definitions and requirements for alien, invasive and TOPS species listings. These relatively low levels of awareness may lead

to regulatory non-compliance. However, the lack of regulatory awareness does not seem to be due to intentional transgressions, but rather due to the complex and fragmented nature of the existing regulatory regime. This finding is supported by the high level of awareness of SAFBAF rules relative to awareness of prescribed regulatory requirements. In view of the latter, we make the following two main recommendations to improve regulatory awareness and thereby potentially increase regulatory compliance:

- **Consolidation and simplification of regulatory requirements:** Until such time as the national legislator introduces a more streamlined and consolidated regulatory system, freshwater recreational bank anglers may have difficulties navigating their way through the current fragmented and complex system. If there is only one set of regulations applicable to freshwater angling across South Africa, as with marine angling (Marine Living Resources Act, Act 18 of 1998 (South Africa, 1998)), it would be easier to enforce and easier for anglers to comply with. The fact that the anglers are aware of the SAFBAF rules and generally comply with these requirements, indicates their willingness to comply with rules and regulations applicable to freshwater recreational angling. It does, however, seem that the generally held view is that if anglers follow the SAFBAF rules, they would also be complying with legislation. Unfortunately, as indicated in the research results, this is not the case.
- **Alignment of organisational and competition rules with regulatory requirements:** It was found that in instances where the legislation applicable to freshwater bank angling is aligned with the rules of SAFBAF, the anglers had a higher level of awareness. However, where legislation differs from the SAFBAF rules, or is not specifically addressed therein, the awareness is lower. The results, therefore, indicate that anglers generally follow the SAFBAF rules. It is recommended that SAFBAF considers amending their rules to include and correlate with national and provincial legislation. This may result in the anglers being more aware of the freshwater angling regulations and could, ultimately, result in enhanced legal compliance.

Although this research was limited to SAFBAF members only, it is recommended that further research be conducted to include other angling disciplines, as well as non-affiliated anglers, to ascertain what the regulatory awareness is across the freshwater recreational fraternity. Ultimately, regulatory awareness and associated legal compliance by recreational anglers are basic requirements for effective environmental management and/or environmental protection.

AUTHOR CONTRIBUTIONS

A Joubert – main author, conceptualisation and methodology of the study, data collection, data analysis, interpretation of results and writing of the initial draft; FP Retief – assisted with conceptualisation, assisted with writing of the initial draft and review and editing; NJ Smit – assisted with conceptualisation, assisted with writing of the initial draft and review and editing; RC Alberts – review and editing; V Wepener – review and editing; C Roos – review and editing.

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APPENDIX

Table A1. Summary of South African Provincial legislation and South African Freshwater Bank Angling Federation rules applicable to freshwater angling: License requirements, angling equipment and closed seasons, as well as bag- and size limits, applicable to selected bank angling species

Legislation	License	Bag limit	Size limit	Angling equipment	Closed seasons
Limpopo					
Limpopo Environmental Management Act, Act 7 of 2003 (South Africa, 2003)	section 54(1)	–	–	section 54(1)(g)	section 54(1)(d) & section 56
Summary of requirements	No, unless with equipment other than rod and reel or in National Park	No	No	Yes, 2 lines and 2 single hooks per line	Yes, but not yet promulgated
Mpumalanga					
Mpumalanga Nature Conservation Act, Act 10 of 1998 (South Africa, 1998)	section 53(1)	–	–	section 54(1)(a)	section 52
Mpumalanga Nature Conservation Regulations, No 2 of 1999 (South Africa, 1999)	–	Schedule 3 of Regulation 23(1)	Schedule 3 of Regulation 23(1)	–	–
Summary of requirements	Yes, if older than 16 years	Yes Yellowfish (All species): 6 Kurper: 20	Yes Yellowfish (All species): 300 mm Kurper: 150 mm	Yes, 2 lines and 2 single hooks per line	Yes, but not yet promulgated
Gauteng					
Transvaal Nature Conservation Ordinance, No 12 of 1983 (South Africa, 1983a)	section 74(1)	–	–	section 72(1)(b)	section 68
Transvaal Nature Conservation Regulations, No 2030 of 1983 (South Africa, 1983b)	–	Schedule 10 of Regulation 38(1)	Schedule 10 of Regulation 38(1)	–	–
Summary of requirements	Yes, if older than 16 years	Yes Yellowfish (all species): 10 Kurper: 20 American bass: 6	Yes Yellowfish (All species): 300 mm Kurper: 150 mm American bass: 200 mm	Yes, 2 lines and 2 single hooks per line	Yes, but not yet promulgated
KwaZulu-Natal					
Nature Conservation Ordinance, No 15 of 1974 (Natal Ordinance) (South Africa, 1974)	section 145(1)	–	–	–	section 143
Transkei Decree, No 9 of 1992 (South Africa, 1992)	section 47(1)	–	–	–	–
Natal Freshwater Fish Regulations, No 141 of 1974 (South Africa, 1974)	–	Regulation 4(2)	Regulation 4(3)	Regulation 3(4) & 3(5)	–
Summary of requirements	Yes – no age restriction / limit	Yes Scalies: 10	Yes Scalies: no limit	Yes, 2 lines and 3 single hooks per line	Yes, but not yet promulgated
North West					
Nature and Environmental Conservation Ordinance, Ordinance 19 of 1974 (South Africa, 1974)	section 53	–	–	section 56 (e)	section 52
Transvaal Nature Conservation Ordinance, No 12 of 1983 (Transvaal Ordinance) (South Africa, 1983)	section 74(1)	–	–	section 72(1)(b)	section 68
Bophuthatswana Nature Conservation Act, Act 3 of 1973 (South Africa, 1973)	section 11(a)(i)	–	–	section 11(c)	–
Nature Conservation Regulations, No 6619 of 2009 (South Africa, 2009)	–	section 6	section 6	–	–
Summary of requirements	Yes – no age restriction/limit	Yes Largemouth yellowfish: Only catch and release Smallmouth yellowfish: 2 Largescale yellowfish: 4 Smallscale yellowfish: 2 Mozambique tilapia: 20	Yes Largemouth yellowfish: not applicable Smallmouth yellowfish: 300 mm Largescale yellowfish: 300 mm Smallscale yellowfish: 300 mm Mozambique tilapia: 150 mm	Yes, 2 lines and 2 single hooks per line	Yes, but not yet promulgated
Northern Cape					
Nature and Environmental Conservation Ordinance, No 19 of 1974 (Cape Ordinance) (South Africa, 1974)	section 53	–	–	section 56(e)	Section 52
Nature and Environmental Conservation Regulations, No 955 of 1975 (South Africa, 1975)	–	Regulation 44(5)	Regulation 44(2)	–	–
Summary of requirements	Yes – no age restriction / limit	Yes Largemouth yellowfish: No limit Yellowfish (<i>Labeobarbus capensis</i>): No limit Black bass: 10	Yes Largemouth yellowfish: 300 mm Yellowfish (<i>Labeobarbus capensis</i>): 400 mm Black bass: 250 mm	Yes, 2 lines and 2 single hooks per line	Yes, but not yet promulgated

Table A1 continued. Summary of South African Provincial legislation and South African Freshwater Bank Angling Federation rules applicable to freshwater angling: License requirements, angling equipment and closed seasons, as well as bag- and size limits, applicable to selected bank angling species

Legislation	License	Bag limit	Size limit	Angling equipment	Closed seasons
Eastern Cape					
Nature and Environmental Conservation Ordinance, No 19 of 1974 (Cape Ordinance) (South Africa, 1974)	section 53	–	–	section 56(e)	section 52
Transkei Decree, No 9 of 1992 (South Africa, 1992)	section 47(1)	–	–	–	–
Nature Conservation Act, 1987 of Republic of Ciskei (South Africa, 1987)	section 56(1)	Schedule 10 and 11	Schedule 10 and 11	section 56(1)	section 54(2)
Nature and Environmental Conservation Regulations, No 955 of 1975 (South Africa, 1975)	–	Regulation 44(5)	Regulation 44(2)	–	–
Summary of requirements	Yes – no age restriction/limit	Yes Yellowfish (All species): 10 <i>(as per Old Ciskei)</i> Largemouth yellowfish: No limit Yellowfish (<i>Labeobarbus capensis</i>): No limit Black Bass: 10	Yes Yellowfish (all species): 300 mm <i>(as per Old Ciskei)</i> Largemouth yellowfish: 300 mm Yellowfish (<i>Labeobarbus capensis</i>): 400 mm Black bass: 250 mm	Yes, 2 lines and 2 single hooks per line	Yes, but not yet promulgated
Western Cape					
Nature and Environmental Conservation Ordinance, No 19 of 1974 (Cape Ordinance) (South Africa, 1974)	section 53	–	–	section 56(e)	section 52
Nature and Environmental Conservation Regulations, No 955 of 1975 (South Africa, 1975)	–	Regulation 44(5)	Regulation 44(2)	–	–
Summary of requirements	Yes – no age restriction/limit	Yes Largemouth yellowfish: No limit Yellowfish (<i>Labeobarbus capensis</i>): No limit Black Bass: 10	Yes Largemouth yellowfish: 300 mm Yellowfish (<i>Labeobarbus capensis</i>): 400 mm Black bass: 250 mm	Yes, 2 lines and 2 single hooks per line	Yes, but not yet promulgated
Free State					
Nature Conservation Ordinance, No 8 of 1969 (Free State Ordinance) (South Africa, 1969)	section 23(1)	–	–	section 26(2)	section 25
Nature Conservation Regulations, No. 184 of 1983 (Free State Regulations) (South Africa, 1983)	–	Part 3 of Regulations 11	Part 3 of Regulations 11	–	–
Summary of requirements	Yes – no age restriction/limit	Yes Largemouth yellowfish: 10 Smallmouth yellowfish: 10	Yes Largemouth yellowfish: 450 mm Smallmouth yellowfish: 450 mm	Yes, 2 lines and 2 single hooks per line	Yes, but not yet promulgated
SAFBAF competition rules					
SAFBAF rules (2019a) <i>Ad hoc</i> SAFBAF rules (2019b)	Rule 12.6 –	Rule 8.4 Ad Hoc Rule 1	Rule 8.4 Ad Hoc Rule 3	Rule 5.1	–
Summary of requirements	Ruling ordinance / regulations of local government applicable	Largemouth yellowfish: not allowed to catch Smallmouth yellowfish: 10	Largemouth yellowfish: not allowed to catch Smallmouth yellowfish: 300 mm	Yes, 2 lines and 2 single hooks per line	–

Table A2. Online questionnaire

QUESTIONNAIRE

Please note that this questionnaire is to be answered anonymously. All questions are related to general freshwater bank angling, and not only competition freshwater bank angling.

1. What age are you? (Mark with an X)

18 – 20	21 - 30	31 – 40	41 - 50	51 - 60	61 - 70	70 +
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2. In which province do you stay? (Mark with an X)

Limpopo	Mpumalanga	Gauteng	KwaZulu-Natal	North West
Northern Cape	Eastern Cape	Free State	Western Cape	

3. In which province / provinces do you angle? (Mark ALL with an X)

Limpopo	Mpumalanga	Gauteng	KwaZulu-Natal	North West
Northern Cape	Eastern Cape	Free State	Western Cape	

4. Is an angling licence a requirement for freshwater recreational angling? (*Limpopo* : Section 54(1) of *Limpopo Environmental Management Act, Act 7 of 2003*; *Mpumalanga* : Section 53(1)(a) of *Mpumalanga Nature Conservation Act, Act 10 of 1998*; *Gauteng* : Section 74(1) of *Transvaal Nature Conservation Ordinance, Ordinance 12 of 1983*; *KwaZulu-Natal* : Section 145 of *Nature Conservation Ordinance, Ordinance 15 of 1974*; Section 47(1) of *Transkei Decree, Government Notice 78 of 1992*; *North West* : Section 53 of *Nature and Environmental Conservation Ordinance, Ordinance 19 of 1974*; Section 74(1) of *Transvaal Nature Conservation Ordinance, Ordinance 12 of 1983*; Section 11(a) of *Bophuthatswana Nature Conservation Act, Act 3 of 1973*; *Northern Cape* : Section 53 of *Nature and Environmental Conservation Ordinance, Ordinance 19 of 1974*; *Eastern Cape* : Section 53 of *Nature and Environmental Conservation Ordinance, Ordinance 19 of 1974*; Section 56 (1)(a) of *Nature Conservation Act, 1987*; Section 47(1) of *Transkei Decree, Government Notice 78 of 1992*; *Free State* : Section 23(1) of *Nature Conservation Ordinance, Ordinance 8 of 1969*; *Western Cape* : Section 53 of *Nature and Environmental Conservation Ordinance, Ordinance 19 of 1974*)

YES	NO
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5. When you angle at a dam that falls within different provinces / boundaries, for example the Vaal Dam that stretches over three provinces, which province legislation is applicable? (Mark with an X)

None, for a dam you follow national legislation	All the provinces that the dam falls into	Only the province from where you cast your line	National legislation and the legislation of the province from where you cast your line
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6. What is the meaning of “bag limit”? (Mark the applicable answer with an X)

The minimum number of fish I can catch per day	The minimum number of fish I can catch and take home per day
The maximum number of fish I can catch per day	The maximum number of fish I can catch and take home per day

7. What is the bag limit of the following fish in the province indicated? (Tick the applicable box):

GAUTENG (Schedule 10 of Regulation 38(1) of the Nature Conservation Regulations, No 2030 of 1983)						
Species	No limit	2	4	6	10	20
Yellowfish						
Black Bass (American)						
Kurper						
MPUMALANGA (Schedule 3 of Regulation 23(1) of Mpumalanga Nature Conservation Regulations, No 2 of 1999)						
Species	No limit	2	4	6	10	20
Kurper						
Yellowfish						
FREE STATE (Part 3 of Regulations 10 – 14 of Nature Conservation Regulations, No 184 of 1983)						
Species	No limit	2	4	6	10	20
Yellowfish						
LIMPOPO						
Species	No limit	2	4	6	10	20
Yellowfish						

NORTHERN CAPE (Regulation 44(2) of Nature and Environmental Conservation Regulations, No 955 of 1975)						
Species	No limit	2	4	6	10	20
Clanwilliam yellowfish						
Largemouth yellowfish						
Black Bass						
WESTERN CAPE (Regulation 44(2) of Nature and Environmental Conservation Regulations, No 955 of 1975)						
Species	No limit	2	4	6	10	20
Clanwilliam yellowfish						
Largemouth yellowfish						
Black Bass						
EASTERN CAPE (Regulation 44(2) of Nature and Environmental Conservation Regulations, No 955 of 1975; Schedule 10 & 11 to Nature Conservation Act, 1987)						
Species	No limit	2	4	6	10	20
Clanwilliam yellowfish						
Largemouth yellowfish						
Black Bass						
NORTH WEST (Section 6 of Nature Conservation Regulations, No 6619 of 2009)						
Species	None	2	4	6	10	20
Largemouth yellowfish						
Smallmouth yellowfish						
Large Scale yellowfish						
Small Scale yellowfish						
Mozambique Tilapia / Kurper						
KWAZULU-NATAL (Regulation 4 of the Natal Freshwater Fish Regulations, No 141 of 1974)						
Species	No limit	2	4	6	10	20
Scalie (Yellowfish)						

8. What is the meaning of “size limit”? (Mark the applicable answer with an X)

The minimum size a fish must be to take home	The maximum size a fish must be to take home
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9. What is the size limit (in mm) of the following fish in the province indicated? (Please tick the applicable box):

GAUTENG (Schedule 10 of Regulation 38(1) of the Nature Conservation Regulations, No 2030 of 1983)							
Species	No limit	150	200	250	300	400	450
Yellowfish							
Black Bass (American)							
Kurper							
MPUMALANGA (Schedule 3 of Regulation 23(1) of Mpumalanga Nature Conservation Regulations, No 2 of 1999)							
Species	No limit	150	200	250	300	400	450
Kurper							
Yellowfish							
FREE STATE (Part 3 of Regulations 10 – 14 of Nature Conservation Regulations, No 184 of 1983)							
Species	No limit	150	200	250	300	400	450
Yellowfish							
LIMPOPO							
Species	No limit	150	200	250	300	400	450
Yellowfish							
NORTHERN CAPE (Regulation 44(2) of Nature and Environmental Conservation Regulations, No 955 of 1975)							
Species	No limit	150	200	250	300	400	450
Clanwilliam yellowfish							
Largemouth yellowfish							
Black Bass							

WESTERN CAPE (Regulation 44(2) of Nature and Environmental Conservation Regulations, No 955 of 1975)							
Species	No limit	150	200	250	300	400	450
Clanwilliam yellowfish							
Largemouth yellowfish							
Black Bass							
EASTERN CAPE (Regulation 44(2) of Nature and Environmental Conservation Regulations, No 955 of 1975; Schedule 10 & 11 to Nature Conservation Act, 1987)							
Species	No limit	150	200	250	300	400	450
Clanwilliam yellowfish							
Largemouth yellowfish							
Black Bass							
NORTH WEST (Section 6 of Nature Conservation Regulations, No 6619 of 2009)							
Species	0	150	200	250	300	400	450
Largemouth yellowfish							
Smallmouth yellowfish							
Large Scale yellowfish							
Small Scale yellowfish							
Mozambique Tilapia / Kurper							
KWAZULU-NATAL (Regulation 4 of the Natal Freshwater Fish Regulations, No 141 of 1974)							
Species	No limit	150	200	250	300	400	450
Scalie (Yellowfish)							

10. In terms of legislation, kindly indicate how fish is measured to determine the size limit? (Section 23(2)(b) of Mpumalanga Nature Conservation Regulations, No 2 of 1999; Section 38(3)(b) of the Nature Conservation Regulations, No 2030 of 1983; Section 44(3) (a) of Nature and Environmental Conservation Regulations, No 955 of 1975)

Method of measurement	Tick applicable method
From nose until end of tailfin	
From nose until fork of tailfin	
Both	

11. When you angle, how many rods with how many single hooks, are you allowed to have in the water at the same time? (Section 54(g) of Limpopo Environmental Management Act, No 7 of 2003; Section 54(1)(a) of Mpumalanga Nature Conservation Act, No 10 of 1998; Section 72(1)(b) of Transvaal Nature Conservation Ordinance, No 12 of 1983; Regulation 3(4 & 5) of the Natal Freshwater Regulations, No 141 of 1974; Section 56 (e) of Nature and Environmental Conservation Ordinance, No 19 of 1974; Section 56(1) of Republic of Ciskei Nature Conservation Act, 1987; Section 11(1) of Bophuthatswana Nature Conservation Act, No 3 of 1973; Section 26 of Nature Conservation Ordinance, No 8 of 1969) Tick the applicable answer.

2 rods with 1 hook each		1 rod with 1 hook		3 rods with 1 hook each	
2 rods with 2 hooks each		1 rod with 2 hooks		3 rods with 2 hooks each	
3 rods with 3 hooks each		1 rod with 3 hooks		2 rods with 3 hooks each	
Unlimited number of rods		Limited number rods, but unlimited hooks			

12. What does “indigenous species” to South Africa means?

Species that originated in South Africa	Species imported into South Africa
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13. “Alien species” means “A species that is not an indigenous species” – Section 1 of National Environmental Management: Biodiversity Act, Act 10 of 2004: (Tick the applicable box)?

A fish species indigenous to South Africa, but found outside its natural distribution range	A fish species that is imported from another country to South Africa	Both
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14. “Invasive species” means “A species whose establishment and spread is outside its natural distribution range and is threatening or potential to threatening the ecosystems / habitats / other species” – Section 1 of National Environmental Management: Biodiversity Act, Act 10 of 2004: (Tick the applicable box)?

A fish species that is imported from another country to South Africa	A fish species in a different catchment area than it originally occurred, threatening the ecosystem	Both
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15. If a species is on South Africa's Threatened or Protected Species (TOPS) list, can you: (Tick the applicable box)?

Catch it and take it home	Catch it, but have to release it
Catch it with a special permit only	

16. In terms of the Alien, Invasive and Tops species list (legislation), please indicate if any of the following popular recreational angling fishes can be categorised in "alien", "invasive" or "TOPS"? (Notice 3 and Notice 4 of National Environmental Management: Biodiversity Act, Act 10 of 2004 - Alien and Invasive Species List, No. 864 of 2016; Critically Endangered, Endangered, Vulnerable and Protected Species List, No. 151 of 2007)

Name of Fish	Invasive Species	Alien Species	TOP Species
Grass Carp			
Clanwilliam Sandfish			
Common carp			
Small-mouth bass			
Whitefish			
Large-mouth bass			
Clanwilliam yellowfish			
Nile Tilapia			
Largemouth yellowfish			

17. Which actions are allowed in terms of the following fish (Answer YES or NO)? (National Environmental Management: Biodiversity Act, Act 10 of 2004 - Alien and Invasive Species List, No.864 of 2016):


Fish Species	Action 1 : Transport from 1 catchment to another		Action 2 : Catch & Release in National Park / Provincial Reserve		Action 3 : Catch & Release in general	
	Yes	No	Yes	No	Yes	No
Grass carp	Yes	No	Yes	No	Yes	No
Common carp	Yes	No	Yes	No	Yes	No
Bass	Yes	No	Yes	No	Yes	No
Nile Tilapia (Kurper)	Yes	No	Yes	No	Yes	No

18. Do you need a special permit (not license) to catch any of the following fish (Mark x at YES or NO)? (Section 57(1) of National Environmental Management: Biodiversity Act, Act 10 of 2004):

Fish Species	Yes	No
Grass carp		
Clanwilliam Sandfish		
Common carp		
Small-mouth bass		
Whitefish		
Large-mouth bass		
Clanwilliam yellowfish		
Nile Tilapia		
Largemouth yellowfish		

19. Kindly identify the following fish:

	Smallmouth yellowfish
	Largemouth yellowfish
	Grass carp
	Common carp

	Smallmouth yellowfish
	Largemouth yellowfish
	Grass carp
	Common carp
	Smallmouth yellowfish
	Largemouth yellowfish
	Grass carp
	Common carp

Thank you for your time.