

UNIVERSITY OF KWAZULU—NATAL
SCHOOL OF LAW, HOWARD COLLEGE

**TO LIST OR NOT TO LIST?
THE LEGAL DEBATE AROUND THE LISTING OF TROUT
AS AN INVASIVE ALIEN SPECIES.**

Sharlene Baijnath

991239137

This mini—dissertation is submitted in partial fulfilment of the requirements for the degree of Master of Laws in Environmental Law

Supervisor: Professor Michael Kidd

2019

DECLARATION REGARDING ORIGINALITY

I, Sharlene Baijnath, declare that:

- A. The research reported in this dissertation, except where otherwise indicated, is my original research.
- B. This dissertation has not been submitted for any degree or examination at any other university.
- C. This dissertation does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.
- D. This dissertation does not contain other persons' writing, unless specifically acknowledged as being sourced from other researchers. Where other written sources have been quoted, then:
 - E. their words have been re-written, but the general information attributed to them has been referenced;
 - F. where their exact words have been used, their writing has been placed inside quotation marks, and referenced.
- G. Where I have reproduced a publication of which I am an author, co-author or editor, I have indicated in detail which part of the publication was written by myself alone and have fully referenced such publications.
- H. This dissertation does not contain text, graphics or tables copied and pasted from the Internet, unless specifically acknowledged, and the sources being detailed in the dissertation/thesis and in the References sections.

Signed:



Date:

15 November 2019

ABSTRACT

The South African government has made numerous attempts to curtail the spread of Invasive Alien Species, such as rainbow and brown trout, through legislation such as the listing of Invasive Alien Species under National Environmental Management: Biodiversity Act (Act 10 of 2004). In the case of trout species, such attempts have been consistently resisted by stakeholders and this ongoing controversy around regulation of trout prompted the need for this dissertation. This dissertation aims to understand existing South African legislative framework surrounding invasive trout and to determine whether stakeholder's resistance to the proposed regulation of trout is justified or not.

Although extensive, South African legislation surrounding Invasive Alien Species has been criticised for its fragmented nature. It is evident, despite compelling reasons for trout stakeholders' resistance to regulation of trout, that proposed regulation of invasive trout is necessary when potential threats, posed to biodiversity—rich South Africa, are considered. A key reason for stakeholders' resistance to proposed regulation of trout was an ineffective Public Participation Process employed by authorities. South Africa could benefit, in future, by ensuring a transparent Public Participation Process is diligently followed.

ACKNOWLEDGEMENTS

This dissertation is the product of sleepless nights, long days and sacrifices and through God's grace, my journey with trout is complete. Throughout the journey, I was fortunate to receive encouragement and support.

Professor Michael Kidd, I thank you for the advice and comments that steered me through murky trout waters. Thank you for supporting my interest in this topic.

My family has been a blessing during this period: Mum for believing in my ability to see this daunting task to fruition and Dad for your advice and proofing my drafts. To Tee, your quiet reassurance and taking the stress off by 'holding down the fort' has been invaluable. Thank you Prinita and Shiven for the constant encouragement along the way. To my youngest cheerleaders: Shai and Saj, the countdown is over and my 'fish project' is finally complete. My weekends are open for sleepovers with both of you and Pan—Man. Jeanie, my fur friend, for your reassuring companionship during our hours together and my friends who patiently listened to my trout—related chatter while offering me encouragement.

This dissertation is yours as much as it is mine. I am indebted to you all.

LIST OF ABBREVIATIONS

ADB	Aquaculture Development Bill
CAB	Conservation Amendment Bill
CBD	Convention on Biological Diversity
CIIP	Consortium of Interested and Affected Parties
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DOC	Department of Conservation
FGC	Fish and Game Council
FOSAF	Federation of Flyfishers of Southern Africa
IAS	Invasive Alien Species
ISSA	Invasive Species South Africa
IUCN	International Union for the Conservation of Nature
NEMA	National Environmental Management Act
NEM:BA	National Environmental Management: Biodiversity Act
NZ	New Zealand
OP	Operation Phakisa
PPP	Public Participation Process
RA	Risk Assessment
SA	South Africa
SANBI	South African National Biodiversity Act
SD	Sustainable Development
SEIA	Socio—Economic Impact Assessment
USA	United States of America

LIST OF TABLES

Table 1: Summary of key dates and information around the listing of trout as an IAS

CONTENTS

DECLARATION REGARDING ORIGINALITY.....	i
ABSTRACT.....	ii
ACKNOWLEDGEMENTS.....	iii
LIST OF ABBREVIATIONS.....	iv
LIST OF TABLES.....	iv
CHAPTER ONE: INTRODUCTION AND BACKGROUND.....	1
1.1 Introduction.....	1
1.2 Research Methodology.....	3
1.3 Outline of Research Questions.....	3
1.4 Structure of the Dissertation.....	3
1.5 Trout as an Invasive Alien Species.....	4
1.5.1 <i>New Zealand</i>	6
1.5.2 <i>New Zealand's Trout Industry</i>	6
1.5.3 <i>South Africa</i>	7
1.5.4 <i>South Africa's Trout Industry</i>	9
1.6 Conclusion.....	10
CHAPTER TWO: LEGAL RESPONSES TO INVASIVE TROUT.....	11
2.1 Introduction.....	11
2.2 General Comparative Responses.....	11
2.3 New Zealand.....	12
2.4 South Africa.....	18
2.4.1 <i>Historical Legislation</i>	18
2.4.2 <i>Current Legislation</i>	19
2.4.3 <i>The Invasive Alien Species Listing Timeline</i>	24
2.5 Conclusion.....	40
CHAPTER THREE: ANALYSIS AND DISCUSSION.....	41
3.1 Introduction.....	41
3.2 South Africa's Legal Response to Invasive Trout.....	41
3.3 Validity of South African Stakeholder Concerns.....	43
3.4 The Sustainable Development Concept.....	45
3.5 Conclusion.....	46

CHAPTER FOUR:RECOMMENDATIONS AND CONCLUDING REMARKS	47
4.1 Introduction.....	47
4.2 Recommendations	47
4.2.1 <i>The Public Participation Process</i>	47
4.2.2 <i>Consideration of SANBI Report</i>	49
4.2.3 <i>Incorporation of Social and Economic Impacts into Risk Assessments</i>	49
4.3 Concluding Remarks.....	50
BIBLIOGRAPHY	51

CHAPTER ONE:

INTRODUCTION AND BACKGROUND

‘These species are not inherently bad. They’re just in the wrong place.’¹

1.1 INTRODUCTION

In 1968, wildlife conservationist: Raymond Dasmann coined the term ‘biological diversity’ with the contracted form ‘biodiversity’ first appearing in a publication by renowned biologist Edward Wilson in 1988.² Biodiversity is defined as the ‘variability among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part and also includes diversity within species, between species, and of ecosystems’.³

Globally, South Africa (SA) ranks third highest in terms of biodiversity on account of its more than 95000 known species, diverse ecosystems and habitats.⁴ The country houses three internationally—recognised biodiversity hotspots in addition to the world’s most threatened floral kingdom: the Cape Floral Kingdom.⁵ Biodiversity provides a range of direct and indirect social, economic, spiritual and ecological benefits and as such, there exists the need for conservation thereof.⁶ In SA, biodiversity supports the livelihoods of millions through agriculture, fishing, tourism and horticulture industries.⁷ A 2008 study estimated the overall value of ecosystem services at R73 billion with the tourism industry contributing the highest

¹ D Lodge ‘Aquarium Opens Invasive Species Exhibit’ (6 January 2006) *The Orange County Register* <https://bit.ly/2KEwZZ8> (Accessed 11 August 2019).

² J de Andrade Franco ‘The Concept of Biodiversity and the History of Conservation Biology: From Wilderness Preservation to Biodiversity Conservation’ (2013) 32(2) *História* 23.

³ National Environmental Management: Biodiversity Act 10 of 2004.

⁴ K Maze et al. ‘Making the Case for Biodiversity in South Africa: Re—Framing Biodiversity Communications’ (2016) 46(1) *Bothalia* <https://bit.ly/2GmdYZn> (Accessed 12 April 2019), AR Paterson ‘Clearing a Path towards Effective Alien Invasive Control: The Legal Conundrum’ (2006) 9(1) *Potchefstroom Electronic Law Journal* <https://www.ajol.info/index.php/pelj/article/view/43454> (Accessed 2 November 2019).

⁵ Department of Environmental Affairs (DEA) ‘SA’s Fifth National Report to the Convention on Biological Diversity’ (2014) <https://bit.ly/2DHNqmj> (Accessed 6 August 2019).

⁶ R Alberts and J Moolman ‘Protecting Ecosystems by way of Biological Control: Cursory Reflections on the Main Regulatory Instruments for Biological Control Agents, Present and Future’ (2013) 16(2) *Potchefstroom Electronic Law Journal* 186.

⁷ E Algotsson ‘Biological Diversity’ in HA Strydom and ND King (eds) *Environmental Management in South Africa* (2009) Juta Law 2 ed 97 at 97.

portion.⁸ Habitat destruction, overharvesting, pollution, climate change and the presence of invasive alien species (IAS)⁹ pose threats to South African biodiversity and ecosystems. On a global scale, IAS pose the second greatest threat to biodiversity¹⁰ with potential impacts within SA including indigenous species extinction, reductions in crop yields, land value, water resources and ecosystem stability.¹¹

The International Union for the Conservation of Nature (IUCN) lists two members of the family *Salmonidae*: rainbow trout (*Oncorhynchus mykiss*) and brown trout (*Salmo trutta*) amongst the world's 100 'worst' IAS on account of their widespread and severe impacts on biodiversity.¹² Rainbow and brown trout were introduced into SA, for angling purposes, in 1897¹³ and 1892¹⁴ respectively. Since the introduction thereof, trout farming and its associated sectors have become a burgeoning and profitable industry. The presence of these species has however, been linked to negative ecological impacts.¹⁵ For these reasons, IAS trout species are often described as conflict—generating species as they offer both positive and negative impacts.¹⁶

Considering the negative ecological threats associated with invasive trout,¹⁷ coupled with SA's rich biodiversity, it would seem prudent to implement measures to protect the country's biological assets. In 2018, the late Minister of Environmental Affairs: Edna Molewa, gazetted draft National Environmental Management: Biodiversity Act (NEM:BA) IAS Regulations¹⁸ and draft Amendments to the IAS Lists¹⁹ for comment. For the first time, trout was legally

⁸ DEA 'State of Play: Baseline Valuation Report on Biodiversity and Ecosystem Services' (2012) <https://bit.ly/2ZaYAta> (Accessed 9 August 2019).

⁹ Section 1 of NEM:BA defines 'alien species' as non—indigenous species or indigenous species that translocate outside their natural distribution range. Indigenous species extending their distribution range by migration or dispersal without human intervention are excluded. 'Invasive species' are defined as species whose establishment and spread outside their natural distribution range threatens ecosystems, habitats or other species; have demonstrated potential to threaten ecosystems, habitats or other species and may result in economic or environmental harm or harm to human health.

¹⁰ DM Richardson and BW Van Wilgen, 'Invasive Alien Plants in South Africa: How Well Do We Understand the Ecological Impacts?' (2004) 100(1) *South African Journal of Science* 45.

¹¹ T Zengeya et al. 'Managing Conflict—Generating Invasive Species in South Africa: Challenges and Trade—Offs' (2017) 47(2) *Bothalia* 1—2, Paterson op cit n4.

¹² Global Invasive Species Database '100 of the World's Worst Invasive Alien Species' <https://bit.ly/1S5FSDN> (Accessed 13 April 2019).

¹³ JM Shelton, MJ Samways and JA Day 'Predatory Impact of Non—Native Rainbow Trout on Endemic Fish Populations in Headwater Streams in the Cape Floristic Region of South Africa' (2014) 16(7) *Biological Invasions* <https://bit.ly/2P05NUD> (Accessed 8 April 2019).

¹⁴ SM Marr et al. 'Evaluating Invasion Risk for Freshwater Fishes in South Africa' (2017) 47(2) *Bothalia* <https://doi.org/10.4102/abc.v47i2.2177> (Accessed 2 April 2019).

¹⁵ Shelton et al op cit n13.

¹⁶ Zengeya et al op cit n11.

¹⁷ Collective name for rainbow and brown trout.

¹⁸ GN R112 in GG 41445 of 16 February 2018.

¹⁹ GN R115 in GG 41445 of 16 February 2018.

listed as an IAS within the country. Given the lucrative trout value chain, it was hardly surprising that the proposed IAS trout listing was met by anger and concern by various stakeholders. Trout farmers, academics, environmental lawyers, fly—fishing associations, public members, tourism companies as well as tackle and fishing equipment industries believed the listing would negatively impact the trout industry.²⁰ The economic benefits, derived from SA's trout industry, were sufficient to warrant concern that the trout listing could negatively impact business and therein lay the controversy.

1.2 RESEARCH METHODOLOGY

The research will place particular focus on trout experiences in New Zealand (NZ) as both countries share similar legal experiences with regards to trout as an IAS, as will be discussed in Chapter Two. This desk—top research is largely doctrinal in nature. This method of research is also referred to as black letter research involving the analysis of publicly available data sources including but not limited to: journals, textbooks, press releases, statutes, judgements, regulations, international and local policy papers.

1.3 OUTLINE OF RESEARCH QUESTIONS

This study aims to critically examine the controversial proposed listing of trout as an IAS, within the South African legislative framework. Specifically, the dissertation aims to address:

- What is the South African legislative framework governing invasive trout?
- Are stakeholders' concerns surrounding the proposed IAS listing of trout warranted?
- How does SA's legal response to invasive trout compare to global responses, NZ in particular?
- Does the proposed IAS trout listing support the concept of Sustainable Development (SD) in SA?

1.4 STRUCTURE OF THE DISSERTATION

This dissertation is structured into Chapters. Chapter One introduced the research topic, provided a background to the project and identified research questions. The evidence against trout as a global IAS is discussed, with particular focus on SA and NZ. The presence of trout as a South African IAS is highlighted and the rationale for the project is noted. Chapter Two

²⁰ J Yeld 'A Rising Controversy' (13 April 2018) <https://bit.ly/2y1i8R1> (Accessed 5 April 2019).

highlights comparative legal experiences of invasive trout management and associated challenges, with particular emphasis on trout legislation in NZ. The background and history of South African legislation pertinent to invasive trout including key issues and controversies will be discussed. Chapter Three details the main discussion where the research question/s will be answered. The final chapter will summarise key project findings and include recommendations.

1.5 TROUT AS AN INVASIVE ALIEN SPECIES

Rainbow trout is indigenous to North America²¹ and brown trout to Europe and Western Asia.²² Both species have since been introduced worldwide as popular angling and aquaculture fish. Rainbow trout, in particular, is regarded as the most widely distributed freshwater fish species and has been introduced into almost 100 countries on every continent, except Antarctica.²³ The naturalisation²⁴ of this species has occurred in many of these countries.²⁵ Razanajatovo et al. state that naturalisation of a species is a key aspect of the biological invasion process as species overcome the barriers in order to establish populations in the wild.²⁶

Both trout species are freshwater opportunistic predators feeding on invertebrates (aquatic and terrestrial) and other fish.²⁷ The biological traits of both species differ with larger brown trout taking longer to reach sexual maturity and laying fewer eggs per kilogram body weight than the smaller rainbow trout counterpart.²⁸ In terms of environmental tolerances, rainbow trout can tolerate water temperatures of between 0 — 26°C with survival, under controlled conditions, being recorded up to 30°C.²⁹ Brown trout, by comparison, require cooler water temperatures of less than 21°C.³⁰

²¹ Anchor Environmental ‘*Brown Trout*’ (2017) <https://bit.ly/2KI445i> (Accessed 8 August 2019).

²² Anchor Environmental ‘*Rainbow Trout*’ (2017) <https://bit.ly/2TmzV3> (Accessed 8 August 2019).

²³ D Stanković, AJ Crivelli and A Snoj ‘Rainbow Trout in Europe: Introduction, Naturalization, and Impacts’ (2015) 23(1) *Reviews in Fisheries Science and Aquaculture* <https://bit.ly/307UyQ7> (Accessed 11 April 2019).

²⁴ Defined as ‘species that, once introduced outside its native distributional range, establishes self-sustaining populations’ by Intergovernmental Science—Policy Platform on Biodiversity and Ecosystem Services <https://www.ipbes.net/glossary/naturalized—species> (Accessed 12 August 2019).

²⁵ Stanković et al op cit n23.

²⁶ M Razanajatovo et al ‘Plants Capable of Selfing Are More Likely to Become Naturalized’ (2016) 7(13313) *Nature Communications* <https://go.nature.com/2NdFXOT> (Accessed 15 August 2019).

²⁷ Anchor Environmental ‘*BRBAs for Important Aquaculture Alien Species*’ <https://bit.ly/2KrCKJA> (Accessed 8 August 2019).

²⁸ Anchor Environmental ‘*Brown Trout*’ op cit n21.

²⁹ Anchor Environmental ‘*Rainbow Trout*’ op cit n22.

³⁰ Anchor Environmental ‘*Brown Trout*’ op cit n21.

Both species require gravel beds on which to spawn,³¹ however rainbow trout outcompetes brown trout for such breeding grounds.³² With these biological traits in mind, rainbow trout is potentially more successful, as an IAS, than brown trout. The ecological impacts alien³³ trout pose on indigenous fish species include competition (for space, breeding ground and food), predation, hybridisation³⁴ and the transmission of diseases.³⁵ Hybridization is responsible for the loss of genetic diversity resulting in a decrease in biodiversity and potential extinction of local species.³⁶ The negative impacts of rainbow trout hybridisation on local species have been recorded in Columbia and New Mexico.³⁷

On account of their global distribution, the ecological impacts of brown and rainbow trout have been widely reported. Yellowstone National Park, a World Heritage site located in the United State of America (USA), houses a variety of fish species including brown, rainbow trout and an indigenous Yellowstone trout species. The alien trout species are threatening the existence of the indigenous species to the point of extinction.³⁸ In Japan, rainbow and brown trout were introduced into the country in the 1800's and pose significant impacts on indigenous freshwater fish species.³⁹ The indigenous white—spotted charr is one of Japan's species of concern as rainbow trout outcompete charr for habitat.⁴⁰ Introduced strains of rainbow trout have been linked to the extinction of local and, in some cases, endemic⁴¹ fish and amphibian species in North America, Dominican Republic, Sri Lanka, Croatia, Slovenia and Bosnia.⁴² Negative ecological impacts of alien rainbow trout on indigenous species have been recorded in Japan, France, Zimbabwe, Chile and Patagonia.⁴³

³¹ Defined as 'producing or depositing a large number of eggs' in Merriam—Webster Dictionary <https://bit.ly/2kyGKhv> (Accessed 12 September 2019).

³² Stanković et al op cit n23.

³³ Defined as 'a species introduced outside its natural distribution' by IUCN <https://bit.ly/2mmVsbN> (Accessed 7 August 2019).

³⁴ Defined as 'breeding of a plant or animal with an individual of another species or variety' in Lexico Dictionary <https://bit.ly/2ktIqbY> (Accessed 9 August 2019).

³⁵ Stanković et al op cit n23.

³⁶ Federal Office for the Environment 'Invasive Alien Species in Switzerland' (2006) <https://bit.ly/2Tu6wAA> (Accessed 12 April 2019).

³⁷ Stanković et al op cit n23.

³⁸ L Abrams 'An Invasive Species Is Threatening Montana's Native Trout and Climate Change Is Making It Possible' (28 May 2014) *Salon* <https://bit.ly/2VKIToK> (Accessed 12 April 2019).

³⁹ S Kitano 'Ecological Impacts of Rainbow, Brown and Brook Trout in Japanese Inland Waters' (2004) 8(1) *Global Environmental Research* 41 at 45.

⁴⁰ K Morita, J Tsuboi and H Matsuda 'The Impact of Exotic Trout on Native Charr in a Japanese Stream' (2004) 41 *Journal of Applied Ecology* 962 at 968.

⁴¹ Defined as 'native and restricted to a certain geographical location' in Lexico Dictionary <https://bit.ly/2kYO8CO> (Accessed 2 August 2019).

⁴² Stanković et al op cit n23.

⁴³ *Ibid.*

1.5.1 New Zealand

Amongst the most studied IAS trout interactions are those from Australasian⁴⁴ countries. Naturalised trout populations have been recorded in both Australia and NZ.⁴⁵ Rainbow trout and brown trout were introduced into NZ in 1883⁴⁶ and 1867⁴⁷ respectively to provide recreational fishing activities for European colonists.⁴⁸ Brown trout has been responsible for the extirpation⁴⁹ and extinction of indigenous fish populations⁵⁰ as well as affecting behaviours of indigenous invertebrates.⁵¹ These invertebrates change their behaviour to avoid predation with these behavioural changes having a cascade effect on the ecosystems within which they exist.⁵² Rainbow and brown trout are regarded as NZ's most successful freshwater fish invader species as they have had noteworthy ongoing negative impacts on indigenous species.⁵³ The presence of trout in NZ's waterways is believed to be one of the country's greatest threats to its biodiversity. Much like SA, NZ is a biodiversity hotspot with more than 80 per cent of plants; 90 per cent of insects; all reptiles and terrestrial mammals being endemic to the country.⁵⁴ It is important to note that 65 per cent of the country's galaxiid fish, the largest family of freshwater fish in NZ, are regarded as threatened. This group of fish is most negatively affected by the trout invasion within the country.⁵⁵

1.5.2 New Zealand's Trout Industry

The introduction of trout in NZ has resulted in the successful establishment of a world—class trout industry.⁵⁶ Fly Fisherman magazine ranked NZ as the world's second best trout fishing

⁴⁴ Defined as the 'region consisting of NZ, Australia and smaller islands' in Lexico Dictionary <https://bit.ly/2mpxzQU> (Accessed 12 August 2019).

⁴⁵ Stanković et al op cit n23.

⁴⁶ Ibid.

⁴⁷ CR Townsend 'Invasion Biology and Ecological Impacts of Brown Trout *Salmo Trutta* in New Zealand' (1996) 78(1—2) *Biological Conservation* <https://bit.ly/2Z9UTnp> (Accessed 15 August 2019).

⁴⁸ AR McIntosh et al 'The Impact of Trout on Galaxiid Fishes in New Zealand' (2010) 34(1) *New Zealand Journal of Ecology* 195 at 195.

⁴⁹ Defined as 'eradication or complete destruction of a species' in Lexico Dictionary <https://bit.ly/2kyIVlc> (Accessed 8 August 2019).

⁵⁰ Townsend op cit n47, PE Hulme 'Beyond Control: Wider Implications for the Management of Biological Invasions' (2006) 43 *Journal of Applied Ecology* 835 at 844, McIntosh et al op cit n48 at 196.

⁵¹ HA Mooney and EE Cleland 'The Evolutionary Impact of Invasive Species' (2001) 98(10) *Proceedings of the National Academy of Sciences of the United States of America* 5448.

⁵² Townsend op cit n47, McIntosh et al op cit n48 at 200.

⁵³ W Chadderton '*Management of Invasive Freshwater Fish: Striking the Right Balance*' (2003) <https://bit.ly/2P6vgfO> (Accessed 12 April 2019).

⁵⁴ NZ Department of Conservation '*NZ Biodiversity Action Plan 2016—2020*' (2016) <https://www.cbd.int/doc/world/nz/nz-nbsap-v2-en.pdf> (Accessed 15 August 2019).

⁵⁵ McIntosh et al op cit n48.

⁵⁶ Ibid at 195.

destination on account of the beautiful locations and diverse fish species.⁵⁷ NZ has been touted as the ‘mecca of angling’ drawing international anglers to enjoy its fly fishing experiences all year round.⁵⁸ With more than 100 000 trout licences sold per annum, NZ’s trout industry is a multi—million dollar one.⁵⁹ Despite the harmful ecological impacts of trout being highlighted, as far back as 1920s, it was only seventy years later that trout was successfully implicated in the extinction of NZ’s indigenous fish species.⁶⁰

Notwithstanding this enlightenment, the management of ecological risks posed by trout has been unhurried and in some cases trout has been prioritised over the local fish species. An example of this would be the ongoing restocking of trout in areas where they have not naturalised and the prioritisation of trout fisheries over indigenous options.⁶¹ The management of rainbow and brown trout, as pests, is viewed in NZ as being socially, practically and economically unacceptable. Furthermore, trout eradication does not meet the scientific criteria for pest management as both species are generally well—established and widespread.⁶² The specific legal protection of trout habitat, a clear indication of the socio—economic importance of this IAS, will be discussed in the following chapter. Ironically, the trout industry has beneficial spinoffs for indigenous freshwater fish communities including the protection of water quality and riverine habitats.⁶³

1.5.3 South Africa

Bearing in mind there exist no South African baseline ecological studies, prior to the introduction of trout in the 1800s, it is difficult to accurately assess their environmental impact.⁶⁴ Both trout species have since been recorded in more than 75 per cent of the country’s riverine systems’ streams with rainbow trout being more abundant than brown trout. Negative ecological impacts of introduced trout species on indigenous aquatic fauna, particularly fish species, has been highlighted as far back as the 1960s. Despite this, quantitative studies of such impacts are largely lacking.⁶⁵ The spread of rainbow trout to inaccessible areas of the country

⁵⁷ R Purnell ‘5 Best Trout Fishing Spots in the World’ *Fly Fisherman* <https://bit.ly/2ZbHbjY> (Accessed 16 August 2019).

⁵⁸ Tourism NZ ‘Fly Fishing’ <https://www.newzealand.com/int/fly-fishing/> (Accessed 15 August 2019).

⁵⁹ Hayes J ‘Salmonid Fisheries’ Cawthron Institute <https://bit.ly/30i8feM> (Accessed 16 August 2019), Chadderton op cit n53.

⁶⁰ McIntosh et al op cit n48.

⁶¹ Ibid at 203.

⁶² Chadderton op cit n53.

⁶³ Ibid.

⁶⁴ Anchor Environmental ‘Rainbow Trout’ op cit n22.

⁶⁵ Shelton et al op cit n13.

was aided by anglers and, quite ironically, by conservation departments who established trout hatcheries. The Eastern Cape Nature Conservation Department, through its trout hatchery, introduced rainbow trout into the Buffalo River where it now threatens two endangered species.⁶⁶ In addition to the intentional stocking of trout into river systems, there are cases of trout escaping from trout farms. The risk of trout invasions into undisturbed areas is further increased by the fact that escaped trout can swim more than 300km from an escape site.⁶⁷

Within the southern hemisphere, both rainbow and brown trout have exhibited a predisposition to become successful invaders.⁶⁸ Some South African anglers consider rainbow trout as an honorary indigenous species considering its establishment in the wild for over a century in eleven of the country's thirty-one ecoregions.⁶⁹ South African studies have illustrated that when introduced to a new environment, alien trout can negatively impact indigenous fish species.⁷⁰ Rainbow trout have been recorded to have negative impacts on ten of SA's fifty Red Data⁷¹ fish species⁷² and are responsible for the depletion of endemic fish species in the Cape Floral Kingdom.⁷³ Brown trout, by comparison, is believed to have negative ecological impacts on three of the country's Red Data fish species.⁷⁴ The disappearance of the Natal cascade frog, *Hadromophryne natalensis*, from streams of the country's World Heritage Site: uKhahlamba Drakensberg Park, has been attributed to the presence of both trout species.⁷⁵ Invasive trout species, in altering the behaviour of herbivorous⁷⁶ invertebrates, have resulted in increased algal vegetation and ultimately ecosystem—level consequences.⁷⁷ Although hybridisation of these invasive species exists as an ecological threat in other parts of the world, this is not a threat within SA as there are no vulnerable indigenous species.⁷⁸

⁶⁶ Anchor Environmental 'Rainbow Trout' op cit n22.

⁶⁷ Ibid.

⁶⁸ ISSA 'RA for Brown Trout *Salmo Trutta* in SA' <https://bit.ly/30cRCRz> (Accessed 30 July 2019).

⁶⁹ Anchor Environmental 'Rainbow Trout' op cit n22.

⁷⁰ Shelton et al op cit n13.

⁷¹ Species identified by IUCN as threatened or endangered <https://www.iucnredlist.org/> (Accessed 9 August 2019).

⁷² Stanković et al op cit n23.

⁷³ Shelton et al op cit n13.

⁷⁴ Anchor Environmental 'Brown Trout' op cit n21.

⁷⁵ ISSA 'RA for Brown Trout *Salmo Trutta* in SA' op cit n68.

⁷⁶ Defined as 'feeding on plants' in Lexico Dictionary <https://bit.ly/2kZ21Rv> (Accessed 10 August 2019).

⁷⁷ ISSA 'RA for Brown Trout *Salmo Trutta* in SA' op cit n68.

⁷⁸ ISSA 'RA for Rainbow Trout *Oncorhynchus mykiss* in SA' <https://bit.ly/2NcGNLF> (Accessed 10 August 2019).

1.5.4 South Africa's Trout Industry

Globally, the dynamic trout industry has grown more than 400 per cent since 1980.⁷⁹ South Africa dominates trout production on the African continent. From an aquaculture perspective, trout farming is the largest of SA's freshwater production industries contributing more than 80 per cent towards the country's freshwater aquaculture.⁸⁰ Almost 95 per cent⁸¹ of the country's trout farms, that farm rainbow trout, are located in the Western Cape, Mpumalanga, Eastern Cape and KwaZulu—Natal.⁸² SA's trout industry includes a well—established processing sector and market supply chain. The current demand—supply balance sees the local demand outweighing the supply and as such, trout is imported into SA to meet this demand.

Trout products include trout caviar, smoked trout filets, fresh and frozen whole trout. As a high—value fish, whole and smoked trout can be priced at R200/kg and R600/kg respectively.⁸³ The South African trout farming sector was valued at R28 million in 2008⁸⁴ with an estimate of R153 million being suggested in 2018.⁸⁵ The trout value chain extends to the processing, retail and export sector; recreational fishing; tackle industry and the hospitality industry and provides an estimated 13000 jobs. In KwaZulu—Natal alone, trout fishing is a 'niche' tourist attraction which brings more than R230 million per annum to the province.⁸⁶ Overall, the trout value chain, including its associated sectors, is estimated to contribute in excess of R10 billion to the South African economy.⁸⁷

In addition to the monetary benefits, there are numerous intangible benefits recreational fishing provides, such as an increased quality of life and allowing people to connect with nature.⁸⁸ Fascinatingly enough, fishing has been described as an addictive pastime to the point where psychological studies illustrate similarities between recreational angling and other addictive behaviours such as gambling. Such similarities include participants being able to

⁷⁹ Anchor Environmental 'Rainbow Trout' op cit n22.

⁸⁰ Ibid.

⁸¹ Ibid.

⁸² DAFF 'Rainbow Trout Feasibility Study 2018' <https://bit.ly/2KDbfwR> (Accessed 7 April 2019).

⁸³ Ibid.

⁸⁴ Anchor Environmental 'Rainbow Trout' op cit n22.

⁸⁵ N Dorward 'Aquaculture and the NEMLA Bill' (25 April 2018) <https://bit.ly/2TERVSW> (Accessed 8 August 2019).

⁸⁶ E Herbst 'Govt's War on Trout' (10 April 2018) <https://bit.ly/2Iv7TsY> (Accessed 3 April 2019).

⁸⁷ Dorward op cit n85.

⁸⁸ R Arlinghaus and S Cooke 'Recreational Fisheries: Socio—Economic Importance, Conservation Issues and Management Challenges' in B Dickson, J Hutton and JW Adams (eds) *Recreational Hunting, Conservation and Rural Livelihoods: Science and Practice* (2009) Blackwell Publishing Ltd 39 at 45.

relax, losing track of time spending time than was originally intended and repeating the same behaviour in the hope that they will gain something of material value.⁸⁹

1.6 CONCLUSION

Globally, the trout industry is a sizeable one despite the negative ecological aspects associated with the presence of such IAS. The South African trout industry is a noteworthy income stream and should not be discounted as an employer however, it is necessary to note the environmental impacts of trout on the country's biodiversity. The proposed listing of trout species as IAS has caused uproar from various stakeholders, the details of which will be detailed in Chapter Two. Comparative legal responses to the management of invasive trout, focussing on NZ in particular, will be noted in the forthcoming chapter.

⁸⁹ MD Griffiths and M Auer 'Becoming Hooked? Angling, Gambling and Fishing Addiction' (2019) 1(1) *Archives of Behavioural Addictions* <https://doi.org/10.30435/ABA.01.2019.02> (Accessed 27 September 2019).

CHAPTER TWO:

LEGAL RESPONSES TO INVASIVE TROUT

2.1 INTRODUCTION

The previous chapter provided details of the various ecological risks posed by invasive trout in multiple countries. The impacts of invasive trout within SA and NZ, as well as an examination of their respective trout value chains were highlighted. The focus of the current chapter will be legal responses and associated challenges of the management of trout as an IAS, initially from a broad comparative perspective, thereafter honing in on NZ and SA. The progression of SA's legal response to invasive trout will be discussed coupled with associated key issues and controversies.

2.2 GENERAL COMPARATIVE RESPONSES

Overall, information regarding global legal responses to invasive trout is fragmented and difficult to locate. Much of the publicly—available information is not in English and translation of technical documents is complex. Furthermore, legislation from developed countries is easier to locate than those from developing nations. With this in mind, readily available legal responses will be briefly highlighted. As a point of departure, it is necessary to note that all highlighted countries, with the exception of the USA, have signed and ratified the Convention on Biological Diversity (CBD).¹ The Convention is an internationally—binding treaty with the conservation of biodiversity as one of its fundamental goals. It is within Article 8(h) of the CBD that 'each contracting Party shall, as far as possible and as appropriate, prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species.'²

The USA, responding to threats posed by invasive trout, implemented fishing regulations encouraging anglers to harvest unlimited invasive alien trout in Yellowstone National Park.³

¹ CBD 5 June 1992.

² Ibid at Art 8(h).

³ UNESCO 'State of Conservation: Yellowstone National Park' (2010) <https://whc.unesco.org/en/soc/491> (Accessed 11 April 2019), Yellowstone National Park 'Yellowstone National Park Fishing Regulations' (2015) <https://yellowstone.net/pdf/FishingRegulations.pdf> (Accessed 11 April 2019).

Japanese legislation has proved insufficient in reducing the ecological impacts associated with invasive trout despite introduction of brown trout being legally prohibited within certain areas.⁴

Several European countries have enacted regulations pertinent to the management of invasive trout. Sweden and Germany legislated measures to control invasive trout stocking and introduction into waterbodies.⁵ In Norway, invasive trout management is included under the country's Nature Diversity Act,⁶ Strategy on IAS⁷ and 'Black List'⁸ of IAS.⁹ Trout farming is permitted in parts of Norway and pesticides have been used in eradicating invasive trout within Norway.¹⁰ Although Finland's National Strategy on IAS includes rainbow trout, a lack of specific anti—trout legislation suggests that the economic value of the country's most valuable fish far outweighs its associated ecological risks.¹¹ In Switzerland and Italy, invasive trout stocking is banned in certain water systems despite vehement opposition by recreational anglers.¹²

2.3 NEW ZEALAND

On account of NZ's trout controversy closely mirroring SA's experience, as will be discussed, NZ is the main country for comparison in this research. Within NZ, protection of trout habitat is a legal provision under s7(h) of the country's Resource Management Act,¹³ requiring that all functions undertaken in the promotion of the sustainable management of natural resources be conducted paying particular attention to the protection of the habitat of trout. Considering both trout species are alien to NZ, the specific legal protection of their habitat is an indication of their socio—economic status within the country.

⁴ S Kitano 'Ecological Impacts of Rainbow, Brown and Brook Trout in Japanese Inland Waters' (2004) 8(1) *Global Environmental Research* 41 at 46.

⁵ D Stanković, AJ Crivelli and A Snoj 'Rainbow Trout in Europe: Introduction, Naturalization, and Impacts' (2015) 23(1) *Reviews in Fisheries Science and Aquaculture* <https://bit.ly/307UyQ7> (Accessed 11 April 2019).

⁶ Act 100 of 2009.

⁷ National Biodiversity Strategy and Action Plan 'Norway Is on Track to Achieve Its National Biodiversity Targets to Combat Invasive Alien Species by 2020—Key Highlights from Norway's Sixth National Report and Post—2010 NBSAP' (30 October 2018) <https://bit.ly/2URqkx> (Accessed 9 April 2019).

⁸ Norwegian Biodiversity Information Centre 'Alien Species in Norway – with the Norwegian Black List 2012' (2012) <https://bit.ly/2Z7rVC5> (Accessed 11 April 2019).

⁹ Norwegian Biodiversity Information Centre 'The Alien Species List of Norway – Ecological Risk Assessment 2018' (2018) <https://bit.ly/2mrdtFX> (Accessed 11 April 2019).

¹⁰ Norwegian Environment Agency 'Alien Salmonids in Norway' (2016) <https://bit.ly/2IjdHZy> (Accessed 9 April 2019).

¹¹ Stanković et al op cit n5, Ministry of Agriculture and Forestry in Finland 'Finland's National Strategy on Invasive Alien Species 2012' (2012) <https://bit.ly/2Lv9hBg> (Accessed 9 April 2019).

¹² Ibid.

¹³ Act 69 of 1991.

Legislation governing NZ’s land—based aquaculture has been referred to as outdated in relation to current aquaculture practices.¹⁴ In 1867, the Salmon and Trout Act¹⁵ was passed with an aim to preserve and propagate the species within the country. Almost a century later, in the 1970’s, trout farming was paradoxically prohibited under pressure from the recreational fishing industry. Thus, even as far back as 50 years ago, this prohibition was a clear indication of the power of the fishing industry within NZ.¹⁶ The country’s old 1987 Conservation Act¹⁷ notes that ‘no person shall establish, manage, or operate a fish farm for trout.’¹⁸ As such, NZ is possibly the only country in the world where trout farming is illegal.¹⁹

On 9 August 2018, the Conservation (Indigenous Freshwater Fish) Amendment Bill (CAB) was drafted in an attempt to improve protection of indigenous fish species and fisheries by closing the gaps in the 30 year old Conservation Act.²⁰ On 4th September 2018, at the CAB’s first parliamentary reading, Minister of Environment: Eugenie Sage, was adamant that CAB intended to introduce ‘some technical changes’ rather than to drastically change fish management.²¹ Although, Sage proclaimed her commitment to consult with the public and iwi²² prior to legislating any amendments, no such consultation had taken place at the time of the CAB’s release. A NZ Government information release noted the key limitation of CAB was a lack of proper consultation with stakeholders and iwi.²³ The need for CAB was clear given the threatened status of NZ’s fish, with alien trout species being identified as NZ’s most successful freshwater fish invaders.²⁴ Sage highlighted that Grayling, the only indigenous fish species afforded legal protection in NZ, was extinct signifying the urgent need for better protection of NZ’s biodiversity.²⁵ On the surface, the CAB appeared innocuous. A deeper reading and interrogation of CAB, however, sparked a tirade of criticism by anglers who viewed the CAB as a threat to the trout industry.

¹⁴ Food and Agriculture Organisation of the United Nations Fisheries and Aquaculture Department ‘*National Aquaculture Sector Overview: NZ*’ <https://bit.ly/2mrdjOR> (Accessed 10 August 2019).

¹⁵ Act 1867.

¹⁶ O Evans ‘*NZ’s Recreational Fishery Industry Fights to Keep Nationwide Ban on Commercial Trout Farms*’ (13 December 2018) <https://bit.ly/2mijUep> (Accessed 2 August 2019).

¹⁷ Act 65 of 1987.

¹⁸ *Ibid* at S26ZI.

¹⁹ Food and Agriculture Organisation of the United Nations Fisheries and Aquaculture Department *op cit* n14.

²⁰ NZ Parliament ‘*CAB—First Reading*’ (4 September 2018) <https://bit.ly/2mfq6DT> (Accessed 22 August 2019).

²¹ *Ibid*.

²² Defined as ‘the largest political grouping in pre—European Māori society’ in NZ Teara Encyclopedia <https://teara.govt.nz/en/tribal-organisation/page-1> (Accessed 2 September 2019).

²³ NZ Treasury ‘*CAB OIA—20180415*’ (29 November 2018) <https://bit.ly/2kthzg7> (Accessed 12 September 2019).

²⁴ W Chadderton ‘*Management of Invasive Freshwater Fish: Striking the Right Balance*’ (2003) <https://bit.ly/2P6vgfO> (Accessed 12 April 2019).

²⁵ NZ Parliament ‘*CAB—First Reading*’ *op cit* n20.

NZ's Fish and Game Council (FGC), a national organisation established under s26 of the Conservation Act, is afforded statutory powers to oversee fish and game management within NZ and represents the interests of anglers and hunters within 12 NZ regions.²⁶ Part 5A of the Conservation Act highlights the critical role FGC plays in providing advice to the Minister on issues related to sports fishing, advocating interests of sports fishermen in statutory processes and liaising with conservation authorities.²⁷

Furthermore, FGC is required to monitor sports fish populations and the ecosystems within which the fish exist.²⁸ The FGC is also required to submit annual Sports Fish and Game Management Plans for approval by the Minister.²⁹ In addition to responsibilities outlined in the Conservation Act, FGC is responsible for issuing of fishing licences under the Freshwater Fisheries Regulations.³⁰ Considering the thousands of trout licences alone, the FGC is an organisation that is at the forefront of fishing management within NZ. The Conservation Act holds a wide range of FGC—related responsibilities which include habitat preservation and no doubt, the proposed CAB came as a surprise to the FGC considering the organisation had not been consulted. The Conservation Act also identifies responsibilities that NZ's Department of Conservation (DOC) are required to undertake in order to manage the country's freshwater fish including development of Freshwater Fisheries Management Plans. The Freshwater Fisheries Management Plans are required to take Sports Fish and Game Management Plans into account.³¹ Similar to Sports Fish and Game Management Plans, Freshwater Fisheries Management Plans require approval by the Minister.³²

Logically, FGC spearheaded the country's retaliation against the proposed CAB. FGC commissioned a prominent legal expert to provide legal opinion on the potential impacts of CAB on the fishing sector. This expert was a lawyer and past Prime Minister: Sir Geoffrey Palmer. Palmer, part of the Queen's Counsel, was appointed by Queen Elizabeth II to be part of Her legal counsel.³³ A number of provisions proposed in CAB were of grave concern to the FGC.

²⁶ FGC 'About NZ Council' <https://bit.ly/2mrdqKh> (Accessed 3 September 2019).

²⁷ Conservation Act s26C(1).

²⁸ Conservation Act s26Q(1)(a).

²⁹ Conservation Act s26Q(3).

³⁰ SR 1983/277.

³¹ Conservation Act s17J(5).

³² Conservation Act s17K(1).

³³ Wikipedia 'Queen's Counsel' https://simple.wikipedia.org/wiki/Queen%27s_Counsel (Accessed 5 September 2019).

First, Clause 5(3) proposed that, in the event of a conflict between a Freshwater Fisheries Management Plan and a Sports Fish and Game Management Plan, the former plan would prevail. In essence, this meant that despite both sets of plans holding the same legal status, having been approved by the Minister, DOC would be entitled to proceed with their Freshwater Fisheries Management Plan without consultation with FGC.³⁴ FGC were concerned that DOC could remove alien trout from trout waters that had been earmarked for indigenous NZ freshwater species. Palmer recommended that this section be deleted from the amended Bill.

Secondly, Clause 6 was of concern as it proposed that persons authorised under Treaty settlements³⁵ were exempt from restrictions such as taking, selling or possessing trout. Palmer pointed out that this provision was in conflict with a 1999 case: *McRitchie v Taranaki Fish and Game Council*.³⁶ In this case, McRitchie claimed he did not require a fishing licence from FGC as trout fishing fell within his Māori rights. The High Court ruled however, that since trout were introduced by Europeans, they were exempt from customary Māori rights and he did indeed require a FGC licence.³⁷ The CAB, as Palmer notes, also reduces FGC authority within the Freshwater Fisheries Regulations³⁸ by removing DOC's need to consult with FGC on various topics. New powers of authority, for DOC and the Minister, as proposed in the Bill could potentially have negative implications for FGC.³⁹ Based on Palmer's advice, FGC was understandably concerned with the proposed amendments.

At the parliamentary readings of CAB, further criticisms were raised. Clause 11 would provide Government authority to declare any land as a 'spawning ground' and potentially prohibit restrictions thereupon. This could essentially mean that private property could suddenly become a restricted area and concerns were raised as to whether private landowners would be expected to bear the costs of protecting these declared areas.⁴⁰ While generally accepted that 'spawning grounds' were necessary for indigenous freshwater fish conservation,

³⁴ FGC 'A Renowned QC's Legal Opinion' (30 August 2018) <https://bit.ly/2m6Nsvm> (Accessed 30 August 2019).

³⁵ Defined as 'settlements and claims by native Māori people against NZ Government for breaches of the Treaty of Waitangi' in Wikipedia https://en.wikipedia.org/wiki/Treaty_of_Waitangi_claims_and_settlements (Accessed 2 August 2019).

³⁶ [1999] 2NZLR 139.

³⁷ *McRitchie v Taranaki Fish and Game Council* (November 1998) *Māori Law Review* <http://maorilawreview.co.nz/1998/11/november-1998-contents/> (Accessed 12 August 2019).

³⁸ SR 1983/277.

³⁹ FGC 'A Renowned QC's Legal Opinion' op cit n34.

⁴⁰ NZ Parliament 'CAB—First Reading' op cit n20.

a number of political parties raised concerns that these ‘spawning grounds’ had not yet been identified and there lacked a formal process for the identification thereof.⁴¹

Following the first parliamentary reading, a select committee convened to discuss the Bill before the next parliamentary reading. That select committee took 11 months to debate and discuss what Sage referred to as a ‘small, technical Bill.’⁴² By comparison, NZ’s Climate Change Response Amendment Bill took just three months in the select committee, despite the scope of the impact of climate change on the country.⁴³ This comparison speaks to the complexity and potential gaps in the CAB that resulted in the drawn—out select committee discussions.

During the period between the two readings, citizens were allowed to comment and present submissions regarding the proposed amendments. NZ’s trout anglers exceed 100 000 and when one considers that FGC was not consulted during the CAB drafting process, many concerned and irate anglers submitted comments. Some angling clubs assisted their members by drafting submission documents that members could merely sign and submit. In total, more than 1500 submissions were made.⁴⁴ In addition to the submissions, a petition was raised against CAB by the owner of a luxury trout fishing lodge who was concerned the CAB would impact negatively on business.⁴⁵ This petition noted that there had been no consultation with FGC or iwi and Palmer’s esteemed legal opinion should be taken into consideration. Not surprisingly, this petition received 5876 signatures from equally concerned citizens.⁴⁶

At the second reading, in August 2019, Sage advised that Clause 5(3)⁴⁷ had been deleted following Palmer’s recommendation and intense criticism from anglers.⁴⁸ Sage also advised that a one year transition period would ensue to allow time for further discussion around problems with CAB, as was identified by the hundreds of submissions and select committee.⁴⁹

⁴¹ NZ Parliament ‘*CAB—Second Reading*’ (2 August 2019) <https://bit.ly/2mtypME> (Accessed 18 September 2019).

⁴² *Ibid.*

⁴³ *Ibid.*

⁴⁴ NZ Parliament ‘*CAB – Submissions and Advice*’ <https://bit.ly/2mlU7Sy> (Accessed 3 September 2019).

⁴⁵ NZ Parliament ‘*Petition of Felix Borenstein*’ (1 October 2018) <https://bit.ly/2mrd5at> (Accessed 12 September 2019).

⁴⁶ *Ibid.*

⁴⁷ CAB Clause 5(3) proposed that the Freshwater Fisheries Management Plan would prevail in the event of a conflict between a Freshwater Fisheries Management Plan and a Sports Fish and Game Management Plan.

⁴⁸ NZ Parliament ‘*CAB—First Reading*’ op cit n20.

⁴⁹ *Ibid.*

The transition period was also implemented to ensure that the current year's fishing season remained unaffected.⁵⁰

Sage reiterates that the outdated Conservation Act, that she inherited, was 'unworkable' in its current form and in dire need of amendment.⁵¹ Even at the second reading, many political parties echoed that while they supported the need for biodiversity protection, they felt that the proposed amendments would have negative impacts on private landowners and anglers. The issue of the arbitrary method by which 'spawning grounds' would be identified was again highlighted although politicians advised they would support the declaration of such sites if they were indeed based on 'good science'.⁵²

At the end of the second reading, a parliamentary vote revealed that only 53 per cent of politicians were in favour of CAB.⁵³ While critics agreed there existed a need for freshwater fish conservation, the lack of consultation by the Minister resulted in an unbalanced CAB. The entire process was referred to, by some politicians, as 'deeply flawed' and 'fraught'.⁵⁴ Yet another criticism was that Sage camouflaged the CAB as a conservation measure for freshwater fish protection when it was in fact attempting to achieve a political purpose.⁵⁵ The Minister was accused of trying to obtain more power whilst simultaneously watering down existing powers of the FGC.⁵⁶ Sage is further accused of intentionally omitting consultation with necessary stakeholders, FGC and iwi in an effort to push the CAB through without resistance and achieve her hidden political agenda.⁵⁷

Supporters of the CAB commended Sage for recognising the gaps in the outdated Conservation Act when she introduced the CAB to provide protection of NZ's indigenous freshwater fish. These supporters felt that as stewards of NZ's biodiversity, the CAB was a step in the direction of better protection of indigenous freshwater fish species.⁵⁸ The CAB was given Royal Assent on 21 October 2019.⁵⁹

⁵⁰ Ibid.

⁵¹ Ibid.

⁵² Ibid.

⁵³ Ibid.

⁵⁴ Ibid.

⁵⁵ Ibid.

⁵⁶ D Williams 'Fishing Faithful Gear up for Trout Fight' (11 October 2018) <https://bit.ly/2ktX2rX> (Accessed 2 September 2019).

⁵⁷ NZ Parliament 'CAB—First Reading' op cit n20.

⁵⁸ Ibid.

⁵⁹ NZ Parliament 'CAB' (22 August 2019) <https://bit.ly/2EQmuPM> (Accessed 20 September 2019).

2.4 SOUTH AFRICA

2.4.1 Historical Legislation

Initial South African legislation, pertinent to inland fisheries and trout, dates back to the 1800s when Act 10 of 1867, promulgated by the Cape Colonial Government, was aimed at encouraging the introduction of alien fish into inland waters.⁶⁰ The motivation for this legislation stemmed from the urge to establish British freshwater angling species as a recreational pastime rather than to spur on inland fisheries.⁶¹ In 1884, Law 21 of 1884 was legislated to provide for the specific introduction of trout and was later revised to ultimately become the Cape Colony Fish Protection Act.⁶² Inland fisheries, including the development of state—owned trout hatcheries, were pursued and promoted with fervour to the extent that bounties on indigenous freshwater fish predators, such as otters, existed.⁶³ Not surprisingly, both South African otter species are today listed as part of the country’s Red Data species.⁶⁴

The promotion of fisheries, including those stocked with alien species, continued well into the 1900s. In 1950, government’s vision for its inland fisheries was articulated as one that supported SD with the primary objective of maximising productivity by selecting suitable species based on their recreational and culinary qualities.⁶⁵ The Inland Fisheries Division noted that a balance between interests of economic fisheries, recreational fishing and the natural fauna should exist with special focus on preserving indigenous fish fauna for scientific and educational purposes.⁶⁶ Although the intentions were seemingly good, the promotion of alien fish species may have ironically posed disastrous environmental impacts in the ecosystems into which they were introduced. This was possibly due to a lack of scientific evidence at the time.

In the mid—1980s, policy change spurred on by a growing awareness of the negative impacts of IAS, resulted in a focus shift from promoting stocking of IAS like trout to the conservation of indigenous fish species.⁶⁷ The negative environmental impacts of IAS now seemed to outweigh the associated economic and social aspects. Thereafter, state hatcheries were either privatised, closed or used for breeding indigenous fish species and the fish licensing

⁶⁰ P Britz ‘The History of South African Inland Fisheries Policy with Governance Recommendations for the Democratic Era’ (2015) 41(5) *Water SA* 624 at 625.

⁶¹ *Ibid.*

⁶² Act 15 of 1893.

⁶³ Britz *op cit* n60.

⁶⁴ Endangered Wildlife Trust ‘*Mammal Red List*’ (2016) <https://bit.ly/2m3JP9B> (Accessed 26 August 2019).

⁶⁵ Britz *op cit* n60.

⁶⁶ *Ibid.*

⁶⁷ *Ibid* at 626.

systems were abandoned.⁶⁸ A century—long support by government of inland fisheries ended and these actions caused major upsets within the angling community. While trout stocking was still allowed in ecosystems where it posed a low risk, there existed an overall lack of policy regarding benefits of farming alien fish.

In 1986, concerned trout flyfishermen formed the Federation of Flyfishers of Southern Africa (FOSAF) when government wished to amend trout regulations without proper consultation with them.⁶⁹ FOSAF's objective is to promote social and economic value of flyfishing while supporting biodiversity conservation goals with a vision of being a strong, respected and consulted voice of the country's flyfishing community.⁷⁰ The organisation provided flyfishermen with a platform to negotiate and liaise with authorities and government on mutually—beneficial legal and policy matters.⁷¹ The birth of FOSAF was in response to conflict with government's relationship to trout. As will be illustrated, the trout conflict between the South African government and FOSAF, rages on three decades later.

2.4.2 Current Legislation

Historically, SA's legislation governing biodiversity is criticised for its broad and fragmented nature.⁷² Paterson suggests that this 'fragmented regime' has been a contributing factor towards the poor success of effectively controlling IAS invasion within the country.⁷³ For the purpose of this study, only legislation relevant to invasive trout will be highlighted. It is worth noting that one of the country's oldest valid environmental laws, is the Environment Conservation Act.⁷⁴ Although intended at offering effective environmental protection, this Act fell short of providing adequate protection and did not give effect to the Constitution.⁷⁵ Consequently, there existed a need for legislative reform and much of the Act has since been repealed⁷⁶ and its subject matter has been accommodated under other legislation.

⁶⁸ Ibid.

⁶⁹ FOSAF 'The History of FOSAF' <https://www.fosaf.org.za/history.php> (Accessed 20 August 2019).

⁷⁰ FOSAF 'The Vision and Mission of FOSAF' <https://www.fosaf.org.za/vision.php> (Accessed 20 August 2019).

⁷¹ FOSAF 'The Constitution of FOSAF' <https://www.fosaf.org.za/constitution.php> (Accessed 20 August 2019).

⁷² E Algotsson 'Biological Diversity' in HA Strydom and ND King (eds) *Environmental Management in South Africa* (2009) Juta Law 2 ed 97 at 97.

⁷³ AR Paterson 'Clearing a Path towards Effective Alien Invasive Control: The Legal Conundrum' (2006) 9(1) *Potchefstroom Electronic Law Journal* <https://www.ajol.info/index.php/pelj/article/view/43454> (Accessed 2 November 2019).

⁷⁴ Act 73 of 1989.

⁷⁵ M Kidd 'The Constitution and Framework Environmental Legislation' in M Kidd (ed) *Environmental Law* (2011) Juta Law 2nd ed. 20 at 35.

⁷⁶ National Environmental Management Act 107 of 1998, National Environment Management: Protected Areas Act 57 of 2003 and National Environment Management: Waste Act 59 of 2008 largely repealed the Environment Conservation Act.

a) *International Legislation and Policy*

The origins of South African biodiversity—related legislation are rooted in the CBD. The Convention, originated from the 1992 Rio Earth Summit, is dedicated to the promotion of SD.⁷⁷ It is widely accepted that the concept of SD was introduced by the United Nations World Commission on Environment and Development in its 1987 Brundtland Report as ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’.⁷⁸ The three objectives of the CBD are the conservation of biodiversity; sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.⁷⁹ Signatories to the Convention are expected to implement and promote these objectives at a domestic level through legal, administrative or policy measures. There are currently 196 countries party to the CBD including SA, which became a signatory in 1993.⁸⁰

The CBD makes references: direct and inferred to the management of IAS within Article 8. A direct reference is preventing the introduction of IAS, controlling and eradicating IAS which threaten ecosystems, habitats or species.⁸¹ Indirect references include promoting the protection of ecosystems;⁸² promoting environmentally—sound and SD in areas adjacent to protected areas;⁸³ developing and maintaining legislation or regulations to protect threatened species;⁸⁴ and regulating and managing any activities posing a threat to biodiversity.⁸⁵ In November 1995, the Convention became officially—binding after its approval by the South African National Assembly.⁸⁶ This action sparked a policy change regarding SA’s biodiversity—related legislation. South Africa has implemented the CBD, on a domestic level, primarily through the NEM:BA with s65 –s79 of that Act focusing on IAS management.

Another noteworthy international response to IAS is the Convention on Wetlands⁸⁷, specifically Resolution VIII.18,⁸⁸ which has potential implications for trout management in

⁷⁷ Algotsson op cit n72.

⁷⁸ United Nations ‘*Report of the World Commission on Environment and Development: Our Common Future*’ (1987) <https://bit.ly/30LjLQs> (Accessed 21 August 2019).

⁷⁹ CBD Art 1.

⁸⁰ CBD ‘*List of Parties*’ (2019) <https://www.cbd.int/information/parties.shtml> (Accessed 20 August 2019).

⁸¹ CBD Art 8(h).

⁸² CBD Art 8(d).

⁸³ CBD Art 8(e).

⁸⁴ CBD Art 8(k).

⁸⁵ CBD Art 8(l).

⁸⁶ Algotsson op cit n72.

⁸⁷ Convention on Wetlands of International Importance especially as Waterfowl Habitat 1975.

⁸⁸ Ramsar ‘*Resolution VIII.18: Invasive Species and Wetlands*’ (2002) <https://bit.ly/3d26KHa> (Accessed 16 June 2020).

SA. As a contracting party to the Convention, SA is required to fulfil the obligations to protect and conserve its wetlands.⁸⁹ Finally, the IUCN's Invasive Species Specialist Group, a global network of IAS experts, provides IUCN members with technical and scientific advice on IAS management.⁹⁰ As an IUCN State member⁹¹, South Africa has access to the Group's leading resource of IAS information: the Global Invasive Species Database.

b) *Constitution of the Republic of SA*⁹²

The Constitution addresses biodiversity and IAS in an indirect manner where the Bill of Rights, under s24(b), affords everyone the right:

‘to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that (i) prevent pollution and ecological degradation; (ii) promote conservation; and (iii) secure ecologically SD and use of natural resources while promoting justifiable economic and social development.’

Feris suggests that good environmental governance is achieved by giving effect to s24 and that every decision that can potentially impact the environment must be deliberated in terms of s24 requirements.⁹³ This provision reiterates the concept of SD and may be indirectly applied to threats posed by IAS on the country's biodiversity whereby management, control and eradication of IAS is essential to conserve biodiversity.

c) *National Environmental Management Act (NEMA)*⁹⁴

The NEMA principles act as guidelines applicable to all organs of state when taking decisions with potential environmental impacts.⁹⁵ While NEMA's s2(3) promotes SD giving effect to s24(b) of the Constitution, s2(2) requires that environmental management is anthropocentric⁹⁶ in its approach placing the needs of humans as its key concern. These two, somewhat contradictory principles, have the potential to cause conflict. Section 2(4)(a) details factors that SD must consider including biodiversity loss avoidance and use of the Precautionary

⁸⁹ Department of Environment, Forestry and Fisheries ‘*World Wetlands Day 2019*’ (2019) <https://bit.ly/2N2p4Fx> (Accessed 16 June 2020).

⁹⁰ Invasive Species Specialist Group ‘*IUCN SSC Invasive Species Specialist Group*’ (2008) <http://www.issg.org/about.htm> (Accessed 16 June 2020).

⁹¹ GN R315 in GG 40815 of 28 April 2017.

⁹² Act 108 of 1996.

⁹³ LA Feris ‘The Role of Good Environmental Governance in the Sustainable Development of South Africa’ (2010) 13(1) *Potchefstroom Electronic Law Journal* 73 at 77.

⁹⁴ Act 107 of 1998.

⁹⁵ NEMA s2(1).

⁹⁶ Defined as ‘the view that mankind is the central or most important element of existence’ in Lexico Dictionary <https://bit.ly/2m1AfUK> (Accessed 1 September 2019).

Principle.⁹⁷ In the context of invasive trout, these principles are important. The need for decision—makers to consider the interests and needs of interested and affected parties,⁹⁸ as requested by NEMA, is interesting in light of the FOSAF conflict with government. NEMA requires all persons exercise ‘Duty of Care’ with regards to the environment by ensuring beneficial and detrimental impacts of activities be evaluated.⁹⁹ Although indirect in its reference to IAS, this provision is applicable to IAS management.¹⁰⁰ Certain activities, as listed and gazetted by government, may not commence without environmental authorisations and a list of such activities are published with a number of them posing potential relevance to invasive trout. Potential trout—related activities include development or expansion of aquaculture facilities, listed under Notices 1¹⁰¹ and 3.¹⁰² Environmental authorisation is also required for any process or activity which threatens biodiversity, as identified in s53(1) of NEM:BA.¹⁰³ The presence and potential invasion of trout could well fall within the scope of this.

d) National Environmental Management: Protected Areas Act¹⁰⁴ and others

The aim of National Environmental Management: Protected Areas Act includes the protection and conservation of the country’s biodiversity and as such, IAS posing a threat to national parks’ biodiversity must be controlled, eradicated or removed.¹⁰⁵ The control and management of IAS, within protected areas, is also highlighted within NEM:BA.¹⁰⁶ On a municipal level, the Local Government: Municipal Systems Act¹⁰⁷ requires all municipalities develop an Integrated Development Plan. NEM:BA, under s76(2)(b), further requires that every Integrated Development Plan must include an IAS management plan. Such a plan must address the monitoring, control and eradication of IAS within the specific municipality.¹⁰⁸ Provincial Ordinances, such as those in the Western Cape, include the regulation of trout as an IAS.¹⁰⁹

⁹⁷ NEMA s2(4)(a)(i) and (vii).

⁹⁸ NEMA s2(4)(g).

⁹⁹ NEMA s28(1).

¹⁰⁰ Paterson op cit n73.

¹⁰¹ GN R983 in GG 38282 of 4 December 2014.

¹⁰² GN R985 in GG 38282 of 4 December 2014.

¹⁰³ Activity 30 of GN R983 in GG 38282 of 4 December 2014.

¹⁰⁴ Act 57 of 2003.

¹⁰⁵ National Environmental Management: Protected Areas Act s55(2)(d).

¹⁰⁶ NEM:BA s76(1).

¹⁰⁷ Section 25(1) of Act No. 32 of 2000.

¹⁰⁸ NEM:BA s76(2). See also s76(4) for the prescribed contents of an invasive species monitoring, control and eradication plan. Note that these responsibilities rest on all organs of state, not only municipalities.

¹⁰⁹ DJ Woodford et al ‘Optimising Invasive Fish Management in the Context of Invasive Species Legislation in South Africa’ (2017) 47(2) *Bothalia* <https://doi.org/10.4102/abc.v47i2.2138> (Accessed 8 April 2019).

Legislation dealing specifically with the ‘control’ of animal IAS includes Agricultural Pests Act¹¹⁰ which the then Department of Agriculture, Forestry and Fisheries (DAFF)¹¹¹ enforced. The Agricultural Pests Act aims to restrict the introduction of IAS into SA with permits being required for the import of plants, insects and alien animals.¹¹²

e) National Environmental Management: Biodiversity Act

Currently, the NEM:BA is SA’s most detailed fauna-related IAS legislation. The Act’s objectives, highlighted in s2, echo those of the CBD and give domestic effect to the international treaty. The country’s commitment to the fight against IAS is apparent in that SA has the largest budget dedicated to the management of IAS, compared to the Gross National Product, of any country in the world.¹¹³ The conservation of SA’s biological resources is a responsibility entrusted to the State.¹¹⁴ The South African National Biodiversity Institute (SANBI), the country’s leading biodiversity research and monitoring authority organisation, is responsible for regular monitoring and reporting on the country’s state of biodiversity and the status of IAS within SA.¹¹⁵ SANBI further acts as an advisory body to government on biodiversity issues, including IAS management.¹¹⁶

The bulk of IAS—specific legislation is located within Chapter 5, specifically s65—s79, of NEM:BA. Invasive species are subject to stricter regulation than alien species.¹¹⁷ The objectives of the chapter include preventing unauthorised introduction and spread of IAS to ecosystems and habitats where they do not naturally occur; managing and controlling IAS to prevent or minimise harm to the environment and biodiversity and eradicating IAS from ecosystems and habitats where they may harm such ecosystems or habitats.¹¹⁸ Restricted activities including importing, possessing, growing, breeding, transporting and trading of IAS are only allowed if permitted.¹¹⁹ The Minister may exempt persons entirely from the permitting process.¹²⁰ Alien species may be exempt by the Minister, from the permitting process.¹²¹

¹¹⁰ Act 36 of 1983.

¹¹¹ In June 2019, the DAFF merged with the Department of Rural Development and Land Reform to become the Department of Agriculture, Land Reform and Rural Development <https://bit.ly/2N7qsa2> (Accessed 19 June 2020).

¹¹² Agricultural Pests Act s3(1)(a) – (b).

¹¹³ *Kloof Conservancy v Government of Republic of SA* [2014] ZAKZDHC 60 at para 20.

¹¹⁴ NEM:BA s3.

¹¹⁵ NEM:BA s11(a).

¹¹⁶ NEM:BA s11(c).

¹¹⁷ Paterson op cit n73.

¹¹⁸ NEM:BA s64(1)(a) – (c).

¹¹⁹ NEM:BA s65 and s71.

¹²⁰ NEM:BA s66(1)(c) and s71(3).

¹²¹ NEM:BA s66(1)(a) and (b).

Kidd notes that species exemption by the Minister is key as all restricted activities involving alien species are considered illegal, unless specifically exempted.¹²² From the time of NEM:BA's enactment in 2005, a number of exempt alien species lists were drafted but it was only in 2013¹²³ that a final list was published. This effectively meant that, for almost a decade, this aspect of the Act had not been enforced. The permitting process is detailed within Chapter 7 and includes the potential for undertaking an independent risk assessment (RA) or expert advice prior to the issuance of a permit.¹²⁴ Section 91 further notes that permits may only be issued if an adequate RA has been conducted; that there exists little or no potential for species invasion; the benefits of allowing the restricted activity outweighs the costs and that adequate measures to prevent IAS escaping are in place.¹²⁵ Offences and penalties include imprisonment, fines or both should one contravene NEM:BA regulations,¹²⁶ undertake a restricted activity without a permit¹²⁷ involving a prohibited alien species¹²⁸ or fail to exercise the 'duty of care' principle when carrying out a restricted activity with an IAS.¹²⁹ The consequences of contravening NEM:BA are harsh with penalties ranging between R5—10 million and imprisonment of up to ten years.¹³⁰

2.4.3 *The Invasive Alien Species Listing Timeline*

a) *2004 to 2017*

Section 70 of NEM:BA requires that the Minister must, within 2 years of NEM:BA coming into effect in September 2004, publish a national list of IAS by end of August 2006.¹³¹ Since inception, the listing of NEM:BA IAS has been confusing and contentious. IAS lists were drafted in 2007¹³² and 2009¹³³ with neither list being published. Rainbow trout was listed as an invasive species in the 2007 draft and both species were included as Category 2 species in the 2009 draft. Such species would need to be regulated and permitted within certain areas.¹³⁴ The

¹²² M Kidd 'Conservation of Biodiversity' in M Kidd (ed) *Environmental Law* (2011) Juta Law 2 ed. 97 at 111.

¹²³ GN R509 in *GG* 36683 of 19 July 2013.

¹²⁴ NEM:BA s89.

¹²⁵ NEM:BA s91(a) – (d).

¹²⁶ NEM:BA s98.

¹²⁷ NEM:BA s65(1) and s71(1).

¹²⁸ NEM:BA s67(2).

¹²⁹ NEM:BA s69(1) and s73(1).

¹³⁰ NEM:BA s101—102.

¹³¹ NEM:BA s70.

¹³² GN R1147 in *GG* 30293 of 17 September 2007.

¹³³ GN R350 in *GG* 32090 of 3 April 2009.

¹³⁴ Woodford et al op cit n109.

controversy over trout listing, as an IAS, was sparked and SANBI—led stakeholder consultations ensued.¹³⁵

In December 2012, the High court case of *Kloof Conservancy v Government of Republic of SA*¹³⁶ began on account of there being no final IAS lists, even at the time of the case. The lack of IAS listing was impacting negatively on Kloof conservancy’s biodiversity projects and the Conservancy ordered the Minister to publish the long overdue lists. During the course of this historic case, the Minister published IAS lists,¹³⁷ together with IAS Regulations¹³⁸ in 2013. This IAS list, now included both trout species as Category 1b species. A Category 1b species was defined as invasive and requiring control by an invasive species management programme.¹³⁹ This list was legally contested and the Minister’s failure to timeously publish the required IAS lists and regulations was declared ‘unlawful and unconstitutional.’¹⁴⁰ As such, the 2013 lists were not enforced. This case highlighted that IAS invasion was being exacerbated by government’s failure to meet its responsibility as well as a lack of law enforcement.¹⁴¹

In February 2014, draft IAS lists¹⁴² and regulations¹⁴³ were published for comment where both trout species were included as Category 2 species. Permits would be required for restricted activities in certain locations and excluded for others. The draft listing exempted recreational ‘catch and release’ fishing activities from permitting, except in protected areas and ‘fish sanctuary areas.’ This exemption is key, as it illustrated the then Department of Environment (DEA)¹⁴⁴ took cognisance of the fishing fraternity’s needs during the listing process. The ‘fish sanctuary areas’ were areas for critically endangered and endangered species that were demarcated in the National Freshwater Ecosystem Priority Area maps. These maps were meant to be attached as Notice 5 of the draft list but Notice 5 was altogether omitted from the draft.¹⁴⁵ This meant that persons, particularly trout anglers, would not be able to effectively comment on the draft without this pertinent information. As such, the 2014 listing was met by fervent

¹³⁵ Ibid.

¹³⁶ [2014] ZAKZDHC 60.

¹³⁷ GN R507 in *GG* 36683 of 19 July 2013.

¹³⁸ GN R506 in *GG* 36683 of 19 July 2013.

¹³⁹ GN R507 in *GG* 36683 of 19 July 2013.

¹⁴⁰ *Supra* n136 at para 140.

¹⁴¹ *Supra* n136 at para 31.

¹⁴² GN R78 in *GG* 37320 of 12 February 2014.

¹⁴³ GN R79 in *GG* 37320 of 12 February 2014.

¹⁴⁴ In June 2019, the DEA merged with functions of Forestry and Fisheries to become Department of Environment, Forestry and Fisheries <https://bit.ly/2N7qsa2> (Accessed 19 June 2020).

¹⁴⁵ List 6 of GN R78 in *GG* 37320 of 12 February 2014 refers to maps contained within Notice 5.

outcries from the trout industry claiming the listing posed a threat to flyfishing and the trout industry as a whole.

Two lawyers and flyfishermen, Mr Ian Cox and Mr. Ilan Lax, spearheaded the criticism of the draft listing. Lax served as national chairperson of FOSAF. Cox criticised NEM:BA for its biocentric¹⁴⁶ approach noting that SA's environmental law stems from the anthropocentric Constitution and NEMA.¹⁴⁷ This is a somewhat confusing comment. While the Constitution does protect human rights, it is not an anthropocentric law as s24 clearly illustrates by affording everyone the right to have their environment protected. While anthropocentric sentiments are indeed echoed in s2(2) of NEMA, Cox fails to highlight that both s24(b) of the Constitution and s2(3) of NEMA explicitly promote SD.

Cox suggests that environmental protection should be done for the benefit of future human generations, rather than for the environment and that law makers should put the needs of humans first.¹⁴⁸ Cox's statement clearly contradicts the requirements of the Constitution, NEMA and the ruling of the Constitutional Court case: *Fuel Retailers Association of Southern Africa v Director General: Environmental Management, Department of Agriculture, Conservation and Environment, Mpumalanga Province*.¹⁴⁹ The case adequately highlighted the importance of balancing all three aspects of SD. The court ruled that notwithstanding the importance of humans' need for development that is socially and economically viable and desired, such development cannot exist 'upon a deteriorating environmental base.'¹⁵⁰ The case continues to stress that the 'environment and development are thus inexorably linked.'¹⁵¹ This case is important in emphasising that the Constitution takes cognisance of the need for environmental protection while simultaneously recognising the need for social and economic development by ultimately envisaging 'that environmental considerations will be balanced with socio—economic considerations through the ideal of SD.'¹⁵²

Even further, the case makes it abundantly clear that NEMA, which gives effect to s24 of the Constitution embraces the concept of SD.¹⁵³ Further still, the case notes that the

¹⁴⁶ Defined as 'the view that the rights and needs of humans are not more important than those of other living things' in Lexico Dictionary <https://bit.ly/2mlTI2u> (Accessed 1 September 2019).

¹⁴⁷ I Cox 'The Survival of Trout in SA' (May 2014) *The Complete Fly Fisherman* <https://bit.ly/2knLjv6> (Accessed 10 July 2019).

¹⁴⁸ Ibid.

¹⁴⁹ [2007] ZACC 13.

¹⁵⁰ Supra n149 at para 44.

¹⁵¹ Supra n149 at para 44.

¹⁵² Supra n149 at para 45.

¹⁵³ Supra n149 at para 59.

Constitution and environmental legislation have introduced new criteria to be considered when developments are considered with economic benefits no longer being the sole criterion for consideration.¹⁵⁴ The importance of Constitution's s24 environmental rights are effectively summarised in the final paragraph of the Supreme Court of Appeal case: *Director: Mineral Development, Gauteng Region v Save the Vaal Environment*¹⁵⁵ where Judge Olivier stated that the Constitution's s24 environmental right is in itself a human right and that the environment must be afforded the appropriate recognition and respect within SA.

Cox states that trout are not 'invasive', his reasoning being trout cannot be deemed 'invasive' purely on account of their threat to indigenous species. In his opinion, Cox notes that the DEA must show that trout causes environmental harm in order to be listed as an IAS. NEM:BA definition of 'invasive species' however notes that an invasive species is one whose presence 'may' result in environmental harm.¹⁵⁶ Taking the myriad of scientific evidence against rainbow and brown trout into account, one could however argue that NEM:BA's listing of trout as an IAS, is in line with NEMA's Precautionary Principle.¹⁵⁷ This 'risk averse and cautious approach' must be applied by decision-makers taking into account limitations on the existing knowledge about potential consequences of an environmental decision.¹⁵⁸

Cox further critiqued that the DEA withheld relevant information, specifically maps, necessary for trout stakeholders to examine prior to commenting on the drafts. These maps identified areas where trout fishing would be prohibited and Cox states that the DEA purported that most trout fishing areas would be unaffected.¹⁵⁹ The maps were only made available after the comment period closed and Cox noted that the maps included much of SA's trout fishing waters and was vastly different to the picture painted by the DEA. Furthermore, the maps were not in an easily accessible format and required a special computer programme to be viewed.¹⁶⁰

In the opposing corner, Professor Jan Glazewski, an environmental law academic at the University of Cape Town and environmental law author, supported NEM:BA's proposed listing of trout as an IAS on account of the overwhelming supporting scientific evidence.¹⁶¹ He noted that the flyfishing sector's 'hysterical' claims that the trout industry was in jeopardy were

¹⁵⁴ Supra n149 at para 79.

¹⁵⁵ [1999] ZASCA 9 at para 20.

¹⁵⁶ NEM:BA s1 definition of invasive species.

¹⁵⁷ NEMA s2(4)(vii).

¹⁵⁸ Supra n149 at para 81.

¹⁵⁹ Cox 'The Survival of Trout in SA' op cit n147.

¹⁶⁰ Ibid.

¹⁶¹ J Glazewski 'Draft Biodiversity Rules No Threat to Flyfishing: Claims on Trout Do Not Hold Water' (1 July 2014) *Business Day* <https://bit.ly/2lHXrag> (Accessed 19 July 2019).

unfounded and incorrect.¹⁶² Glazewski's sentiments were echoed by organisations such as the Southern African Society of Aquatic Scientists who submitted a position paper on trout to the Minister supporting the draft listing stating all trout species were alien to SA and possessed the ability to invade ecosystems.¹⁶³

Additional support for the draft listing came from invasion biology expert and academic, Professor Brian van Wilgen. He noted that the listing of trout posed no threat to existing legal facilities and supported SD by allowing profitable trout operations while simultaneously protecting the country's unique biodiversity.¹⁶⁴ In May 2014, DEA issued a position paper, amongst all the uproar and confusion, to clarify the listing of rainbow and brown trout. Therein, DEA categorically stated that there was 'no threat to the continued operations of existing, legal trout industries.'¹⁶⁵ The DEA made reference to groups such as FOSAF as spreading panic around the impact of the listing on the trout industry. It was noted that trout was already being regulated at a provincial level as permits were necessary to legally operate a trout farm or to stock trout in waterways.¹⁶⁶ The DEA made it clear that claims that trout were not invasive were incorrect and not scientifically based. The paper denied the lobbyists' accusations that the draft listing was a call for trout eradication and retorted that control and eradication of an IAS was so expensive and difficult that to date, there was only one South African IAS that had been successfully eradicated.¹⁶⁷

The position paper highlighted that the regulation of trout was aimed at preventing the invasion of trout into areas where they did not occur.¹⁶⁸ Regulation 4(3) of the draft IAS regulations substantiated this position assigning landowners responsibility to ensure that trout do not spread outside of their land: 'A landowner on whose land a Category 2 Listed Invasive Species occurs must ensure that the specimens of the species do not spread outside of the land or the area specified in the permit.'¹⁶⁹ The DEA's position was further substantiated by the exemption of recreational 'catch and release' restricted activities in areas where trout already

¹⁶² Ibid.

¹⁶³ Southern African Society of Aquatic Scientists 'Southern African Society of Aquatic Scientists Position Paper on Trout' (27 June 2014) <https://bit.ly/2ICDxh6> (Accessed 1 July 2019).

¹⁶⁴ B Van Wilgen 'SA Trout Industry Is Swimming against the Tide of Biodiversity Priorities' (22 June 2014) *Weekend Argus* <https://bit.ly/2k1aRxE> (Accessed 5 May 2019).

¹⁶⁵ DEA 'Clarification of the Regulation of Brown Trout and Rainbow Trout' (19 May 2014) <https://bit.ly/2kAFaLR> (Accessed 10 May 2019).

¹⁶⁶ Ibid.

¹⁶⁷ Ibid.

¹⁶⁸ Ibid.

¹⁶⁹ GN R79 in GG 37320 of 12 February 2014.

existed. Information within this position paper was communicated to the general public in The Witness newspaper.¹⁷⁰

In August 2014, the Minister published an IAS list,¹⁷¹ without repealing the 2013¹⁷² list, excluding both trout species from the invasive listing. The listing notice made no reference to the hotly—debated maps. Dr. Guy Preston, DEA’s Deputy Director—General: Environmental Programmes, on the topic of the exclusion of these species, noted that there was no point in targeting areas where trout had already established itself and as such there would be no impact to the trout industry or flyfishing. He stated that the emphasis was on prohibiting introduction of invasive trout into pristine environments.¹⁷³ The need for a balance between current economic activity and preservation of the country’s biodiversity was required.

In 2014, Operation Phakisa (OP), focusing on the economic potential of the ocean, was launched by the Department of Planning, Monitoring and Evaluation to implement the country’s National Development Plan while bolstering economic growth and employment.¹⁷⁴ It was at OP that agreements regarding invasive trout management were made between government and the trout industry.¹⁷⁵ These agreements included the mapping of trout areas and agreement that trout would be exempted from IAS listing in areas where they were already established. These settlements were recorded in the OP final report and endorsed by government.¹⁷⁶ It was also envisaged that the introduction of trout norms and standards would assist the trout sector to ultimately become self—regulated.¹⁷⁷ The establishment of norms and standards would allow trout farms that fell within the specified scope to bypass the red—tape associated with an environmental impact assessment, provided they abided by the norms and standards.¹⁷⁸

¹⁷⁰ Z Nqayi ‘Confusion over Trout Regulations’ (21 May 2014) *The Witness* <https://bit.ly/2lJQrJX> (Accessed 13 May 2019).

¹⁷¹ GN R599 in GG 37886 of 1 August 2014.

¹⁷² GN R507 in GG 36683 of 19 July 2013.

¹⁷³ Interview with G Preston ‘*Environmental Affairs Legislature Addressing Species That Cause Harm*’ (19 May 2014) SABC Digital News <https://bit.ly/2kWHywM> (Accessed 5 September 2019).

¹⁷⁴ Department of Planning, Monitoring and Evaluation ‘*Operation Phakisa*’ <https://bit.ly/2m6NP9e> (Accessed 12 August 2019).

¹⁷⁵ I Lax ‘Sustaining the SA Trout Industry’ (3 August 2015) *Farmers Weekly* <https://bit.ly/2kzKXS2> (Accessed 10 June 2019).

¹⁷⁶ R Krohn ‘*Letter to Phakisa Oct 2017*’ (5 October 2017) <https://bit.ly/2lBa5rH> (Accessed 2 June 2019).

¹⁷⁷ Lax op cit n175.

¹⁷⁸ Department of Planning, Monitoring and Evaluation ‘*Operation Phakisa: Aquaculture Final Lab Report September 2014*’ (19 September 2014) <https://bit.ly/2k5i0wX> (Accessed 10 September 2019).

The IAS lists were reviewed and published in 2016, altogether excluding brown and rainbow trout.¹⁷⁹ To avoid confusion, the 2013¹⁸⁰ IAS list was repealed. The furore around trout listing, as an IAS, seemed to temporarily quieten down and what ensued was extensive engagement between authorities and the trout sector on a ‘win—win’ way forward.¹⁸¹ In an undated and unsigned July 2017 letter sent to trout stakeholders, Preston is said to have noted that despite the OP agreements and protracted discussions, the DEA continued to receive legal threats from members of FOSAF and other trout groups.¹⁸² Preston noted that the OP agreement was made on provision that there would still need to be regulation of the trout and permits were always part of the DEA’s vision for specific trout—related activities. In light of the legal threats, the DEA sought legal advice with the outcome being that the option that posed the least legal risk would be to nationally categorise trout species as Category 2 IAS while allowing for the potential of self—regulated permits.¹⁸³ Preston further noted that this opinion was agreed to by provinces as well as the DAFF.

Understandably, the trout stakeholders were taken aback feeling that the DEA had defaulted on the agreements made at OP not to list the trout species as invasive. The trout stakeholders felt the DEA had repudiated on a three year process of engagement between the two groups and the trust was broken.¹⁸⁴ On 11 October 2017, Cox wrote a scathing 23—page letter¹⁸⁵ accusing Minister Molewa and her predecessors of failing to properly publish draft laws in terms of NEM:BA’s s99 and s100. Section 99 notes that prior to the Minister exercising a power, the PPP must be followed.¹⁸⁶ The PPP includes the Minister publishing a notice in the Government Gazette and in at least one newspaper. The newspaper must be nationally—distributed unless the issue affects just a single area, in which case a local newspaper can be used.¹⁸⁷ The notice should contain sufficient information to enable the public to submit meaningful written representations or objections within 30 days of the date of Gazette publication.¹⁸⁸ Cox’s letter further tabulated NEM:BA notices, dating back to 2005, where a

¹⁷⁹ GN R864 in GG 40166 of 29 July 2016.

¹⁸⁰ GN R507 in GG 36683 of 19 July 2013.

¹⁸¹ Krohn op cit n176.

¹⁸² Durban Fly Tyers ‘Letter to Trout Stakeholders’ (Undated) <https://bit.ly/2IJ3VpD> (Accessed 2 September 2019).

¹⁸³ Ibid.

¹⁸⁴ Krohn op cit n176.

¹⁸⁵ I Cox ‘Annexure E: The Widespread Failure to Properly Publish Draft Laws for Comment as Required in Terms of Sections 99 and 100 of the National Environmental Management Biodiversity Act, 2004’ (11 October 2017) <https://bit.ly/2lEjoXT> (Accessed 3 March 2019).

¹⁸⁶ NEM:BA s99(2)(c).

¹⁸⁷ NEM:BA s100(1).

¹⁸⁸ NEM:BA s100(2).

draft notice should have been published as per s99 and s100 of NEM:BA. The information obtained within the table was supplied by the DEA itself. In several cases, Cox showed that DEA was unable to show whether notices were published in newspapers. This alone could mean that the public were completely unaware of pending legislation changes and would thus be unable to make any representations, let alone meaningful ones. Cox drew attention to the case of *Kruger and Another v Minister of Water and Environmental Affairs and Others*¹⁸⁹ where the Minister was found to have failed to comply with provisions of s99 and s100 of NEM:BA.

The letter noted that the 30-day period, as stipulated in s100 of NEM:BA, is regarded by the courts as a minimum period and detailed numerous incidents where draft notices were published in newspapers long after they had been gazetted. In one instance, NEM:BA's Bioprospecting Benefit Sharing Agreement, the newspaper notice was placed 30 days after the gazetted notice.¹⁹⁰ The information further notes that incorrect newspapers were used when publishing the notices. In the case of the 2014 IAS Regulations,¹⁹¹ the notice was published in the Post newspaper 24 days after the gazette publication. Apart from the delay in the newspaper publication, these regulations have a nationwide impact and the Post is a Durban—based newspaper. This is not in keeping with requirements stipulated in s100 of NEM:BA. The timing of Cox's hard—hitting critique was somewhat ironic, given the events that were to follow.

At the end of October 2017, the DAFF released progress on OP making reference to the communication by Preston on the implications of the state's legal opinion on trout's listing as an IAS. The press release noted that the Trout Mapping process had not yet been finalised. The Aquaculture Development Bill (ADB),¹⁹² referred to in the release, had been signed off by the National Economic Development and Labour Council.¹⁹³ Originally proposed in 2016, the ADB was revived and approved by cabinet in May 2018. The approval of the ADB exacerbated the already tense relationship and feelings of distrust between authorities and the trout sector. The aquaculture industry, including the trout sector, believed the ADB was government's attempt to control and overregulate the industry rather than to develop it.¹⁹⁴ Sceptics further

¹⁸⁹ [2015] ZAGPPHC 1018.

¹⁹⁰ Cox 'Annexure E: The Widespread Failure to Properly Publish Draft Laws for Comment as Required in Terms of Sections 99 and 100 of the National Environmental Management Biodiversity Act, 2004' op cit n185.

¹⁹¹ GN R598 in GG 37885 of 1 August 2014.

¹⁹² GN R248 in GG 41632 of 18 May 2018.

¹⁹³ DAFF 'Portfolio Committee 24th of October 2017: Feedback on Aquaculture Operation Phakisa Oceans Economy' (24 October 2017) <https://bit.ly/34BL7JW> (Accessed 1 September 2019).

¹⁹⁴ A van Wyk 'Fish and Crocodile Farmers Say a New Bill Intended to Develop Their Sector Will Destroy It' (28 May 2018) <https://bit.ly/2sfWhDo> (Accessed 9 September 2019).

felt that the ADB aimed to control aquaculture rather than aid development and a number of aquaculture organisations attempted to halt the progress of the ADB, without success.¹⁹⁵ The objectives of the ADB include the promotion of SD and transformation of a competitive aquaculture sector.¹⁹⁶ The ADB was seen as a threat to existing trout facilities given the requirement for an aquaculture licence holder must, where applicable, comply with Black Economic Empowerment legislation.¹⁹⁷ The ADB has since lapsed according to National Assembly Rule 333(2) on 7 May 2019.¹⁹⁸

b) The 2018 listing

On 16 February 2018, mere months after Cox’s letter to the Minister, Draft IAS regulations¹⁹⁹ and amendments to the IAS lists²⁰⁰ were gazetted for comment. The proposed amended IAS list included eighteen new freshwater fish such as both trout species, salmon and catfish. Except for trout, salmon and catfish, which were allocated to Category 2, new freshwater fish species were allocated to the more restrictive Category 1a. This is of interest as trout, salmon and catfish are all integral to OP plans²⁰¹ and possibly given a more lenient category in light of their economic value.

For trout, two of the twelve restricted activities were exempt from the permitting process, namely ‘having in possession or exercising physical control over any specimen of a listed invasive species’ and ‘catch and release of a specimen of a listed invasive fresh—water fish or listed invasive fresh—water invertebrate species’.²⁰² These exemptions, as they had in the 2014 draft IAS lists,²⁰³ illustrated that the DEA had taken the socio-economic needs of the fishing sector into account when listing trout as an IAS. Regulation 4(3) of the draft IAS regulations²⁰⁴ iterated the DEA’s stance of not wishing to eradicate trout in areas where they currently existed but rather to avoid introduction into areas where they currently did not exist. This regulation stated that: ‘A person in control of a Category 2 Listed Invasive Species, or person in possession of a permit, must ensure that the specimens of the species do not spread outside of

¹⁹⁵ Ibid.

¹⁹⁶ ADB s2.

¹⁹⁷ ADB s66.

¹⁹⁸ Parliamentary Monitoring Group ‘*Aquaculture Development Bill (B22—2018)*’ <https://pmg.org.za/bill/806/> (Accessed 13 August 2019).

¹⁹⁹ GN R112 in GG 41445 of 16 February 2018.

²⁰⁰ GN R115 in GG 41445 of 16 February 2018.

²⁰¹ Department of Planning, Monitoring and Evaluation ‘*Operation Phakisa*’ op cit n174.

²⁰² List 7 of GN R115 in GG 41445 of 16 February 2018.

²⁰³ GN R507 in GG 36683 of 19 July 2013.

²⁰⁴ GN R112 in GG 41445 of 16 February 2018.

the land or the area specified in the Notice or permit.²⁰⁵ In effect, this meant that all restricted activities, except two exempt ones would require permits to lawfully operate.²⁰⁶ Such a permit would only be issued after a RA had been conducted.²⁰⁷

For certain restricted activities, including ‘growing or breeding’ of IAS, the RA must be undertaken by a RA practitioner who has knowledge of NEM:BA, expertise in biodiversity matters and conducting RAs and who has consulted with one other relevant expert.²⁰⁸ In addition, this person should also comply with requirements of the Natural Scientific Professions Act.²⁰⁹ Although the prescribed application fee needed to accompany permit applications was a maximum of just R200,²¹⁰ the trout sector envisaged that the cost of conducting RAs, taking the necessary requirements into account, would be exorbitant. The trout sector risked potentially becoming criminals overnight should the draft IAS Regulations be promulgated. With severe penalties for non—compliance, the concerns held by the trout industry were evidently warranted.

On 19 February 2018, Cox wrote to Preston querying the listing process and whether NEMA’s s2 principles were considered in the IAS listing process, requesting reasons for listing both trout species as IAS and requesting details of the newspaper in which the notice had been published.²¹¹ Cox queried why the IAS listing had been drafted prior to the release of the SANBI IAS status report.²¹² NEM:BA requires that SANBI must report on the IAS status to the Minister.²¹³ The 2017 report was to be the first comprehensive national assessment of IAS invasions and was meant to inform decisions regarding IAS management. The report drew attention to the difficulty of controlling trout invasions in particular.²¹⁴ Given the critical information contained within the SANBI report, it would make sense, as Cox suggested, for the draft IAS Regulations and lists to take cognisance of the report.

The SANBI report noted that the historical and ongoing impasse surrounding IAS trout management had unfortunately resulted in an absence of regulations of these IAS and further

²⁰⁵ Regulation 4(3) of GN R112 in GG 41445 of 16 February 2018.

²⁰⁶ Regulation 4(2) of GN R112 in GG 41445 of 16 February 2018.

²⁰⁷ NEM:BA s71(2).

²⁰⁸ Regulation 17(3) of GN R112 in GG 41445 of 16 February 2018.

²⁰⁹ Act 27 of 2003.

²¹⁰ Annex A in GN R112 in GG 41445 of 16 February 2018.

²¹¹ I Cox ‘Annexure G: Email to Dr. Guy Preston’ (19 February 2018) <https://bit.ly/2kMisAv> (Accessed 5 June 2019).

²¹² B Van Wilgen and JRU Wilson ‘The Status of Biological Invasions and Their Management in SA in 2017 – Draft for Review Only’ (2017) <https://bit.ly/2kMhSmj> (Accessed 5 June 2019).

²¹³ NEM:BA s11(1)(a)(iii).

²¹⁴ Van Wilgen and Wilson op cit n212.

suggested that the NEM:BA regulations aim for a ‘mutually beneficial strategy’ by allowing biodiversity conservation in some areas and fishery development in others.²¹⁵ Trout lobbyist’s vehement ongoing resistance to the proposed IAS Regulation and lists may result in the spread of the IAS into areas where they do not already occur.²¹⁶ Woodford notes that the comprehensive enforcement of NEM:BA is constrained by both human and budget resources within government and conservation agencies.²¹⁷ The Minister could, in taking these limited resources into account, use the SANBI report to better prioritise limited DEA resources.

Incidentally, the Minister had not yet published the notice in a newspaper at the time of Cox’s enquiry. On 21 February 2018, the Minister published the request for public comment in the Star Newspaper and again on the 25 February 2018 in the Sunday Times and the City Press.²¹⁸ The reason for these multiple publications may be that the Star is not a nationally—distributed newspaper and as such, did not conform to s100(1)(b) of NEM:BA. The Minister sought to rectify this non—compliance by publishing the notice in two nationally—distributed newspapers albeit nine days after the gazetted notice which FOSAF felt this was non—compliant with NEM:BA requirement.²¹⁹ On FOSAF’s concern of tardy publishing of newspaper notices, however, a simple reading of NEM:BA confirms there is no specification for the simultaneous publishing of notices in the Gazette and newspaper.²²⁰

In early March 2018, Preston responded to Cox’s letter including the RAs for both trout species that were used to inform the IAS listing. The contents of the letter were strikingly similar to the information contained within the DEA’s May 2014 position paper.²²¹ Preston clarified that the IAS lists had been amended in light of new studies and noted that the already complex field of invasion biology was being further complicated by the reality of climate change and its impacts.²²² On Cox’s query of how NEMA’s s2 principles were considered during the drafting process, Preston noted that the Precautionary Principle²²³ and the environment being held in public trust²²⁴ were amongst the NEMA principles DEA considered

²¹⁵ Ibid.

²¹⁶ SM Marr *et al.* ‘Evaluating invasion risk for freshwater fishes in SA’ (2017) 47(2) *Bothalia* <https://doi.org/10.4102/abc.v47i2.2177> (Accessed 2 April 2019).

²¹⁷ Woodford *et al* op cit n109.

²¹⁸ FOSAF ‘*Applicant’s Replying Affidavit*’ (17 April 2019) <https://bit.ly/2kJxg2X> (Accessed 5 September 2019).

²¹⁹ Ibid.

²²⁰ NEM:BA s100(1).

²²¹ DEA ‘*Annexure I: Response to Request for Information Pertaining to the Proposed Listing of Trout under the NEM:BA IAS Regulations*’ (8 March 2018) <https://bit.ly/2kMisAv> (Accessed 5 June 2019).

²²² DEA ‘*Annexure I: Response to Request for Information Pertaining to the Proposed Listing of Trout under the NEM:BA IAS Regulations*’ op cit n221.

²²³ NEMA s2(4)(a)(vii).

²²⁴ NEMA s2(4)(o).

while drafting the IAS lists. Preston advised that the proposed listing did not aim to negatively impact upon the existing trout industry but rather that the trout industry was an important one, in need of nurturing. Trout's proposed IAS listing was, according to Preston, supported by other government departments and SANBI.²²⁵ Preston iterated that the purpose of the draft IAS regulations was aimed at preventing the spread of trout into areas where they currently did not occur.²²⁶ This purpose was substantiated by Regulation 4(3) of the 2018 draft regulations.

Days later, on the 12 March 2018, Cox responded to Preston in a 55-page Memorandum of Objection²²⁷ to the draft IAS regulations and lists. Cox noted that the draft regulations and associated lists were 'fatally defective' on account of their failure to comply with s100 of NEMBA and would be challenged in court should the Minister fail to retract them. He further noted that the published newspaper notices were unlawful in that they fell short of the required 30 day public comment period.²²⁸ Existing NEMBA IAS regulations and lists were, according to Cox, already 'ineffective and unworkable' with all spheres of government ignoring its requirements. The evidence of this particular claim is located within the draft 2017 SANBI report.²²⁹ Landowners are legally required to notify government of IAS on their land.²³⁰ In reality however, only 59 such notifications have been received representing only 0.001 per cent of South African land parcels.²³¹ This statistic illustrates that 99.99% of landowners were either blissfully unaware or ignoring their legal obligations. In addition to notification of the presence of IAS, a landowner is required to 'take steps to control and eradicate the listed invasive species and to prevent it from spreading.'²³² It is understandable that landowners are hesitant to notify government as they may then be required to take potentially costly steps.

Cox attributes much of NEM:BA's failure as an 'unworkable law' to the manner in which NEM:BA was developed having not followed the conventional white paper policy—making process. The result of which is a law that was largely biocentric in its approach, having incorporated the values of the CBD into account.²³³ NEMA, Cox noted, was underpinned by

²²⁵ DEA 'Annexure I: Response to Request for Information Pertaining to the Proposed Listing of Trout under the NEM:BA IAS Regulations' op cit n221.

²²⁶ Ibid.

²²⁷ I Cox 'Annexure J: Memorandum of Objection: Draft Amendments to IAS Lists and Regulations 2017' (12 March 2018) <https://bit.ly/2kMisAv> (Accessed 5 June 2019).

²²⁸ Ibid.

²²⁹ Van Wilgen and Wilson op cit n212.

²³⁰ NEM:BA s73(2)(a).

²³¹ Van Wilgen and Wilson op cit n212.

²³² NEM:BA s73(2)(b).

²³³ Cox 'Annexure J: Memorandum of Objection: Draft Amendments to IAS Lists and Regulations 2017' op cit n227.

anthropocentric values and therein lay the controversy. Cox quips that the tough listing of trout as IAS has less to do with scientific evidence, which in his opinion, is lacking and more to do with government's need to institute state control over all biological resources. Herein he accuses the DEA of having ulterior motives.²³⁴ Considering that the majority of the country's trout waters are privately—owned and given the economic value of trout, one can understand the reasoning behind Cox's accusation. The letter continues to query the quality and independence of the DEA's RAs suggesting that the authors were unqualified and biased in their reporting and that the RAs completely excluded the social aspect of the trout value chain.²³⁵ Cox's criticism that DEA had excluded the socio—economic aspects associated with trout is a valid one. As highlighted in the *Fuel Retailers* judgement, environmental interests must be balanced with socio—economic ones.²³⁶ The judgement further notes that NEMA illustrates that environmental authorities, such as the DEA, are under an obligation to consider socio—economic factors 'as an integral part of its environmental responsibility.'²³⁷

A DEA media release²³⁸ generated in March 2018 in response to the public outcry over trout's IAS drafting, stated that while trout hatcheries would still require permitting under the proposed regulations, the length of such permits may be extended to 40 years to accommodate for the entire trout life cycle.²³⁹ Cox argued that the draft IAS regulations only allowed for such permits to be issued for a maximum period not exceeding ten years. Cox's statement is correct when read solely in context of s27(1)²⁴⁰ of the draft IAS regulations. However, s27(2) — (3) of the draft IAS Regulations do allow for permits, in excess of ten years, to be issued if certain criteria are met.

Within his statement, Cox refers to the NEM: Laws Amendment Bill²⁴¹ as it proposes to drastically amend s73 of NEM:BA, the core of IAS management. Anticipated changes include the measures to be undertaken to eradicate IAS and remove landowners' obligation to report the presence of IAS on their properties.²⁴² The proposed changes were misrepresented by DEA as being minor in nature and Cox remarks that the Bill, if passed, may not survive the legal

²³⁴ Ibid.

²³⁵ Ibid.

²³⁶ [2007] ZACC 13 at para 61.

²³⁷ Supra n236 at para 62.

²³⁸ DEA 'Environmental Affairs Responds to Public Comments on Rainbow and Brown Trout Listing as Invasive Species' (7 March 2018) <https://bit.ly/2lPGzi2> (Accessed 10 August 2019).

²³⁹ Ibid.

²⁴⁰ Section 27(1) of GN R112 in GG 41445 of 16 February 2018 states a permit may be issued for a period not exceeding ten years.

²⁴¹ B14D—2017.

²⁴² Ibid.

challenge that will follow.²⁴³ The NEM: Laws Amendment Bill lapsed in terms of the National Assembly Rule R333(2), on 7 May 2019, but was revived by the National Council of Provinces on 17 October 2019.²⁴⁴

On 13 March 2018, the Consortium of Interested and Affected Parties (CIIP) comprising Aquaculture SA, Trout SA and FOSAF wrote to the Minister demanding a retraction of the draft IAS Regulations and lists. CIIP bluntly informed the Minister that failure to withdraw the notices may result in legal proceedings to render the notices unlawful.²⁴⁵ The Minister responded to the CIIP, on 30 March 2018, noting that while it was unnecessary to retract the IAS listing, the period for public comment on the notice would be extended by 30 days in light of the various concerns about the comment period.²⁴⁶ The Socio—Economic Impact Assessment (SEIA) and other relevant RAs, used to inform the draft IAS lists, were to be posted on the DEA’s website. In a City Press advert²⁴⁷ on 13 May 2018, an extension of the public commenting period till 18 June 2018 was published. The extension was not, however, gazetted as required by s100(1)(a) of NEM:BA.

On 16 June 2018, Cox submitted another representation criticising the Minister and her predecessors for failing ‘abysmally’ to implement NEM:BA’s Chapter 5 and accused the DEA of ‘egotistical vanity’ in their repeated attempts to list trout species as IAS.²⁴⁸ Cox did not fail to mention that the Minister had, once again, failed to follow the s100 requirements of NEM:BA when she failed to Gazette the extension notice.²⁴⁹ On the topic of the RAs, which the Minister had promised would be posted on the DEA website, Cox stressed that they were difficult to locate and it was only on account of his frequent use of the site that he was able to locate the documents. On discovery thereof however, he found the Minister had only posted 10 of the 79 proposed IAS amendments on the DEA website. Cox interestingly noted that the Minister should not list a species as an IAS merely because it had been deemed so by scientists. Cox critiques the available RAs as being sloppy, lacking reliable local data and depending

²⁴³ Cox ‘Annexure J: Memorandum of Objection: Draft Amendments to IAS Lists and Regulations 2017’ op cit n227.

²⁴⁴ Parliamentary Monitoring Group ‘National Environmental Management: Laws Amendment Bill’ <https://pmg.org.za/bill/706/> (Accessed 2 September 2019).

²⁴⁵ CIIP ‘Annexure L: Formal Demand for the Withdrawal of Notices GN112 and 115’ (13 March 2018) <https://bit.ly/2mhn42a> (Accessed 5 June 2019).

²⁴⁶ E Molewa ‘Annexure M: Withdrawal of IAS Notices GN112 and GN115’ (30 April 2018) <https://bit.ly/2mhn42a> (Accessed 5 June 2019).

²⁴⁷ City Press ‘Annexure N: Extension of the Public Commenting Period for the Proposed Amendments to the IAS Regulations and Species lists published 16 February 2018’ (13 May 2018) <https://bit.ly/2mhn42a> (Accessed 5 June 2019).

²⁴⁸ I Cox ‘Annexure O: Representations’ (16 June 2018) <https://bit.ly/2P0GW33> (Accessed 5 June 2019).

²⁴⁹ Ibid.

excessively on desktop studies and further poked holes in the DEA's SEIA, that appeared to have referred to a different set of draft IAS lists rather than the 2018 ones and that quite blatantly, failed to conform to the required SEIA guidelines.²⁵⁰ Cox concluded with a request for DEA to halt attempts to publish new NEM:BA laws but rather to begin a policy—making process.

The following day, the CIIP wrote to Preston requesting the draft IAS regulations and lists are withdrawn in light of the DEA's shortcomings related to the listings thus far. The defective nature of the SEIA and the failure to take the SANBI report into consideration were also cited as reasons to withdraw the legislation.²⁵¹ On 22 June 2018, yet another notice extending the public comment period was published in national newspaper, Mail and Guardian as well as the Government Gazette.²⁵² Notwithstanding the Minister's efforts to show good faith by extending the public comment period, FOSAF wrote to the Minister on the 23 June 2018 requesting that the draft IAS regulations and lists be withdrawn. The failure of the Minister to do so would result in FOSAF seeking relief from the Courts.²⁵³ On the same day, Cox submitted his third objection to the draft IAS regulations and lists.²⁵⁴ He suggested that the numerous attempts by DEA to rectify the notices could be seen as a confession that the original notice was defective and with this implied confession, the entire notice listing should begin de novo²⁵⁵ or anew. Cox ridiculed the DEA when he noted that the notice published the prior day may well be the first time that the DEA had complied with the s100 requirements of NEM:BA in the last decade.²⁵⁶ Notwithstanding this jibe, Cox concluded by stating that the entire notice process was unlawful and should be halted.

In August 2018, the numerous threats of legal action against the DEA became a reality when FOSAF instructed lawyers to move an application against the Minister to seek relief on the matters of the draft IAS regulations and lists. An interdict application was lodged by FOSAF against the Minister of Environmental Affairs, at the Gauteng High Court, on 28 August 2018.²⁵⁷ On 31 August 2018, FOSAF served Gauteng High Court application papers

²⁵⁰ Ibid.

²⁵¹ CIIP 'Annexure P: Draft Amendments to the IAS Lists and Regulations 2018 promulgated in terms of NEM:BA' (17 June 2018) <https://bit.ly/2mhn42a> (Accessed 5 June 2019).

²⁵² GN R622 in GG 41722 of 22 June 2018.

²⁵³ FOSAF 'Annexure R: Draft Amendments to the IAS Lists and Regulations 2018 promulgated in terms of NEM:BA' (23 June 2018) <https://bit.ly/2mhn42a> (Accessed 5 June 2019).

²⁵⁴ I Cox 'Annexure S: Representations' (23 June 2018) <https://bit.ly/2mhn42a> (Accessed 5 June 2019).

²⁵⁵ Latin expression meaning 'from the beginning' in Merriam—Webster Dictionary <https://bit.ly/2m2X1LW> (Accessed 2 September 2019), Cox 'Annexure S: Representations' op cit n254.

²⁵⁶ Ibid.

²⁵⁷ FOSAF 'Notice of Motion' (28 August 2018) <https://bit.ly/2RdsCWq> (Accessed 3 April 2019).

on the Minister.²⁵⁸ The application included nineteen Annexures: ‘A’ to ‘S,’ many of which have already been discussed. The Minister filed a Notice of Opposition 13 September 2018.²⁵⁹ In late September 2018, the Minister at the time passed away. In December 2018, the DEA filed an answering affidavit.

On the 17 April 2019 Lax, in a replying affidavit,²⁶⁰ noted a number of concerns namely that one of the affidavits submitted by Preston lacked legal status as Preston had not been vetted, by the new Minister, to respond on behalf of the Minister.²⁶¹ Lax further noted that the DEA had responded that the court application by FOSAF was ‘premature’ in that the draft IAS Regulations and lists had not yet been promulgated and consequently did not affect anyone’s rights. This comment, Lax writes, is indicative of the lack of appreciation the DEA has on the importance of PPP within the law—making process. The DEA attempted to prove that it had done more than legislation required when it presented all the newspaper publications as part of its legal submissions. Lax contended that it was not the number of newspaper publications that counted, but rather whether those publications met the legal requirements. Lax maintains that they fell short of the s100 of NEM:BA requirements.

²⁵⁸ *The Federation of Southern African Fly Fishers and the Minister of Environmental Affairs* Case 62486/18.

²⁵⁹ I Lax ‘Why FOSAF took DEA to court’ 2018 32(169) *Southern Africa Flyfishing Magazine* <https://bit.ly/2mucPrm> (Accessed 4 September 2019).

²⁶⁰ FOSAF ‘*Applicant’s Replying Affidavit*’ op cit n218.

²⁶¹ *Ibid.*

2.5 CONCLUSION

The management of trout as an IAS, is a contentious topic in many countries including SA. A brief summary of key dates and information associated with SA's trout controversy are detailed:

Date	Issue
1 September 2004	NEM:BA enacted.
17 September 2007	IAS list draft: Rainbow trout listed.
3 April 2009	IAS list draft: Both species listed.
19 July 2013	IAS list published: Both species listed. List deemed unlawful.
12 February 2014	IAS list draft: Both species listed.
19 May 2014	DEA released a position paper clarifying trout listing.
1 August 2014	IAS list published: Both species excluded and listing published (Post).
29 July 2016	IAS list published: Both species excluded.
16 February 2018	IAS list draft: Both species listed.
21 February 2018	Minister published Notice (Star).
25 February 2018	Minister published Notice (City Press and Sunday Times).
07 March 2018	DEA media release regarding trout listing as IAS.
12 March 2018	Cox submitted Memorandum of Objection.
13 May 2018	Minister extended public comment period (City Press).
16 June 2018	Cox submits 2 nd objection.
22 June 2018	Minister extended public comment period (Mail and Guardian and Gazette).
23 June 2018	1)FOSAF requests Minister to withdraw IAS lists. 2) Cox submits 3 rd objection.
31 August 2018	FOSAF serves court papers on Minister.

Table 1: Summary of key dates and information around the listing of trout as an IAS.

As has been discussed in this Chapter, both NZ and SA trout anglers took the legal route by which to fight their respective authorities in what they believe was a threat to the trout sector. The current chapter has already answered the research question around SA's legislative framework governing invasive trout. The forthcoming chapter aims to discuss answers to the remaining research questions.

CHAPTER THREE:

ANALYSIS AND DISCUSSION

3.1 INTRODUCTION

The previous chapter has illustrated that regardless of the motives, interference by authorities in the trout industry, is contentious in both NZ and SA. This chapter seeks to answer the outstanding three research questions: the comparison of SA's legal response to invasive trout with other countries; whether stakeholders' concerns around the listing of trout as an IAS are warranted and whether the IAS listing supports the concept of SD in SA.

3.2 SOUTH AFRICA'S LEGAL RESPONSE TO INVASIVE TROUT

SA's legal response to invasive trout is considerably milder in comparison to countries such as Japan, Norway, Italy and Switzerland where prohibition of invasive trout and even poisoning has been legislated.

In comparing SA's response to that of NZ, there are some interesting comparisons including a number of uncanny similarities. First, both the Conservation Amendment Bill (CAB) and the Draft IAS lists were proposed in 2018 and both in an attempt to protect indigenous biodiversity. Interestingly, neither legislation was trout—specific nor aimed at trout eradication despite what many trout anglers and stakeholders thought. Furthermore, both FOSAF and the FGC supported improved efforts for the protection of indigenous freshwater species. This support, however, was not expected to be at the expense of the social and economic benefits that anglers felt the proposed legislation would impact negatively upon.

Secondly, legislation was proposed without the legislated consultation requirements being fulfilled in NZ and SA and what ensued was a lack of trust between trout sectors and authorities in both countries. In the case of NZ, Eugenie Sage did not consult with stakeholders or iwi before presenting the CAB to parliament and in SA, there were a number of instances where stakeholders felt they were not afforded the opportunity for adequate consultation on proposed legislation changes. As a result of this lack of proper consultation, both opposing sides felt that the legislation had been proposed in an attempt for authorities to gain more control over natural resources. Authorities were subsequently accused of using the proposed legislation to implement ulterior motives. The importance of effective communication is

essential to successful relationships, regardless of their nature.¹ Research has illustrated that effective communication allows for trust to be built between parties. The methods of communication, used by SA policy makers are similar to those used worldwide and include the publication of proposed legislation in newspapers, parliamentary newsletters and government websites.² In this respect, SA is on par with the rest of the world.

Thirdly, opposition groups in both countries sought legal assistance from prominent lawyers: Sir Geoffrey Palmer in the case of NZ and Ian Cox and Ian Lax in the case of SA. Fourth, both NZ's and SA's angling communities raised concerns about the methodology by which NZ's 'spawning grounds' and SA's 'fish sanctuaries' were identified and demarcated by respective authorities. In both cases, opposition parties: FGC and FOSAF raised the potential ramifications of such demarcations may be costs that need to be borne by private landowners. Last, an interesting similarity in both countries was the use of the word 'unworkable' with respect to legislation. In SA, Cox referred to existing NEM:BA regulations and IAS lists as being 'unworkable' and as such ineffective. Sage, in the case of NZ, utilised the word in reference to the outdated Conservation Act that she, as Minister of Environment, had inherited. It was the 'unworkable' Conservation Act, she noted, that spurred on the need for the CAB.

There are a number of key differences in the manner in which SA and NZ cases evolved. Possibly the most glaring difference was the reaction of authorities to the uproar from trout stakeholders. In SA, the concerns raised by opposition regarding the lack of consultation by government was met by the authorities merely extending the public comment periods rather than amending the proposed legislation or initiating consultation workshops. In contrast, the NZ authorities heard and took the stakeholders' concerns into account when they deleted Clause 5(3) of the CAB. Furthermore, Sage allowing for a one year transition period, before CAB is to be enacted, shows the importance that NZ authorities hold for their stakeholders' concerns. By allowing such a transition period, NZ authorities acknowledge that the CAB, as it exists, requires fine tuning before it can be promulgated. In the 1990's, NZ's Department of Conservation endured a similar situation over a proposed IAS programme whereby the country's public outcry over a proposed feral horse eradication programme resulted in the

¹ VW Harris '9 Important Communication Skills for Every Relationship' <https://bit.ly/31KG88N> (Accessed 29 September 2019).

² MP Sebola 'Communication in the South African Public Participation Process' (2017) 9(6) *African Journal of Public Affairs* 25 at 29.

programme being terminated.³ It is possible that DOC did not wish to repeat such a situation and thereby allowed the CAB's one year transition period. Therefore, while both opposition groups: FOSAF and FGC sought legal opinion on their respective proposed legislation, only FOSAF was forced to initiate legal proceedings against authorities.

The use of science in the management of IAS and trout was another area where the two cases differed. Cox maintained that trout were not invasive and should not be persecuted purely because scientists deemed it so. Indeed this is an ironic comment, given the myriad of scientific evidence to the contrary. Moreover, authorities are required to base their IAS identification and listings on something solid and the presence of scientific evidence provides this rooting. In addition to the South African scientific studies supporting trout listing as an IAS, the IUCN's listing of rainbow trout as a global IAS provides further ammunition for the proposed listing. In the case of NZ, opposition to the proposed CAB highlighted that they would support the identification of 'spawning grounds' if it were based on 'good science.'⁴

Finally, a noteworthy aspect of NZ's policy making process that was vastly different to SA's, was the transparency on public comments. The NZ government website allows one to view all public comments and submissions, including petitions received and this allows for transparency. The availability of this information on the NZ government website illustrated that the government is being transparent in their dealings and the public feel at ease knowing their comments have been both received and acknowledged.

3.3 VALIDITY OF SOUTH AFRICAN STAKEHOLDER CONCERNS

In some regards, the concerns raised by stakeholders surrounding the proposed listing of trout is warranted and in other cases, they are not. First, stakeholders were well within their rights to feel excluded with respect to the proposed legislation as they were not adequately consulted as per the legislated requirements, as has been discussed in the previous chapter. NEMA's s4(2)(b)(f) and s23(2)(d) both clearly provide for the PPP to ensue in issues of environmental governance. Kidd notes that people must be afforded the opportunity to be heard, in a meaningful manner, prior to environmental decisions being made.⁵ Zengeya et al. highlight that the amount of time and energy spent debating the trout listing is a 'stark reminder to

³ R Wittenberg and MJW Cock 'Invasive Alien Species: A Toolkit of Best Prevention and Management Practices' (2001) CAB International, 1 at 182.

⁴ NZ Parliament 'CAB—Second Reading' (2 August 2019) <https://bit.ly/2mtyPM> (Accessed 18 September 2019).

⁵ M Kidd 'Environmental Justice: A South African Perspective' in M Kidd *Environmental Law* (2011) Juta 2 ed. 292 at 304.

managers to anticipate potential management conflicts before they have a chance to disrupt problem—solving.⁶ The odds of arriving at a practical, mutually—agreed upon IAS management strategy is greatly increased when stakeholders are identified and engaged with at the onset of a given project.⁷

Cox, in his October 2017 letter to the Minister, highlighted the numerous instances wherein government had failed to comply with the requirements of s99 and s100 of NEM:BA.⁸ Stakeholders, such as FOSAF, were justified in this regard. The saga regarding the incorrect newspapers being used for publishing draft notices is another valid bone of contention. Newspapers, such as the Post, are not nationally—distributed and inappropriate for introducing national IAS lists. Given the magnitude of the trout sector and its peripheral industries, it is understandable the concerns shared by stakeholders, particularly in light of their exclusion during the drafting of the proposed legislation. Sebola notes that the PPP is ‘one of the cornerstones of democracy in modern governments which, if well cherished, may satisfy the needs of the majority of the citizens and gives them pride as contributors to adopted policy decisions.’⁹

Secondly, the draft IAS listing, prior to the release of the SANBI report, is another valid concern from stakeholders. The draft lists were indeed ‘premature’¹⁰ and should have been informed by the report as required by NEM:BA.¹¹ Despite the existence of scientific evidence to support the listing of the species as IAS, exercising patience and waiting for the SANBI report would have worked in the DEA’s favour as the report highlights the negative ecological impacts posed by trout on indigenous biodiversity in SA. Thirdly, DEA’s trout—related RAs completely excluded socio—economic aspects of the trout industry and the associated value chain. The intangible worth of the recreational aspects of fishing were also completely disregarded from these RAs. Considering the SA trout value chain provides some 13000 jobs and contributes millions to SA’s Gross Domestic Product, this is a huge oversight on the part of DEA.¹² In this regard, FOSAF and relevant stakeholders were warranted in this regard.

⁶ T Zengeya et al ‘Managing conflict—generating invasive species in SA: Challenges and trade—offs’ (2017) 47(2) *Bothalia* 9.

⁷ Ibid.

⁸ I Cox ‘Annexure E: The widespread failure to properly publish draft laws for comment as required in terms of sections 99 and 100 of the National Environmental Management Biodiversity Act, 2004’ (11 October 2017) <https://bit.ly/2lEjoXT> (Accessed 3 March 2019).

⁹ Sebola op cit n2.

¹⁰ FOSAF ‘Applicant’s Replying Affidavit’ (17 April 2019) <https://bit.ly/2kJxg2X> (Accessed 5 September 2019).

¹¹ Section 11(1)(a)(iii) of NEM:BA.

¹² N Dorward ‘Aquaculture and the NEMLA Bill’ (25 April 2018) <https://bit.ly/2TERVSW> (Accessed 8 August 2019).

It is debatable as to whether FOSAF's questioning of the invasive potential of trout, was a valid concern or not. Scientific evidence supporting trout listing as a successful IAS is clear with both species having been identified as 'fully invasive' and possessing the ability to impose major ecological impacts within SA.¹³ Notwithstanding this scientific evidence, there does exist a scarcity in the number of quantitative SA studies relating to trout.¹⁴ The DEA, in applying the NEMA s2 Principles, thus correctly erred on the side of caution when employing the Precautionary Principle and including both trout species on the draft IAS list. The listing of trout species, as an IAS, further allows SA to fulfil its CBD obligations, namely biodiversity conservation. While it may appear to stakeholders that the draft listing was 'biocentric' in this approach, one could understand this approach given a country as biologically diverse as SA.

3.4 THE SUSTAINABLE DEVELOPMENT CONCEPT

On the question of whether the proposed IAS listing supports the concept of SD, the World Commission on Environment and Development's SD definition is key. When read in conjunction with this definition, the proposed listing of trout as an IAS does allow for the development of the current trout sector without impacting negatively on the future generations' needs. The proposed listing, in no way threatens legal trout farming but rather aims to reduce the ecological impact of IAS trout into areas where they currently do not exist, particularly pristine areas.¹⁵ The claims by the trout sector, suggesting that the DEA were attempting to destroy the industry, have no substance and it appears that accusations may stem from the lack of trust between the two parties.

Section 24(b) of the Constitution promotes SD within SA. The proposed listing of trout as an IAS, is consistent with the requirements of s24(b)(ii) as it aims to protect the environment for current and future generations through reasonable measures by conserving biodiversity. As a global biologically—diverse hotspot, there is no debate that SA's biodiversity must be conserved for present and future generations. Furthermore, s24(b)(iii) requires that environmental protection secures ecologically SD as a primary goal with the promotion of 'justifiable' economic and social development being subsidiary goals.

¹³ SM Marr et al. 'Evaluating invasion risk for freshwater fishes in SA' (2017) 47(2) *Bothalia* <https://doi.org/10.4102/abc.v47i2.2177> (Accessed 2 April 2019).

¹⁴ JM Shelton, MJ Samways and JA Day 'Predatory Impact of Non—Native Rainbow Trout on Endemic Fish Populations in Headwater Streams in the Cape Floristic Region of South Africa' (2014) 16(7) *Biological Invasions* <https://bit.ly/2P05NUD> (Accessed 8 April 2019).

¹⁵ DEA 'Environmental Affairs responds to public comments on rainbow and brown trout listing as invasive species' (7 March 2018) <https://bit.ly/2IPGzi2> (Accessed 10 August 2019).

Cox's request, for the DEA to take an anthropocentric approach, is contradictory to the fundamentals of SD as embodied in both the Constitution and other environmental legislation. As Kidd suggests, the three pillars of SD: social, economic and environmental aspects are of equal importance.¹⁶ NEM:BA, having originated from the CBD, shares two objectives pertinent to this discussion: conservation of biodiversity and the sustainable use of biodiversity components. The DEA has taken an approach that supports SD in that it allows for the social and economic aspects, associated with trout, to continue and thrive. This is achieved by the provision for application and issuing of permits for restricted activities. The exemption of permits for the two restricted activities further strengthens the case that DEA has provided for the social and economic aspects of trout. In fact, the Category 2 listing of both trout species is the most lenient of the potential IAS listing options and this again supports the view that, while not specified in the RAs, the DEA has considered the social and economic aspects of invasive trout when listing them as IAS. If the DEA listing was in fact 'biocentric,' as Cox suggests, it is likely that all trout restricted activities would have been entirely prohibited rather than being allowed with a permit. Environmental protection, the third pillar of SD, is incorporated into the listing where DEA prohibits introduction of trout without permits and RAs. National legislation, in the case of the Draft IAS lists, are intended to prevent the spread of IAS species into areas where they could potentially establish and invade.¹⁷

3.5 CONCLUSION

Trout stakeholders' criticisms of the draft IAS lists are, in some instances, valid and warranted and include the lack of consultation in the drafting of the lists. In addition, the socio—economic aspects were omitted from the DEA's RAs. Notwithstanding these criticisms, it is evident that the listing of trout as an IAS supports the concept of SD within the country. The current chapter has answered the remaining research questions and the last chapter will seek to provide recommendations for the project before concluding the dissertation.

¹⁶ M Kidd 'Introduction' in M Kidd *Environmental Law* (2011) Juta 2 ed. 1 at 17.

¹⁷ Marr et al. op cit n13.

CHAPTER FOUR:

RECOMMENDATIONS AND CONCLUDING REMARKS

4.1 INTRODUCTION

Globally, trout species are vilified as ecosystem destroyers. In SA, the debate surrounding trout species listing as an IAS has continued for decades and formed the core of this paper. As a starting point, this paper reviewed SA's legal response to invasive trout and thereafter compared the response to other countries, NZ in particular. Furthermore, the study planned to investigate the validity of trout stakeholders' concerns to the topical NEM:BA draft IAS listing and to determine whether the proposed listing supported the concept of SD.

The comparison of legal responses, between SA and NZ, has been detailed in Chapter Three. This study revealed that, despite the legislated Public Participation Process (PPP) not being diligently adhered to, South African authorities were justified in their proposed listing of trout species given the species' potential to negatively impact on the environment. It was also evident that concerns raised by trout stakeholders, regarding the potential negative impact of the proposed trout listing on the trout sector, were warranted as RAs used to inform the listing completely excluded socio-economic impacts. Notwithstanding the exclusion of such impacts in RAs, the proposed listing of trout as an IAS supported the concept of SD. Chapter Three discussed remaining research questions and this chapter aims to provide recommendations and ultimately conclude the thesis.

4.2 RECOMMENDATIONS

4.2.1 The Public Participation Process

The previous chapter has highlighted the importance of involving stakeholders, at the onset of any IAS project or legislation, as a key to success. The importance of a transparent PPP cannot be discounted as it represents authorities' willingness to openly divulge the decision—making process with the public. The United States Environmental Protection Agency, in a guide to the PPP, notes that the establishment of a 'climate of integrity' comprised of transparency and trust, is necessary for a successful PPP and that failure of the PPP occurs when authorities are

dishonest or disingenuous about considering public comment.¹ Undoubtedly a time-consuming and capacity-intensive task, the online availability of public submissions and comments may be a long-term option for SA's authorities to implement to foster transparency with its citizens during the policy-making process.

Effective PPP is not a singular event, but a process as the name suggests, allowing stakeholders the opportunity to influence decisions that potentially affect their lives and livelihoods. The PPP allows for better decisions and policies that have been informed by all the necessary data, perspectives and values. Decisions taken, having incorporated all relevant input, tend to be more implementable and sustainable and subject to less resistance than decisions that are taken without effective public participation. It is hoped that the lessons learnt during the course of the trout listing saga will enable the DEA to ensure better PPP in forthcoming interactions with stakeholders.

It is argued that SA's current communication mechanisms do not allow for maximum levels of public participation in policy and decision making processes with younger generations preferring to engage with authorities through modern technologies such as social media platforms.² The current administration is, however, not receptive to this idea but rather opt to continue global trends of employing conventional methods of public participation. In July 2019, the SA population was estimated at 59 million SA citizens.³ Considering there were 31 million SA internet users in January 2019,⁴ there exists a huge potential for the SA government to engage with almost 53% of the population via the internet. Such interactions would be faster and more responsive than the current conventional hardcopy submissions that exist as part of the PPP. This is an opportunity that policy-makers could investigate as a means to a PPP that encompasses a greater number of participants.

¹ United States Environmental Protection Agency 'Public Participation Guide: Introduction to Public Participation' (22 February 2018) <https://bit.ly/31QYy7V> (Accessed 3 October 2019).

² MP Sebola 'Communication in the South African PPP: The Effectiveness of Communication Tools' (2017) 9(6) *African Journal of Public Affairs* 29.

³ Statistics SA 'Mid-year population estimates, 2019' (29 July 2019) <http://www.statssa.gov.za/publications/P0302/P03022019.pdf> (Accessed 4 October 2019).

⁴ Businesstech 'These are the biggest social media and chat platforms in 2019' (2 February 2019) <https://bit.ly/2UV60Lp> (Accessed 3 October 2019).

4.2.2 *Consideration of SANBI Report*⁵

The SANBI report noted that there exists a high level of non—compliance with NEM:BA IAS regulations as a result of ignorance of the legislation, a lack of capacity or a conscious decision not to comply. Despite the existing provision for the Minister to issue directives regarding IAS, no such directives had been issued at the time of the SANBI report.⁶ The already—challenging task of enforcing IAS legislation, with limited enforcement capacity, is further complicated when trying to regulate conflict—generating species such as trout. The SANBI report highlighted that the trout debate was ‘unfortunate’ as both the IAS regulations and the IAS lists were intended to be beneficial for all parties involved.⁷ In addition to the trout impasse consuming capacity within an already—stretched regulatory body, it also resulted in the absence of accepted regulatory framework creating the potential for non—compliance with the regulations. The SANBI advised that there existed a need for a detailed assessment of human capacity requirements necessary to enforce IAS management within SA, given the DEA’s human capacity shortages. The outcomes of such an assessment could then be used to prioritise existing capacity in the war against IAS.⁸ While it may be too late to consider the report at the current stage of the proceedings, authorities should utilise the SANBI report in forthcoming cases where IAS, particularly conflict—generating species, are being managed.

4.2.3 *Incorporation of Social and Economic Impacts into Risk Assessments*

The current trout listing subconsciously accommodated for the social and economic benefits and allows for the trout sector to continue and flourish. It may be in the DEA’s interest, however, to formally document such impacts into the relevant RAs, even if just to appease irate trout stakeholders. Additional qualitative trout studies, undertaken by independent researchers, should also be conducted to provide stakeholders and authorities with current data regarding trout in SA.

⁵ B van Wilgen and JRU Wilson ‘*The Status of Biological Invasions and their Management in SA in 2017 – Draft for Review only*’ (2017) <https://bit.ly/2kMhSmj> (Accessed 5 June 2019).

⁶ Ibid.

⁷ Ibid.

⁸ Ibid.

4.3 CONCLUDING REMARKS

This study was undertaken to investigate the controversial listing of trout species as IAS within SA. The debate surrounding trout management as an IAS is not a uniquely South African one and from the literature, it is evident that many countries have and are still dealing with the identical controversy. Trout has been a part of SA's recreational history for the greater part of two centuries and it is unlikely that this will cease in the near future. Similarly, it is unlikely that the impasse between the trout sector and authorities, which has waged for more than three decades, will find an end anytime soon particularly in light of the legal proceedings. Although it is too late to renew discussions between DEA and FOSAF, given the current case that is underway, FOSAF has shown that it is indeed a force to be reckoned with. There will ultimately need to be a rebuilding of trust amongst all stakeholders and authorities.

This study contributes significantly to understanding both sides of the controversial trout debate. For the time being, however, trout enthusiasts continue to enjoy their beloved pastime. As John Gierach, an American author and avid trout fisherman, aptly describes the lure of trout fishing: 'They say you forget your troubles on a trout stream, but that's not quite it. What happens is that you begin to see where your troubles fit into the grand scheme of things, and suddenly they're just not such a big deal anymore.'⁹

⁹ J Gierach 'Trout Fishing Quotes' <https://www.azquotes.com/tag/trout-fishing> (Accessed 4 October 2019).

BIBLIOGRAPHY

CASES

South Africa:

Director: Mineral Development, Gauteng Region v Save the Vaal Environment [1999] ZASCA 9

Fuel Retailers Association of Southern Africa v Director General: Environmental Management, Department of Agriculture, Conservation and Environment, Mpumalanga Province [2007] ZACC 13

Kloof Conservancy v Government of Republic of SA [2014] ZAKZDHC 60

Kruger and Another v Minister of Water and Environmental Affairs and Others [2015] ZAGPPHC 1018

The Federation of Southern African Fly Fishers and the Minister of Environmental Affairs
Case 62486/18

New Zealand:

McRitchie v Taranaki Fish and Game Council [1999] 2NZLR 139

STATUTES

International:

Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971

Convention on Biological Diversity of 5 June 1992

South Africa:

Acts:

Agricultural Pests Act 36 of 1983

Cape Colony Fish Protection Act 15 of 1893

Constitution Act 108 of 1996

Environmental Conservation Act 73 of 1989

Local Government: Municipal Systems Act 32 of 2000

National Environmental Management Act 107 of 1998
National Environmental Management: Biodiversity Act 10 of 2004
National Environmental Management: Protected Areas Act 57 of 2003
National Environmental Management: Waste Act 59 of 2008
Natural Scientific Professions Act 27 of 2003

Bills:

Aquaculture Development Bill
National Environmental Management: Laws Amendment Bill (B14D—2017)

Government Gazettes:

GN R1147 in *GG* 30293 of 17 September 2007
GN R350 in *GG* 32090 of 3 April 2009
GN R506 in *GG* 36683 of 19 July 2013
GN R507 in *GG* 36683 of 19 July 2013
GN R509 in *GG* 36683 of 19 July 2013
GN R78 in *GG* 37320 of 12 February 2014
GN R79 in *GG* 37320 of 12 February 2014
GN R598 in *GG* 37885 of 1 August 2014
GN R599 in *GG* 37886 of 1 August 2014
GN R983 in *GG* 38282 of 4 December 2014
GN R985 in *GG* 38282 of 4 December 2014
GN R864 in *GG* 40166 of 29 July 2016
GN R315 in *GG* 40815 of 28 April 2017
GN R112 in *GG* 41445 of 16 February 2018
GN R115 in *GG* 41445 of 16 February 2018
GN R248 in *GG* 41632 of 18 May 2018
GN R622 in *GG* 41722 of 22 June 2018

New Zealand:

Conservation Act 65 of 1987
Conservation (Indigenous Freshwater Fish) Amendment Bill
Freshwater Fisheries Regulations (SR 1983/277)
Resource Management Act 69 of 1991

Salmon and Trout Act 1867

Norway:

Nature Diversity Act 100 of 2009

BOOKS

Kidd M *Environmental Law* 2 ed (2011) Juta Law Cape Town.

Wittenberg R and MJW Cock *Invasive Alien Species: A Toolkit of Best Prevention and Management Practices* (2001) CAB International Wallingford.

CHAPTERS IN BOOKS

Algotsson E ‘Biological Diversity’ in Strydom HA and King ND (eds) *Environmental Management in South Africa* (2009) Juta Law Cape Town.

Arlinghaus R and S Cooke ‘Recreational Fisheries: Socio—economic Importance, Conservation Issues and Management Challenges’ in Dickson B, Hutton J and Adams WM (eds) *Recreational Hunting, Conservation and Rural Livelihoods: Science and Practice* (2009) Blackwell Publishing Ltd.

JOURNALS

Alberts R and J Moolman ‘Protecting Ecosystems by way of Biological Control: Cursory Reflections on the Main Regulatory Instruments for Biological Control Agents, Present and Future’ in *Potchefstroom Electronic Law Review* 16(2), 2013, 185 —213.

de Andrade Franco JL ‘The concept of biodiversity and the history of conservation biology: from wilderness preservation to biodiversity conservation’ in *História* 32(2), 2013, 23.

Britz P ‘The History of South African Inland Fisheries Policy with Governance Recommendations for the Democratic Era’ in *Water SA* 41, 2015, 624 – 632.

Feris LA ‘The Role of Good Environmental Governance in the Sustainable Development of South Africa’ in *Potchefstroom Electronic Law Journal* 13(1), 2010, 73—99.

Griffiths MD and M Auer ‘Becoming hooked? Angling, gambling and fishing addiction’ in *Archives of Behavioural Addictions* 1(1), 2019, <https://doi.org/10.30435/ABA.01.2019.02> (Accessed 27 September 2019).

Hulme PE ‘Beyond control: wider implications for the management of biological invasions’ in *Journal of Applied Ecology* 43, 2006, 835 — 847.

Kitano S ‘Ecological Impacts of Rainbow, Brown and Brook Trout in Japanese Inland Waters’ in *Global Environmental Research* 8(1), 2004, 41—50.

Marr SM, BR Ellender, JD Woodford, EA Mhairi, RJ Wasserman, P Ivey, T Zengeya and OLF Weyl ‘Evaluating invasion risk for freshwater fishes in SA’ in *Bothalia* 47(2), 2017, <https://doi.org/10.4102/abc.v47i2.2177> (Accessed 2 April 2019).

Maze K, M Barnett, EA Botts, A Stephens, M Freedman and L Guenther ‘Making the case for biodiversity in SA: Re—framing biodiversity communications’ in *Bothalia* 46(1), 2016, <https://journals.abcjournal.aosis.co.za/index.php/abc/article/view/2039> (Accessed 12 April 2019).

McIntosh AR, PA McHugh, NR Dunn, JM Goodman, SW Howard, PG Jellyman, LK O’Brien, P Nyström and DJ Woodford ‘The impact of trout on galaxiid fishes in NZ’ in *NZ Journal of Ecology* 34(1), 2010, 195—206.

McRitchie v Taranaki Fish and Game Council in *Māori Law Review* November 1998, <http://maorilawreview.co.nz/1998/11/november-1998-contents/> (Accessed 12 August 2019).

Morita K, J Tsuboi and H Matsuda ‘The impact of exotic trout on native charr in a Japanese Stream’ in *Journal of Applied Ecology* 41, 2004, 962—972.

Paterson A ‘Clearing a Path towards Effective Alien Invasive Control: The Legal Conundrum’ in *Potchefstroom Electronic Law Journal* 9(1), 2006, <https://www.ajol.info/index.php/pelj/article/view/43454> (Accessed 2 November 2019).

Razanajatovo M, N Maurell, W Dawson, F Essl, H Kreft, J Perg, P Pyšek, P Weigelt, M Winter and M van Kleunen ‘Plants capable of selfing are more likely to become naturalized’ in *Nature Communications* 7(13313), 2016, <https://go.nature.com/2NdFXOT> (Accessed 15 August 2019).

Richardson DM and B van Wilgen ‘Invasive alien plants in South Africa: how well do we understand the ecological impacts?’ in *South African Journal of Science* 100(1), 2004, 45-52.

Sebola MP ‘Communication in the South African PPP: The Effectiveness of Communication Tools’ in *African Journal of Public Affairs* 9(6), 2017, 25—35.

Shelton JM, MJ Samways and JA Day ‘Predatory impact of non—native rainbow trout on endemic fish populations in headwater streams in the Cape Floristic Region of SA’ in *Biological Invasions* 16(7), 2014, <https://link.springer.com/article/10.1007/s10530-014-0735-9> (Accessed 8 April 2019).

Stanković D, AJ Crivelli and A Snoj ‘Rainbow Trout in Europe: Introduction, Naturalization and Impacts’ in *Reviews in Fisheries Science and Aquaculture* 23(1), 2015, <https://www.tandfonline.com/doi/abs/10.1080/23308249.2015.1024825> (Accessed 11 April 2019).

Townsend CR ‘Invasion biology and ecological impacts of brown trout *Salmo trutta* in NZ’ in *Biological Conservation* 78(1—2), 1996, <https://www.sciencedirect.com/science/article/abs/pii/0006320796000146> (Accessed 15 August 2019).

Woodford DJ, P Ivey, MS Jordaan, PK Kimberg, T Zengeya and OLF Weyl ‘Optimising invasive fish management in the context of invasive species legislation in South Africa’ in *Bothalia* 47(2), 2017, <https://doi.org/10.4102/abc.v47i2.2138> (Accessed 8 April 2019).

Zengeya T, P Ivey, DJ Woodford, O Weyl, A Novoa, R Shackleton, DM Richardson and B van Wilgen ‘Managing conflict—generating invasive species in South Africa: Challenges and trade—offs’ in *Bothalia* 47(2), 2017, 1-11.

PROCEEDINGS

Mooney HA and EE Cleland 'The evolutionary impact of invasive species' in *Proceedings of the National Academy of Sciences of the United States of America* 98(10), 2001, 5448.

INTERNET RESOURCES

Abrams L 'An Invasive Species is Threatening Montana's Native Trout and Climate Change is making it possible' 28 May 2014, https://www.salon.com/2014/05/28/a_invasive_species_is_threatening_montanas_native_trout_and_climate_change_is_making_it_possible/ (Accessed 12 April 2019).

Anchor Environmental 'BRBAs for important aquaculture alien species' <https://anchorenvironmental.co.za/projects/brbas-important-aquaculture-alien-species> (Accessed 8 August 2019).

Anchor Environmental 'Brown Trout' <https://anchorenvironmental.co.za/sites/default/files/2017-11/BRBA%20S.%20trutta.pdf> (Accessed 8 August 2019).

Anchor Environmental 'Rainbow Trout' <https://anchorenvironmental.co.za/sites/default/files/2017-11/BRBA%20O.%20mykiss.pdf> (Accessed 8 August 2019).

Businesstech 'These are the biggest social media and chat platforms in 2019' 2 February 2019, <https://businesstech.co.za/news/internet/296752/these-are-the-biggest-social-media-and-chat-platforms-in-2019/> (Accessed 3 October 2019).

CBD 'List of Parties' 2019, <https://www.cbd.int/information/parties.shtml> (Accessed 20 April 2019).

Chadderton W 'Management of Invasive Freshwater Fish: Striking the Right Balance!' 2003, https://www.researchgate.net/publication/254383410_Management_of_invasive_freshwater_fish_striking_the_right_balance/download (Accessed 12 April 2019).

CIIP ‘Annexure P: Draft Amendments to the IAS Lists and Regulations 2018 promulgated in terms of NEM:BA’ 17 June 2018, [https://www.fosaf.org.za/documents/Part%205%20Application%20Annexures%20L%20to%20S%20\(end\)%20August%202018.pdf](https://www.fosaf.org.za/documents/Part%205%20Application%20Annexures%20L%20to%20S%20(end)%20August%202018.pdf) (Accessed 5 June 2019).

CIIP ‘Annexure L: Formal Demand for the Withdrawal of Notices GN112 and 115’ 13 March 2019 [https://www.fosaf.org.za/documents/Part%205%20Application%20Annexures%20L%20to%20S%20\(end\)%20August%202018.pdf](https://www.fosaf.org.za/documents/Part%205%20Application%20Annexures%20L%20to%20S%20(end)%20August%202018.pdf) (Accessed 5 June 2019).

City Press ‘Annexure N: Extension of the Public Commenting Period for the Proposed Amendments to the IAS Regulations and Species lists published 16 February 2018’ 13 May 2018, [https://www.fosaf.org.za/documents/Part%205%20Application%20Annexures%20L%20to%20S%20\(end\)%20August%202018.pdf](https://www.fosaf.org.za/documents/Part%205%20Application%20Annexures%20L%20to%20S%20(end)%20August%202018.pdf) (Accessed 5 June 2019).

Cox I ‘The Survival of Trout in SA’ May 2014, *The Complete Fly Fisherman* <https://www.invasives.org.za/files/109/Media-Reports/526/-The-Complete-Fly-Fisherman-May-2014--The-survival-of-trout-in-South-Africa.pdf> (Accessed 10 July 2019).

Cox I ‘Annexure E: The Widespread Failure to Properly Publish Draft Laws for Comment as Required in Terms of Sections 99 and 100 of the National Environmental Management Biodiversity Act, 2004’ 11 October 2017, <https://www.fosaf.org.za/documents/Part%203%20Application%20Annexures%20A%20to%20E%20August%202018.pdf> (Accessed 3 March 2019).

Cox I ‘Annexure G: Email to Dr. Guy Preston’ 19 February 2018, <https://www.fosaf.org.za/documents/Part%204%20Application%20Annexures%20F%20to%20K%20August%202018.pdf> (Accessed 5 June 2019).

Cox I ‘Annexure J: Memorandum of Objection: Draft Amendments to IAS Lists and Regulations 2017’ 12 March 2018, <https://www.fosaf.org.za/documents/Part%204%20Application%20Annexures%20F%20to%20K%20August%202018.pdf> (Accessed 5 June 2019).

Cox I 'Annexure O: Representations' 16 June 2018,
[https://www.fosaf.org.za/documents/Part%205%20Application%20Annexures%20L%20to%20S%20\(end\)%20August%202018.pdf](https://www.fosaf.org.za/documents/Part%205%20Application%20Annexures%20L%20to%20S%20(end)%20August%202018.pdf) (Accessed 5 June 2019).

Cox I 'Annexure S: Representations' 23 June 2018,
[https://www.fosaf.org.za/documents/Part%205%20Application%20Annexures%20L%20to%20S%20\(end\)%20August%202018.pdf](https://www.fosaf.org.za/documents/Part%205%20Application%20Annexures%20L%20to%20S%20(end)%20August%202018.pdf) (Accessed 5 June 2019).

DAFF 'Portfolio Committee 24th of October 2017: Feedback on Aquaculture Operation Phakisa Oceans Economy' 24 October 2017,
https://pmg.org.za/files/171024Operation_Phakisa.docx (Accessed 1 September 2019).

DAFF 'Rainbow Trout Feasibility Study 2018'
https://www.nda.agric.za/doaDev/sideMenu/fisheries/03_areasofwork/Aquaculture/economics/Final%20Rainbow%20Trout%20Feasibility%20Study%202018_Formatted.pdf (Accessed 7 April 2019).

DEA 'State of Play: Baseline Valuation Report on Biodiversity and Ecosystem Services' 2012,
<http://img.teebweb.org/wp-content/uploads/2013/02/STATE-OF-PLAY-South-Africa1.pdf>
(Accessed 9 August 2019).

DEA 'SA's Fifth National Report to the Convention on Biological Diversity' 2014,
<https://www.cbd.int/doc/world/za/za-nr-05-en.pdf> (Accessed 6 August 2019).

DEA 'Clarification of the Regulation of Brown Trout and Rainbow Trout' 19 May 2014,
https://www.environment.gov.za/mediarelease/invasivespecies_clarificationoregulation
(Accessed 10 May 2019).

DEA 'Environmental Affairs Responds to Public Comments on Rainbow and Brown Trout Listing as Invasive Species' 7 March 2018,
https://www.environment.gov.za/mediarelease/rainbowtrout_browntrout_invasivespecies
(Accessed 10 August 2019).

DEA ‘Annexure I: Response to Request for Information Pertaining to the Proposed Listing of Trout under the NEM:BA IAS Regulations’ 8 March 2018, <https://www.fosaf.org.za/documents/Part%204%20Application%20Annexures%20F%20to%20K%20August%202018.pdf> (Accessed 5 June 2019).

Department of Environment, Forestry and Fisheries ‘World Wetlands Day 2019’ 2019, <https://www.environment.gov.za/events/international/worldwetlandsday2019> (Accessed 16 June 2020).

Department of Planning, Monitoring and Evaluation ‘Operation Phakisa’ <https://www.operationphakisa.gov.za/pages/home.aspx> (Accessed 12 August 2019).

Department of Planning, Monitoring and Evaluation ‘Operation Phakisa: Aquaculture Final Lab Report September 2014’ 19 September 2014, <https://www.operationphakisa.gov.za/operations/oel/aquaculture/Oil%20and%20Gas%20Documents/Lab%20Documents/OPOceans%20Aqua%20Final%20Lab%20Report.pdf> (Accessed 10 September 2019).

Dorward N ‘Aquaculture and the NEMLA Bill’ 25 April 2018, <https://pmg.org.za/files/180425nigel.pptx> (Accessed 8 August 2019).

Durban Fly Tyers ‘Letter to Trout Stakeholders’ Undated, http://www.durbanflytyers.co.za/Articles/Letter_To_Trout_Stakeholders.pdf (Accessed 2 September 2019).

Endangered Wildlife Trust ‘Mammal Red List’ 2016, <https://www.ewt.org.za/resources/resources-mammal-red-list/mammal-red-list/#1549273535606-7cf94eaf-2176> (Accessed 26 August 2019).

Evans O ‘NZ’s Recreational Fishery Industry Fights to Keep Nationwide Ban on Commercial Trout Farms’ 13 December 2018, <https://salmonbusiness.com/new-zealand-recreational-fishery-industry-fights-to-keep-nationwide-ban-on-commerical-trout-farms/> (Accessed 2 August 2019).

Federal Office for the Environment ‘*Invasive alien species in Switzerland*’ 2006, <https://www.bafu.admin.ch/bafu/en/home/topics/biodiversity/publications-studies/publications/invasive-alien-species.html> (Accessed 12 April 2019).

FGC ‘*About NZ Council*’ <https://fishandgame.org.nz/about/about-fish-and-game-council/> (Accessed 3 September 2019).

FGC ‘*A Renowned QC’s Legal Opinion*’ 30 August 2018, <https://fishandgame.org.nz/assets/Uploads/Legal-Opinion-On-Indigenous-Freshwater-Fish-Amendment-Bill-by-Sir-Geoffrey-Palmer2.pdf> (Accessed 30 August 2019).

Food and Agriculture Organisation of the United Nations Fisheries and Aquaculture Department ‘*National Aquaculture Sector Overview: NZ*’ http://www.fao.org/fishery/countrysector/naso_newzealand/en (Accessed 10 August 2019).

FOSAF ‘*The Constitution of FOSAF*’ <https://www.fosaf.org.za/constitution.php> (Accessed 20 August 2019).

FOSAF ‘*The History of FOSAF*’ <https://www.fosaf.org.za/history.php> (Accessed 20 August 2019).

FOSAF ‘*The Vision and Mission of FOSAF*’ <https://www.fosaf.org.za/vision.php> (Accessed 20 August 2019).

FOSAF ‘*Annexure R: Draft Amendments to the IAS Lists and Regulations 2018 promulgated in terms of NEM:BA*’ 23 June 2018, [https://www.fosaf.org.za/documents/Part%205%20Application%20Annexures%20L%20to%20S%20\(end\)%20August%202018.pdf](https://www.fosaf.org.za/documents/Part%205%20Application%20Annexures%20L%20to%20S%20(end)%20August%202018.pdf) (Accessed 5 June 2019).

FOSAF ‘*Notice of Motion*’ 28 August 2018, <https://www.fosaf.org.za/documents/Part%201%20Application%20Notice%20of%20Motion%20August%202018.pdf> (Accessed 3 April 2019).

FOSAF ‘*Applicant’s Replying Affidavit*’ 17 April 2019, <https://www.fosaf.org.za/documents/FOSAFs-Replying-Affidavit-17-April%202019.pdf> (Accessed 5 September 2019).

Gierach J ‘*Trout Fishing Quotes*’ <https://www.azquotes.com/quotes/topics/trout—fishing.html> (Accessed 4 October 2019).

Glazewski J ‘*Draft Biodiversity Rules No Threat to Flyfishing: Claims on Trout Do Not Hold Water*’ 1 July 2014, *Business Day*, <https://www.invasives.org.za/files/109/Media%20Reports/523/%20Business%20Day,%201%20July%202014:%20Claims%20on%20trout%20do%20not%20hold%20water.pdf> (Accessed 19 July 2019).

Global Invasive Species Database ‘*100 of the World’s Worst Invasive Alien Species*’ 2019, http://www.iucngisd.org/gisd/100_worst.php (Accessed 13 April 2019).

Harris VW ‘*9 Important Communication Skills for Every Relationship*’ 2015, <https://ifas.ufl.edu/media/smartcouplesifasufledu/docs/pdfs/9-Important-Communication-Skills-for-Every-Relationship.pdf> (Accessed 29 September 2019).

Hayes J ‘*Salmonid Fisheries*’ Cawthron Institute <https://www.cawthron.org.nz/coastal-freshwater/services/salmonid-fisheries/> (Accessed 16 August 2019).

Herbst E ‘*Govt’s War on Trout*’ 10 April 2018, <https://www.politicsweb.co.za/opinion/govts-war-on-trout> (Accessed 3 April 2019).

Interview with G Preston ‘*Environmental Affairs Legislature Addressing Species That Cause Harm*’ 19 May 2014, <https://www.youtube.com/watch?v=KrCYdQ82Auw> (Accessed 5 September 2019).

Intergovernmental Science—Policy Platform on Biodiversity and Ecosystem Services definitions ‘*Naturalized Species*’ 2019, <https://www.ipbes.net/glossary/naturalized—species> (Accessed 12 August 2019).

Invasive Species Specialist Group ‘IUCN SSC Invasive Species Specialist Group’ 2008, <http://www.issg.org/about.htm> (Accessed 16 June 2020).

ISSA ‘RA for brown trout *Salmo trutta* in SA’ <https://www.invasives.org.za/files/112/Risk-Assessments/539/Brown-Trout---Risk-Assessment.pdf> (Accessed 30 July 2019).

ISSA ‘RA for rainbow trout *Oncorhynchus mykiss* in SA’ <https://www.invasives.org.za/files/112/Risk-Assessments/540/Rainbow-Trout---Risk-Assessment.pdf> (Accessed 10 August 2019).

IUCN ‘Invasive Species’ 2019, <https://www.iucn.org/theme/species/our-work/invasive-species> (Accessed 7 August 2019).

IUCN ‘IUCN Red List’ 2019, <https://www.iucnredlist.org/> (Accessed 9 August 2019).

Krohn R ‘Letter to Phakisa Oct 2017’ 5 October 2017, <https://www.fosaf.org.za/documents/Letter%20to%20Phakisa%20Oct%202017%20Krohn.pdf> (Accessed 2 June 2019).

Lax I ‘Sustaining the SA Trout Industry’ 3 August 2015, *Farmers Weekly*, <https://www.farmersweekly.co.za/opinion/by-invitation/sustaining-the-sa-trout-industry/> (Accessed 10 June 2019).

Lax I ‘Why FOSAF took DEA to court’ in *Southern Africa Flyfishing Magazine*, 2018 32(169), https://issuu.com/saflyfishingmag/docs/saff_nov_2018 (Accessed 4 September 2019).

Lexico Dictionary ‘Anthropocentric’ 2019, <https://www.lexico.com/en/definition/anthropocentric> (Accessed 1 September 2019).

Lexico Dictionary ‘Australasia’ 2019, <https://www.lexico.com/en/definition/australasia> (Accessed 12 August 2019).

Lexico Dictionary ‘Biocentrism’ 2019, <https://www.lexico.com/en/definition/biocentrism> (Accessed 1 September 2019).

Lexico Dictionary 'Endemic' 2019, <https://www.lexico.com/en/definition/endemic> (Accessed 2 August 2019).

Lexico Dictionary 'Extirpate' 2019, <https://www.lexico.com/en/definition/extirpate> (Accessed 8 August 2019).

Lexico Dictionary 'Herbivorous' 2019, <https://www.lexico.com/en/definition/herbivorous> (Accessed 10 August 2019).

Lexico Dictionary 'Hybridization' 2019, <https://www.lexico.com/en/definition/hybridization> (Accessed 9 August 2019).

Lodge D 'Aquarium opens invasive species exhibit' 6 January 2006, *The Orange County Register*, <https://www.ocregister.com/2006/01/06/aquarium-opens-invasive-species-exhibit/> (Accessed 11 August 2019).

Merriam—Webster Dictionary 'De Novo' 2019, <https://www.merriam-webster.com/dictionary/de%20novo> (Accessed 2 September 2019),

Merriam—Webster Dictionary 'Spawn' 2019, <https://www.merriam-webster.com/dictionary/spawn> (Accessed 12 September 2019).

Ministry of Agriculture and Forestry in Finland 'Finland's National Strategy on Invasive Alien Species 2012' 2012, https://mmm.fi/documents/1410837/1894125/Finlands_national_strategy_on_invasive_alien_species.pdf/61137cdf-92ad-4ac8-8b6d-0feaeaedfe74 (Accessed 9 April 2019).

Molewa E 'Annexure M: Withdrawal of IAS Notices GN112 and GN115' 30 April 2018, [https://www.fosaf.org.za/documents/Part%205%20Application%20Annexures%20L%20to%20S%20\(end\)%20August%202018.pdf](https://www.fosaf.org.za/documents/Part%205%20Application%20Annexures%20L%20to%20S%20(end)%20August%202018.pdf) (Accessed 5 June 2019).

National Biodiversity Strategy and Action Plan 'Norway is on track to achieve its national biodiversity targets to combat invasive alien species by 2020—Key highlights from Norway's

Sixth National Report and post—2010 NBSAP’ 30 October 2018, <http://nbsapforum.net/knowledge-base/best-practice/norway-track-achieve-its-national-biodiversity-targets-combat-invasive> (Accessed 9 April 2019).

Norwegian Biodiversity Information Centre ‘*Alien species in Norway – with the Norwegian Black List 2012*’ 2012, https://artsdatabanken.no/Files/13960/Alien_Species_in_Norway_-_with_the_Norwegian_Black_List_2012 (Accessed 11 April 2019).

Norwegian Biodiversity Information Centre ‘*The Alien Species List of Norway – ecological risk assessment 2018*’ 2018, <https://www.biodiversity.no/alien-species-2018> (Accessed 11 April 2019).

Norwegian Environment Agency ‘*Alien Salmonids in Norway*’ 2016, https://bioenv.gu.se/digitalAssets/1588/1588452_norwegian-environment-agency.pdf (Accessed 9 April 2019).

Nqayi Z ‘Confusion over Trout Regulations’ 21 May 2014, *The Witness*, <https://www.news24.com/Archives/Witness/Confusion-over-trout-regulations-20150430> (Accessed 13 May 2019).

NZ Department of Conservation ‘*NZ Biodiversity Action Plan 2016—2020*’ 2016, <https://www.cbd.int/doc/world/nz/nz-nbsap-v2-en.pdf> (Accessed 15 August 2019).

NZ Parliament ‘*CAB – Submissions and Advice*’ https://www.parliament.nz/en/pb/bills-and-laws/bills-proposed-laws/document/BILL_79000/tab/submissionsandadvice (Accessed 3 September 2019).

NZ Parliament ‘*CAB—First Reading*’ 4 September 2018, https://www.parliament.nz/en/pb/hansard-debates/rhr/combined/HansDeb_20180904_20180904_36 (Accessed 22 August 2019).

NZ Parliament ‘*Petition of Felix Borenstein*’ 1 October 2018, https://www.parliament.nz/en/pb/petitions/document/PET_80469/petition-of-felix-borenstein-change-the-conservation (Accessed 12 September 2019).

NZ Parliament ‘*CAB—Second Reading*’ 2 August 2019, https://www.parliament.nz/en/pb/hansard-debates/rhr/combined/HansDeb_20190807_20190807_52 (Accessed 18 September 2019).

NZ Parliament ‘*CAB*’ 22 August 2019, https://www.parliament.nz/en/pb/bills-and-laws/bills-proposed-laws/document/BILL_79000/conservation-indigenous-freshwater-fish-amendment-bill (Accessed 20 September 2019).

NZ Teara Encyclopedia ‘*Iwi*’ 2019, <https://teara.govt.nz/en/tribal-organisation/page-1> (Accessed 2 September 2019).

NZ Treasury ‘*CAB OIA—20180415*’ 29 November 2018, <https://treasury.govt.nz/sites/default/files/2018-11/oia-20180415.pdf> (Accessed 12 September 2019).

Parliamentary Monitoring Group ‘*National Environmental Management: Laws Amendment Bill*’ <https://pmg.org.za/bill/706/> (Accessed 2 September 2019).

Parliamentary Monitoring Group ‘*Aquaculture Development Bill (B22—2018)*’ <https://pmg.org.za/bill/806/> (Accessed 13 August 2019).

Purnell R ‘5 Best Trout Fishing Spots in the World’ in *Fly Fisherman* <https://www.flyfisherman.com/editorial/5-best-trout-fishing-spots-in-the-world-2/152250> (Accessed 16 August 2019).

Ramsar ‘*Resolution VIII.18 Invasive species and wetlands*’ 2002, https://www.ramsar.org/sites/default/files/documents/pdf/res/key_res_viii_18_e.pdf (Accessed 16 June 2020).

South African Government ‘*President Ramaphosa announces reconfigured departments*’ 14 June 2019, <https://www.gov.za/speeches/president-cyril-ramaphosa-announces-reconfigured-departments-14-jun-2019-0000> (Accessed 19 June 2020).

Southern African Society of Aquatic Scientists ‘*Southern African Society of Aquatic Scientists Position Paper on Trout*’ 27 June 2014, <https://www.invasives.org.za/files/110/Position-Papers-on-Invasive-Trout/537/SASAgS-Position-Paper-on-Trout.pdf> (Accessed 1 July 2019).

Statistics SA ‘*Mid—year population estimates 2019*’ 29 July 2019, <http://www.statssa.gov.za/publications/P0302/P03022019.pdf> (Accessed 4 October 2019).

Tourism NZ ‘*Fly Fishing*’ <https://www.newzealand.com/int/fly-fishing/> (Accessed 15 August 2019).

UNESCO ‘*State of Conservation: Yellowstone National Park*’ 2010, <https://whc.unesco.org/en/soc/491> (Accessed 11 April 2019).

United Nations ‘*Report of the World Commission on Environment and Development: Our Common Future*’ 1987, <https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf> (Accessed 21 August 2019).

United States Environmental Protection Agency ‘*Public Participation Guide: Introduction to Public Participation*’ 22 February 2018, <https://www.epa.gov/international-cooperation/public-participation-guide-introduction-public-participation> (Accessed 3 October 2019).

Van Wilgen B ‘*SA Trout Industry Is Swimming against the Tide of Biodiversity Priorities*’ 22 June 2014, *Weekend Argus*, <https://www.invasives.org.za/files/109/Media-Reports/701/-Weekend-Argus-22-June-2014--SA-trout-industry-is-swimming-against-tide-of-biodiversity-priorities.pdf> (Accessed 5 May 2019).

Van Wilgen B and J Wilson ‘*The Status of Biological Invasions and Their Management in SA in 2017 – Draft for Review only*’ 2017, <https://www.sanbi.org/wp-content/uploads/2018/04/status-report-biological-invasions.pdf>, (Accessed 5 June 2019).

Van Wyk A ‘*Fish and Crocodile Farmers Say a New Bill Intended to Develop Their Sector Will Destroy It*’ 28 May 2018, <https://www.businessinsider.co.za/fish-and-crocodile-famers-hate-the-new-draft-aquaculture-legislation-2018-5> (Accessed 9 September 2019).

Wikipedia ‘*Queen’s Counsel*’ https://simple.wikipedia.org/wiki/Queen%27s_Counsel
(Accessed 5 September 2019).

Wikipedia ‘*Treaty of Waitangi*’ 2019,
https://en.wikipedia.org/wiki/Treaty_of_Waitangi_claims_and_settlements (Accessed 2
August 2019).

Williams D ‘*Fishing Faithful Gear up for Trout Fight*’ 11 October 2018,
[https://www.newsroom.co.nz/2018/10/10/272212/fishing-faithful-gear-up-for-trout-
fight?preview=1](https://www.newsroom.co.nz/2018/10/10/272212/fishing-faithful-gear-up-for-trout-fight?preview=1) (Accessed 2 September 2019).

Yeld J ‘*A rising controversy*’ 13 April 2018, [https://www.politicsweb.co.za/opinion/a-rising-
controversy](https://www.politicsweb.co.za/opinion/a-rising-controversy) (Accessed 5 April 2019).

Yellowstone National Park ‘*Yellowstone National Park Fishing Regulations*’ 2015,
<https://yellowstone.net/pdf/FishingRegulations.pdf> (Accessed 11 April 2019).