

UCT LAW FACULTY

DISSERTATION

WHITE SHARK CAGE DIVING IN SOUTH AFRICA

A critical assessment of South Africa's regulatory framework

Programme: Master of Laws in Marine & Environmental Law
Submission Date: 07.03.2017
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Word Count: 23.767 Words

Research dissertation presented for the approval of Senate in fulfilment of part of the requirements for the degree LLM coursework & dissertation in Marine and Environmental Law. The other part of the requirement for this qualification was the completion of a programme of courses.

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ABSTRACT

‘White Shark Cage Diving’ (WSCD) enables tourists to experience a face-to-face encounter with wild sharks in the open water. In order to attract the animals close to the cages, tour operators often use chum, bait, or decoys, which interferes with the natural habits of marine wildlife. These practices have great potential to adversely impact animals and the marine environment, with unknown long-term consequences. Globally, South Africa has the most extensive WSCD industry. The management is based on a policy paper and regulations published in 2008 by the Minister of Environmental Affairs (a ministry which also included Tourism).

This thesis discusses the question of whether South Africa’s WSCD industry is appropriately regulated in the light of today’s best practices. South Africa’s regulatory framework will be compared to the management arrangements of other jurisdiction where WSCD takes place. The ultimate objective of this thesis is to determine whether the South Africa’s WSCD regime strikes a sustainable balance between commercial interests and the need to protect this elusive creature.

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LIST OF ABBREVIATIONS

Code of Conduct	Code of Conduct for Great White Shark Cage Diving in the Guadalupe Island Biosphere Reserve of 2015
CONANP	National Commission of Natural Protected Areas
DAFF	Department of Agriculture, Forestry and Fishery
DEA	Department of Environmental Affairs (former Department of Environmental Affairs and Tourism)
DEWNR	Department of Environment, Water and Natural Resources
DOC	Department of Conservation
DRBIG	Management of the Biosphere Reserve Guadalupe
EWT	Endangered Wildlife Trust
GFNMS	Gulf of the Farallones National Marine Sanctuary
GFNMS Regulations	Greater Farallones National Marine Sanctuary Final Regulations of 12. March 2015, Federal Register Vol. 80, No. 48
Guadalupe Management Plan	Programa de Manejo de la Reserva de la Biosfera Isla Guadalupe, publicado en el Diario Oficial de la Federación el 17 de junio del 2011
MLRA	Marine Living Resource Act No. 18 of 1998
National Marine Sanctuaries Act	Marine Protection, Research, and Sanctuaries Act of 1972, Public Law 92-532, 91st United State Congress
NEMBA	National Environmental Management: Biodiversity Act
NOAA	National Oceanic and Atmospheric Administration
re	Regarding
SAMSA	South African Maritime Safety Authority

SBMP	National Environmental Management: Biodiversity Act – Shark Biodiversity Management Plan
SEMANART	Secretariat of Environment and Natural Resources
PIRSA	Primary Industries and Resources South Australia
White Shark Tourism Policy	Great White Shark Tourism (Neptune Islands Conservation Park) Policy of 2012, Department of Natural Resources (now: DEWNR)
WSCD	White Shark Cage Diving
WSCD Policy	Policy on White Shark Cage Diving of 4 July 2008, GN 723 in GG 31210
WSCD Regulations	Regulations for the Management of White Shark Cage Diving of 4 July 2008, GN 724 in GG 31211 (including Amendment of Regulations GN 803 in GG 32457 dated 31 July 2009 and Amendment of Regulations GN 818 in GG 32463 dated 7 August 2009)

Chapter I

INTRODUCTION

1. Background

Non-consumptive marine-based wildlife tourism has been growing rapidly in recent decades, raising concerns over the sustainability of this sector.¹ Non-consumptive wildlife tourism typically involves viewing and photographing wildlife, either in captivity or in their natural environment, and forms part of a tourism sector called “nature based” or “ecotourism”.² In contrast to consumptive wildlife tourism (which relates to the extraction of animals from the environment), non-consumptive activities do not harm the species which are observed.³ Within the wildlife viewing sector, large and charismatic animals are generally the main tourist attractions.⁴ Certain species such as dolphins, for example, are popular because of properties such as cuteness or approachability attributed to them by humans.⁵ As regards sharks, it is their reputation of being primitive, wild, and dangerous that has made them especially appealing to the growing eco-adventure market.⁶

Today, many shark species are considered endangered and millions are killed every year.⁷ Amid declining shark populations, shark specific tourist activities have become increasingly popular.⁸ A recent estimate suggested that shark watching activities (defined as any form of observing sharks (sharks, rays and chimaeras) in their natural habitat from boats or underwater

¹ Burgin S & Hardiman N “Effects of non-consumptive wildlife-orientated tourism on marine species and prospects for their sustainable management”, *Journal of Environmental Management* 151 (2015), 210; Ziegler J, Dearden P, Rollins R “But are tourists satisfied? Importance-performance analysis of the whale shark tourism industry on Isla Holbox, Mexico”, *Tourism Management* 33 (2012), 692.

² Gallagher A.J & Hammerschlag N “Global shark currency: the distribution, frequency and economic value of shark ecotourism”, *Current Issues in Tourism* 8 (2011), 2.

³ Dobson J, Jones E, Botterill D “Exploitation or Conservation: Can Wildlife Tourism Help Conserve Vulnerable and Endangered Species?”, *Interdisciplinary Environmental Review* 7 (2005), 1.

⁴ Dobson J “Shark! A New Frontier in Tourist Demand for Marine Wildlife” in Higham J & Lück M, “Marine Wildlife and Tourism Management: Insight from the Natural and Social Sciences”, *CAB International* (2008), 50-51; Gallagher & Hammerschlag *Global shark currency* 2.

⁵ Dobson in Higham & Lück 50.

⁶ Dobson et al *Exploitation or Conservation* 5; Dobson in Higham & Lück 51.

⁷ Dobson in Higham & Lück 55; Worm B, Davis B, Kettner L, Ward-Paige C A, Chapman D, Heithaus M R, Kessel S T, Gruber S H, “Global catches, exploitation rates, and rebuilding options for sharks” *Marine Policy* 40 (2013), 194.

⁸ Richards K, O’Lary B, Roberts C, Ormond R, Gore M, Hawkins J “Sharks and people: Insight into the global practices of tourism operators and their attitudes to Shark behaviour”, *Marine Pollution Bulletin* 91 (2015), 200.

without intention to harm them) generate over 314 million USD every year and support more than 10.000 jobs worldwide; furthermore, a significant annual increase in visitors at shark watching sites was observed within various studies.⁹ Based on the documented growth trends, it is estimated that shark watching will attract 2.5 times more visitors within the next two decades and will generate more than 785 million USD in direct visitor expenditures.¹⁰

Shark diving tourism is highly diverse in terms of species, practices, and regulations and no universal best practices currently exist.¹¹ Within the shark diving industry, the desire of humans to see the apex predator of the oceans and the added cachet of having “survived” the encounter has led to the development of a sub-branch called White Shark Cage Diving (“WSCD”).¹² WSCD operators generally target the great white shark as the marine equivalent of the ‘big five’ land mammals,¹³ and enable tourists to view white sharks in their natural habitat, from the deck of the boat or from inside an underwater cage.¹⁴

Facing the endangered status of the great white shark as well as the growing popularity of shark-related tourism activities, WSCD must be viewed within the broader context of the conservation need of sharks, the potential impacts the activities may have on the animals, and the broader marine environment, as well as the potential benefits for conservation associated with WSCD. Conducted under the right circumstances, shark-based tourism can contribute towards better conservation of these animals; it enables sharks to generate income purely by their existence, may support scientific research, and - if the information is given properly - it may also contribute to public awareness.¹⁵ However, there are also aspects of WSCD which can negatively impact the animals, the environment, and other water users. For example,

⁹ Andrès M, Cisneros-Montemayo R, Barnes-Mauthe M, Al-Abdulrazzak D, Navarro-Holm E, Sumaila U.R “Global economic value of shark ecotourism: implications for conservation”, *Fauna & Flora International Oryx* 47(3) (2013), 385; Gallagher & Hammerschlag *Global shark currency* 3,9; Richards et al *Sharks and people* 200.

¹⁰ Andrès et al *Global economic value of shark ecotourism* 385.

¹¹ Gallagher A J, Vianna G M.S, Papastamatiou Y P, Macdonald C, Guttridge T, Hammerschlag N “Biological effects, conservation potential, and research priorities of shark diving tourism”, *Biological Conservation* 184 (2015), 366.

¹² Cater C, “Perceptions of and Interactions with Marine Environments: Diving Attractions from Great white sharks to Pygmy Seahorses” in Garrod B & Gössling S, “New Frontiers in Marine Tourism. Diving Experiences, Sustainability, Management”, *Elsevier* (2008), 55.

¹³ Endangered Wildlife Trust (EWT), “Position Statement on Baited Shark Diving”, July (2016), 2.

¹⁴ National Oceanic and Atmospheric Administration (“NOAA”), “Draft programmatic environmental assessment of potential white shark research and education projects within the Gulf of the Farallones and Monterey Bay National Marine Sanctuaries”, *Office of National Marine Sanctuaries, National Ocean Service, NOAA, U.S. Department of Commerce* (2014), 20.

¹⁵ Dobson in Higham & Lüick 55-57.

through certain attraction techniques such as chumming or baiting, non-natural food sources are offered or represented to the wild animals and an indiscriminate feeding response is triggered in sharks. This constitutes a wholly other activity than pure wildlife observation as we know it from terrestrial safaris, for example.¹⁶ The activities conducted by the tour operators aim to change the sharks' behaviour temporarily so that the encounters with the tourists can be maximised. These activities may alter and impact on the sharks' behaviour also in the long-term with unknown consequences.¹⁷ The luring of sharks towards the boats may lead to crashes with the cage or the boat where sharks are harmed or even killed.¹⁸ Furthermore, the interests of the tour operators often conflict with the interests and safety desires of other water users such as scuba divers, swimmers, surfers and fisherman. The growing popularity of WSCD may also lead to overexploitation of the shark sites with negative impacts on the whole marine environment. Ultimately, there is still a lack of (scientific) knowledge as regards the long-term impacts of WSCD on the animals and the marine ecosystem.¹⁹

Given the adverse impacts but also the potential benefits, an appropriate legal framework and management plan are crucial to create an environmental responsible, sustainable, and a long-living industry.²⁰ It is in this context that the governance and regulation of the WSCD industry in South Africa shall be explored in this thesis.²¹

¹⁶ EWT *Position Statement 1*.

¹⁷ See for example: Bruce B (CSIRO Marine & Atmospheric Research), "A review of cage diving impacts on white shark behaviour and recommendations for research and the industry's management in New Zealand", *Department of Conservation, New Zealand* (2015), 12-17; Bruce B & Bradford R, "The effects of shark cage-diving operations on the behaviour and movements of white sharks, *Carcharodon carcharias*, at the Neptune Islands, South Australia" *Marine Biology* 160 (2013), 889; Hammerschlag N, Gallagher A J, Wester J, Luo J, Ault J S, "Don't bite the hand that feeds: assessing ecological impacts of provisioning ecotourism on an apex marine predator", *Functional Ecology* 26 (2012), 567; Richards et al *Sharks and people* 201

¹⁸ Gallagher et al *Biological effects, conservation potential, and research priorities* 372. Furthermore, see: Delaney Chambers, "Why Sharks Are Getting Stuck In Diver Cages", *National Geographic* from 14.10.2016 (first accessed: 15.12.2016 <http://news.nationalgeographic.com/2016/10/dramatic-video-of-shark-getting-stuck-in-cage-with-diver-and-why/>); "Video captures moment shark slams into tourist's diving cage in South Africa", *ABC News* from 9.11.2015 (first accessed 15.12.2016 <http://www.abc.net.au/news/2015-11-09/video-shows-shark-slamming-into-diving-cage/6924376>); "Diver survives after huge great white shark breaks into cage in terrifying video", *The Telegraph: News* from 14.10.2016 (first accessed 15.12.2016 <http://www.telegraph.co.uk/news/2016/10/14/diver-survives-being-trapped-inside-cage-with-great-white-shark/>).

¹⁹ See inter alia: Bruce *A review of cage diving* 12-17; Burgin & Hardiman *Effects of non-consumptive wildlife-orientated tourism* 210 – 211; EWT *Position Statement 2-4*; Gallagher et al *Biological effects, conservation potential, and research priorities* 366.

²⁰ Bruce *A review of cage diving* 5; Techera E J & Klein N, "The Role of Law in Shark-Based Eco-Tourism: Lessons from Australia", *Marine Policy* 39 (2012), 1.

²¹ Within this broad context, the focus of this dissertation will be on the regulation of the negative environmental impacts on sharks as well as the marine environment. The scope of this dissertation is further explored in section 2 of this chapter.

WSCD has developed in five jurisdictions so far: it takes place (1) within the Neptune Islands Group Marine Park in South Australia, (2) in California at the Farallon Islands, (3) in Mexico within the Guadalupe Island Biosphere Reserve, (4) at the Stewards Island in New Zealand and (5) at five sites along the coast between Cape Town and Port Elizabeth in South Africa. A key regulatory driver within all five jurisdictions is that white sharks are protected from all exploitation activities.²² Out of all WSCD destinations, South Africa currently has the most extensive WSCD industry.²³ In 2016 there were 13 licenced WSCD operators,²⁴ conducting tours on five dive sites along 700 km of South Africa’s coast.²⁵ WSCD management is mainly based on the Marine Living Resource Act of 1998²⁶ (“MLRA”), the respective Policy on White Shark Cage Diving of 4 July 2008²⁷ (“WSCD Policy”) and Regulations for the Management of White Shark Cage Diving of 4 July 2008²⁸ (“WSCD Regulations”).

The policy objectives for the management of WSCD in South Africa are the improvement of the regulatory and compliance framework and the promotion of the growth and transformation of the industry in line with black empowerment efforts.²⁹ The conditions for each operator and allowed techniques are set out in the individual permits,³⁰ but in general tour operators may lure sharks to cage diving boats by a chum slick that emanates from the boat. Furthermore, fish-based baits and/or seal-resembling decoys are tethered to the cage diving boat and manoeuvred to entice sharks to swim close or entice them to breach.³¹

Facing the vulnerability of the species combined with the extent of South Africa’s WSCD industry, this dissertation seeks to answer whether South Africa’s WSCD regime achieves the delicate balance between the different interests.

²² See detailed information in this regard in Chapter III.

²³ Bruce *A review of cage diving* 9.

²⁴ Republic of South Africa, “Process for whale watching, shark cage diving permits postponed”, *SANews – South African Government News Agency*, Media Releases from 12 June 2016 (first accessed: 15.12.2016 <http://www.sanews.gov.za/south-africa/process-whale-watching-shark-cage-diving-permits-postponed>).

²⁵ Annexure 1 WSCD Regulations.

²⁶ Act No. 18 of 1998.

²⁷ South Africa’s Policy on White Shark Cage Diving of 4 July 2008, GN 723 in GG 31210.

²⁸ South Africa’s Regulations for the Management of White Shark Cage Diving of 4 July 2008, GN 724 in GG 31211 (including Amendment of Regulations GN 803 in GG 32457 dated 31 July 2009 and Amendment of Regulations GN 818 in GG 32463 dated 7 August 2009).

²⁹ DEA *WSCD Policy* 5.

³⁰ WSCD Regulations, Section 5 (6).

³¹ Johnson R & Kock A, “South Africa’s White Shark cage-diving industry – is their cause for concern?” in Nel DC & Peschak TP (eds) “Finding a balance: White shark conservation and recreational safety in the inshore waters of Cape Town, South Africa; proceedings of a specialist workshop”, *WWF South Africa Report Series* (2006), 42-43.

2. Primary Research Question, Methodology, and Structure

The primary research question of this dissertation is whether South Africa's WSCD industry is sufficiently and effectively regulated to respond to the potential negative impacts WSCD may have on sharks and the marine environment (including other water users).

The author is aware that a variety of different shark-diving activities exist worldwide,³² as well as within South Africa,³³ but the focus of this dissertation will be the cage diving industry, its impacts on great white sharks (and the broader marine environment), and how WSCD jurisdictions regulate this industry. South Africa's current legal framework will be examined and assessed as regards the inclusion of provisions to minimise potential adverse environmental impacts of the industry as well as mechanisms which promote the conservation of great white sharks. An overview of the current state of affairs, threats and conservation of great white sharks will provide the reader with a broad background of the vulnerability of this species. An introduction to shark-based tourism and its practices will enable an understanding of the tour operations and the problems related thereto. In order to enable a consistent review of the management approaches adopted by the different WSCD jurisdictions, certain regulatory elements will be distilled. The regulatory regimes of all WSCD jurisdictions will be examined on the basis of these key elements and the most sustainable practices summarised in a "Best Practice Model". The subjects of this evaluation are the management plans, policy papers, and regulations which have been adopted specifically to regulate WSCD or to respond to the risks related to this industry.

It is self-evident that there is a set of other legal provisions are also applicable to WSCD such as maritime laws, laws regarding safety or dumping at sea, labour laws, tax laws etc. However, such an analysis would exceed the scope of this thesis. There are several other issues beyond the scope of this thesis, which will accordingly not be discussed. Firstly, the individual permits are generally not publicly available. Secondly, an in-depth analysis of the individual practices of tour operators is excluded, since they may vary from operator to operator. Thirdly, although the relationship between the industry and scientific research will be taken into consideration, it will not be elaborated in detail. Fourthly, the socio-economic aspects related to this tourism

³² Estimates count around 376 dive-with-sharks tour operators in 83 locations spread around 29 countries (Gallagher & Hammerschlag *Global shark currency* 6).

³³ Besides WSCD there exist also tiger shark diving and other scuba diving activities in South African waters.

sector are excluded. It is globally recognised that non-consumptive shark diving tourism has been responsible for a shift of the socio-economic importance of sharks from a fisheries product to a more valuable reusable resource.³⁴ If this resource is managed with social responsibility, it may also contribute to empowerment and livelihood opportunities for coastal communities.³⁵ South Africa's WSCD policy even sets the transformation of the industry and black economic empowerment as one of its management objectives.³⁶ However, the regulation and implementation in practice of this human dimension will not be analysed. The discussion whether WSCD should be allowed in the first place and the ethical debate in respect to provisioning wildlife tourism won't be part of this dissertation. The question is rather how WSCD can be regulated in order to minimise the adverse impacts and conserve this elusive species.

This dissertation has the format of a desktop study, considering all relevant laws, policies and commentary thereon. A matrix of key elements will be distilled and used to examine the regulatory approach of each WSCD jurisdiction. The purpose thereof is to highlight those provisions or approaches which ensure the most environmentally sound management. Since there are various differences within the legal regulations, all of the existing WSCD jurisdictions are collectively relevant for establishing a "Best Practice Model". The summary of best practices consists of elements which are necessary to minimise the negative impacts on the sharks and the overall marine environment, while ensuring economic viability and industry harmony. Through a review of the regulatory framework of all WSCD jurisdictions, the most sustainable approaches can be identified. After having outlined the "best" existing practices, South Africa's WSCD regime is assessed against these provisions with the aim of highlighting shortcomings and necessary improvements. A comparative analysis is particularly useful for this task, because it allows to inform an improvement of South Africa's WSCD regime – if this is found to be wanted – by drawing on existing experiences.³⁷

The following Chapter II is dedicated to the theoretical and practical issues related to WSCD. Beginning with an excursus describing the (conservation) state of white sharks, WSCD

³⁴ See, *inter alia*, Hammerschlag *Global shark currency* 1, 2.

³⁵ Dobson in Higham & Lück 56; Gallagher et al *Biological effects, conservation potential, and research priorities* 372, 374.

³⁶ DEA *WSCD Policy* 5.

³⁷ See Chapter III below.

practices, and the problem areas related to these tourism operations. At the end of chapter, certain key regulatory tools which aim to mitigate the risks will be distilled. In the further course of this thesis, the key elements will serve as a matrix to examine the different management approaches within the existing WSCD jurisdictions. Chapter III consists of a review and summary of the existing WSCD regimes. By looking into the specific management plans/policies, by jurisdiction best practices will be highlighted and summarised in a “Best Practice Model”. Chapter IV will then compare South Africa’s current legal regime to the best practices. Through this comparative analysis, the effectiveness of South Africa’s WSCD management will be tested, shortcomings identified and possible improvement suggestions drawn from the other jurisdictions. The Conclusion in Chapter V - the final section - outlines the outcomes of this dissertation and responds to the question whether South Africa’s WSCD industry is sufficiently and effectively regulated.

Chapter II

CAGE DIVING AND THE NEED FOR REGULATION

1. The Great White Shark and Diving Tourism

1.1 Sharks: Status, threats, and conservation efforts

With a length between approximately four to eight meters and a weight between approximately 1.8 and 3.2 tonnes, the *Carcharodon carcharias* - the scientific name of the great white shark - is the world's largest known predatory fish.³⁸ The great white shark is a relatively rare, but ecologically important apex predator.³⁹ The (ecological) impacts which follow when top predators such as sharks are eliminated are far-reaching and include, *inter alia*, the release of mesopredator prey populations from predatory control and the induction of subsequent cascades of indirect trophic interactions.⁴⁰ Already a low population number may have negative effects on the ecological stability of the marine environment.⁴¹

In the last few decades, the number of sharks declined globally, at an alarming rate. Shark populations on the US east coast, for example, have declined an estimated 80-90% since the 1980s.⁴² A study published in 2016 by the University of Stellenbosch, South Africa, indicated that the population of great white sharks in South Africa is even 52% less than estimated previously, meaning that South Africa's great white sharks face extinction.⁴³ Major threats for great white sharks are fisheries (commercial, recreational, and subsistence/artisanal), bather protection

³⁸ WWF, "Overview – the Great White Shark", *World Wildlife Fund*, (first accessed 01.10.2016 <http://www.worldwildlife.org/species/great-white-shark>).

³⁹ Wildlife Conservation Society, "White Shark *Carcharodon carcharias*: status and management challenges", *Conclusions of the Workshop on Great White Shark Conservation Research, New York* (2004),1.

⁴⁰ Myers RA, Baum J K, Shepherd T D, Powers S P, Peterson C H, "Cascading Effects of the Loss of Apex Predatory Sharks from a Coastal Ocean", *Science Vol. 315* (2007), 1846.

⁴¹ Andreotti S, Rutzen M, von der Walt S, Heyden S, Henriques R, Meyer M, Oosthuizen H, Matthee C, "An integrated mark-recapture and genetic approach to estimate the population size of white sharks in South Africa", *Marine Ecology Progress Series Vol. 552* (2016), 241.

⁴² Gallagher & Hammerschlag *Global shark currency* 2.

⁴³ Andreotti et al *An integrated mark-recapture and genetic approach to estimate the population size of white sharks in South Africa* 241.

programs (for example shark nets), habitat deterioration/loss, but also ecotourism.⁴⁴ In response to the worrying research results, conservation measures to improve the situation for great white sharks have been established. Internationally, the great white shark is listed as “vulnerable” on the World Conservation Union (IUCN) Red List of Threatened Species,⁴⁵ as well as on Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES),⁴⁶ requiring any trade of this species to be licensed and monitored. Since February 2010, the Memorandum of Understanding on the Conservation of Migratory Sharks, which was adopted under the auspices of the Convention on the Conservation of Migratory Species of Wild Animal (CMS), has been open for signature. Its aim is to promote conservation of migratory shark species, in which currently 29 shark species are listed.⁴⁷ Furthermore, great white sharks are listed on Annex 1 (Highly Migratory Species) of the UN Convention on the Law of the Sea (UNCLOS), in order to coordinate management and assessment of this species.⁴⁸ The United Nations published an International Plan of Action for Conservation and Management of Sharks and diverse regional measures have been developed that aim to facilitate conservation and management of sharks on an international level.⁴⁹ Conservation efforts also exist on a national level. Some countries, such as the five WSCD destinations (Australia, USA, Mexico, New Zealand, and South Africa,), Namibia, Israel, the Maldives, the Philippines, Malta and others have passed national laws to protect great white sharks.⁵⁰

Facing the current status of the great white sharks, it is evident that the future existence of this species is seriously threatened. The emergence of the abovementioned international documents shows that policy makers start to recognise the necessity of regulations which promote the conservation of this species and not its exploitation. The protection of great white sharks on an international level further obligates governments (which committed themselves to these

⁴⁴ See for example DEA, “National Environmental Management: Biodiversity Act – Shark Biodiversity Management Plan”, GN 258 in GG 38607, 12; Department of the Environment and Energy, “Recovery Plan for the White Shark (*Carcharodon carcharias*)”, *Commonwealth of Australia* (2013), 14, 22; Richards et al *Sharks and people* 200; Wildlife Conservation Society *White Shark Carcharodon carcharias* 2.

⁴⁵ The IUCN Red List of Threatened Species, “*Carcharodon carcharias*” (2009).

⁴⁶ Appendix II of the CITES as valid from 10 March 2016.

⁴⁷ Memorandum of Understanding on the Conservation of Migratory Sharks, Convention on the Conservation of Migratory Species of Wild Animal of 1979.

⁴⁸ United Nations Convention on the Law of the Sea of 1982, Article 64.

⁴⁹ See, *inter alia*, Food and Agriculture Organization of the United Nations, “International Action for Conservation and Management of Sharks” (first accessed: 15.10.2016 <http://www.fao.org/ipoa-sharks/background/sharks/en/>).

⁵⁰ Bruce *A review of cage diving* 2; Dearden P, Topelko K.N, Ziegler J, “Tourist Interactions with Sharks” in *Higham & Lück*, 67; Fergusson et al *Carcharodon carcharias* 6.

documents) to implement respective provisions on a national level and adopt their policies in line with the international obligations.

1.2 The emergence of shark-based tourism and WSCD

Humans' demand for contact with certain wildlife species is influenced by the cultural conditioning of perceptions towards these animals,⁵¹ and as regards sharks, the conditioning has been strong.⁵² The great white shark has a long history of demonisation in numerous paintings, books and films, TV documentaries, and covered news stories. Furthermore, the great white shark has never been the subject of a positive "Disneyfication" like other great predators.⁵³ All these factors have led to the global image of great white sharks as the perfect human killer.⁵⁴ These factors have undoubtedly contributed to great white sharks becoming a main attraction within the growing adventure market and may be considered as wildlife icons of the marine environment.⁵⁵

Diving activities with sharks started in the mid-70s and became popular in the mid-80s. By that time, these activities were generally limited to advanced or professional divers.⁵⁶ In the 90s, when the first efforts to protect certain shark species from (fishing) exploitation were implemented,⁵⁷ the shark diving industry started to explode.⁵⁸ Shark diving sites were established all over the world and controversial feeding practices as well as the manipulation of sharks (touching, grabbing, inverting) became custom to impress visitors.⁵⁹ From 2000 onwards, an increasing number of reports were published that outline the decline in shark populations worldwide and urge for protective measures. Suddenly, the shark diving industry found itself in a situation where sharks needed to be protected from humans, instead of the reverse.⁶⁰

⁵¹ Duffus D & Dearden P, "Non-consumptive wildlife-oriented recreation: A conceptual framework", *Biological Conservation* 53 (1990), 218.

⁵² Dearden et al in Higham & Lüeck 67.

⁵³ Dobson et al *Exploitation or Conservation* 4; Dobson in Higham & Lüeck 51.

⁵⁴ In real life, however, sharks demonstrate a lack of interest when in close proximity of human swimmers (Neff C, Hueter R, "Science, policy, and the public discourse of shark "attack": a proposal for reclassifying human-shark interactions", *J Environ Stud Sci* 3 (2013), 69).

⁵⁵ Dobson in Higham & Lüeck 51.

⁵⁶ Dearden et al in Higham & Lüeck 68, 70.

⁵⁷ For example, South Africa passed national laws to protect white sharks in 1991 and shortly afterwards WSCD tourism evolved (Johnson & Kock in Nel & Peschak 42).

⁵⁸ Dearden et al in Higham & Lüeck 71.

⁵⁹ Gallagher et al *Biological effects, conservation potential, and research priorities* 372.

⁶⁰ Dearden et al in Higham & Lüeck 73.

One category of shark-based tourism is WSCD. “Cage Diving” refers to the activity of humans (diver, non-diver, and even non-swimmers⁶¹) being lowered into the sea in a protective steel cage to encounter wild sharks in close proximity. WSCD operators typically aim for sightings of great white sharks, however also other species of sharks, prey, marine mammals, and sea birds may be observed during dives. The dives take place in areas where great white sharks naturally occur and are focussed around seal and sea lion colonies.⁶² Operators usually use an attractant to lure sharks closer to the boat, which is released into the water.⁶³ Organic attractants consist of minced fish parts and are called chum or berley. In addition, bait which is attached to ropes may be used to attract sharks or entice them to breach.⁶⁴ For baiting fish parts are used that could constitute food to great white sharks (e.g. not finely minced fish).⁶⁵ Some operators use artificial decoys or acoustic stimuli to attract the animals. Artificial decoys are any objects made from artificial materials towed or floating behind a vessel to attract the interest of great white sharks.⁶⁶ The operating models also differ as regards the boat and cage design, the tourist capacity and the duration of the boat trips may also vary from three hours to multiple days, often depending on the location of the cage diving site.⁶⁷

2. Impacts and benefits related to WSCD

Whilst some shark diving and snorkelling trips seek to observe the natural behaviour of sharks, most WSCD operators influence and modify the behaviour of sharks by provisioning (i.e. the act of concentrating predators by offering a non-natural food source).⁶⁸ Encouraging great white sharks to remain at the surface whilst normally they stalk their prey from below as well as the causing of breaching behaviour by baited lines are some of the key elements of a successful and economically viable shark cage diving operation.⁶⁹ The objective of these activities is to attract the sharks within the visual range of observers and extend the contact time. This enables visitors to view sharks that

⁶¹ See for example Sharkquests (first accessed 01.11.2016 <http://www.sharkquests.com/faq>).

⁶² Bruce *A review of cage diving* 5.

⁶³ Gallagher et al *Biological effects, conservation potential, and research priorities* 366.

⁶⁴ EWT *Position Statement* 2.

⁶⁵ Department of Conservation (DOC), “Commercial Great White Shark Cage Diving New Zealand – Code of Practice”, *Marine Species and Threats Team, DOC* (2015), 4.

⁶⁶ DOC *Code of Practice* 4.

⁶⁷ More information on the different WSCD operations are provided in Chapter III below.

⁶⁸ Hammerschlag et al *Don't bite the hand that feeds* 567; Richards et al *Sharks and people* 201.

⁶⁹ Bruce *A review of cage diving* 14; Huvneers C, Rogers P, Beckmann C, Semmens J, Bruce B, Seront L, “The effects of cage-diving activities on the fine-scale swimming behaviour and space use of white sharks”, *Marine Biology* (2013), 2871.

would otherwise not be reliably seen.⁷⁰ Related to these activities, changes of great white sharks' behaviour, such as a shift of the centre of great white shark activities towards the cage operations,⁷¹ a change within the swim area and depth (sharks swam significantly shallower and within a limited area), and an increased energy requirement have been observed.⁷² Hence, (temporal) behavioural changes of great white sharks are not only a side-effect but an aim of WSCD operators. The extent to which these short-term spatial and temporal behavioural changes influence long-term movement and residence patterns as well as the fitness of sharks, is uncertain.⁷³

As sharks exhibit associative learning behaviours similar to those of land mammals, conditioning (e.g. sharks associating boats and divers with food provision) has generated significant concern amongst scientists and the public.⁷⁴ The aspects of conditioning or an increase in aggression have, contrary to popular misinterpretations, not been subject of specific scientific research regarding great white sharks in particular.⁷⁵ However, a recent study which focused on great white sharks in South Australia observed that sharks at cage diving sites became aligned with the timing of arrival of the vessels and that this pattern persisted even on days where no cage diving vessels were present.⁷⁶ Similar anticipatory responses have been found in other shark and rays species.⁷⁷ Furthermore, it was documented that some sharks are more successful at catching bait and notably these sharks showed evidence of possible conditioning. In contrast, sharks which failed to gain rewards showed a declining interest in chum with time.⁷⁸ This decrease of interest when sharks become accustomed to chum may indicate a "negative conditioning",⁷⁹ but is also dangerous as tour operators might use more and more attractant to satisfy tourist expectations.

Related to the possibility of conditioning is the fear that shark provisioning tourism poses an increased danger for other water users. Whereas some authors argue that the stimuli presented by WSCD operators is sufficiently dissimilar to that provided by a swimmer or diver alone to render it improbable that sharks would start to associate swimmers with the stimuli,⁸⁰ others urge that

⁷⁰ Bruce *A review of cage diving* 14.

⁷¹ Bruce & Bradford *The effects of shark cage-diving operations* 901.

⁷² Huveneers et al *The effects of cage-diving activities* 2871, 2872.

⁷³ Bruce *A review of cage diving* 14.

⁷⁴ DOC *Code of Practice* 4; Hammerschlag et al *Don't bite the hand that feeds* 567.

⁷⁵ Bruce *A review of cage diving* 12.

⁷⁶ Bruce & Bradford *The effects of shark cage-diving operations* 905.

⁷⁷ Bruce *A review of cage diving* 16; Hammerschlag et al *Don't bite the hand that feeds* 567.

⁷⁸ Johnson & Kock in Nel & Peschak 49 -53.

⁷⁹ Johnson & Kock in Nel & Peschak 49.

⁸⁰ Johnson & Kock in Nel & Peschak 52, 53.

WSCD operations and other water activities shall be separated in time and space.⁸¹ Some jurisdictions (for example Florida, Hawaii, and Western Australia) have responded to the risk that shark chumming / baiting increases safety hazards for other water users by completely banning shark provisioning tourism.⁸²

Another risk related to WSCD activities is that sharks may be injured or even killed through collisions with cages or boats. Whilst the divers are protected by shark proof cages, species can become physically damaged quite easily if thrown bait is handled in a way that directs sharks too close to the cage or the propeller of the boat, if the speed of the boats is too high when approaching sharks, or if boats come too close to predation activities.⁸³ While there is no data collection as regards physical traumas of sharks from collisions with cages, authors of various studies observed scratches and tooth damages caused by cages while conducting their research.⁸⁴

There is a significant lack of data regarding the possible impacts WSCD operations may have on the local environment or other species such as finfish, other sharks and rays.⁸⁵ Whereas a study suggested that the effects of ecotourism, displayed in only a small subset of the shark population, has little effect on the remaining ecosystem,⁸⁶ other authors suggest that the possible impacts on the marine environment as a whole is an important aspect to consider and an area in which further research is needed.⁸⁷

All the aforementioned of risks have one problematic aspect in common: the significant lack of scientific certainty in respect of the actual impacts of the industry. The possible impacts of non-consumptive marine-based tourism in general, and WSCD operations in particular have been subject to several scientific studies; and respective research and monitoring is still on-going. However, due to a lack of baseline data⁸⁸ and quantitative data the various hypotheses cannot be verified. Furthermore, the scientific research is very localised and based on short periods of

⁸¹ Bruce *A review of cage diving* 17.

⁸² Hammerschlag et al *Don't bite the hand that feeds* 567; Paris N, "Shark Tourism Banned in Western Australia", *The Telegraph*, News from 9.7.2012 (first accessed: 10.10.2016 <http://www.telegraph.co.uk/travel/travelnews/9387262/Shark-tourism-banned-in-Western-Australia.html>).

⁸³ DOC *Code of Practice* 11, 12; Gallagher et al *Biological effects, conservation potential, and research priorities* 372.

⁸⁴ Burgin & Hardiman *Effects of non-consumptive wildlife-orientated tourism* 214.

⁸⁵ Bruce *A review of cage diving* 12.

⁸⁶ Laroche R, Kock, A, Dill L, Oosthuizen W, "Effects of provisioning ecotourism activity on the behaviour of white sharks, *Carcharodon carcharias*", *Marine Ecology Progress Series* 338 (2007), 208.

⁸⁷ Bruce *A review of cage diving* 12.

⁸⁸ Research regarding WSCD started years after the first tour operations (Bruce & Bradford *The effects of shark cage-diving operations* 890).

observation. Only five studies have been concerned with the impact of provisioning marine ecotourism on great white sharks, and their results are conflicting.⁸⁹ Three of the five studies were published between 2005 and 2007, which raises the issue whether their results are still accurate especially facing the increase of cage diving activities. Last but not least, due to an inconsistent use of terms, studies are often misinterpreted by the public.⁹⁰

Despite the risks, WSCD may also have positive implications: it may provide for socio-economic incentives for species conservation, educate tourists and create awareness, may contribute towards scientific research and support political lobbying for wider protection.⁹¹ However, in order to profit from the advantages of shark based tourism, the industry must be managed in a way that eliminates or mitigates the risks while ensuring that the benefits of this form of wildlife tourism are really obtained.

3. Key elements for managing the industry sustainably

Ecotourism activities have been widely recognised as a (potential) threat for the wellbeing of great white sharks. Due to the protected status of sharks, governments have a general obligation to initiate conservative measures and minimise potential impacts on the animals.⁹² Ideally, this effect should be reflected within the frameworks regulating WSCD activities.

The regulatory frameworks of the WSCD jurisdictions generally include provisions regarding objectives, planning and permitting schemes as well as monitoring, compliance and enforcement provisions. Based on the problem areas described in section 2 of this chapter, the general structure of environmental laws, and research studies that had as subject the management of shark-based tourism activities,⁹³ certain elements can be identified that should be reflected in the applicable regulatory framework. These key elements consist of (a) objectives and principles, (b) specific and clear planning, (c) regulations of WSCD activities, (d) provisions that promote the conservation of

⁸⁹ Bruce B, Stevens J and Bradford R, "Site fidelity, residence times and home range patterns of white sharks around pinniped colonies, Final Report to the Australian Government Department of the Environment and Heritage", *CSIRO Marine and Atmospheric Research* (2005); Johnson & Kock in Nel & Peschak; Laroche et al *Effects of provisioning ecotourism*; Bruce B. & Bradford R, "The effects of shark cage-diving operations on the behaviour and movements of white sharks, *Carcharodon carcharias*, at the Neptune Islands, South Australia" *Marine Biology* 160 (2013); Huvneers C, Rogers P, Beckmann C, Semmens J, Bruce B, Seront L, "The effects of cage-diving activities on the fine-scale swimming behaviour and space use of white sharks", *Marine Biology* (2013).

⁹⁰ Bruce *A review of cage diving* 12.

⁹¹ Dobson et al *Exploitation or Conservation* 2.

⁹² See explanations in section 1 of this chapter.

⁹³ Bruce *A review of cage diving*; Dobson et al *Exploitation or Conservation*; Techera & Klein *The Role of Law*.

sharks and (e) monitoring, compliance and enforcement provisions. In the course of this thesis, the aforementioned elements will serve as the matrix to review the different WSCD regulations, develop a best practice model and assess South Africa's WSCD regime.

In order to contribute to an environmentally sound management of the WSCD industry, rules and provisions that emphasise the sustainability of the sector must be considered in respect of each key element. Following overview shall describe in more detail what is to be wished by way of rules within the regulatory frameworks.

a. Objectives and principles

In order to minimise possible deleterious impacts on great white sharks and allow for an environmental friendly development of this tourism sector, the regulatory framework must be viewed through the lens of environmental principles and certain standards must be satisfied. Environmental principles shall be included in a way that binds not only the state actors, but also each individual directly.

In light of the vulnerable status of sharks and the absence of scientific certainty, the objectives and principles which guide the management should include the conservation of the species as its main objective. Furthermore, the precautionary approach stating that “[w]here there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation”⁹⁴ is a very important environmental principle that should not be missing in frameworks concerning unknown impacts. Any extension of the industry should be linked to the concept of sustainable development. Sustainable development is generally defined as a development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.⁹⁵ It aims to secure the long-term stability of the economy and environment through integrating economic, environmental, and social interests into decision making processes.⁹⁶

b. Planning

Facing the steady growth of the WSCD industry and its economic potential, it seems appropriate that governments adopt specific policies and plans that inform and guide the management of this

⁹⁴ UN Rio Declaration on Environment and Development of 1992, Principle 15.

⁹⁵ Report of the World Commission on Environment and Development “Our Common Future” of 1987, 41.

⁹⁶ Emas R, “The concept of Sustainable Development: Definition and Defining Principles”, Brief for GSDR 2015, *Florida International University*, 2.

tourism sector. The policies in place should be accurate (and updated regularly) to take into account new scientific outcome. The planning framework should be forward looking, clear as regards the responsible authorities, identify priority actions and guide the resource allocation and implementation of the provisions.

c. Regulation of WSCD activities

The regulation of the practices involved in WSCD ought to respond to the various risk factors related to these activities.⁹⁷ Therefore provisions should be put in place that (i) limit the effort and (ii) minimise impacts on sharks and the overall marine environment.

(i) *Limiting effort:*

In line with the precautionary principle is the necessity to prevent overexploitation of shark diving sites. Furthermore, strong competition between WSCD operators may also lead to violation of protective and limitative provisions.⁹⁸ Hence, limitations regarding the efforts must be put in place (e.g. restricting the number of licences to operate, the areas in which WSCD operations may take place, and restrictions regarding the operating times periods). The most common way to do so is through the implementation of permitting systems.

(ii) *Reducing the impact:*

The legislative requirements to protect sharks must be reflected in provisions that mitigate negative effects for sharks (and the marine environment). Such regulations may include, *inter alia*, provisions and limitations regarding the allowed attractant, operation restrictions such as distance requirements and speed restrictions, and regulations regarding the equipment etc.

d. Direct conservation efforts

It is not sufficient to provide for the mitigation or risks, but also the benefits of non-consumptive wildlife tourism should be promoted within the respective management regulations. Provisions for direct funding of protection measures by tour operators, well trained employees and specified education plans which ensure a minimum standard of the information provided to the tourists on board may contribute directly to better conservation of the animals and their surroundings.

⁹⁷ For an overview on the risks related to the activities see section 2 of this chapter.

⁹⁸ Dobson et al *Exploitation or Conservation* 10; EWT *Position Statement* 3,4.

e. Monitoring, compliance, and enforcement

It is evident that a functioning compliance and enforcement system is necessary to ensure that tour operators respect regulations and conditions. Monitoring can be facilitated through reporting obligations, regular controls by qualified officials and a certain level of transparency. Best practices should further involve a combination of the traditional command and control mechanisms, self-regulation (through industry-based code of conducts) and economic incentives to ensure a better compliance by tour operators.⁹⁹

⁹⁹ Techera & Klein *The Role of Law* 11.

Chapter III

MANAGEMENT OF WSCD AROUND THE WORLD

Great white sharks are protected species in all the WSCD jurisdictions. Furthermore, three of the areas where WSCD takes place fall within marine protected areas.¹⁰⁰ Hence, the provisions regulating the industry typically reflect legal requirements to protect the animals against potential risks and/or to minimise the overall environmental impact of the operations within the protected areas.¹⁰¹ Chapter II of this thesis outlined certain problem areas related to WSCD activities¹⁰² and how - in theory – these risks may be addressed by the key elements.¹⁰³ The outcomes of these reflections can be summarised as follows:

The potential negative impacts of WSCD must be recognised by the governments. Therefore, the regulation of the industry should be guided by environmental principles such as the precautionary principle and the principle of sustainable development. Instead of unfettered economic growth, the objectives for the management should be a better species conservation, and enhancing public awareness and education. The management plans and policies in place must be updated regularly, forward looking and clear as regards responsibilities and implementation measures. The risks of long-lasting changes of great white sharks' behaviour and conditioning, may be reduced by limiting the effort and restricting the attractant to a minimum. Furthermore, the impact on the whole marine environment must be taken into consideration when WSCD activities are permitted. Conflicts with other water users (*inter alia* scientists, fishers or swimmers) may be solved by restricting WSCD tours to certain areas, in due distance from the coast. To prevent collisions between sharks and the boat or cages, further distance requirements and speed limits should be put in place. Furthermore, the cage design must be state of the art. To achieve an actual improvement of the conservation status of great white sharks, direct conservation measures should be provided for within the regulations. The effectiveness of the regulations must be warranted by a suitable enforcement and

¹⁰⁰ E.g. the Neptune Islands Group Marine Park in South Australia, the Gulf of the Greater Farallones Marine Sanctuary in California and the Guadalupe Islands Biosphere Reserve in Mexican waters.

¹⁰¹ Bruce *A review of cage diving* 2.

¹⁰² See Chapter II, section 2.

¹⁰³ See Chapter II, section 3.

monitoring system, including traditional command and control measures as well as incentives for voluntary compliance.

Each WSCD jurisdiction provides for a specific management policy and licencing system to regulate the industry. Besides this, the regulatory frameworks are similarly as diverse as the tour operators themselves. The following chapter provides an overview on the different management arrangements per jurisdiction. The review of each jurisdiction starts with a brief description of the characteristics of the jurisdiction's WSCD operations. The applicable provisions will then be examined based on the key elements (a) to (e). An in-depth analyses on how the jurisdictions address the risks and uncertainties related to WSCD within their regulatory frameworks will follow in section 2 of this chapter, when discussing innovative approaches and practices. In conclusion, the provisions which are - in the opinion of this author - the most sustainable, will be summarised in a "Best Practice Model".

1. Review of WSCD operations and management by jurisdiction

1.1 The management of WSCD industry in South Australia

Australia is the longest-standing example of shark-based tourism in the world.¹⁰⁴ WSCD operations started in the 1960s and take place within the Neptune Islands Conservation Park, a highly protected area approximately 60 km south of Port Lincoln and 30 km off the coast.¹⁰⁵ There are three licenced operators that have different operating models: two are permitted to use chum and threatened bait to attract sharks and the third operator uses acoustic attraction methods.¹⁰⁶

Since the Neptune Islands Group is declared as a marine protected area, the management of WSCD reflects mainly the requirements provided for in the legislation for protected areas.¹⁰⁷ The respective provisions ensure that all tourism activities undertaken in marine parks are appropriately

¹⁰⁴ Techera & Klein *The Role of Law* 2.

¹⁰⁵ Bruce *A review of cage diving* 8; Lake D, "Nature Like Nowhere Else – Activating Nature-based Tourism in South Australia", *South Australian Tourism Commission*, 4.

¹⁰⁶ Lake *Nature Like Nowhere Else* 7-10; Rogers P.J, Huveneers C, Beckmann C.L, "Monitoring residency of white sharks, *Carcharodon carcharias* in relation to the cage-diving industry in the Neptune Islands Group Marine Park", Report to the Department of Environment, Water and Natural Resources, *SARDI Research Report Series No. 818* (2014), 9.

¹⁰⁷ See *inter alia*, Wilderness Protection Act 1992 and respective regulations, South Australia's National Parks and Wildlife Act 1972 and respective regulations, the Marine Park Act of 2007 and respective regulations, Neptune Islands Group (Ron and Valerie Taylor) Marine Park Management Plan.

regulated and compatible with both park management and species conservation goals.¹⁰⁸ Furthermore, the listing¹⁰⁹ of the great white shark as a vulnerable species obligates the South Australian Government and tour operators to protect them against different threats. In the Recovery Plan for the White Shark (*Carcharodon carcharias*) of 2013, the Australian Government recognises that ecotourism, including cage diving, is a threat to the species and sets the investigation and management (and where necessary reduction) of these impacts as one of its objectives.¹¹⁰

a. Objectives and principles

Based on the relevant legislation (see the explanations above), the Department of Natural Resources (now: Department of Environment, Water and Natural Resources, “DEWNR”) of South Australia adopted a specific cage diving management policy in 2012 (“White Shark Tourism Policy”).¹¹¹

The management objectives set forth in this policy are:

- to enable the sustainable development of the South Australian White Shark tourism industry by defining the circumstances under which commercial activities may take place and by fostering competition;
- to develop an understanding of the impacts of tourism activities and prevent any risk to great white sharks which could harm sharks or compromise recovery of the species;
- to avoid and minimise impacts on reserve values; and
- to improve industry certainty and reduce excessive regulation (red tape).¹¹²

It is favourable that the objectives and principles guiding the management of WSCD in South Australia include sustainability as the benchmark for future development. Furthermore the focus is

¹⁰⁸ National Parks and Wildlife Regulations of 2001, Regulation 37 (1)(b); Marine Parks Zoning Regulations of 2012, Regulation 8(3)(h).

¹⁰⁹ The white shark is listed as Vulnerable and Migratory under the Australian Government’s Environment Protection and Biodiversity Conservation Act of 1999 and is a protected species under South Australia’s Fisheries Management Act of 2007; IUCN Red List of Threatened Species.

¹¹⁰ Department of the Environment and Energy *Recovery Plan for the White Shark* 14, 22.

¹¹¹ Department of Natural Resources (now: DEWNR), “Great White Shark Tourism (Neptune Islands Conservation Park) Policy of 2012”.

¹¹² DEWNR *White Shark Tourism Policy* 1.

on the prevention of negative impacts related, which reflects the need to protect this species from detrimental tourism activities.

b. Planning

The White Shark Tourism Policy was adopted after a research study¹¹³ that focussed on the impacts of WSCD on sharks at the Neptune Islands detected a significant increase in the residency times of white sharks at cage diving sites (subsequent to a significant increase of operator efforts).¹¹⁴ The policy applies in conjunction with the Commercial Tour Operator Licensing and Permitting Policy,¹¹⁵ and includes any attraction, observation or interaction with Great White Sharks at Neptune Islands Conservation Park. The DEWNR is responsible for the issuing of licences, the administration, and for ensuring compliance and enforcement.¹¹⁶

The White Shark Tourism Policy is currently being updated and is expected to be released by the end of 2017. By updating the policy regularly, the South Australian government takes into account new scientific outcomes and the management plan stays accurate. The main aim of the revised policy is to safeguard the industry by protecting against further behavioural changes of the animals. Therefore, the DWNR works together with different government and federal departments, great white shark scientists, and tour operators.¹¹⁷ Besides a consolidated licencing system that should support investment in the industry, an adaptive management approach that is based on the ongoing monitoring of shark residency will be incorporated, and the use of berley and bait will be further limited.¹¹⁸ Furthermore, steps are also being taken to establish a unified industry code of conduct.¹¹⁹

¹¹³ The respective research study was conducted by Bruce B & Bradford R and is called “The effects of shark cage-diving operations on the behaviour and movements of white sharks, *Carcharodon carcharias*, at the Neptune Islands, South Australia”. It was published in *Marine Biology* 160 in 2013.

¹¹⁴ Bruce *A review of cage diving* 8.

¹¹⁵ DEWNR, “Commercial Tour Operator Licensing and Permitting Policy of 2011”.

¹¹⁶ DEWNR *White Shark Tourism Policy* 1.

¹¹⁷ *Lake Nature Like Nowhere Else* 12.

¹¹⁸ Bruce *A review of cage diving* 9.

¹¹⁹ Rogers P.J & Huvneers C “Residency and photographic identification of white sharks *Carcharodon carcharias* in the Neptune Islands Group Marine Park between 2013 and 2015”, Report to the Department of Environment, Water and Natural Resources, *SARDI Research Report Series No. 893* (2016), 24.

c. Regulation of WSCD activities

(i) *Limiting effort:*

All commercial tourism activities conducted in parks proclaimed under the National Parks and Wildlife Act require a licence.¹²⁰ Currently, there are two different permits: an operational permit, valid for five years and issued by the DEWNR, and a separate permit for the use of chum, issued annually by Primary Industries and Resources South Australia, a research and development agency of the government of South Australia. Through the updated White Shark Tourism Policy, the licencing process will be consolidated into a single licence and the licence term will be extended to a 10 year term.¹²¹ The prolongation of the licence term should be an incentive for further investments in the industry.

The number of licences is limited to a maximum of three and will be issued according to the outcomes of a competitive licence allocation process. Applicants must complete an Expression of Interest, indicating how they will meet or exceed basic requirements. The granted licences enable tour operators to undertake specifically defined activities, and requires them to abide by certain licence conditions. The number of vessels per operator is limited to one. The policy further provides for operation-free days: days available for tourism are not more than five designated days each week throughout the year. Through the limitation of the operation days the exposure of sharks to WSCD activities will be minimised, which will in turn reduce the risk of behavioural changes.¹²² The limit of days is reviewed annually based on the outcomes of shark behaviour monitoring.¹²³

The Neptune Islands is (and will remain) the only site where WSCD operations may take place in Australia.

It is worth mentioning at this point, that Western Australia banned shark cage tourism after four fatal shark attacks in 2012.¹²⁴

¹²⁰ National Parks and Wildlife Regulations of 2001, Regulation 37 (1)(b).

¹²¹ Bruce *A review of cage diving* 9.

¹²² Bruce *A review of cage diving* 8.

¹²³ DEWNR *White Shark Tourism Policy* 1, 2.

¹²⁴ See *inter alia* Paris *Shark Tourism Banned in Western Australia*.

(ii) *Reducing the impact:*

The attraction of sharks with chum and baits (teleost fish products only) is subject to a respective additional permit which must be issued under the National Parks and Wildlife Act.¹²⁵ As mentioned above, only two of the three tour operators have such a permit at the moment. No decoys (towed or static) are permitted.¹²⁶ The updated policy will further restrict the use of chum and baits by imposing a limit on the amount allowed per day.¹²⁷ One tour operator may use sound as an attraction. The potential effects of this attractant on sharks and other protected species is unknown, but considered potentially harmful.¹²⁸ The fact that operators use different attractant seems suitable to decrease the risk of conditioning, as the sharks are getting stimulated by different technics and do not get used to just one attractant. However, it is debatable if is precautionary to allow acoustic attractant as the consequences are fairly unknown.

The White Shark Tourism Policy also imposes a distance requirement that stipulates that no anchoring or operating shall take place within 200 metres from another tour operator.¹²⁹

One of the tour operators has adopted its own code of conduct to ensure the safety of persons and sharks involved. The code includes a clear preference for conduct that does not harm sharks in any way or risk modifying their behaviour, such as not rewarding sharks with food, only using bait rope made of natural fibre twine, and prohibiting anyone from touching sharks.¹³⁰

d. Direct conservation efforts

There are government fees imposed on tour operators,¹³¹ but no information is available as to where the revenue of the WSCD industry is going. However, as regards whale-shark tourism at the Ningaloo Reef in Western Australia, the fees collected from licences are put into a trust account and are used to contribute to the costs for implementing management programs.¹³² It is not clear whether the same mechanism is provided for shark diving tourism in South Australia.

¹²⁵ Fisheries Management (General) Regulations of 2007, Section 23.

¹²⁶ Bruce *A review of cage diving* 8.

¹²⁷ Lake *Nature Like Nowhere Else* 15.

¹²⁸ DOC *Code of Practice* 12.

¹²⁹ DEWNR *White Shark Tourism Policy* 3.

¹³⁰ Techera & Klein *The Role of Law* 5.

¹³¹ Bruce *A review of cage diving* 24.

¹³² Techera & Klein *The Role of Law* 8.

The conservation obligations for tour operators are detailed in the White Shark Recovery Plan. According to the objectives of this plan, cage dive operators must engage in shark research and education programs. Furthermore, the different stakeholders shall develop and implement tourism education strategies and initiatives. The required content of those educational programs and initiatives is not prescribed by the law.¹³³

e. Monitoring, compliance, and enforcement

Operators are required to complete daily electronic logbooks recording the timing and location of operations, the volume of chum dispensed, and various details of sharks sighted.¹³⁴ Each vessel is therefore fitted with a ‘black box’ including a global positioning device and logging system.¹³⁵ According to the national recovery plan, cage dive operators are obliged to report great white shark interactions to the Australian Department of Sustainability, Environment, Water, Population and Communities annually.¹³⁶

The revised policy which is expected to be published by the end of 2017, will establish a management approach that will monitor the efficacy of the management initiatives to reduce the impact on sharks. This adaptive management approach is so far unique. Ongoing monitoring of shark residency times will allow for management measures (e.g. limiting the number of operation days, limiting of usage of bait) to be adjusted depending on the level and direction of measured change in shark behaviour and residency.¹³⁷ This approach shall, *inter alia*, demonstrate the commitment to a responsible and sustainable management, provide for an ongoing framework for monitoring and compliance, and bring greater certainty for tour operators, consumers, government, and community.¹³⁸

A failure to comply with a limitation, restriction, condition or provision of the permit, permission or other authority constitutes an offence according to Section 70 A of the South Australia’s National Parks and Wildlife Act 1972. In addition to the prescribed penalty,¹³⁹ an extra fine is imposed

¹³³ Department of the Environment and Energy *Recovery Plan for the White Shark* 22.

¹³⁴ Rogers et al *Monitoring residency of white sharks* 16.

¹³⁵ Techera & Klein *The Role of Law* 9.

¹³⁶ Department of the Environment and Energy *Recovery Plan for the White Shark*.

¹³⁷ Bruce *A review of cage diving* 9.

¹³⁸ Lake *Nature Like Nowhere Else* 18.

¹³⁹ The maximum penalty is 2 500 Australian Dollar (South Australia’s National Parks and Wildlife Act, Section 70A).

where a vulnerable species (e.g. great white shark) is involved. This additional penalty may amount up to 750 Australian Dollar for each animal affected by the act.¹⁴⁰

Overall, the compliance and enforcement provisions seem adequate. The adaptive management approach which will be implemented with the updated policy will further promote monitoring and will allow the competent authority to react more flexible if certain changes of sharks' behaviour are observed.

1.2 The management of WSCD industry in California

In the US, WSCD is only permitted within the Gulf of the Farallones National Marine Sanctuary ("GFNMS"), approximately 45 km off the coast west of San Francisco. There have been two to four vessels actively operating great white shark tours (usually on day trips) within the sanctuary since 2009.¹⁴¹ Due to the short season and difficult weather, no commercial great white shark tourism operator is known to derive all of its income from shark diving or viewing operations in the GFNMS management area.¹⁴²

The regulations applicable to shark related activities within the GFNMS are the strictest of any WSCD jurisdiction worldwide.¹⁴³ The legal framework applicable consists of the National Marine Protection, Research, and Sanctuaries Act¹⁴⁴ ("National Marine Sanctuaries Act") along with the Greater Farallones National Marine Sanctuary Final Regulations of 2015¹⁴⁵ ("GFNMS Regulations"). According to the GFNMS Regulations, any attracting of great white sharks anywhere in the sanctuary, or approaching within 50 m of any great white shark within two nautical miles around the Farallones Islands, is prohibited.¹⁴⁶

a. Objectives and principles

Despite the general prohibition of attracting and approaching sharks, permits may only be issued for those activities which are in line with the objectives of the National Marine Sanctuaries Act.¹⁴⁷

¹⁴⁰ South Australia's National Parks and Wildlife Act, Section 74.

¹⁴¹ Bruce *A review of cage diving* 11.

NOAA *Draft programmatic environmental assessment* 11.

¹⁴³ Bruce *A review of cage diving* 11.

¹⁴⁴ Marine Protection, Research, and Sanctuaries Act of 1972, Public Law 92-532, 91st United State Congress.

¹⁴⁵ Greater Farallones National Marine Sanctuary Final Regulations of 12. March 2015, Federal Register Vol. 80, No. 48.

¹⁴⁶ GFNMS Regulations, § 922.82.

¹⁴⁷ NOAA *Draft programmatic environmental assessment* 5.

The objectives of this act are:

- the support, promotion, and coordination of research;
- long-term monitoring;
- enhancing education and public - awareness; and
- - the protection and conservation of great white sharks, and the prevention of disturbances and alterations to white sharks' behaviour.¹⁴⁸

Furthermore the regulation of WSCD tours should reduce conflicts between shark researchers and shark wildlife viewing operators.¹⁴⁹ The management of WSCD within the GFNMS is particular in the sense that shark viewing is only allowed for the specific purpose of education. Hence, enhancing education and public awareness is not only a side effect of WSCD operations but the only purpose for what WSCD activities are allowed.

b. Planning

The first set of GFNMS Regulations that specifically addressed disturbances of great white sharks as a result of cage diving operations and other wildlife watching operations was adopted in 2008, after seven years of research, planning, and public participation. Since then, the regulations have been revised regularly, and the most accurate version is from March 2015.¹⁵⁰

In order to implement the sanctuary regulations and to protect and conserve the great white shark population at the Farallones Islands, the White Shark Stewardship Project was established.¹⁵¹ The White Shark Stewardship Project helps to prevent disturbances and alterations to great white sharks' natural behaviours, and developed into an umbrella for all white shark programs of the sanctuary including, *inter alia*, public and boater outreach, naturalist trainings, school education programs, and permitting and coordinating with the National Oceanic and Atmospheric Administration ("NOAA") Office of Law Enforcement and other partners to track vessel activity and potential disturbances throughout the sanctuary.¹⁵²

¹⁴⁸ Bruce *A review of cage diving* 23; National Marine Sanctuary Act, Section 301[16 U.S.C. 1431],(b).

¹⁴⁹ NOAA *Draft programmatic environmental assessment* 3.

¹⁵⁰ NOAA *Draft programmatic environmental assessment* 3.

¹⁵¹ NOAA *Draft programmatic environmental assessment* iv, v.

¹⁵² GFNMS, "Ecosystem Protection – White Shark Stewardship Project", 1 (first accessed: 13.01.2017 <http://farallones.noaa.gov/eco/sharks/>); NOAA *Draft programmatic environmental assessment* 3.

The competent authority for the issuing of permits for WSCD operations, which would fall under “educational tourism”, is the Office of National Marine Sanctuaries. Before the issuing of a permit, the GFNMS superintendent must have reviewed and considered the application (including the educational plan). An application must further be consistent with the Programmatic Environmental Assessment,¹⁵³ and associated decisions and the National Environmental Policy Act.¹⁵⁴ The Programmatic Environmental Assessment draft describes research and education projects that may have the potential to affect White Sharks within the sanctuary and hence, require authorisation.¹⁵⁵ If any proposed method is not covered under the aforementioned acts, further analyses are required.¹⁵⁶ The NOAA Office of Law Enforcement is the competent authority for compliance and enforcement regarding any decisions in respect of the sanctuary.¹⁵⁷

c. Regulation of WSCD activities

(i) *Limiting effort:*

As mentioned above, a permit system is used to provide for exemptions to activities which are prohibited under the GFNMS Regulations. Hence, when a proposed activity, among other things, furthers the understanding of sanctuary resources and qualities, contributes to education or the natural value of the sanctuary, or assists in managing the sanctuary, a permit may be issued (in coordination with the state and other federal agencies taking into account any applicable environmental laws and regulations).¹⁵⁸ Cage diving operations or boat-based great white shark watching falls under the permit category “Education”.¹⁵⁹

The GFNMS Regulations do not provide for a limit of permits, vessels, or operation days. However, due to the natural aggregation of white sharks in the area, WSCD operations only take place from 13 September until the end of November. Furthermore, the annual number of permits never exceeds four operators, each operating with only one vessel.¹⁶⁰

¹⁵³ NOAA, “Draft programmatic environmental assessment of potential white shark research and education projects within the Gulf of the Farallones and Monterey Bay National Marine Sanctuaries” of 2014.

¹⁵⁴ National Environmental Policy Act of 1969, Public Law 91-190, 91st United States Congress.

¹⁵⁵ NOAA *Draft programmatic environmental assessment* vii.

¹⁵⁶ NOAA *Draft programmatic environmental assessment* 5.

¹⁵⁷ GFNMS *Ecosystem Protection* 1.

¹⁵⁸ GFNMS Regulations, § 922.83 (b).

¹⁵⁹ NOAA *Draft programmatic environmental assessment* 6.

¹⁶⁰ NOAA *Draft programmatic environmental assessment* 11.

The only location where WSCD operations are permitted is the GFNMS.¹⁶¹

(ii) *Reducing the impact:*

The priority of the WSCD management in California is the protection of great white sharks, trying to minimise any possible human-related impacts by prohibiting any attraction of these animals.

The regulations define “attract or attracting” as “conducting or attempting to conduct any activity that lures or may lure any animal in the sanctuary by using food, bait, chum, dyes, decoys (e.g., surfboards or body boards used as decoys), acoustics, or any other means, except the mere presence of human beings (e.g., swimmers, divers, boaters, kayakers, surfers)”.¹⁶²

In contrast to the practices found in South Australia, the permits for tour operators within the GFNMS may only allow the use of artificial decoys in form of seals which may be tethered to the anchored vessel; towing a decoy behind a moving vessel is prohibited.¹⁶³ The use of baits, chum or marine mammal blubber for the purpose of attracting great white sharks is only possible in conjunction with scientific research and would require further permits and authorisation.¹⁶⁴

After a review of the effects decoy attractants, bait, chum or scent attractants may have on great white sharks as well as on the overall marine environment, the sanctuary management concluded that it would be unwarranted if educational tour operators use organic material to attract the animals.¹⁶⁵ Both of the methods (e.g. artificial and organic attractant) have detrimental effects with unknown long-term results. According to the sanctuary management, stationary decoys alone are effective enough for the purpose of educational WSCD tours. The additional use of organic attractants by tour operators could lead to increased disturbances. Furthermore, the use of scent for non-research activities could distract great white sharks from approaching bait, chum or scent used by researchers. This would have potential adverse effect on research activities, which are prioritized within the GFNMS.¹⁶⁶

¹⁶¹ Bruce *A review of cage diving* 11.

¹⁶² GFNMS Regulations, § 922.81.

¹⁶³ Bruce *A review of cage diving* 11.

¹⁶⁴ GFNMS, “White Shark Regulations & Permits”, 1. (first accessed: 13.01.2017 http://farallones.noaa.gov/eco/sharks/sharks_permitting.html); NOAA *Draft programmatic environmental assessment* 6.

¹⁶⁵ NOAA *Draft programmatic environmental assessment* 36-40, 57.

¹⁶⁶ NOAA *Draft programmatic environmental assessment* 57.

There are no provisions specifying the cage design or providing for distance requirements. Within the Programmatic Environmental Assessment, the impact of the permitted attractant on other species (seabirds, mammals, other fish, or turtles) has been analysed with the outcome that – due to the short operation season within the GFNMS and the restrictions regarding the form of attractant – the potential impact is negligibly.¹⁶⁷

d. Direct conservation efforts

There is no information available regarding direct (financial) contributions for shark conservation resulting from the educational WSCD tours.

Since commercial WSCD operations require an educational purpose, the operators must - within their applications - provide information about their education plans and must carry on any of their trips a naturalist with specific qualifications.¹⁶⁸ The assessment of the education plan by the authority secures a certain standard of the information provided for on tours. The fact that the tours are conducted by a specific trained naturalist give the impression that the educational task is really being taken serious. It is assumable that a specially trained naturalist has more in-depth knowledge about the GFNMS than an ordinary tour guide.

e. Monitoring, compliance, and enforcement

The tour operators must keep a record and complete a daily log which has to be submitted by the end of the season.¹⁶⁹ The official compliance and enforcement authority is the NOAA Office of Law Enforcement, which works in conjunction with the White Shark Steward Ship Project as well as other partners working in and for the GFNMS.¹⁷⁰

If a person violates any regulation of the National Marine Sanctuaries Act or the respective regulations or any provision provided for in the permit issued under the Act, a civil penalty up to the amount of 100,000 USD for each such violation, may be imposed. Each day of a continuing violation constitutes a separate violation, which can eventually result in a very high civil penalty.¹⁷¹ Furthermore, it results in a criminal offence if a person destroys, causes the loss of or injures any

¹⁶⁷ NOAA *Draft programmatic environmental assessment* 51-59.

¹⁶⁸ NOAA *Draft programmatic environmental assessment* 6,7.

¹⁶⁹ Bruce *A review of cage diving* 26.

¹⁷⁰ GFNMS *Ecosystem Protection* 1.

¹⁷¹ National Marine Sanctuaries Act (as amended by Public Law 106-153, November 2000), Section 307.

sanctuary resource. The punishment for such a criminal offense can be a fine, imprisonment or both.¹⁷²

The GFNMS also provides for a whistleblowing system: Wildlife disturbance may be reported by completing an online form and will be revised and further processed by the competent department of the GFNMS.¹⁷³ The whistleblowing system is a useful tool to support compliance and enforcement.

1.3 The management of WSCD industry in Mexico

The only site where WSCD is permitted in Mexican waters is within the Guadalupe Island Biosphere Reserve. The Guadalupe Islands are located 260 km off the mainland and shark diving operations are restricted to a 6 km stretch of the coast of the island. There are currently six active operators which offer multiple-day trips.¹⁷⁴

Because of its unique ecology, the Guadalupe Island was declared as Biosphere Reserve by the Mexican federal government (the Ministry of Environment and Natural Resources) in 2005.¹⁷⁵ The regulation of tourism activities within the reserve is based on environmental legislation related to protected areas,¹⁷⁶ national laws protecting white sharks¹⁷⁷ and a management plan regarding the Guadalupe Island Biosphere¹⁷⁸ (“Guadalupe Management Plan”). A formal “Code of Conduct”¹⁷⁹ guides the operations according to the aforementioned laws.¹⁸⁰ Ecotourism activities are regulated

¹⁷² National Marine Sanctuaries Act, Section 306 (1) and Section 307 (c).

¹⁷³ GFNMS, “Have You Witnessed a Wildlife Disturbance”, 1 (first accessed: 13.01.2017 http://farallones.noaa.gov/eco/seabird/seabird_report.html).

¹⁷⁴ Bruce *A review of cage diving* 10.

¹⁷⁵ Decreto por el que se declara Área Natural Protegida, con la categoría de Reserva de la Biosfera, la zona marina y terrestre que incluye a la Isla Guadalupe, de jurisdicción federal, así como a las demás superficies emergidas que se encuentran dentro de la misma, localizada en el Océano Pacífico, frente a la costa de la Península de Baja California, con una superficie total de 476,971-20-15.79 hectáreas. Publicado el 25 de abril del 2005 en el Diario Oficial de la Federación.

¹⁷⁶ Ley General del Equilibrio Ecológico y la Protección al Ambiente, Reglamentos de la Ley General del Equilibrio Ecológico y la Protección al Ambiente, en Materia de Áreas Naturales Protegidas y en Materia de Impacto Ambiental; Ley General de Vida Silvestre y su Reglamento.

¹⁷⁷ Procuraduría Federal de Protección al Ambiente, “Especies en Categoría de Riesgo”, NOM-059-SEMARNAT-2010; Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación, “Pesca responsable de tiburones y rayas. Especificaciones para su aprovechamiento”, OM-029-PESC-2006.

¹⁷⁸ Programa de Manejo de la Reserva de la Biosfera Isla Guadalupe, publicado en el Diario Oficial de la Federación el 17 de junio del 2011.

¹⁷⁹ Aguilar M. T, Morales O. S, Padilla M. H. & Camarena A.B, “Code of conduct for great white shark cage diving in the Guadalupe Island Biosphere Reserve”, Secretaría de Medio Ambiente y Recursos Naturales and Comisión Nacional de Áreas Naturales Protegidas, Miguel Hidalgo, D.F. Mexico City (2015).

¹⁸⁰ Aguilar et al *Code of conduct* 17.

and monitored by the National Commission of Natural Protected Areas (“CONANP”) with the purpose of preventing possible impacts and disturbances that may affect the behaviour of the species and the natural functioning of the ecosystem.¹⁸¹

a. Objectives and principles

The management objectives which guide the regulation of WSCD activities are:

- to ensure sustainability and conservation of the Guadalupe Island Biosphere Reserve;
- to prevent any possible negative and harmful impact or disturbances on the natural
- behaviour and habitat of great white sharks; and
- to guarantee the species conservation and achieve sustainable development from an environmental, social, and economic perspective.¹⁸²

b. Planning

WSCD operations are guided by the Code of Conduct for Great White Shark Cage Diving in the Guadalupe Island Biosphere Reserve (“Code of Conduct”), which was first published in 2007 and updated in 2015. The Code of Conduct is part of the strategy of sustainable management which has been termed the ‘Guadalupe Management Plan’ and ensures a rational use of the resource “white shark”. It was developed following an integrated approach collaborating with the Management of the Biosphere Reserve Guadalupe (“DRBIG”) Island, various government authorities, academia and specialists of the area, tourism operators, and users. The responsible agencies for managing WSCD are the Secretariat of Environment and Natural Resources (“SEMANART”) and CONAP.¹⁸³

Various arrangements regarding WSCD activities and their management are currently under review.¹⁸⁴

¹⁸¹ Aguilar et al *Code of conduct* 13.

¹⁸² Aguilar et al *Code of conduct* 13; Bruce *A review of cage diving* 23.

¹⁸³ Aguilar et al *Code of conduct* 12-14.

¹⁸⁴ Bruce *A review of cage diving* 11.

c. Regulation of WSCD activities

(i) *Limiting effort:*

WSCD operators require two licences in order to be able to conduct tourism operations, one operation permit every two years which is issued by CONAP and an annual permit regarding the interaction with protected species which is issued by SEMARNAT. The number of licences as well as the number of vessels a tour operator may have is currently not limited.¹⁸⁵

Within the Guadalupe Island Biosphere Reserve, WSCD operations are restricted to a 6 km stretch of coast on the northeast side of the island which measures approximately 35 km in length.¹⁸⁶ The reason for the spatial restriction of WSCD operations within the reserve is to provide areas where sharks can reside without being exposed to operations. This spatial restriction is a valuable tool to minimise the impact on the animals.¹⁸⁷

The Code of Conduct does not provide for operation-free days, although between July and January only there is a natural aggregation of great white sharks in the waters Guadalupe Island.¹⁸⁸

(ii) *Reducing the impact:*

Mexico is one of two jurisdictions where the use of chum is completely prohibited. In addition, the use of decoys or acoustic stimuli is not permitted.¹⁸⁹ The operators can use fish-based baits which are to be authorised by the SEMARNAT. The use of baits is regulated in detail: the angle it can be thrown into the water, the distance from the mainland, the length the rope must be, etc. The Code of Conduct provides that an operator must ensure that the bait line is immediately removed from the water if the great white shark following the bait approaches within 2 m of the vessel. However, if a shark catches the bait, the bait line must be immediately released and the bait can be consumed by the animal. There is no limit on baits per day.¹⁹⁰

¹⁸⁵ Aguilar et al *Code of conduct* 20; Bruce *A review of cage diving* 11, 24.

¹⁸⁶ Aguilar et al *Code of conduct* 57; Bruce *A review of cage diving* 10.

¹⁸⁷ Bruce *A review of cage diving* 10.

¹⁸⁸ Aguilar et al *Code of conduct* 12.

¹⁸⁹ Aguilar et al *Code of conduct* 39; Bruce *A review of cage diving* 11.

¹⁹⁰ Aguilar et al *Code of conduct* 39.

The integrity of great white sharks is further protected by limiting the daily anchorage manoeuvres to a maximum of three times and imposing a distance requirement providing that operators shall not come closer than 50 m from great white sharks foraging on marine mammals.¹⁹¹

As it exists in other jurisdictions too, the design of the cage is predefined so that the risk of sharks being injured is minimised. The cages must be checked by the management of the reserve annually, which ensures that tour operators comply with the requirements.¹⁹²

The Code of Conduct provides for numerous provisions which shall minimise the overall impact of the operations, including the prohibition of entering the mainland of the island, dumping provisions, regulations regarding soaps and chemicals used on the boat, the prohibition to introduce any exotic species, prohibitions to somehow interact with any other marine organism or bird, and so on.¹⁹³

d. Direct conservation efforts

There is a permit fee imposed on tour operators¹⁹⁴ and visitors must obtain a “Conservation Bracelet” for every day they spend within the Guadalupe Biosphere Reserve.¹⁹⁵ The fee received goes to the DRBIG and is exclusively used for the management and conservation of the marine reserve.¹⁹⁶ Such a mechanism is ideal for countries which struggle with limited financial resources.

As regards the educational mandate of tour operators, the Code of Conduct provides that the clients must be informed about the biosphere reserve and its characteristics and features; but no more detail is prescribed.¹⁹⁷

e. Monitoring, compliance, and enforcement

The permit holders must notify the dates of their arrival and departure to the reserve to the management of the biosphere reserve and the Mexican Navy. At the end of each trip, an “activity report” must be submitted to the management and any unusual activity has to be reported immediately. Furthermore, any violation of any regulation will result in a sanction by the competent

¹⁹¹ Aguilar et al *Code of conduct* 32.

¹⁹² Aguilar et al *Code of conduct* 34, 35.

¹⁹³ Aguilar et al *Code of conduct* 21 -24.

¹⁹⁴ Ley Federal de Derechos de 1981, Article 194.

¹⁹⁵ Ley Federal de Derechos de 1981, Article 198; Reserva de la Biosfera Isla Guadalupe, “Cuanto cuestó?” (first accessed 19.01.2017: <http://islaguadalupe.conanp.gob.mx/cuanto-cuesta/>).

¹⁹⁶ Aguilar et al *Code of conduct* Reserva de la Biosfera Isla Guadalupe *Cuanto cuestó?*

¹⁹⁷ Aguilar et al *Code of conduct* 16.

federal authority in the subject.¹⁹⁸ The restriction of WSCD operations to the 6 km stretch further facilitates compliance monitoring.¹⁹⁹

1.4 The management of WSCD industry in New Zealand

WSCD operations are relatively new in New Zealand and started in 2008. Cage dives primarily take place near the Stewart Island, where there is a stable resident population of great white sharks.²⁰⁰ There are currently two operators offering shark cage diving on a day-trip basis.²⁰¹

Despite the fact that great white sharks - also called “white pointer sharks” in New Zealand - are fully protected under national legislation,²⁰² WSCD activities were initially unregulated. Recognising the community concerns regarding the impacts of these tourism activities, the Department of Conservation (“DOC”) introduced a Code of Practice in 2013 (of which an updated version was released in 2015), followed by a permitting system in 2014.²⁰³ Aside from the aforementioned regulations, a number of other legislative requirements are also applicable to WSCD such as the Maritime Transport Act of 1994, the Maritime Rules, Health and Safety in Employment Act of 1992, and the Marine Mammals Protection Act of 1978.²⁰⁴ WSCD in New Zealand is managed by two government organisations, the DOC and Maritime New Zealand.

a. Objectives and principles

The management objective of the Code of Practice is to ensure that potential risks to sharks resulting from cage diving activities are identified and minimised.²⁰⁵ Therefore, the Code of Practice includes a description of any potential risk for sharks, levels them from high to low, and provides for mitigation strategies and behavioural norms.²⁰⁶

¹⁹⁸ Aguilar et al *Code of conduct* 16, 17.

¹⁹⁹ Bruce *A review of cage diving* 10.

²⁰⁰ Department of Conservation, “Cage diving in New Zealand”, *News & Issues*, 1.12. 2015 (first accessed 15.01.2017 <http://www.doc.govt.nz/shark-cage-diving>).

²⁰¹ Bruce *A review of cage diving* 11.

²⁰² Wildlife Act of 1953, Act No 31, Reprint as at 17 December 2016, Schedule 7A; Fisheries (White Pointer Shark—High Seas Protection) Regulations of 2007; Wildlife (White Pointer Shark) Order of 2007.

²⁰³ DOC *Cage diving in New Zealand*.

²⁰⁴ DOC *Code of Practice* 3.

²⁰⁵ DOC *Code of Practice* 3.

²⁰⁶ DOC *Code of Practice* Appendix B.

b. Planning

The DOC, as the responsible authority for controlling, managing, and monitoring the impacts of WSCD on great white sharks, published a formal Code of Practice, which must be complied with by the operators. The Code of Practice forms the key conditions for the WSCD permits.²⁰⁷ Maritime New Zealand is responsible for the safety of the crew and clients at sea operation. Therefore, a set of guidelines²⁰⁸ was published to assist operators of commercial WSCD operations to implement their safety systems and to conduct their operations safely.²⁰⁹

The DOC acknowledges the concerns that WSCD may lead to behavioural changes and declares that it will constantly work alongside all parties to understand and improve the conservation management of great white sharks.²¹⁰ The DOC confirmed that any new, relevant information that indicates any significant increased risk will be acted on.²¹¹ The management of WSCD in New Zealand seems to be an endless work in progress to ensure that the management of this industry is guided by the experiences from other jurisdictions and the latest scientific knowledge on great white sharks.²¹² Hence, the Code of Practice, which was updated in 2015, is currently under review again.

c. Regulation of WSCD activities

(i) *Limiting effort:*

Tour operators require a permit under the Wildlife Act which is to be issued by the DOC. The first set of permits was allocated in 2014 and reviewed in 2016.²¹³ There is no limit of permits nor a limit of vessels specified in the Code of Practice, but currently there are two permits granted.²¹⁴ Vessels must keep a minimum distance of 200 m from another vessel.²¹⁵

²⁰⁷ DOC *Cage diving in New Zealand*, Management.

²⁰⁸ Maritime New Zealand, “Safety Guidelines for Commercial Shark Cage Diving”, December 2014.

²⁰⁹ Maritime New Zealand *Safety Guidelines* 5.

²¹⁰ DOC *Code of Practice* 16.

²¹¹ DOC *Cage diving in New Zealand*, Management.

²¹² Bruce *A review of cage diving* 2.

²¹³ DOC *Cage diving in New Zealand*, Permitting System.

²¹⁴ Bruce *A review of cage diving* 24.

²¹⁵ Bruce *A review of cage diving* 26.

The Code of Practice does not provide for operation-free days, but the great white shark viewing season is only between December and May, hence tours only operate in this period.²¹⁶

WSCD activities are only authorised within 300 m of Edwards Island, which is 8 km from the Steward Islands.²¹⁷

(ii) *Reducing the impact:*

The risk of conditioning the animals is minimised by the obligation to mince chum finely enough so that it does not provide any source of food, as well as the restriction that it may only be discharged via a ladle or pump.²¹⁸

As regards the handling of baits, New Zealand has the strictest conditions of all WSCD jurisdictions that allow its use. The amount of thrown bait is to be minimised as much as possible and only one throw bait may be used at a time. In the event that a great white shark takes or consumes any part of throw bait for whatever reason, no further baits are allowed on that day. The bait is handled by trained rope handlers to minimise the chance that sharks take the bait. No artificial decoys or acoustic stimuli may be used to attract sharks or lure them to the cage.²¹⁹

The Code of Practice provides for detailed regulations to prevent sharks being seriously injured or killed due to crashes with WSCD equipment (this risk is rated as medium to high by the DOC).²²⁰

Furthermore, the Code of Practice also includes prohibitions of dumping any waste or unauthorised organic material in the sea, and provisions regarding the interaction with seabirds and other marine mammals, and obliges WSCD operators to keep a minimum distance of 1000 m from swimmers or other diving activities.²²¹

d. Direct conservation efforts

The regulative framework for WSCD in New Zealand does not provide for any direct conservation measures related to the activities.

²¹⁶ Bruce *A review of cage diving* 11.

²¹⁷ Bruce *A review of cage diving* 25.

²¹⁸ DOC *Code of Practice* 4, 10.

²¹⁹ Bruce *A review of cage diving* 12; DOC *Code of Practice* 8-15; Maritime New Zealand *Safety Guidelines* 11.

²²⁰ DOC *Code of Practice* 8, 9.

²²¹ Bruce *A review of cage diving* 26; DOC *Code of Practice* 12, 13.

e. Monitoring, compliance, and enforcement

The operators are required to keep a daily trip log and submit those to the DOC. The DOC closely monitors the operators, particularly around methods of attracting sharks to ensure the operators are following permit conditions. Therefore, observers have been established which monitor the levels of cage diving activities and the response of sharks to this. The observers can be uniformed staff members and ‘secret shoppers’.²²² The DOC can request access to copies of any photos or film taken of great white sharks and from 2017, the operators must install video cameras.²²³

A certain degree of transparency is ensured by including the key conditions of the permits in the mandatory Code of Conduct. This ensures that the permits do not differ from one another in sensitive issues such as bait handling or cage and vessel design.

All incidents of shark entanglement, injury, ingesting material other than natural baits, or becoming trapped, or partially trapped, inside the dive cage, must be reported as soon as possible to the local DOC office. Failure to do so results in a sanction with a fine.²²⁴

2. Innovative approaches and practices

a. Objectives and principles

The main objectives which should guide WSCD regulations are:

- the protection and conservation of sharks, including the prevention of disturbances and alterations to great white sharks and their behaviour;
- enhancing education and public awareness;
- and minimising impacts on the overall marine environment.

All of the reviewed jurisdictions include (at least partly) those objectives within their management plans. As already mentioned, it is to be wished that environmental principles are included. As the review shows, the concept of sustainable development has been included within the Australian and

²²² DOC, “DOC tightens controls on shark cage diving”, *Media releases*, DOC from 01.12.2015 (first accessed: 16.01.2017 <http://www.doc.govt.nz/news/media-releases/2015/doc-tightens-controls-on-shark-cage-diving/>).

²²³ DOC *Code of Practice* 16; DOC, “DOC has reissued temporary permits for shark cage diving operators off Rakiura/Stewart Island”, *Media releases*, DOC from 23.12.2016 (first accessed: 16.01.2017 <http://www.doc.govt.nz/news/media-releases/2016/doc-finalises-shark-cage-diving-permits/>).

²²⁴ DOC *Code of Practice* 16.

Mexican legal framework, but the precautionary principle, which is crucial if someone thinks of the great lack of scientific data, is not included in any management plan.

b. Planning

A factor that clearly emerges from the jurisdictions is that the regulatory framework must be reviewed regularly and adjusted if and where necessary. All of the reviewed management plans have been regularly updated. Furthermore all of the jurisdictions currently review their regulation to include new scientific outcomes and improve the protection against behavioural changes of the animals. Therefore, governments generally work together with different stakeholders such as scientists, tour operators, and users. The Programmatic Environmental Assessment draft, which has been adopted in California, is a great tool to guide authorities within the fulfilment of their responsibilities.

c. Regulation of WSCD activities

(i) *Limiting effort:*

As regards the permit system, California has a very specific approach only allowing activities within the GFNMS that further the understanding of sanctuary resources and qualities, contributes to education or the natural value of the sanctuary, or assists in managing the sanctuary. WSCD operators often justify their activities with their contribution to a better awareness and education.²²⁵ Linking an educational task to the allowance of WSCD activities is definitely a viable tool to ensure that operators take on this duty.

It is debatable whether it is useful to determine the number of operators by law. However, a binding limitation of licences which is based on a precautionary approach and re-assessed regularly is favourable since it raises the competition in the application process and favours those operators which have the most sustainable business plan. Such a system is incorporated in South Australia, for example. In general, the number of active tour operators range from two to six per jurisdiction.

The number and conditions of granted permits should be reviewed on a regular basis. This regular review takes place in all WSCD jurisdiction.

²²⁵ EWT *Position Statement 3*.

To facilitate monitoring and reduce competition, the number of vessels should also be limited to one per operator. In South Australia, tour operators are only allowed to have one operating vessel registered per permit at any time. The other jurisdictions do not provide for any limits in this regard.

Restrictions regarding permitted shark cage diving sites also exist in all WSCD jurisdictions. Generally, WSCD operations are only allowed within one specific site. When designating the dive sites, due regard shall be taken to the distance to the mainland where other water users may be. In addition, within the WSCD sites further restrictions regarding the space and amount of anchoring manoeuvre, distance requirements, and restrictions regarding the allowed radius of chumming and baiting reduces the impact on sharks and the marine environment. Such further restrictions are included in the regulatory frameworks of Mexico and New Zealand. Limiting the area within a shark diving site also helps with the monitoring. This is especially favourable for countries with limited resources as regards compliance and enforcement measures.

As it is practice is South Australia, the exposure of sharks to WSCD activities can be minimised by operation-free days within each week; the number of days should be reassessed on an annual basis to take into consideration eventual changes of sharks' behaviour. Furthermore, where WSCD sites are very close to popular beaches, seasonal closures would also minimise conflicts with other water users.

(ii) *Reducing the impact:*

Globally, the response regarding the attraction of great white sharks in the wild is varied: in California, only the use of artificial decoys in the form of seals which may only be towed to an anchored vessel is allowed; one tour operator in Australia uses acoustic stimuli to attract sharks; Mexico prohibits chumming but allows baiting; Australia and New Zealand allow chumming and baiting subject to limitations. Any kind of attractant bears certain risks: As regards artificial decoys or ropes, there are concerns that regarding the impact of ingestion of parts thereof,²²⁶ that it impacts on their predation opportunities and that it causes a shark to deviate from patrolling for food, or from mating.²²⁷ The effects of other man-made attractants such as sounds, chemicals or electrical devices on sharks and other species are also unknown, and potentially harmful.²²⁸ As regards the use of organic bait or scent, changes of behaviour of the animals are not only possible but have

²²⁶ DOC Code of Practice 10.

²²⁷ NOAA Draft programmatic environmental assessment 52.

²²⁸ DOC Code of Practice 11.

actually been documented.²²⁹ From an environmental perspective, the answer to the question of what the best practice with regard to the use of attractions might be, is simple: no attraction at all.

However, since sharks are harder to view than other marine mammals that stay closer to the surface, it seems necessary for the industry's viability to use some form of attractant to enable regular sightings and satisfy tourists. Accordingly, as regards the use of chum, New Zealand's regulation seems the best practice model: chum must be minced so finely that it does not offer a food source to sharks. Furthermore, a maximum of chum per day may also help to control the overall impact of the organic scent released in the ocean.

In the author's opinion, baited lines or decoys which lure the sharks close to cages or entice them to breach shall not be allowed at all. If a shark catches a bait it constitutes a food reward that will probably lead to conditioning; the risk of sharks getting hurt by swimming full speed towards the boats is very high, and the ingestion of ropes attached to baits may lead to injuries of the alimentary canal; baiting also increases the energy consumption of sharks without providing any nutrition in return. However, if the use of bait is indispensable to enable sightings, the conditions have to be very strict: a maximum of one bait per day must be put in place, bait ropes must be made out of biodegradable material, baits must not be presented immediately in front of the cages, and they must be recovered if a shark approaches. Detailed bait handling provisions are to be found in New Zealand's and Mexico's formal code of conduct.

Spatial restrictions within the sites are necessary to ensure that sharks can reside without being exposed to operations. A distance requirement in respect of the anchoring of the boat, as well as a speed limit, should also be put in place. As it is provided for in New Zealand, a distance requirement from swimmers or other divers would minimise the risk of conflicts with other water users.

The design of the cage must be prescribed in detail and checked regularly to avoid injuries of the sharks in the event of collision.

It is also necessary that the WSCD regulations start to include provisions protecting the whole marine environment following an ecosystem approach (e.g. provisions prohibiting dumping, diving outside the cage, behaviour during boat tours and similar). The impact of WSCD on the broader

²²⁹ White Sharks have been observed swimming in a crisscross pattern several kilometers downstream of a baiting station for periods of up to 12 hours after cessation of chumming; also changes regarding the swimming depths and swimming spatial range when WSCD vessels were using chum have been documented (see section 2 in Chapter II above or NOAA *Draft programmatic environmental assessment* 54).

marine environment is still treated as a side issue. As the functioning of the whole marine ecosystem depends on the balance of various factors, this issue must be considered in more detail when adopting regulations.

d. Direct conservation efforts

The desirable situation would be that a certain percentage of the income generated by WSCD operations is earmarked and directly used for the conservation of great white sharks, the implementation of the regulations and compliance, and enforcement procedures. None of the jurisdictions really provide for such a mechanism. Where WSCD takes place in marine parks, however, the visitors' fee is at least partly used as entrance fee of the marine park.

As regards the educative benefit of WSCD activities, the content of the education plan should be provided by the respective environmental department or at least regularly.

e. Monitoring, compliance, and enforcement

The new policy of South Australia provides for an adaptive management approach, which shall monitor the efficacy of the management initiatives to reduce the impact on sharks, and allows for management measures (e.g. limiting the number of operation days, limiting of usage of bait) to be adjusted respectively to the outcomes.

Furthermore, the use of technical devices such as black boxes sending out the locations and filming of the tours – as it is practice in New Zealand – are effective tools to promote compliance with the regulations. Operators must report details electronically after each tour to the competent authority. Mandatory logbooks are provided in all WSCD jurisdictions to ensure the record-keeping of activities. However, it is somehow subjective which type of shark behaviour or activity is considered abnormal.

Enforcement can be facilitated through spatial restrictions within the WSCD areas. Whistleblowing systems where any individual can directly report to the competent authority if an irregularity or violation takes place are also a valuable supplement to traditional monitoring mechanisms. It is also reasonable that the authority competent for the issuing of the permits (in general the respective environmental department) is responsible for the enforcement of the provisions. A zero-tolerance policy with respect to any violations of provisions or permit conditions is necessary to ensure the integrity of the sector.

3. A “Best Practice Model”

Even though the operation models differ, a set of best practice provisions can be extrapolated. Based on the analysis above, the “Best Practice Model” includes following provisions with respect to each key element.

a. Objectives and principles

The inclusion of the principle of sustainable development should not be missing within the WSCD regulations. The management must follow a precautionary approach and should include as its objectives

- the protection and conservation of great white sharks (including the prevention of disturbances and alterations to white sharks and their behaviour);
- enhancing education and public awareness; and
- minimising the impacts on the overall marine environment.

b. Planning

The management plans must be accurate. A regular review is necessary to include outcome of monitoring.

c. Regulation of WSCD activities

(i) *Limiting the effort:*

The number of licences must be limited on the basis of a precautionary approach and should be regularly assessed. The number of vessels a tour operator may register for WSCD activities should be limited to one. The allowed WSCD areas shall be restricted and a certain distance to the mainland should be considered when defining the areas. Within each week there shall exist operation-free days. Furthermore, seasonal closings should take place with regards to WSCD sites that are situated close to popular beaches.

(ii) *Reducing the impact:*

The impact of WSCD can be reduced by limiting the allowed attractant. In the opinion of the author, only fish-based chum should be allowed as attractant. However, it must be minced so finely that it may not offer a food source. Also, there has to be a daily limit on chum. Baiting and decoying of

sharks shall be prohibited. The use of artificial attractants, such as noise, chemicals, and electrical devices, shall be prohibited as their long-term effects are completely unknown. If an attractant is to be used, it seems more adequate to use a scent consisting of elements of the natural diet of sharks, than to intervene by using artificial methods and substances.

The operations shall be further restricted by imposing spatial restriction within the WSCD sites, distance requirements to sharks and speed limitations when approaching sharks. The cage design must be also prescribed to minimise injuries.

Furthermore, other provisions such as provisions promoting the protection of the whole marine environment as well distance requirements to other vessels, divers, swimmer or surfer should also not to be missed within the management regime.

d. Direct conservation efforts

A direct contribution of WSCD operations to the conservation of the species would be secured, if a certain percentage of the income generated by the operations is earmarked for conservation purposes.

As regards the educational task the tour operators have, an education plan should be prescribed within the regulations and assessed within the permit application process. Furthermore, the quality of the information provided on board should be controlled regularly. It is also more professional if the tours are conducted by a specially trained person (e.g. conservationist or biologist) than by a tourist guide.

e. Monitoring, compliance and enforcement

Implementing an adaptive monitoring approach as it is provided for in South Australia seem the perfect tool to assess the efficacy of measures. The monitoring can also be facilitated by mandatory black boxes sending out locations and filming of WSCD tours. Compliance can be easily tested by introducing independent observers (also undercover). Activity logbooks should be completed with regards to each tour and submitted electronically to the competent authority.

The consistency as regards the competent authorities is also very important. The permitting authority shall be responsible for enforcing the conditions and a zero-tolerance approach should be adopted as regards violations.

The applicable regulations and permits should be made available for tourists. An online whistleblowing system where visitors can report violations directly to the competent authority is great to increase the pressure on tour operators to comply with the provisions.

Chapter IV

SOUTH AFRICA'S WSCD REGULATIONS IN THE LIGHT OF BEST PRACTICES

Chapter IV of this thesis is dedicated to the analysis of South Africa's WSCD regime. After introducing into the particularities of South Africa's industry, the content of the existing WSCD Policy and regulations will be assessed against the best practices.

1. The management of WSCD industry in South Africa

South Africa has the most extensive WSCD industry worldwide. According to the latest allocation process in 2011, there are currently active 13 operators,²³⁰ conducting WSCD activities along five different dive sites, namely: Seal Island, False Bay; Dyer Island, Gansbaai; Quoin Rock, Quoin Point; Seal Island, Mossel Bay; and Algoa Bay, Port Elizabeth.²³¹ In addition thereto, a further one to three vessels may attract great white sharks for non-commercial scientific purposes.²³² In South Africa, the dive sites are typically close to the shore. Seal Island at Mossel Bay, for example, is located only 700 m offshore from the nearest populated centre.²³³

WSCD developed in South Africa in the 90s, shortly after national legislation protecting great white sharks from all fishing exploitation had been passed.²³⁴ The first permits were issued in 2000 and after their expiry in 2001, the industry was managed by exemptions according to Section 81 of the MLRA.²³⁵ In 2008, the DEA adopted the WSCD Policy and WSCD Regulations, which still guide the management of the industry. In March 2015, the DEA published a Shark Biodiversity Management Plan²³⁶ (“SBMP”), which aims to achieve, improve, and maintain a favourable conservation status for resident and migratory sharks by providing numerous action plans.²³⁷

²³⁰ Republic of South Africa *Process for whale watching, shark cage diving permits postponed* Media Releases.

²³¹ WSCD Regulations, Annexure 1; Department of Environmental Affairs, “White Shark Cage Diving permit in St. Francis”, *Media releases* from 27 July 2015.

²³² Johnson & Kock in Nel & Peschak 43.

²³³ Bruce *A review of cage diving* 9.

²³⁴ Johnson & Kock in Nel & Peschak 42.

²³⁵ Johnson & Kock in Nel & Peschak 56.

²³⁶ DEA National Environmental Management: Biodiversity Act – Shark Biodiversity Management Plan” published 25 March 2015 in GN 258 in GG 38607.

²³⁷ DEA NEMBA – *Shark Biodiversity Management Plan*, iii.

a. Objectives and principles

As mentioned above, the two main regulatory frameworks regarding the WSCD industry in South Africa are the WSCD Policy and the regulations. In the WSCD Policy, the DEA acknowledges the lack of scientific knowledge regarding the management of this industry and cites Principle 15 of the Rio Declaration which provides for the precautionary approach.²³⁸ A precautionary approach in respect of the management and development of marine living resources is also provided as an objective in the MLRA.²³⁹ The principle of sustainable development and the sustainable use of resources is included in South Africa's Constitution²⁴⁰ and in the MLRA,²⁴¹ and is therefore also applicable to the management of WSCD.

The objectives explicitly included in the WSCD Policy and Regulations may be summarised as follows:

- To promote the economic growth of the industry and the sustainable non-consumptive use of white sharks (through the allocation of the optimal number of permits and the allocation of permits to persons who will be able to beneficially exercise the allocation);
- To improve the regulatory and compliance framework, provide for control over diving or boat-based viewing of white sharks so that these activities do not threaten the safety of divers or the well-being of the white sharks, and provide for control over the number of WSCD operators; and
- To redress past racial and gender discrimination in the industry.²⁴²

b. Planning

The WSCD Policy provides for the establishment of a management plan to manage the sector in accordance with an ecosystem-based management approach.²⁴³ As of today, no such management plan that specifically addresses WSCD in particular or marine ecotourism in general has been developed. However, the SBMP recognises marine ecotourism as a (potential) threat and provides for the following action plans regarding non-consumptive use of sharks: review of impacts regarding attraction, provisioning and boat- or diver-disturbance; develop mitigation measures to

²³⁸ DEA *WSCD Policy* 5.

²³⁹ MLRA, Section 1(c).

²⁴⁰ Constitution of the Republic of South Africa, Act 108 of 1996, Section 24.

²⁴¹ MLRA, Section 1(d).

²⁴² WSCD Policy, 6; WSCD Regulations, Section 2.

²⁴³ DEA *WSCD Policy* 8.

reduce the impact on target species and the local ecosystem; and establish an industry Code of Conduct for diving with certain shark species. The period in which these actions should occur is set for three to five years.²⁴⁴

The DEA is the competent authority to regulate this industry,²⁴⁵ and the compliance and enforcement authority falls within the competence of the fishery control officers.²⁴⁶

Some of South Africa's WSCD operators refer to a Code of Conduct that they follow, although the document is not accessible online.²⁴⁷

c. Regulation of WSCD activities

(i) *Limiting effort:*

WSCD operations require a permit issued by the DEA. According to the WSCD Regulations, a permit is valid for a period of 12 months.²⁴⁸ Permit holders who complied with the permit conditions will be re-allocated their permits each year for five years from the date of the first allocation. A review of the number of operators shall also take place five years from the date of allocation.²⁴⁹

The number of permits and areas of operation are not limited and can be determined by the Minister, in line with the objectives and taking into account the environmental principles.²⁵⁰ The current areas and allowed number of permits per area is set out in the regulations: Altogether 16 permits may be issued for five different sites, the allowed number of commercial tour operators range from one allowed permit in Mossel Bay for example, to eight commercial permits in Gansbaai.²⁵¹ The last allocation of permits took place in 2011, where 13 permits were issued. The new allocation process should have taken place in 2016, however, it has been postponed and the term for application shall start in 2017. The current permits expired in July 2016.²⁵²

²⁴⁴ DEA NEMBA – Shark Biodiversity Management Plan 24,25.

²⁴⁵ MLRA, Article 77.

²⁴⁶ MLRA, Article 51.

²⁴⁷ See for example <http://www.sharkadventures.co.za/>, <http://www.sharkquests.com/faq>.

²⁴⁸ WSCD Regulation, Section 5 (5).

²⁴⁹ DEA WSCD Policy 6.

²⁵⁰ WSCD Regulation, Section 4.

²⁵¹ WSCD Regulation, Annexure 1.

²⁵² Republic of South Africa *Process for whale watching, shark cage diving permits postponed* Media Releases.

Each operator may have two WSCD vessels per permit, although only one vessel may be used at a time.²⁵³

The WSCD regulations impose a closure of WSCD operations from 1 December until 20 January of the next year for two of the five dive sites (e.g. Mossel Bay, and Quoin Point), due to school holidays.²⁵⁴ As regards the other WSCD sites, the period of operation is not restricted.

(ii) *Reducing the impact:*

Practices like chumming, baiting, and the use of decoys are subject to the conditions set out in the permit.²⁵⁵ The permits must be displayed on the boat.²⁵⁶ The Great White Shark Protection Foundation, founded by South African WSCD operators, uploaded a WSCD permit on their website to provide information about the terms and conditions applicable for their operations.²⁵⁷ In this permit chum and bait is limited to 25 kg (together) per operator per day and may consist of fish products only (no mammal remains are allowed), and artificial lures to attract white sharks may only be used after written permission.²⁵⁸ However, the uploaded permit has no date.²⁵⁹ Since it was issued by the Department of Environmental Affairs and Tourism, which ceased to exist in 2008, it may be assumed that the disclosed permit is out-dated. Furthermore, it is also unclear whether the same conditions apply to each operator.

The WSCD vessels and the cages must be certified by the South African Maritime Safety Authority (“SAMSA”). Further specifications in regard to the vessel and cage design are imposed by the permit conditions.²⁶⁰

Any dumping of material into the sea other than allowed within the range of the permit (e.g. chum) is prohibited. Also, diving outside the cages, and touching, tagging, or interfering with sharks is forbidden.²⁶¹ The permit which is online available also includes a provision whereby no operator

²⁵³ DEA *WSCD Policy* 7.

²⁵⁴ WSCD Regulation, Annexure 1.

²⁵⁵ WSCD Regulation, Section 3, 8.

²⁵⁶ WSCD Regulation, Section 10.

²⁵⁷ Great White Shark Protection Foundation, “Permit and Exemptions”, Department of Environmental Affairs and Tourism, Exemption in terms of Section 81 MLRA – Ref: V1/8/5/1 (first accessed 15.12.2016 <http://www.gwspf.co.za/permit.html>).

²⁵⁸ Bruce *A review of cage diving* 25; Great White Shark Protection Foundation *Permit and Exemptions* Section 21.

²⁵⁹ Great White Shark Protection Foundation *Permit and Exemptions* Preamble.

²⁶⁰ WSCD Regulation, Section 9 (1), (2).

²⁶¹ WSCD Regulation, Section 7.

shall approach a seal colony closer than 10 m and that particular care shall be taken with noise pollution in November and December during the seal breeding season.²⁶²

d. Direct conservation efforts

The WSCD Regulations provide for a permit fee; although the revenue is not earmarked for conservation purposes. Certain investments in the WSCD sector or investment plans are to be considered in favour of the respective permit applicant. The prescribed investments include investments in new vessels and equipment, marketing, or the optimal use of permits but (absurdly!) not conservation measures. The WSCD Policy as well as the permit which is disclosed even provide for the possibility that a permit may be revoked if a permit holder fails to utilise their WSCD permits of undertake an average of less than 50 trips per season.²⁶³

Tour operators must provide for adequate education of the tourist. It is considered favourable if an education plan is submitted with the permit application so that the DEA can assess the plan. Furthermore, one General Guide certified tour guide shall be employed by the operator.²⁶⁴

e. Monitoring, compliance, and enforcement

The WSCD vessels must have a monitoring system,²⁶⁵ which logs positions every five minutes. However, the positions may be deleted at the start of the next trip.²⁶⁶ Tour operators are required to submit regularly logbooks in terms of their permit, from which statistics should be reported.²⁶⁷

If tour operators or their members have been convicted of a serious infringement of the permit conditions or underlying legislation, tour operators will not be allocated a WSCD permit; admission of guilt fines excluded.²⁶⁸

Despite the fact that the DEA is responsible for issuing the permits, the fishery control officers are responsible for the enforcement of (partly) environmental provisions. To support compliance and enforcement, the WSCD Policy includes an observer program which provides that all permit

²⁶² Great White Shark Protection Foundation *Permit and Exemptions* Section 16.

²⁶³ DEA *WSCD Policy* 11.

²⁶⁴ DEA *WSCD Policy* 9.

²⁶⁵ WSCD Regulation, Section 6 (l).

²⁶⁶ Great White Shark Protection Foundation *Permit and Exemptions* Section 15.

²⁶⁷ DEA *WSCD Policy* 11; Great White Shark Protection Foundation *Permit and Exemptions* Section 3.

²⁶⁸ DEA *WSCD Policy* 11.

holders are required to carry an independent observer on WSCD tours.²⁶⁹ To date, it remains unclear whether such program has been implemented, who these independent observers should be, what their qualifications should be, and under what circumstances they are needed.²⁷⁰

2. Best Practices *versus* South Africa's WSCD management

The outcome of the discussion in advance: South Africa's WSCD management scores average to poor in comparison to the best practises. Of course, the bar is set high but especially in a sector where long-term impacts are unknown and may affect the whole marine ecosystem, the regulative approach should be orientated towards best practices in contrast to minimum standards.

The main shortcomings of South Africa's regulations and respective improvement suggestions may be summarised as follows:

South Africa's management objectives do not include a commitment to the protection and conservation of sharks or the overall marine environment, nor do they promote enhancing public awareness. The urgency regarding economic growth seems to undermine the importance of the conservation and protection of sharks. This management approach is neither in line with the principle of sustainable development nor with the precautionary principle.

The poor evaluation of South Africa's WSCD management may also be caused by the fact that policy and regulations are clearly out-dated. There is great urgency to revise the management in light of new scientific outcomes and developments in the sector.

It is highly questionable whether the amount of permitted WSCD operators and designated cage diving sites are in line with a precautionary approach and the principle of sustainable use of the resource. How can it be justified that while other jurisdictions only permit WSCD in one specific area (and further restrict it to certain stretches within the area) and limit the number of tour operators between one and six, in South Africa there are five sites within 700 km with up to 8 commercial operators may be active at one site? This high number of operators exerts competition and client expectations within the industry. Some of South Africa's tour operators even advertise

²⁶⁹ DEA *WSCD Policy* 7.

²⁷⁰ EWT *Position Statement* 4.

with cash back and additional tours if there are no spectacular sightings.²⁷¹ This pressure of expectation may increase the risk that certain limits and provisions will be disrespected.²⁷²

Particularly in light of the size of the industry in South Africa, some operation-free days per week seem indispensable to minimise the negative impacts on the animals. Whereas in most of the WSCD jurisdictions tours can only be conducted seasonally (due to the migration of sharks), the consistent residency of sharks in South African waters permits operations throughout the year. Therefore, temporal or seasonal closings may be a suitable tool to minimise conflicts with other water users and respond to the growing concerns of the public. It is not clear why two of the WSCD sites are closed during school holiday and the others not.

A further major shortcoming in the opinion of the author is that the details regarding the use of chum, bait, and decoys are set out in the individual permits and not in the publicly available regulations. This makes the industry non-transparent and the consistency of the management cannot be assessed. However, it is certainly excessive that tour operators may use chum, bait and decoys to attract sharks, whereas some jurisdictions ban the attraction completely or reduce it to one method. The use of organic attractant is limited to 25 kg, however if 8 operators conduct tours at one site at the same time, it is very doubtful if this limit serves its purpose of minimizing the risk of behavioural changes of the animals. As already outlined, the practice of luring of sharks towards the boat especially constitutes high risks for the animals. Hence, such practices should be prohibited. It is also worrying that neither the regulations nor the permit which is available online²⁷³ contain distance requirements and speed limitations when approaching the sharks. Particularly in cases where several tour operators conduct dives at the same site, a certain distance should be kept between the boats, as well as the animals observed.

As regards direct conservation measures, reference is made to the fact that the conservation of sharks is not part of the management objectives. Instead of promoting the investment in the growth of the sector, the WSCD regulations should include incentives for tour operators to invest in the

²⁷¹ See for example Shark Guarantee at Apexpredators (<http://www.apexpredators.com/shark-cage-diving/great-white-gansbaai/description>), Unreal Africa (http://www.unrealafrica.com/index.php?option=com_k2&view=item&id=11:paragliding&Itemid=12) and Sharkquests (<http://www.sharkquests.com/one-day-trips>).

²⁷² EWT *Position Statement* 4.

²⁷³ Great White Shark Protection Foundation, "Permit and Exemptions", Department of Environmental Affairs and Tourism, Exemption in terms of Section 81 MLRA – Ref: V1/8/5/1 (first accessed 15.12.2016 <http://www.gwspf.co.za/permit.html>).

conservation and protection of the species. It would also be beneficial for the entire management if a certain percentage of the income generated by the industry would be earmarked and exclusively used for the implementation of management and conservative measures. The promotion of educative activities on board is in line with the best practices, since an education plan shall be submitted within the application process so that the DEA can assess it. The requirement that the employed tour guide is certified as at least Level 2: General Guides by the South African Qualifications Authority also provides for a certain standard of the person imparting the knowledge.

An adequate monitoring of the industry seems difficult considering the number of operators and the lack of capacity within the DEA. The implementation of the observer program at the expense of the operators - as it was initially provided in the WSCD Policy but has been never put in place - could be a cost-effective way to increase the capacity for implementing regulations and ensuring compliance and enforcement. It is also questionable whether a zero-tolerance policy is implemented by the DEA since the WSCD Policy “serious infringements” when it refers to violations of provisions. Because the tour operators are required to display the permit visibly on the WSCD vessels, a whistleblowing system for individuals would contribute to better compliance of the industry.

Altogether it is strongly recommended that the current WSCD regulations be revised. Instead of encouraging the expansion of the industry to promote economic growth, the conservation and integrity of sharks should be the focus of the regulations. The species’ vulnerability combined with increased or extensive tourism could lead to an ecological collapse and the disappearance of great white sharks. The disappearance of the target species would in turn lead to an economic collapse and disappearance of the WSCD industry.²⁷⁴ Hence, a revision of South Africa’s WSCD regulative framework towards a more environmentally-friendly management would not only benefit the sharks but also ensure continuity of the industry.

The table on the following page should provide for a visual summary of the analytical discussion.

²⁷⁴ Duffus & Dearden *Non-consumptive wildlife-oriented recreation* 222-225; Ziegler et al *But are tourists satisfied?* 692.

The column “Complied” contains the assessment. The symbols used are therefore:

✓: in line with best practice;

~: partly corresponding to best practice;

X: does not comply with best practice

Regulatory Element	Best Practice	South Africa	Complied?
(a) Objectives and principles			
Objectives	<ul style="list-style-type: none"> - The <u>protection and conservation</u> of sharks (including the prevention of disturbances and alterations to white sharks and their behaviour). - Enhancing <u>education</u> and public awareness. - Minimise impacts on the overall marine environment. 	<ul style="list-style-type: none"> - <u>Promote the economic growth</u> of the industry and <u>non-consumptive sustainable use</u> of white sharks. - Provide regulatory framework and control over industry so that <u>the safety of divers or sharks</u> is not threatened. - <u>Redress past racial and gender discrimination</u> in the industry. 	~
Environmental Principles	<ul style="list-style-type: none"> - Sustainable development. - Precautionary principle. 	<ul style="list-style-type: none"> - Precautionary principle as well as the principle of sustainable use of resources are included <i>inter alia</i> in South Africa’s constitution and the MLRA, but not in the WSCD Regulations. Hence, <u>only the state</u> is directly <u>bound</u> to these principles. 	~
(b) Planning			
Accuracy	<ul style="list-style-type: none"> - <u>Regular review</u> to include outcome of monitoring. 	<ul style="list-style-type: none"> - WSCD Policy and Regulations were published in <u>2008</u> and <u>not updated</u> since, neither are they currently under review. 	X
(c) Regulation of WSCD activities			
<i>(i) Limiting effort:</i>			
Limit re licences	<ul style="list-style-type: none"> - Limitation of licences on the basis of a precautionary approach; 	<ul style="list-style-type: none"> - The number of licences is not limited by law, but can be determined by the minister. Currently the regulations provide for <u>16 commercial operators</u>. It seems questionable whether this 	~

	<ul style="list-style-type: none"> - Regular assessment of number of operators. 	<ul style="list-style-type: none"> limit is informed by a precautionary approach and does not lead to an overexploitation, since for Gansbaai, for example, commercial operators are provided; - The system of reviewing the number of operators every five years corresponds to the best practices. 	
Limit re vessel	<ul style="list-style-type: none"> - <u>One</u> vessel per tour operator. 	<ul style="list-style-type: none"> - <u>Two</u> vessels per tour operator allowed whereby they may not be used simultaneously. 	X
Limit re areas	<ul style="list-style-type: none"> - The allowed WSCD areas shall be restricted; - The distance to the mainland should be considered. 	<ul style="list-style-type: none"> - There are currently five designated WSCD site along 700 km of South Africa's south-east coast; again the compliance with the <u>precautionary approach is questionable</u>; - The WSCD sites are very close to the mainland compared to the WSCD sites in other jurisdictions. 	X
Limit re operating times	<ul style="list-style-type: none"> - Imposing <u>operation-free</u> days within each week; - Seasonal closing due to situation close to popular beaches. 	<ul style="list-style-type: none"> - South Africa is one of the only destinations where WSCD takes place all year long. There are <u>no</u> operation-free days imposed by the regulations; - <u>Two out of the five</u> dive sites are closed during school holidays 	X
<i>(ii) Reducing the impact:</i>			
Regulations re attractant	<ul style="list-style-type: none"> - Only fish-based chum is allowed as attractant, but must be minced so finely that it may not offer a food source; - Daily limit of chum; - <u>Baiting and decoying</u> of sharks shall be <u>prohibited</u>; - Any artificial attractant (noise, chemicals, and electrical devices) shall be prohibited. 	<ul style="list-style-type: none"> - Only fish parts may be used as <u>chum</u> but no provision how it must be minced or disposed; - <u>Baiting is allowed</u>, subject to the permit conditions; - 25 kg of bait and chum per operator per day; questionable if in case eight operators are active at the same time (e.g. Gansbaai) this limitation is still accurate to minimise impact; - The use of <u>artificial decoys</u> is allowed with prior written consent. 	~

Operation restrictions	<ul style="list-style-type: none"> - <u>Spatial restriction within the WSCD sites;</u> - <u>Distance requirements to sharks and speed limitations</u> when approaching sharks; - Cage design to minimise injuries. 	<ul style="list-style-type: none"> - <u>No information</u> re spatial restriction within the WSCD sites; - <u>No distance or speed requirements</u> to sharks imposed by the regulations; - Cage design is prescribed in the permit conditions. 	X
Other provisions	<ul style="list-style-type: none"> - Provisions <u>protecting the whole marine environment;</u> - <u>Distance requirements</u> to other vessels, divers, swimmer or surfer. 	<ul style="list-style-type: none"> - The WSCD Regulations <u>include respective provisions</u> to minimise impact on marine environment; - <u>No distance requirements</u> to other vessels or water users imposed by the regulations. 	~
(d) Direct conservation efforts			
Funds for conservation	<ul style="list-style-type: none"> - % of income generated by WSCD operations used for <u>conservation purposes.</u> 	<ul style="list-style-type: none"> - No such regulation exists within the WSCD management; - Investments by tour operator in vessels, marketing and use are welcomed, but conservation is <u>not</u> mentioned. 	X
Prescribed education plans	<ul style="list-style-type: none"> - Prescribed or assessed education plan - Carrying a specially trained person on board. 	<ul style="list-style-type: none"> - It is rated favourable in the application process if an education plan is submitted with the permit application; - A certified tourist guide shall be employed by the operator. 	✓
(e) Monitoring, compliance and enforcement			
Regular monitoring, reporting and compliance	<ul style="list-style-type: none"> - <u>Adaptive monitoring approach</u> assessing the efficacy of measures; - <u>Mandatory black boxes</u> sending out locations; - <u>Filming</u> of WSCD tours; - Independent observer (also undercover) test compliance; - Activity logbook which must be submitted 	<ul style="list-style-type: none"> - The vessels must carry an <u>electronic monitoring system</u> sending through GPS locations which are deleted at the start of the next trip; - The WSCD Policy provides or an <u>observer program</u> which has <u>never been implemented;</u> - <u>Mandatory</u> (paper-based) <u>logbooks</u> which must be submitted monthly per post to the responsible department. 	~

	electronically to the competent authority.		
Consistency as regards competent authorities	<ul style="list-style-type: none"> - The <u>permitting authority shall be responsible for enforcing the conditions</u>; - <u>Zero-tolerance</u> re violations. 	<ul style="list-style-type: none"> - Responsible for the enforcement of permit conditions and the WSCD Regulations are <u>Fishery Officers</u>, not the DEA; - In case of <u>serious</u> infringement of the permit conditions or underlying legislation, tour operators will not be allocated a permit. 	X
Whistle blowing system	<ul style="list-style-type: none"> - An online <u>whistleblowing system</u> where visitors can report violations directly to the competent authority 	<ul style="list-style-type: none"> - The WSCD regulations or the DEA Website do <u>not</u> provide for a specific whistle blowing system. 	X

Chapter V

CONCLUSIONS

WSCD is a relatively young but constantly growing form of shark-based tourism. As global interest in shark-encounters increases, so do concerns regarding the negative impacts of shark diving in general, and WSCD in particular. Some authors suggest that marine-based wildlife tourism is simply another form of harmful exploitation of the marine resources,²⁷⁵ or that it would be more beneficial to the long-term conservation of marine biodiversity to have animals professionally cared for in captivity than to encourage interaction with marine animals in their natural environment.²⁷⁶ Others see a net conservation benefit arising from shark diving tourism if it is conducted under the right conditions,²⁷⁷ and argue for the significant economic value of shark ecotourism as well as its contribution to scientific research.²⁷⁸

However, since five jurisdictions already have established WSCD industries, the question this thesis sought to answer was not whether WSCD should be allowed in the first place. Rather, the focus of this dissertation is how this industry can be managed to mitigate the risks related to these kind of tourism operations and whether South Africa's industry is sufficiently and effectively managed. The key regulatory tools which should ensure the sustainability of this industry include (a) objectives and principles, (b) specific and clear planning, (c) regulations of WSCD activities, (d) provisions that promote the conservation of sharks and (e) monitoring, compliance and enforcement provisions. After examining the management of all five WSCD jurisdiction, practices were distilled that (in the author's opinion) correspond best with a sustainable and precautionary management approach. A comparison of South Africa's current regulatory framework with the best practices shows average to poor compliance. The main shortcomings of South Africa's WSCD management may be summarised as follows:

Neither the conservation of sharks nor the educative aspect of WSCD are part of the management objectives. This is a major failure since the future existence of great white sharks is seriously under threat. The WSCD Policy and Regulations are clearly outdated, which is unacceptable facing the

²⁷⁵ Ziegler et al *But are tourists satisfied?* 692.

²⁷⁶ Burgin & Hardiman *Effects of non-consumptive wildlife-orientated tourism* 217.

²⁷⁷ Gallagher et al *Biological effects, conservation potential, and research priorities* 365.

²⁷⁸ Hammerschlag *Global shark currency* 11.

number and outcomes of scientific studies that were published after the WSCD Policy and regulations have been adopted. Furthermore, it is highly questionable whether the number of allowed permits (altogether 16) or the dedication of WSCD sites (currently five, located close to the shore compared to WSCD sites in other jurisdictions) are informed by a precautionary approach. There are no operation-free days provided for within a week or month; it is further unclear why only two of five dive sites are seasonally closed. All of the dive sites are typically close to the shore and conflicts with fishers, divers and other water users can occur everywhere. Compared to the regulations provided for within the other WSCD jurisdictions, it becomes evident that within South Africa the use of attractant is allowed in an excessive manner: sharks may be attracted via chum, baits, and artificial decoys. Taking into consideration the research study which found a declining interest of sharks in attractant with the time of exposure,²⁷⁹ and the strong competition of tour operators, it is very probable that the 25 kg limit on attractant is not always complied with. That details regarding the allowed attractant and its headlining are included in the individual permit only, and not integrating in the publicly available regulations, fails to promote transparency or consistency. The publicly available regulations should also provide for distance requirements to sharks, boats, and other water users, and speed limitations when approaching sharks.

Investments in the industry sector are promoted within the WSCD Policy, but not conservation efforts! In this regard, providing direct funding for conservation schemes and the implementation of the WSCD regulations by earmarking a certain percentage of the income generated through WSCD seems necessary, considering the lack of capacity within the DEA. There is furthermore much room for improvement in the regular monitoring, compliance, and enforcement of the regulations. Currently, South Africa's system provides for paper-based logbooks where tour operators report their interactions during tours according to their own perceptions and an electronic monitoring system sending through GPS locations, which are deleted at the start of the next trip. This system can be easily improved by implementing the observer program, which was initially provided for in the WSCD Policy; the obligation of filming WSCD tours and providing the DEA with the material on request; and the adoption of a zero-tolerance policy and whistleblowing system.

²⁷⁹ Laroche et al *Effects of provisioning ecotourism* 199.

The outcome of the comparative assessment is that South Africa's WSCD industry is currently not sufficiently and effectively regulated to minimise the observed and still unknown negative impacts of these activities. This situation is especially worrying since South Africa's great white sharks face the threat of extinction and the government continues to encourage the growth of the industry. In a press release related to the postponement of the whale-watching and WSCD permits allocation process, the government stated that the growth of the ocean economy involving non-consumptive use of marine resources is one of the critical pillars of the Nine-Point Plan to boost economic growth, and that through WSCD, South Africa has the opportunity to boost this contribution considerably.²⁸⁰

Accordingly, a review and adaption of South Africa's WSCD management system is urgently needed to take into account the scientific and regulatory developments of recent years. In order to ensure that the industry will be maintained in the future, this legislative review should be guided by experiences from other jurisdictions, integrate the views of independent scientists, tour operators, and the public, and follow a precautionary approach not only on paper but in practice.

²⁸⁰ Republic of South Africa *Process for whale watching, shark cage diving permits postponed* Media Releases.

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