

A Legal Analysis of Prohibition of Marine Pollution

By

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DECLARATION BY STUDENT

I **Mpho Paulos Bapela** declare that 'A Legal Analysis of Prohibition of Marine Pollution' is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

.....

M.P Bapela

Dated:

DEDICATION

I dedicate this mini-dissertation to my lovely mother, Matlakala Muriel Bapela.

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Firstly I would like to thank the Almighty God who made all this possible and who has guided and protected me from my infancy up to this day.

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List of abbreviations

AMSA -	Australian Maritime Safety authority
CITES -	Convention on the International Trade in Endangered Species
COAG -	Council of Australian Government
DAF-	Department of Agriculture and Fishery
DE -	Department of Energy
DH -	Department of Health
DM -	Department of minerals
DTI-	Department of Trade and Industry
DWEA-	Department of Water and Environmental Affairs
EC-	European Community
EEZ-	Exclusive Economic Zone
FCDA-	Foodstuff Cosmetics and Disinfection Act
FFASA-	Fertilizers, Farms, Agricultural remedies and Stock remedies Act
FWS-	Fish and Wildlife Services
HSA-	Hazardous Substances Act
IMO-	International Maritime Organisation
IPPC-	Integrated Pollution Prevention and Control
KCM-	Kankola Copper Mine
MARPOL-	Prevention of Marine Pollution from Ships
MLRA-	Mineral Living Resource Act
MPA-	Marine Pollution Act

MPBLA-	Marine Pollution from Land-Based activities Act
MPRDA-	Mineral, Petroleum, Resource and Development Act
MOU-	Memorandum of Understanding
MZA-	Maritime Zone Act
NEMA-	National Environmental Management Act
NEMICM-	National Environmental Management Integrated Coastal Management
NEMPAA-	National Environmental Management Protected Areas Act
NEMWA-	National Environmental Management Waste Act
NMFS-	National Marine Fisheries Services Act
NWA-	National Water Act
OSLO-	Convention for the prevention of marine pollution by dumping from ships and aircrafts
OSPAR-	Convention for the protection of the marine environment on the North E
Pcb-	Polychlorinated Biphenyls
RSA-	Republic of South Africa
UNCLOS-	United Nations Convention on the Law of Sea
UNEP-	United Nation Environmental Programme
UN-	United Nations
USA-	United State of America
WHO-	World Health Organisation

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Foodstuff Cosmetics and Disinfection Act 36 OF 1947

Fertilizers, Farms, Agricultural remedies and Stock remedies Act

Hazardous Substances Act of 1960

Mineral Living Resource Act

Marine Pollution Act 05 OF 2012

Mineral, Petroleum, Resource and Development Act 28 of 2002

Maritime Zone Act 52 OF 1995

National Environmental Management Act 56 2002

National Environmental Management Protected Areas Act 57 OF 2003

National Environmental Management Waste Act 59 OF 2008

National Water Act 36 OF 1998

International Instruments

Australian Maritime Safety authority

Convention for the prevention of marine pollution by dumping from ships and air crafts

Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft 1972

Convention for the Prevention of Marine Pollution from Land Based Activities

Convention for the protection of the marine environment on the North East Atlantic

Convention on the International Trade in Endangered Species

Council of Australian Government

International Convention for the Prevention of Pollution of the Sea by Oil 1954

International Convention on Civil Liability for Oil Pollution Liability

International Maritime Organisation

Rio Declaration on Environment and Development

United Nation Environmental Programme

United Nations Convention on the Law of Sea

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Australian Common Wealth V State of Tasmania (1983) 158 CLR 1, [1983] HCA 21

Great Chora Metal Industries Limited V Malaysia International Shipping [1998] HCA 65; 196 CLR 161; 72 ALJR 1592; 158 ALR 1

Nyasulu and Others v Kankola Copper Mine PLC and others (2007/HP/1286) [2011] ZMHC 86 (1 January 2011);

People of Satawal ex rel Ramoloilug v Mina Maru No 3 [2001] FMSC 24; 10 FSM Intrm. 337 (Yap 2001) (20 July 2001)

ABSTRACT

This mini-dissertation deals with the legal analysis of the prohibition of marine pollution. It is found that the harmful effects of marine pollution on the marine ecosystem, human health and the economy is a problem that needs to be solved immediately. International Conventions and different legislation have been drafted in order to regulate, reduce, mitigate or stop marine pollution. Despite the existence of these conventions and legislation, this problem continues unabated. Large numbers of marine species are known to be harmed and killed as a result of marine pollution. Marine pollution did not receive much attention until many species in the sea and the marine ecosystem faced adverse consequences resulting from marine pollution. Although it has become a global concern, most nations are still producing huge pollution loads. This mini-dissertation analyses the legal framework and the sources of marine pollution, the effects of marine pollution on the marine ecosystem and human health. Furthermore, it makes a comparative analysis between South Africa as developing country and Australia as a developed country in order to determine what South Africa could learn from Australia. The study makes recommendations on how marine pollution can be solved, mitigated or combatted.

Key words: *Marine Pollution; Ecosystem; Human health.*

CHAPTER ONE

1. INTRODUCTION

The United Nations Convention for the Law of Sea (UNCLOS) defines marine pollution as “a direct or indirect introduction by humans of substances or energy into the marine environment (including estuaries), resulting in harm to living resources, hazards to human health, hindrances to marine activities including fishing, impairment of the quality of sea water and reduction of amenities”.¹

Awareness of marine pollution started in the 16th century. Soni noted that “although there has been a localized concern with the problem of marine pollution since the 16th century, the recognition of water pollution as a global dimension problem is of relative recent origin and is only beginning to find legal expression”.² In South Africa the earliest reference to marine pollution was in 1811. Before then, it was believed that substances entering the sea simply become more and more diluted by the huge body of water until their concentrations are negligible, and so the sea was regarded as a vast sink into which anything could be dumped with impunity.³

The protection of the ocean was largely neglected although there has been general emergence of environmental consciousness in the past few decades.⁴ The *Minamata* incident which occurred in Japan’s most Southerly Island in the second half of the 1950’s served as an alert to scientists all over the world of the danger of marine pollution. By the 1950’s some countries had passed legislation concerning marine pollution.⁵ Although other countries have been slow to take legislative actions, the *Minamata* incident played a big role in alerting the world of the dangers of marine pollution.⁶

¹ Article 1(4) of the United Nations Convention on Law Of the Sea; 1982

² Ramanlal Soni, Control of marine pollution in international law, (Juta & Co.Ltd, south Africa, 1985) page 119

³ Gibson R N, Atkinson R.J.A, Gordon J.D.M, South African Journal of Marine Science (Cape Town: C. Struik & Co 2004) Volume 12, Issue no 341–354.

⁴ Ramanlal (see note 2 above)

⁵ Gilbert, Steven G. A, Small Dose of Toxicology. CRC PRESS Boca Raton (London New York Washington, D.C. 2004)

⁶ Komyo E. National Institute for Minamata Disease, Environment Agency, Volume 25, Issue no 06 (Hama, Minamata City 1997)

Little had been done legally in terms of marine pollution until the 1960's, when a vessel from Liberia caused marine pollution. The vessel was named the *Torrey Canyon*.⁷ This incident, which took place in 1967, alerted the whole world again about marine pollution. As a result of this incident, control of marine pollution, and regulatory legal frameworks together with environmental preservation became more imperative.⁸ After the realisation that marine pollution needed to be managed and regulated in the 1970's, the Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (1972 OSLO Convention), which provides "for the control of dumping harmful substances from Ships and Aircraft into the ocean and further made a restriction by requiring a permit in order to dump certain substances such as arsenic, lead, copper, zinc and their compounds", was promulgated.⁹

In 1973, the Convention for the Prevention of Pollution from Ships (MARPOL) was introduced. The Convention covers pollution by oil, chemicals, harmful packaged forms, sewage and garbage.¹⁰ The MARPOL replaced the Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (OSLO Convention) in 1974. In the early 80's, the United Nation Convention on the Law of the Sea 1982 was enacted, and "defined the rights and responsibilities of nations with respect to their use of the world's ocean, establishing the guidelines for businesses, the environment and the management of marine natural resources."¹¹ In 1992, the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) Convention was entered into, and it is the current legislative instrument regulating corporation on environmental protection on land base sources of marine pollution.¹²

South Africa has laws that regulate marine pollution. For example, Chapter VI of the South African Regulations under the Prevention and Combating of Pollution of the Sea By Oil Act 59 of 1984 "set out steps to combat or prevent marine pollution by oil and state that upon a discharge of oil from an offshore installation having been

⁷ Regarded as the world's first major marine oil spill having a capacity of 120,000 tons.

⁸ Howard S. Schiffman, *International Law and the Protection of the Marine Environment* (2001) page 375.

⁹ Convention for the Prevention of Marine Pollution by Dumping from Ships and Air-craft.

¹⁰ International Convention for the Prevention of Pollution from Ships (MARPOL) 1978.

¹¹ Townsend-Gault Director Centre for Asian Legal Studies, University of British Columbia Vancouver, *Tropical Coasts Volume 7* Canada.

¹² Convention for the Protection of the Marine Environment of the North East Atlantic, 1992.

reported to a principal officer, the master or the owner of such offshore installation shall, unless such principal officer directs otherwise, take such steps as may be described in the contingency plan referred to in regulation 22(f) in order to combat the pollution or to prevent pollution by any further such discharge of oil".¹³ The purpose of the Marine Pollution (Prevention of Pollution From Ships) Act no. 2 of 1986 "is to provide for the protection of the sea from pollution by oil and other harmful substances discharged from ships, and for that purpose to give effect to the International Convention for the Prevention of Pollution from Ships, 1973, as amended by the Protocol of 1978; and to provide for matters connected therewith".¹⁴

The schedule in terms of the Prevention of Pollution by Garbage From Ships Regulations 1992 "applies to South African ships wherever they may be, and to small vessels and ships while they are within the Republic of South Africa, the territorial waters thereof and the fishing zone and that if any person fails to comply with any of the requirements of these regulations such person shall be guilty of an offence and shall be punishable on conviction with a fine not exceeding R20 000.00 or imprisonment for a period not exceeding two years or with both such fine and such imprisonment".¹⁵

2. RESEARCH PROBLEM

2.1 Source of the research problem

The problem of marine pollution is caused by dumping substances into the sea and diluted in the body of water. The current situation with regard to marine reflects lack of knowledge about the importance of marine life and the ecosystem. People tend to ignore the importance of marine life, as they see an ocean as just a huge body of water, ignoring the fact that there are species which live in the water whose lives are endangered in the polluted area. Once the lives of those species are adversely affected, the lives of human beings will also be affected.

¹³ The Prevention and Combatting of Pollution of the Sea by Oil Act 1984, Chapter VI of South African Regulations.

¹⁴ Marine Pollution (Prevention of Pollution From Ships) Act no. 2 of 1986, as amended by International Convention for the Prevention of Pollution from Ships Amendment Act, No. 66 of 1996.

¹⁵ Prevention of Pollution by Garbage from Ships Regulations, 1992.

3. BACKGROUND TO THE RESEARCH PROBLEM

Marine pollution is not a new phenomenon. It has been in existence since the earth was created.¹⁶ Increasing human populations have contributed to the high volume of marine pollution. During the middle ages, diseases such as cholera and typhoid fever broke out all across the world, and those diseases are caused by contaminated water.¹⁷ The contamination of water was caused by the dumping of garbage into the rivers, which eventually reached the sea. By the 1800s, people began to understand that unsanitary living conditions and water contamination contributed to disease epidemics. However, this did not stop the problem of marine pollution because many people still had the perception that the ocean is so vast that it will simply dilute the garbage dumped into the sea¹⁸.

The second half of the 1950's saw the occurrence of the *Minamata* incident. A company released methyl mercury into the ocean, which poisoned the whole of *Minamata* Bay, resulting in dead fish and sea-birds lining its shores. People ate fish that were contaminated with mercury industrial waste, and this caused a disease of chronic poisoning by alkyl mercury compounds from industrial waste, characterized by the impairment of brain functions such as speech, sight and muscular coordination.¹⁹ As a result of methyl mercury released by the company 43 people died and about 70 people, mostly children, were permanently paralysed, while possibly thousands suffered less drastic effects²⁰.

This incident led to the realisation that marine pollution needs to be managed and regulated. Few countries heeded the call, while some were reluctant. However, after the 1967 *Torrey Canyon* incident, many legal frameworks were promulgated in order to manage and regulate marine pollution. In the same year, the Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircrafts (OSLO convention) was promulgated. This opened a room for the promulgation of other conventions, namely, the Prevention of Marine Pollution from Ships (MARPOL) and the United Nations Convention on the Law of Sea (UNCLOS).

¹⁶ Markham A, A brief history of pollution (1994 New York, St. Martin's Press) page 162

¹⁷ ibid

¹⁸ ibid

¹⁹ Husam Al-Najar, The Islamic University of Gaza- Civil and Environmental Engineering Department Public Health, Diseases caused by Pollution.

²⁰ Ramanlal (see note 02 Above)

4. STATEMENT OF THE RESEARCH PROBLEM

Marine pollution is a worldwide problem. Laws and policies have been introduced to regulate this type of pollution, but it seems that the implementation of these laws and policies is weak because the problems of marine pollution continue to escalate on a daily basis. Legal frameworks on marine pollution has set out the punishments for non-compliance. However, those punishments are not stringent and effectively implemented or good enough to deter people from causing marine pollution. Lack of better understanding and knowledge pertaining to marine pollution and its sources contributes greatly to the high percentage of marine pollution.²¹

By estimation, marine pollution from land based sources contributes 80% of marine pollution.²² Buckley asserts that “Over 60 pipelines along South Africa’s coast discharge about 800 million litres of household and industrial effluent into the sea daily”.²³ This high percentage of marine pollution proves that there is a need for the government to create awareness on the effects of marine pollution, particularly on the marine ecosystem, human health and the ocean economy.

²¹ Md Shahidul Islamim, Impacts of Pollution on Coastal and Marine Ecosystems Including Coastal and Marine Fisheries and Approach for Management, (2004) page 01.

²² Global Programme of Action for the Protection of Marine Environment from Land Based Activities, UNAP, “why have a global programme of action” on the GPA website at <http://www.gpa.unap.org/about> accessed on the 07 August 2015 7h55 PM.

²³ Buckley R, Marine pollution the poisoning of the seas, (1995) page 11

5. DEFINITION OF KEY CONCEPTS

5.1 Marine pollution

The United Nations Convention for the Law of Sea (UNCLOS) defines marine pollution as “a direct or indirect introduction by humans of substances or energy into the marine environment (including estuaries), resulting in harm to living resources, hazards to human health, hindrances to marine activities including fishing, impairment of the quality of sea water and reduction of amenities”.²⁴

5.2 Ecosystem

The term ecosystem is defined in different ways. According to Merriam Webster Dictionary, ecosystem is defined as “the complex of a community of organisms and its environment functioning as an ecological unit”.²⁵ Christopherson and Robert define the ecosystem as a natural system consisting of all plants, animals and microorganisms in an area functioning together with all the non-living physical factors of the environment.²⁶

5.3 Human health

The World Health Organization (WHO) defined health in its broader sense in its 1948 constitution as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity."²⁷

²⁴ Article 1(4) (See note 1 above)

²⁵ Merriam Webster Dictionary found on <http://www.merriam-webster.com/dictionary/ecosystem> accessed on 16 August 2016 at 11h31 AM.

²⁶ Christopherson, Robert W, *Geosystems: An Introduction to Physical Geography* (3rd edition 1997)

²⁷ Constitution of the World Health Organization, Geneva: World Health Organization; 1948.

6. LITERATURE REVIEW

6.1 Sources of marine pollution

Marine pollution can occur in many different ways²⁸. It can occur through land based activities, oil spills, pollution from sea-bed activities, noise pollution, and pollution from or through the atmosphere and vessel source pollution.²⁹ Each of these sources has its own way of polluting marine, but attention is paid only to those which cause high percentage of marine pollution and devastating damage to the marine lives. Having realised that marine pollution negatively impacts the marine ecosystems, human health and economic growth, it has become imperative to strengthen laws on marine pollution by enforcing and implementing compliance and bringing polluters to justice.³⁰

One of the major causes of marine pollution is land based activities³¹, that is, oil and gas, among others.³² These hazardous pollutants are mostly visible in the oceans and seas, while some are not, but the common characteristic of these pollutants is that they cause irreparable damage to marine resources, the ecosystems and marine lives.³³

a. Marine pollution from land based activities

Marine pollution from land based activities is not only transboundary, it also contributes the highest percentage, accounting for 80% of marine pollution³⁴. Marine pollution literature has confirmed that the high percentage of marine pollution caused by land based activities hampers the wellbeing of coastal areas and the marine environment, jeopardizes the health and wellbeing of people and hampers the

²⁸ Cornelis A. M. van Gestel, Martijs Jonker, Jan E. Kammenga, Ryszard Laskowski, Claus Svendsen, *Linking Approaches from Ecological and Human Toxicology* (1995)

²⁹ Kindt, John Warren, *Marine Affairs Bibliography: A Comprehensive Index to Marine Law and Policy* (1984)

³⁰ William F. Precht *Coral Reef Restoration Handbook*, (1999)

³¹ Li Daoji and Dag Daler, *Ocean Pollution from Land-based Sources: East China Sea*, *A Journal of the Human Environment* 33(1):107-113. (2004)

³² Larry Crowder a,, Elliott Norse, *Essential ecological insights for marine ecosystem-based management and Marine Spatial Planning* (2008)

³³ Daud Hassan, *Protecting the Marine Environment from Land-based Sources of Pollution*, (2006)

³⁴ (See note 31 above)

survival of natural resources³⁵. It has the capacity to disrupt the marine ecosystems by developing situations which are dangerous to marine life such as algal blooms and coral bleaches, eventually resulting in the malformation of marine life.³⁶

It is viewed that marine pollution from land based activities has not been strictly examined under both the national and the international agenda due to the view that the discharges are as a result of actions championing the economic interest of the country.³⁷ However, it is pertinent to point out that by ignoring land based marine pollution because it is discharged by major economic interests is unfair to the marine ecosystems. This is because in both the marine ecosystems and marine lives, there are aspects of economic relevance such as Pharmaceuticals and Fisheries, both of which play a big role in the growth of the economy³⁸.

The government must ensure that each field, body or entity complies with the regulations binding against marine pollution, and should not be allowed to perform actions which will have an adverse impact merely because it is regarded as contributing strongly to the economic growth. The government should strive to strike a balance between land based activities and marine life.

Marine Pollution from land based activities is closely related to the activities which we do on a daily basis, intentionally or unintentionally.³⁹ The concern is that human beings continue to perform such harmful activities on a daily basis all over the world. Due to this impunity, it is sometimes categorically characterized as normal behaviour, whereas it is harmful and abnormal. In view of this overwhelming concern, such discharges are to be managed and mitigated in order not to extinct marine lives and the ecosystems.

An intervention which was introduced in the United States to combat marine pollution is The Marine Debris Research, Prevention and Reduction Act of 2005 (MDRPRA). The act was passed to establish programmes within the National Oceanic and Atmospheric Administration (NOAA) and the United States Coast Guard (USCG) to

³⁵ Patrick J. Walsh, Sharon Smith, Lora Fleming, Helena Solo-Gabriele, William H. Gerwick, *Oceans and Human Health: Risks and Remedies from the Seas*, (Elsevier Inc 2008)

³⁶ United Nations Environment Programme annual report, (2006)

³⁷ Sebek V, *Marine Policy*, (1992) page 3-4

³⁸ James N. Sanchirico, Kathryn A. Cochran, and Peter M, Emerson, *Marine Protected Areas: Economic and Social Implications* (2002) page 01

³⁹ (See note 20 Above)

help “identify, determine sources of, assess, reduce, and prevent marine debris and its adverse impacts on the marine environment and navigation safety”.⁴⁰ South Africa must follow the route of conducting researches in order to understand and advocate the importance of protecting marine from harmful substances.

According to Gorman, “plastics are synthetic organic polymers, and though they have only existed for just over a century, millions of tonnes of plastic are produced annually”.⁴¹ Its versatile material has led to high volume of the use of plastics, and it had become part and parcel of human being’s everyday life.⁴² The fact that plastic had become part of the human’s everyday life is the main reason why plastic poses a big threat, and is considered to be hazardous to the marine environment when dumped into the ocean.⁴³

The threat posed by plastic to the marine environment was not taken seriously for a long time until recently after many incidents concerning plastic have emerged and caused adverse effects to the marine environment. Writers like Stefatos influenced this nonchalance of plastic causing marine pollution when he said, “it does not constitute hazard”.⁴⁴ Stefatos’ assertion is wrong because there are many incidents of plastic causing serious damage to marine animals through ingestion and entanglement despite the vastness of the ocean.

The most popular harm caused by plastic debris is the ingestion of plastic by marine animals. Moser and Lee state that “after making a study on 1033 birds collected off the coast of North Carolina in the USA, they found that individuals from 55% of the species recorded had plastic particles in their guts, they obtained evidence that some seabirds select specific plastic shapes and colors, mistaking them for potential prey items”.⁴⁵

⁴⁰ Water, marine debris, law, regulations and treatise, found on website <http://www.water.epa.gov/type/oceb/marinedebris/lawsregs.cfm> accessed on the 11 August 2015 at 5:07am.

⁴¹ Gorman, M, Environmental Hazards Marine Pollution (1993) page 01

⁴² Hansen, J., Draft position statement on plastic debris in marine environments. (1990)

⁴³ Pruter, A.T, Sources, quantities and distribution of persistent plastics in the marine environment (1987) page 03

⁴⁴ Stefatos A., Chararampakis M., Papatheodorou G., Ferentinos G, Marine debris on the sea floor of the Mediterranean sea (1999) page 389–393.

⁴⁵ Moser, M.L. & Lee, D.S, A fourteen-year survey of plastic ingestion by western North Atlantic seabirds Colonial Waterbirds (1992)

An examination on different types of marine animals indicated that these animals feed selectively on plastic because only white plastic were ingested by these animals, and it is known that it is not only white plastic that enters the sea.⁴⁶ The ingestion of plastic on marine animals have the effect of blocking gastric enzyme secretion, makes the steroid hormone levels low, and leads to failure of reproductive organs and delay of ovulation.⁴⁷

b. Oil spills

After the Second World War, marine pollution from oil spills and ship-sources became more rampant⁴⁸. The consequences and calamities produced as a result of the widespread of harmful marine pollution show that the impacts and effects can be irreparable, especially if it happened in economically and environmentally sensitive areas of the globe⁴⁹. Before the Torrey Canyon incident, there was no stringent regulatory framework in place on marine pollution.⁵⁰ Torrey Canyon's pollution incidence was an eye opener which woke the international community from their slumber, leading to a collective agreement that there was urgent need to regulate and manage marine pollution.

It is evident that across borders, an international legal framework and local legal and regulatory frameworks have been put in place to guard against oil spills.⁵¹ This is done in order to protect life inherent in the ocean and to prevent other environmental hazards. A breach of measures taken to regulate the safety, operational and other coastal regulations is tantamount to a strict liability by the operators or offenders, and the cause of action is applicable in maritime common law, criminal liability, contract

⁴⁶ Carpenter E.J, Anderson S J, Harvey, G.R., Miklas, H.P., Peck, B.B, Polystyrene spherules in coastal waters (1972) page 749–750

⁴⁷ Azzarello, M.Y, Van-Vleet, E.S, Marine birds and plastic pollution(1987) Marine Ecology Progress, page 295–303

⁴⁸ International Maritime Organization, Manual on Oil Pollution: Combating oil spills, (2005, 2nd edition), page 225

⁴⁹ *ibid*

⁵⁰ Duruigbo, Henrik Ringbom European Union Maritime Safety Policy and International Law, (2000)

⁵¹ Peter C. Nwilo and Olusegun T. Badejo, Impacts and Management of Oil Spill Pollution along the Nigerian Coastal Areas, (2005), found on website http://www.fig.net/pub/figpub/pub36/chapters/chapter_8.pdf accessed on the 12 August 2015 at 5:04 am

law and tort⁵². The South African statutory oil pollution prevention and liability rules draw extensively from ratified international instruments and protocols.

6.2 Legal framework preventing, regulating and protecting Marine

a. The Constitution of the Republic of South Africa (1996)

The Constitution of the Republic of South Africa (1996) makes ample provisions for the protection and prevention of environmental pollution, including the marine⁵³. The issues relating to environment protection and fundamental rights are contained in section 24(a) of the Bill of Rights of the Constitution which provides that "everyone has the right to an environment that is not harmful to their health or well-being." Therefore, everyone is protected against any discharge of harmful substances in whatever form. Individuals and the state have the responsibility to protect the environment, hence they (individuals and states) can be held liable for creating "an environment that is harmful to the health or well-being of other people." More importantly, section 24(b) emphatically provides that the state must ensure the right of individuals by reasonable legislative and other measures that:

- (i) prevent pollution and ecological degradation;
- (ii) Promote conservation;
- (iii) Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

Pursuant to this, the Constitution imposes obligations on the government to ensure that pollution is prevented.⁵⁴ Failure to do this might lead to civil or criminal liabilities on the part of the state and its officials. Hence, at all times, the state must be seen to take reasonable legislative measures to prevent pollution.

⁵²Obozuwa Enike, Dominic, P.M., Garki Abuja, Legal consequences of major oil spills, FCT-Nigeria found on website http://www.academia.edu/5887568/Legal_Consequences_of_Major_Oil_Spills accessed on the 12 August 2015 at 5:18 AM

⁵³ Birnod Prasad Sharma, Constitutional Provisions relating to environmental issues, policy brief (2010)

⁵⁴ Craig Scott & Patrick Macklem, Constitutional Ropes Of Sand Or Justiciable Guarantees, (1992)

b. The Marine Pollution (Prevention of Pollution from Ships) Act 2 of 1986

This Act is the primary instrument of setting marine minimum standards and measures of policing the design, building and operation of tankers.⁵⁵ The Act applies the International Convention of MARPOL “to any South African ship, wherever it may be, and to any ship found within the Republic or its territorial waters or exclusive economic zone,⁵⁶ and section three of the MARPOL provides that non-compliance therewith is a criminal act, subject to a fine of R500 000 or a prison sentence of five years”.

c. Marine Pollution (Intervention) Act 64 of 1987

This Act “incorporates the provisions of the International Convention relating to intervention on the High Seas in Cases of Oil Pollution Casualties into South African legislation”.⁵⁷ The idea behind this Act is to “confer the powers given to a state party in terms of the international convention upon SAMSA⁵⁸ in order to intervene in instances of potential spillage in order to circumvent such spillage by a tanker. The Act further imparts jurisdiction upon the court in whose area a person charged with contravening this act is found. The court in which such proceedings will be brought is a Magistrates court, which will impose the penalties provided for in this Act”.⁵⁹

d. Marine Pollution (Control and Civil Liability) Act 6 of 1981

The Act has two purposes, being “to provide for the prevention and combating of pollution of the sea by oil and other harmful substances and to determine liability in certain respects for loss or damage caused by oil pollution incidents”.⁶⁰ In terms of liability, it provides for both criminal and civil liability. With regard to criminal provisions, the Act provides “that if any oil is discharged from a ship, tanker or offshore installation, the master of the ship and its owner shall be guilty of an

⁵⁵ The Marine Pollution (Prevention of Pollution from Ships) Act 2 of 1986

⁵⁶ Section 2 of the Marine Pollution (Prevention of Pollution from Ships) Act 2 of 1986

⁵⁷ Marine Environment Protection Committee 54th session Agenda item 8, (2005) found on website <http://www.sjofartsverket.se/pages/6729/54-8>. Accessed on the 12 August 2015 at 6:45 AM.

⁵⁸ South African Maritime Safety Authority, established by Act 5 of 1998

⁵⁹ Section 4(2) of the Marine Pollution (Intervention) Act 64 of 1987

⁶⁰ Preamble to the Marine Pollution (Control and Civil Liability) Act 6 of 1981

offence”.⁶¹ The effect of this is to cause strict liability on both the master and the owner.

In addition, section 9 provides for strict liability on the owner of the ship but not on the master of the ship.⁶² It states that the owner “shall be liable for any loss or damage which results⁶³, the costs of any measures taken by the authority for the purposes of reducing loss or damage⁶⁴ and any loss or damage caused by any such measures taken”.⁶⁵

e. Plastic bag reduction ordinances

Charging for all types of carryout bags has proven to lead to large reductions in single-use bag consumption.⁶⁶ Charges have a greater impact on overall reduction in carryout bag use because they effectively incentivize changes in consumer behaviour because customers are required to make a conscious decision to purchase a bag.⁶⁷

This has led to the reduction in marine pollution by plastic debris in the sense that people will be using the plastic bags wisely knowing that they are not for free. They will opt not to throw them away afterwards; rather they will keep them safe and use them again in order to save money.

f. Convention for the prevention of marine pollution from land based sources

Article 1(1) of this convention provides that “the Contracting Parties pledge themselves to take all possible steps to prevent pollution of the sea, by which is meant the introduction by man, directly or indirectly, of substances or energy into the marine environment (including estuaries) resulting in such deleterious effects as hazards to human health, harm to living resources and to the marine ecosystems,

⁶¹Section 2(1) of the Marine Pollution (Control and Civil Liability) Act 6 of 1981

⁶² Section 9 of the Marine Pollution (Control and Civil Liability) Act 6 of 1981

⁶³ Section 9(1)(a) of the Marine Pollution (Control and Civil Liability) Act 6 of 1981

⁶⁴ Section 9(1)(b) of the Marine Pollution (Control and Civil Liability) Act 6 of 1981

⁶⁵ Section 9(1)(c) of the Marine Pollution (Control and Civil Liability) Act 6 of 1981

⁶⁶ Jennie R. Romer, Leslie Mintz Tamminen, Plastic Bag Reduction Ordinances, *Tulane Environmental Law Journal* [Vol. 27:237] (2010) page 10

⁶⁷ Jennie R. *ibid* page 10

damage to amenities or interference with other legitimate uses of the sea”.⁶⁸ The Convention went further to give obligation to contracting parties to try to reduce marine pollution by taking possible measures.

g. Convention on the prevention of marine pollution by dumping waste and other matters

Article I provides that “contracting parties shall individually and collectively promote the effective control of all sources of pollution of the marine environment, and pledge themselves especially to take all practicable steps to prevent the pollution of the sea by the dumping of waste and other matter that is liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea”.⁶⁹ This gives the contracting parties an obligation to ensure that they refrain from polluting the sea.

h. National Environmental Management: Waste Act 58 of 2009

The purpose of the Act is “to reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development; to provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management measures; to provide for the licensing and control of waste management activities; to provide for the remediation of contaminated land; to provide for the national waste information system; to provide for compliance and enforcement; and to provide for matters connected therewith.” It seeks to minimize pollution and the use of natural resources through “vigorous control, cleaner technologies, cleaner production and consumption practices, and waste minimization are key to ensuring that the environment is protected from the impact of waste.”⁷⁰

⁶⁸ Article 1(1) of the Convention for the Prevention of Marine Pollution from Land Based Sources.

⁶⁹ Article I of the Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter.

⁷⁰ Preamble for the National Environmental: Waste Act 58 of 2009

Section 65(1) of the Act deals with compliance and enforcement and provides that “despite the powers conferred on the Minister or MEC by or under this Act, the Minister of Water Affairs and Forestry may exercise any powers conferred on him or her by section 19, 53 and 155 or the National Water Act, 1998 (Act No. 36 of 1998), in respect of a person who contravenes or fails to comply with any condition of a waste management license, a remediation order or measures specified in terms of section 38(3) that may lead to an impact on a water resource⁷¹.”

The Act goes further in section 68(4) to state that “a person who is convicted of an offence in terms of this Act and who persists after conviction in the act or omission that constituted the offence commits a continuing offence and is liable on conviction to a fine not exceeding R1 000 or to imprisonment for a period not exceeding 20 days, or to both such fine and such imprisonment, in respect of each day that person persists with that act or omission.” This section is used to punish the perpetrators for non-compliance.⁷²

i. National Environmental Management: Integrated Coastal Management Act 24 of 2008

This Act establishes a system of integrated coastal and estuarine management in South Africa in order “to encourage the conservation of the coastal environment, sustain the natural attributes of coastal landscapes and seascapes, and ensure that development and the use of natural resources within the coastal zone is ecologically sustainable and socially and economically justifiable.” It defines “rights and duties in relation to coastal areas and determines the responsibilities of organs of state in relation to coastal areas.” Furthermore, it “prohibits incineration at sea and controls dumping at sea, pollution in the coastal zone, inappropriate development of the coastal environment and other adverse effects on the coastal environment and also gives effect to South Africa's international obligations in relation to coastal matters”.⁷³

The Act prevents pollution by monitoring control and surveillance of the department is responsible for protecting and preventing illegal marine activity and ensure

⁷¹ Section 65(1) of the National Environmental Management: Waste Act 58 of 2009

⁷² Preamble of the National Environmental Management: Integrated Coastal Management Act 24 of 2008

⁷³ Preamble of the National Environmental Management: Integrated Coastal Management Act 24 of 2008

compliance with legislation. To this end, fishery control officers are mandated to monitor landed fish at harbours, slipways and fish processing establishments on an ongoing basis in order to ensure that permit holders comply with their permit conditions in line with the marine and coastal management.⁷⁴

Applications of these pieces of legislation ensure ample prevention and protection of the marine, seas and oceans from the discharge of harmful substances by any entity. More importantly, contained in the laws are also adequate sanctions on transgression of any of the legislation.

7. PURPOSE OF THE STUDY

7.1 Aims

The main aim of the study is to analyze existing laws and regulations that prohibit marine pollution.

7.2 Objectives of the study

- a. The key objective is to apply and interpret laws and regulations on the prohibition of marine pollution in order to deter and curb marine pollution by perpetrators and to hold them corporately and individually liable. The other objective arising from and relevant to the key objective is:
- b. To recommend measures that can be taken in order to minimize or curb marine pollution.

8. RESEARCH METHODOLOGY

The research is based on extensive literature study of the subject of marine pollution using library resources such as case law, legislation, textbooks and national and international journals. It is a non-empirical research.

⁷⁴A review of the Department of Environmental Affairs and Tourism: (1994 – 2009) found on website https://www.environment.gov.za/sites/default/files/docs/15yearreview_contentoverview_introduction_executivesummary.pdf on the 15 February 2016

9. SIGNIFICANCE OF THE RESEARCH

This study is significant because it seeks to compliment other areas of research which have shown interest in the field of marine. The study will further improve understanding of the effects that marine pollution has on marine life, human health and economy. It will also highlight the compelling need to come up with a way of how to manage, prohibit or eradicate sources of marine pollution in order to preserve marine life. It will further create awareness on people with regard to the danger of marine pollution.

10. SCOPE AND LIMITATION OF THE RESEARCH

This mini-dissertation consists of six chapters. Chapter one is the introduction of the study, and examines the research problem, background to the research problem, statement of the research problem, definition of keys concepts, literature reviewed, purpose of the study, research methodology and the significance of the research. Chapter two discusses the source of marine pollution. Chapter three deals with the effects of marine pollution on the ecosystem and human health. Chapter four focuses on how marine pollution is regulated in South Africa. Chapter five deals looks at comparative analysis between South Africa and Australia. Chapter six gives conclusion and recommendations on how marine pollution can be solved, mitigated or combatted.

CHAPTER TWO: SOURCES OF MARINE POLLUTION

2.1 Overview

This mini-dissertation focused on the legal analysis of the prohibition of marine pollution. It is, therefore, important to know the causes of marine pollution. There are numerous sources of marine pollution, ranging from land based activities, ship operations to factors such as the atmosphere and noise. In order to have good understanding on these sources, it is advisable to treat each marine source separately.

Generally the sources of marine pollution have been classified in the following way:

- a. Land-based pollution.
- b. Pollution from sea-bed activities.
- c. Noise pollution.
- d. Pollution from or through the atmosphere.
- e. Vessel source pollution.

2.1.1 Land-based pollution

Land-based pollution includes sewage, sediments, pesticides, litter, toxic waste, marine debris and oil. These types of land-based pollution pose a threat to marine pollution as they have the capacity to cause danger to the marine ecosystem and human health.⁷⁵ Land based pollution can be defined “as pollution of marine caused by discharge from coastal establishments or other sources situated on land or

⁷⁵Investigation of Pollution from Land-Based Sources & Activities & their Impacts on the Marine Environment Found on website <http://www.oceandocs.org/bitstream/handle/1834/2911/PSTR-CRBWorldWetlandsDayPoster-handout.pdf?sequence=1> accessed on 20 August 2015 1:19 PM

artificial structures”.⁷⁶ Land-based pollution threatens marine environment in that it affects coastal waters situated at a place of high biological productivity.⁷⁷

Land-based sources of marine pollution

a. Sewage

Sewage includes both treated and untreated human and animal organic waste emanating from privy pits, septic tanks, packaged treatment plants, sewage system outfalls and disposal ponds transported through marine outfalls pipes clinched into aquifers and then to the marine environment.⁷⁸ Human sewage largely consists of waste from toilets by way of being flushed; it can also be through dirty water that had been used for bathing, doing laundry, washing dishes and vegetables and animals disposition as a result of food preparation that is thrown as garbage.⁷⁹ The high disposal of sewage into the sea poses a serious problem because it can cause harm to marine life and human health through the substances entering the sea as they contain a large amount of bacteria and pathogens.⁸⁰

b. Oil

Marine pollution can occur through offshore oil and gas exploitation either by way of accident oil spill or by produced water coming from oil bearing strata consisting of oil and gas when it is produced.⁸¹ The produced water enters the sea and adversely affects the marine environment and human health as it contains substances and heavy metals that need high oxygen. This includes toxic poly-atomic hydrocarbons,

⁷⁶ Alexandre- Charles Kiss and Dinah Shelton, *International Environmental Law*, (2004, 3rd edition)

⁷⁷ Yoshifumi Tanaka, *The International Law of the Sea*, (2015 , first edition)

⁷⁸ *ibid*

⁷⁹ *Pollution of the Ocean by Sewage, Nutrients, and Chemicals* found on website

<http://www.waterencyclopedia.com/Po-Re/Pollution-of-the-Ocean-by-Sewage-Nutrients-and-Chemicals.html#ixzz3iMOJxNsL> accessed on 20 August 2015 at 1:32 PM

⁸⁰ *ibid*

⁸¹ Benny Joseph, *Environmental Studies*, (Tata McGraw-Hill Publishing Company Limited 2005), 3rd edition

ethyl benzene, xylene, benzene, copper, nickel and mercury.⁸² These substances and heavy metals are very dangerous to marine life particularly on the basis that the sea contains animals with sensitive skin. So any contact with water contaminated by heavy metals and substances will be dangerous to those animals as they are the most vulnerable ones to this type of marine pollution.

c. Sediments

According to GESAMP, Sediments are “the direct results of the loss of sediments from the aquatic areas or land based areas”.⁸³ It can have the effect of burial of bottom dwelling marine organisms.⁸⁴ GESAMP also states that “the environmental effect of sedimentation include loss of important and sensitive marine habitat, decrease in fishery resources, loss of recreational attributes, loss of coral reef communities, human health concerns, change in fishing migration, loss of submerged vegetation and coastline alteration”.⁸⁵

Sediments through rivers always affects the coastal and marine ecosystem as these rivers carry the most process of natural geochemical and control dissolved materials.⁸⁶ We must be aware that human activities have the capacity to cause sedimentation by way of cutting trees situated near the river basin, and this causes erosion of the river basin watershed. They can also increase sedimentation through pollution discharges into the waters.⁸⁷

⁸² ibid

⁸³ Joint Group of Experts on the Scientific Aspects of Marine Environment Protection. (2001). "Sea of Troubles." GESAMP Study No. 70. Geneva: United Nations Environmental Programme. Also available from <http://gesamp.imo.org/no70>

⁸⁴ ibid

⁸⁵ ibid

⁸⁶ An Overview of Land Based Sources of Marine Pollution found on website <http://www.cep.unep.org/issues/lbsp.html> accessed on the 20 August 2015 at 1: 43 PM

⁸⁷ ibid

d. Nutrients

Nutrients cause eutrophication, which is “the flourishing of algal blooms that depletes the water’s dissolved oxygen and suffocate marine life”.⁸⁸ Eutrophication causes a high quantity of dead zones globally.⁸⁹ Nutrients enter coastal waters either directly or indirectly and so is the organic materials from plants, animals and humans. These nutrients and organic materials raise the level of physical, chemical and biological progression. This progression is known as eutrophication.⁹⁰ Human accelerated eutrophication can be activated by any substance which contains nutrients, an example of which may be phosphorus and nitrogen.⁹¹

If people do not refrain from engaging in actions that have the capacity to introduce high amount of nutrients into the sea, it is possible that the whole coastal ecosystem may change.⁹² The change may result in the survival of only the tolerant and resilient species. This means that sensitive species may not make it, resulting in the reduction of marine species.⁹³ Coastal waters are affected by some algal blooms because certain marine species have the capacity to produce natural poison, which will negatively affect the food web consumed by other marine mammals and humans, who are high consumers, resulting in their harm. All these are perpetrated by associated eutrophication and nutrients enriched in coastal waters.⁹⁴

⁸⁸ Marine problems: Pollution found on website http://wwf.panda.org/about_our_earth/blue_planet/problems/pollution/ accessed 20 August 2015 at 1:56PM

⁸⁹ Marine problems: Pollution found on website http://wwf.panda.org/about_our_earth/blue_planet/problems/pollution/ accessed 20 August 2015 at 1:56PM

⁹⁰ ibid

⁹¹ ibid

⁹² U.S, Environmental Protection Agency, Oceans and Coastal Protection Division, Assessing and Monitoring Floatable Debris, Found on website <<http://www.epa.gov/owow/oceans/debris/floatingdebris/toc.html&x003e> accessed on 20 August 2015 2:01 PM.

⁹³ ibid

⁹⁴ ibid

e. Pesticides

The majority of organic chemicals identified so far in the sea are pesticides, and most products of technical use contain chlorine.⁹⁵ Pesticides are substances used to control pests, including insects, waterweeds and plant diseases.⁹⁶ Often pesticides are associated with human use that has negative effects on the quality of water and species living in water.⁹⁷ The introduction of pesticides into the water has the effects of raising the environmental cost because other species may die as a result of that introduction.⁹⁸ Due to its chemical strength, pesticides have killed many fishes and other species living in water.⁹⁹ Pesticides are dangerous to marine life and the marine environment as it have contributed a lot to the declination of fishes and other marine species through pesticides poisoning.¹⁰⁰

f. Solid waste and marine debris

A vast variety and amount of human delivered solid waste is lost, discarded or discharged daily into oceanic and coastal environments, or reaches the sea through waterways and other land based sources.¹⁰¹ Marine debris is defined “as any persistent solid material that is manufactured or processed and directly and indirectly, intentionally or unintentionally disposed of or abandoned into the marine environment”.¹⁰² Marine debris is a global pollution problem that impacts on human health and safety, and endangers wild life and aquatic habitants.¹⁰³ It costs local and national economies millions in wasted resources and revenues.¹⁰⁴ Marine debris can present a danger to human health. Nails, glasses and syringe on the beach can

⁹⁵ W. Ernst, Effects of pesticides and related organic compounds in the sea (1980), Volume 33, page 03

⁹⁶ Pesticides and Aquatic Animals: A Guide to Reducing Impacts on Aquatic Systems found on website <https://pubs.ext.vt.edu/420/420-013/420-013.html> accessed 20 August 2015 at 2:10 PM

⁹⁷ Pesticides and Aquatic Animals: A Guide to Reducing Impacts on Aquatic Systems found on website <https://pubs.ext.vt.edu/420/420-013/420-013.html> accessed 20 August 2015 at 2:10 PM

⁹⁸ ibid

⁹⁹ ibid

¹⁰⁰ (See note 104 Above)

¹⁰¹ Ljubomir Jeftic, Seba Sheavly, and Ellik Adler, Marine Litter, A Global Challenge united nations environmental programme, (2009)

¹⁰² What is marine debris? Found on website <http://oceanservice.noaa.gov/facts/marinedebris.html> accessed on the 20 August 2015 at 2: 20 PM

¹⁰³ The Problem With Marine Debris found on website <http://www.coastal.ca.gov/publiced/marinedebris.html> accessed on the 20 August 2015 at 2: 32 PM

¹⁰⁴ ibid

cause physical harm to beach goers, and trash in our waterways increases the amount of pathogens and chemicals impacting on water quality.¹⁰⁵

g. Toxic substances

Toxic pollutants “are organic and inorganic compounds either synthesized or chemically transformed natural substances, When accidentally released into the marine environment they can have severe adverse effects on marine ecosystem”.¹⁰⁶ When toxic substances enter the sea, it negatively affects the marine life in the sense that it makes marine mammals suffer from different illnesses, including liver diseases, reproductive malformation, growth and development issues and nervous system problems.¹⁰⁷

2.1.2 Pollution from sea bed activities

Pollution from sea bed activities occurs when harmful substances are released directly, and arise from exploration and the resources of seabed processes.¹⁰⁸ It accounts for only 1% towards the pollution of the marine environment, although it may be higher in certain regions due to higher rate of exploration activities.¹⁰⁹ Pollution from sea bed activities has the potential to cause transboundary¹¹⁰ marine pollution.¹¹¹ The 1982 United Nations Convention on the Law of Sea “declared the seabed area beyond national jurisdiction and its mineral resources as the common heritage of mankind to be administered for the benefit of mankind as a whole”.¹¹² All

¹⁰⁵ ibid

¹⁰⁶ Caribbean Sea Pollution Toggle Sidebar specifics of the Problem found on website <https://caribbeanseapollution.wordpress.com/specifics-of-the-problem/> accessed on the 20 August 2015 at 2: 42 PM

¹⁰⁷ The Effects of Ocean Pollution on Marine Mammals By Bob Bohle found on website http://www.bluevoice.org/news_issueseffects.php accessed on the 20 August 2015 at 2: 53 pm

¹⁰⁸ Philippe Sands, Jacqueline Peel, Principles of International Environmental Law, (2012) page 445

¹⁰⁹ ibid

¹¹⁰ A transboundary river is a river that crosses at least one political border, either a border within a nation or an international boundary.

¹¹¹ A series of papers on policy options, prepared for the third meeting of the Global Ocean Commission, (November 2013) Policy Options Paper # 10: Modernising ocean governance found on website <http://www.globaloceancommission.org/wp-content/uploads/GOC-paper10-governance.pdf> accessed on the 20 August 2015 at 3 :02 pm

¹¹² United Nations Convention on the Law of Sea (1982)

mineral exploration and exploitation must be sponsored by the state party to UNCLOS, and approved by the international sea bed authority. The authority has adopted regulation to govern the future exploitation of sea bed minerals.¹¹³

2.1.3 Noise pollution

Noise pollution negatively affects the livelihood of marine species. When ships pass and make sound, and when the operation of oil exploration is in progress and makes sound, they disturb marine species and put their lives in danger.¹¹⁴ The lives of marine species is endangered by noise pollution in the sense that they cannot effectively communicate to each other in a noisy environment in order to warn or alert fellow members against being preyed upon. Other members will not be able to hear the warning or alert, and eventually, they will be caught by their preys and lose their lives.¹¹⁵

2.1.4 Pollution through the atmosphere

Although knowledge of the transportation process and comprehensions of the physical interaction between the ocean and atmosphere is presently insufficient,¹¹⁶ the ocean also receives pollution from or through the atmosphere. When the climate changes, the ocean temperature rises and the carbon dioxide level also rises in the atmosphere, the ocean becomes acidified, the marine ecosystem changes and the distribution of fishes becomes modified. This ends up having an effect on the

¹¹³ ibid

¹¹⁴ Jim Cummings, Natalie Brandon, Acoustic Ecology Institute, (2004)

¹¹⁵ Ivy Lacandula, Marine Pollution, (2013), University of the visayas found on website <http://www.slideshare.net/ivylacandula/marine-pollution-28446733> accessed on 20 August 2015 at 3:06

¹¹⁶ The Treaties, Pollution of the Marine Environment found on website <http://oikoumene.net/eng.ngo/eng.ngo.rio/eng.ngo.rio.2.29/index.html> accessed on 20 August 2015 at 3:09

¹¹⁷ Hussein Kaaoud, Impacts of Climate Change on the Aquatic ecosystem, International Journal of Science and Knowledge (2015).

sustainability of fisheries and the lives of the communities which depends on fishery.¹¹⁷

2.1.5 Pollution from ships

Ship is the only mode of transport which is used to transport goods by using the sea route. There are possibilities that accidents may happen, and such accidents may cause irreparable damage to the sea. Vessel source pollution may occur through operational and accidental discharge of oil into the sea.¹¹⁸ With the view that such pollution may cause irreparable harm to the sea and the marine species, the need to regulate the shipping industry becomes imperative and such regulations are coupled with sanctions.¹¹⁹ There is no longer free navigation by ship owners as it is traditionally used to be. Currently, navigation is qualified by ensuring the protection and promotion of safe maritime.¹²⁰ Even upon the initiation of the regulation of the shipping industry and the promotion of maritime safety, there are substandard low-cost ships that are still operating. These ships pose a serious threat to the marine environment and human life.¹²¹

¹¹⁸ Alan Khee-Jin Tan, *Vessel-Source Marine Pollution: The Law and Politics of International Regulation* (2005)

¹¹⁹ *ibid*

¹²⁰ *ibid*

¹²¹ *ibid*

CHAPTER THREE: THE EFFECTS OF MARINE POLLUTION ON THE ECOSYSTEM AND HUMAN HEALTH

3.1 Overview

The discharge of effluent into the marine environment must be regulated and controlled by legal frameworks because such substances or their interactions are hazardous to marine life, the marine ecosystem and human health.¹²² An understanding of the sources of marine pollution, pathways and targets of the marine environment is a prerequisite to the test of designing a control strategy and the determination of control of both national and international standards.¹²³

Marine pollution has significant impacts on human health in the sense that the diet of human beings also includes food which comes from the sea, and if the food is negatively affected by marine pollution through toxic substances entering the sea and other sources, human beings will be affected as they will consume contaminated sea food. This will affect the health and well-being of human beings.¹²⁴ Contamination occurs through toxic compounds being concentrated in the animal's flesh, and this mostly occurs on fishes.¹²⁵

Marine pollution is defined "as the deleterious effect of introduction of substance or energy on living resources and marine life, human health and impairment of activities"¹²⁶. The legal control of marine pollution can be derived from two rational grounds: the traditional need to protect the health of human beings and the ecological need to protect marine ecosystem.¹²⁷

¹²²Meng Qing-Nan, Land Based Marine Pollution: International Law Development, (Martinus Nijhoff Publishers, 1987)

¹²³ ibid

¹²⁴ ibid

¹²⁵ Hites RA, Foran JA, Carpenter DO, Hamilton MC, Knuth BA, Schwager SJ. "Global assessment of organic contaminants in farmed salmon, (2004)

¹²⁶ Definition of marine pollution by United Nations Convention on the Law of Sea (1982)

¹²⁷ (See note 116 Above)

3.1.1 Marine pollution on marine ecosystem

An ecological ground for marine pollution control emerged naturally accompanying the development of the discipline of ecology concerning living organisms and the surrounding in the environment.¹²⁸ If one component of the ecosystem is damaged, the adverse effects eventually will work on human. In this sense, human activity, which is unjustifiable by law, developed on ecological ground and will be judged on the basis that it causes or it has the potential to cause damage to the quality of the marine ecosystem or environment.¹²⁹

In the case of Nyasulu and Others v Kankola Copper Mine PLC and others (2007/HP/1286) [2011] ZMHC 86 (1 January 2011)

The facts of the case are as follows “the plaintiffs is Nyusulu and others, the first defendant is the Environmental Council of Zambia, second defendant is Konkala copper mines plc and the third defendant is the Chingola Municipal Council. This action involved residents of Chingola, whose only source of water was a stream in which the Kankola Copper Mine was discharging the effluence from its mining operations. The Konkola Copper Mine is alleged to have failed to inspect and supervise the pipes in question, and to regularly meet the required acceptable standards of ensuring that no leakage or spillage occurred. The Chingola Municipal Council failed to take adequate measures to mitigate and control the effects of the pollution of water supply by maintaining sufficient water reserves.

This caused great damage to the Chingola residents as the local authority collected huge amounts of rates from the mine and the Chingola residents should also enjoy those benefits. Upon trial, the municipality was disjoined on the reason that it is not the water supplier of the Chingola residents. During the trial, it was also mentioned that there was no water supply for ten days, and when asked, the reason was that the water supplier had been shut because of pollution caused by the Konkola mining. Due to this pollution, everyone who drank that water suffered from chest pains, diarrhea, stomach pains and his sight was affected. The plaintiff’s statement stated

¹²⁸ (Hussein Kaaoud, See note 117 above)

¹²⁹ *ibid*

that when water was switched off, there was a foul smell, and when it was boiled, there were bubbles which could not go away even when cooled. It was then realized that the water was contaminated by the mine and the fishes in the near rivers were dying as a result of the contamination”.¹³⁰

The judge “ordered Konkola Copper Mine to pay four million kwacha to each plaintiff as general damages, one million kwacha as punitive damages, this is to deter others who may discharge poisonous substances without diminishing their potency not to cause harm to the environment, human beings, animals and others”.¹³¹

The Judge reiterated that “there was lack of corporate social responsibility and a tipping point for corporate recklessness. International investors should observe high environmental standards that are a global approach”. The fact that the host country is in dire need of foreign investment to improve the well-being of its people does not mean that its people should be dehumanized by ‘Greed and Crude Capitalism’ which puts profit above human life.¹³²

3.1.2 Reduction of the availability of marine pharmaceuticals

Marine pollution and reduction of ocean health is affecting public health and the wellbeing of individuals as they are deteriorating globally, and the rate of deterioration is expected to increase at a higher rate because of marine pollution.¹³³ Human beings face a serious problem because of the reduction in ocean health and marine pollution. The ocean used to produce important plants that were used for pharmaceutical purposes and which helped in curing diseases.¹³⁴ Nowadays these pharmaceutical plants have become scarce as a result of bad sea conditions caused by marine pollution. Therefore, the ocean is unable to produce pharmaceutical plants which will help human beings with cure of different diseases.¹³⁵

¹³⁰ Nyasulu and Others v Konkola Copper Mine PLC and others (2007/HP/1286) [2011] ZMHC 86

¹³¹ (Hansen, J. See note 42 Above)

¹³² Nyasulu (see note 130 above)

¹³³ Joseph Alcamo, Elena M. Bennett, Millennium Ecosystem Assessment, Coastal ecosystems and coastal communities (2005) Chapter 19.

¹³⁴ *ibid*

¹³⁵ *ibid*

Marine organisms have compounds which have the capacity to fight human diseases such as viral diseases or cancer. If the marine ecosystem is affected because of marine pollution, this will mean that people will no longer be able to get compounds from marine organisms in order to cure diseases.¹³⁶ It is important that the existing marine pollution legislation be used to curb marine pollution in order to preserve the marine ecosystem because it plays a vital role in human life.

3.1.3 The Endangered Species Act of 1973

In 1969, the US Department of the Interior, Agriculture, and Defense passed the Endangered Species Conservation Act “to prevent mass extinctions of certain species”.¹³⁷ The use of endangered species by humans for food, fur, and other commercial uses were outlawed by this act and by the Marine Mammal Protection Act of 1972. In 1973, the Convention on International Trade in Endangered Species (CITES) of Wild Fauna and Flora was implemented to cut back on the trade of plants and animals in trouble.¹³⁸

The 1973 Endangered Species Act is one of the most significant environmental laws in America, and defines endangered or threatened species, puts plants and invertebrates under protection, requires federal agencies to start programs to conserve important habitats, creates a wide umbrella of laws against hunting for endangered species, and matches contributions from individual states towards the project.¹³⁹ The United States Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) are responsible for the enforcement of the Endangered Species Act.¹⁴⁰

This act is very important in that it seeks to protect endangered species to avoid or prevent the extinction of species. Looking at the way fishing is commonly practised in

¹³⁶ National oceanic and atmospheric administration, United States Department of Commerce, found on website http://www.noaa.gov/features/economic_0309/medicines.html on the 21 August 2015 at 1:17 AM

¹³⁷ Threatened and Endangered Species - MarineBio.org". MarineBio Conservation Society found on <http://marinebio.org/oceans/threatened-endangered-species/> Accessed 21 August 2015 1:25 AM

¹³⁸ *ibid*

¹³⁹ *ibid*

¹⁴⁰ *ibid*

South Africa, the fishes are endangered. Thus, South Africa should adopt this act in order to prevent the possible extinction of fishes under its territorial waters.

3.1.4 Marine pollution on human health

The protection of human from activities that may cause damage to his physical existence is a familiar reason for legal development.¹⁴¹ Marine pollution has to be controlled by using legal intervention because it causes damage.¹⁴² The sole concern of legal intervention is to prevent marine pollution in order to protect human health.¹⁴³ In this instance, any particular activity which introduces substances into the marine environment will not be unjustifiable unless its potential of causing adverse effects on human beings can be proved. This means that the establishment of cause effect relationship between particular activities and specific victims becomes the pre-requisites for the development of law on marine pollution control.¹⁴⁴

Marine pollution can affect human health through sea food consumed by human beings on a daily basis.¹⁴⁵ People living on coastal areas are most vulnerable as fishing is their preferred source of means. It serves as food to them and some use it for commercial purposes. When fishes are harmed, they will pass on the harm to human beings through food chain, and this will cause damage because the toxins contained in fishes will now be transferred to the human body, causing unrest on humans.¹⁴⁶

¹⁴¹ (See footnote 116 Above)

¹⁴² *ibid*

¹⁴³ *ibid*

¹⁴⁴ (Meng Qing-Nan, see note 122 above)

¹⁴⁵ The Harmful Effects of Ocean Pollution found on website

<http://jrsience.wcp.muohio.edu/fieldcourses09/PapersMarineEcologyArticles/TheHarmfulEffectsofOceanP.html> accessed on the 20 August 2015 at 1: 51 AM

¹⁴⁶ *ibid*

People of Satawal ex rel Ramoloilug v Mina Maru No 3 [2001] FMSC 24; 10 FSM Intrm. 337 (Yap 2001) (20 July 2001)

In this case “the plaintiffs sought compensation for damage to the nearby reef that was the source of the community’s fish supply. The productivity of the reef was diminished following the grounding. Additionally, there were incidents of ciguatera poisoning from eating the fish, and this may have been the result of the damage to the reef.

The plaintiffs were granted summary judgment and there was a hearing for damages.

The court considered various means of monetary valuation, including commodity values, tourism value and replacement value. The court also considered the amount of compensation awarded in a previous grounding. Expert testimony was relied upon to determine damages. The cost of cleanup was also awarded”.¹⁴⁷

This case set a precedent which shows that marine pollution harms human beings, and if one is caught polluting the marine, he or she will be held liable to pay or remedy the pollution out of his own pocket. He or she will also be required to compensate people who suffered damage as a result of his/her actions of marine pollution.

3.2 Conclusion

With respect to the degradation of the marine ecosystem, it is not only through marine pollution that the marine ecosystem can be degraded, human beings also play a pivotal role in degrading the marine ecosystem through fishing.¹⁴⁸ Fishing is often done by people situated in the coastal areas because the majority of them see fishing as an important source of means. Some go fishing in order to feed their families and some go there for commercial purposes. One could imagine what will happen to those species if, for example, more than twenty families go to fishing, each having a target of how many fishes he/she must catch before going home. This

¹⁴⁷ *People of Satawal ex rel Ramoloilug v Mina Maru No 3 [2001] FMSC 24; 10 FSM Intrm. 337 (Yap 2001) (20 July 2001)*

¹⁴⁸ Science Ideas and Concepts, Human impacts on marine environments, (2009)

will obviously create an unsustainable fishing practice, resulting in the degradation of the marine ecosystem.¹⁴⁹

Degradation is also caused by the manner in which fishers use to catch fishes. The majority of fishers use a net to catch fishes. In the process, the net will end up catching species that were not targeted. As a result, the untargeted species caught become useless to the fisher and are thrown away.¹⁵⁰

Human health is seriously threatened by marine pollution in the sense that many marine species are used as sea food, and if contaminated, they will eventually cause harm to human beings as they eat those sea foods on a daily basis. One should be aware that some effects may not show immediately but they may have a negative impact on the health and well-being of humans in the future.

¹⁴⁹ *ibid*

¹⁵⁰ Science Ideas and Concepts, Human impacts on marine environments, (2009)

CHAPTER FOUR: THE REGULATION OF MARINE POLLUTION IN SOUTH AFRICA

4.1 INTRODUCTION

Marine pollution is not given much attention in South Africa like other issues, there are few legislative frameworks directly dealing with marine pollution, however the National Environmental Management Act and the constitution address the issue of marine pollution and that other section of National Environmental Management Act although they are not directly dealing with marine pollution they assist in curbing actions which might eventually have impacts on marine.

4.1.1 The Constitution of the Republic of South Africa

Section 24 of the Constitution contains two elements. Firstly section 24(a) comprises a fundamental right¹⁵¹ by stating that "everyone has the right to an environment that is not harmful to their health or well-being". A person's "well-being" is harmed if his or her interests are harmed. What would constitute an environment harmful to a person's well-being must be determined according to the merits of the case.¹⁵² Section 24(a), read with section 8 of the Constitution, is seen as being directly horizontally applicable, and as such individuals share the burden of protecting the environment,¹⁵³ for this reason, individuals can be held liable for creating "an environment that is harmful to the health or well-being of other people".

Secondly section 24(b), which has more of a socio-economic right in nature it "imposes a constitutional imperative on the state to ensure the right of individuals by reasonable legislative and other measures that:

- (i) prevent pollution and ecological degradation;
- (ii) promote conservation and;

¹⁵¹ Glazewski J, *Environmental Law in South Africa*, (Butterworths 2000)

¹⁵² *Hichange Investment (Pty) Ltd v Cape Produce Co (Pty) Ltd t/a Pelts Products and Others* 2004 2 SA 393 (E) at 41 5; Glazewski *Environmental Law in South Africa*, page 77.

¹⁵³ Currie, De Waal & Erasmus *The Bill of Rights Handbook*, (2013 sixth edition) page 405.

(iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development”.¹⁵⁴

This part of the constitutional right is unlikely to have direct horizontal application, as it only imposes obligations on the government and not on individuals.¹⁵⁵ The state may as a result be held liable should it fail to implement reasonable legislative measures.

In terms of section 231 of the Constitution, before international agreements can become law in South Africa they must be “signed by the national executive, approved by Parliament and enacted into law by national legislation”.¹⁵⁶ Section 232 provides that “customary international law is recognized as part of South African law without the need for it to be incorporated, unless it is inconsistent with the Constitution”.¹⁵⁷

Section 39(1) of the Constitution mandates the courts to consider international law when interpreting the Bill of Rights as a result of that when section 24 of the constitution is interpreted, the court is compelled to consider international law, whether binding or not binding.¹⁵⁸ It is significant that South Africa has made its environmental right justiciable, which means it carries the same weight as any other fundamental right.¹⁵⁹ This is important for South Africans as it means that a competent court may adjudicate on whether or not the environmental right has been violated or not and the perpetrators may be subjected to punishment.

It is very important that the right to environment is incorporated in the constitution and forms part of fundamental rights, since the constitution is the supreme law of the country and that every conduct inconsistent to it is invalid and obligations imposed by it must be fulfilled, this means that marine pollution will be curbed if we can uphold the constitutional right to environment and seek to comply and act in accordance with the constitutional provisions.

¹⁵⁴ Section 24(b) of the Constitution of South Africa

¹⁵⁵ *ibid*

¹⁵⁶ Kotze & Jansen van Rensburg *Law and Justice Journal*, (2003) page 126.

¹⁵⁷ Section 232 of the Constitution of South Africa

¹⁵⁸ Section 39(1) of the Constitution of South Africa

¹⁵⁹ Currie (see note 153 above)

4.1.2 National Environmental Management Act (NEMA)

National Environmental Management Act¹⁶⁰ requires that “management of the marine should comply with the principles of co-operative environmental governance as set out in the Act”.¹⁶¹ Marine pollution activities needs to be regulated and managed in accordance with the principles contained in section 02 of National Environmental Management Act. National Environmental Management Act makes provision for “all three fields of environmental concern, being the following: resource conservation and exploitation; pollution control and waste management and development”.¹⁶² The Preamble sets out the motivations for the National Environmental Management Act. In terms of these it can be seen that the National Environment Management Act sets out the constitutional environmental right, which in itself calls for "reasonable legislative measures" in a more tangible and workable manner.¹⁶³

Chapter 6 of the National Environmental Management Act provides for international obligations and agreements. Section 25(3) empowers the Minister of Environmental Affairs and Tourism to “pass domestic legislation or regulations to give effect to any international instrument to which South Africa is a party, once the relevant constitutional provisions have been complied with”.¹⁶⁴

Chapter 7 of the National Environmental Management Act is of particular importance as it provides for “compliance and enforcement, It provides for access to environmental information¹⁶⁵ and protection of whistle-blowers”.¹⁶⁶ Access to information is imperative when instituting a claim against a polluter, whether it is a private individual or the state, in order to obtain sufficient evidence to prove the allegation.

Section 28 of the National Environmental Management Act pertains to duty of care and remediation of environmental damage. This section starts out by providing that

¹⁶⁰ National Environmental Management Act 107 of 1998

¹⁶¹ Prince Edward Islands Management Plan, Chapter 3 found on website

http://www.sanap.ac.za/sanap_ems/docs/marion_ems/PEIMPFinal%20web%20without%20sign/PEIMP_v0.2_Chapter%203%20Legal%20status.pdf at 22 August 04:50 PM

¹⁶² Section 02 of National Environmental Management Act 107 of 1998

¹⁶³ Glazewski (See note 151 above)

¹⁶⁴ Section 25(3) of National Environmental Management Act 107 of 1998

¹⁶⁵ Section 32 of the Constitution and the Promotion of Access to Information Act 2 of 2000.

¹⁶⁶ Section 31 of the National Environmental Management Act

"every person" has a duty to take "reasonable measures" to prevent harm to the environment. This section does not impose an absolute duty to clean up or prevent pollution, but sets out measures which need to be taken and those measures are as follows "the measures to investigate, assess and evaluate the impact on the environment; inform and educate employees about environmental risks; cease, modify or control any act, activity or process causing the pollution or degradation; contain or prevent the movement of pollutants; eliminate any source of pollution or degradation, or remedy the effects of the pollution or degradation".¹⁶⁷

As we are aware that the National Environmental Management Act is an act which seeks to cover and address every actions that have effects of degrading the environment and since the ocean forms part of the environment the National Environmental Management Act is very important in providing the guideline on how marine pollution can be mitigated, prevented and managed in order to conserve the marine species and marine life for the future generations.

4.1.3 Marine Pollution Act 6 of 1981

The main act in South Africa which regulates pollution from ships, tankers and offshore installations is the Marine Pollution Act 6 of 1981.¹⁶⁸ The purpose of this act is to "provide for the protection of the marine environment from pollution by oil and other harmful substances, and for that purpose to provide for the prevention and combating of pollution of the sea by oil and other harmful substances; to determine liability in certain respects for loss or damage caused by the discharge of oil from ships, tankers and offshore installations; and to provide for matters connected therewith".¹⁶⁹

Section 5(1) of the Act in attempt to prevent or remove pollution of the sea by harmful substances and states that "if in the opinion of the Authority a harmful substance is likely to be discharged from a ship or a tanker, it may take such measures, including the destruction, burning or disposal in any other manner of the

¹⁶⁷ (Currie, See note 153 Above)

¹⁶⁸ Vrancken P.H.G, South Africa and the Law of the Sea, (2011)

¹⁶⁹ Preamble of Marine Pollution Act 6 of 1981

harmful substance in such ship or tanker, as it may deem fit to guard against or to prevent pollution of the sea by such harmful substance".¹⁷⁰

In terms of the Act it is provided that the "discharge of any oil from a ship, tanker or offshore installation within 12 miles of the South African coast is an offence".¹⁷¹ For the purposes of the Act "oil" is defined as "any kind of mineral oil including a spirit produced from oil and a mixture of oil and water or oil and any other substance"¹⁷². The act provides that the "discharge of oily water or oil and any other substance which contains more than a hundred parts per million of oil is prohibited between 12 and 50 miles offshore and such a discharge is an offence".¹⁷³

Despite the existence of this Act, marine pollution still occurs and mostly by way of oil spills. The challenge is that if an oil spill is caused by a ship of the flag state which is not a rich state the international courts or tribunals will not force that state to repair the damage caused as soon as possible like when pollution is done by the developed state. This is because of the principle of common but differentiated responsibility as set out in terms of Principle 07 of the Rio Declaration on Environment and Development.¹⁷⁴

Principle 07 of Rio Declaration states that "States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities, the developed countries acknowledge the responsibility that they bear in the international pursuit to sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command".¹⁷⁵

This principle must reflect that repairing the damage caused should be across the board and not consider the status of the state because delay in remedying the damage basically means that the marine life will be suffering and marine ecosystem

¹⁷⁰ Section 5(1) of the Marine Pollution Act 6 of 1981

¹⁷¹ National Gazette No 32103, (2009), Vol 526

¹⁷² Section 1(1) of the Marine Pollution Act 6 of 1981

¹⁷³ Amendment Maritime Booklet (2006 10th edition) found on website www.wylie.co.za accessed on the 18 August 2015 at 04:31 PM.

¹⁷⁴ Principle 07 of the Rio Declaration on Environment and Development.

¹⁷⁵ *ibid*

will be degraded and at times death in marine life may occur and this kind of damage cannot be remedied.

4.1.4 National Environmental Management: Waste Act 58 of 2009

The purpose of the Act is “to reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development; to provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management measures; to provide for the licensing and control of waste management activities; to provide for the remediation of contaminated land; to provide for the national waste information system; to provide for compliance and enforcement; and to provide for matters connected therewith”.¹⁷⁶ It seeks to minimize pollution and the use of natural resources through “vigorous control, cleaner technologies, cleaner production and consumption practices, and waste minimization are key to ensuring that the environment is protected from the impact of waste”.¹⁷⁷

Section 65(1) of the Act deals with compliance and enforcement and provides that “despite the powers conferred on the Minister or MEC by or under this Act, the Minister of Water Affairs and Forestry may exercise any powers conferred on him or her by section 19, 53 and 155 or the National Water Act, 1998 (Act No. 36 of 1998), in respect of a person who contravenes or fails to comply with any condition of a waste management licence, a remediation order or measures specified in terms of section 38(3) that may lead to an impact on a water resource”.¹⁷⁸

The Act went further in section 68(4) and state that “a person who is convicted of an offence in terms of this Act and who persists after conviction in the act or omission that constituted the offence commits a continuing offence and is liable on conviction to a fine not exceeding R1 000 or to imprisonment for a period not exceeding 20 days, or to both such fine and such imprisonment, in respect of each day that person

¹⁷⁶ National Environmental Management: Waste Act 58 of 2008

¹⁷⁷ Preamble of the National Environmental Management: Waste Act of 2008

¹⁷⁸ Section 65(1) of the National Environmental Management Waste Act of 2008

persists with that act or omission”.¹⁷⁹ This section is used to punish the perpetrators for non-compliance.

4.1.5 National Environmental Management: Integrated Coastal Management Act 24 of 2008

This Act establishes a system of integrated coastal and estuarine management in South Africa in order “to encourage the conservation of the coastal environment, sustain the natural attributes of coastal landscapes and seascapes, and ensure that development and the use of natural resources within the coastal zone is ecologically sustainable and socially and economically justifiable”. It defines “rights and duties in relation to coastal areas and determines the responsibilities of organs of state in relation to coastal areas”. Furthermore, it “prohibits incineration at sea and controls dumping at sea, pollution in the coastal zone, inappropriate development of the coastal environment and other adverse effects on the coastal environment and also gives effect to South Africa's international obligations in relation to coastal matters”.¹⁸⁰

The Act prevents pollution by monitoring control and surveillance of the department, it is responsible for protecting and preventing illegal marine activity and ensuring compliance with legislation. To this end, fishery control officers monitor landed fish at harbours, slipways and fish-processing establishments on an ongoing basis to ensure that permit holders comply with their permit conditions.¹⁸¹

¹⁷⁹ Section 68(4) of the National Environmental Management Waste Act of 2008

¹⁸⁰ Morné van der Linde and Loretta Feris, *Compendium Of South African Environmental Legislation* (2010 2nd edition)

¹⁸¹ Marine and coastal management, A review of the Department of Environmental Affairs and Tourism: 1994 – 2009 found on website https://www.environment.gov.za/sites/default/files/docs/15yearreview_marine_coast.pdf accessed on the 19 August 2015 at 4:22 AM

4.2 Conclusion

Existing marine pollution laws in South Africa are very lenient on the person who have contravened the provision of the law in the sense that, a person can pollute the environment particularly the ocean and through his/her act of polluting the action will kill marine life and marine plants which retain the growth of the economy. That person's punishment will be imprisonment of not more than 20 days or a fine not exceeding R1000, irrespective of the magnitude of the damage caused. The punishment does not correspond or commensurate to the pollution caused. The terms of punishment are not good enough to deter or rather compel people to refrain from polluting the ocean because the consequences thereof are not dire.

CHAPTER FIVE: A COMPARATIVE ANALYSIS BETWEEN SOUTH AFRICA AND AUSTRALIA

5.1 INTRODUCTION

This chapter seeks to compare the manner in which South Africa and Australia manage the issue of marine pollution. Lessons will be drawn from Australia as a first world country. Furthermore, the chapter looks at challenges that both countries encounter in as far as marine pollution is concerned.

5.2 THE SOUTH AFRICAN CONTEXT

Legislation in South African governing effluent discharges into the sea are as good as that of any European country because it is structured in a manner that clearly indicates its purpose and objectives. This makes it easy to understand its (legislation) seeks to achieve.¹⁸² Marine pollution has been recognized as having to do with the most critical issues which need to be addressed as a matter of urgency. Few studies have assessed marine pollution in South Africa. In terms of existing studies, the main sources of marine pollution in South Africa are from land based marine pollution, which includes industrial development, storm water runoff, litter on beaches, poor catchment management, inappropriate planned sewage disposal and treatment, river pollution, sugarcane burning, coastal urbanization, climate change, mining, Freshwater abstraction and flow modification, municipal and industrial wastewater, agricultural practices, port and harbour operations and off road vehicles".¹⁸³

It is important to note that South Africa does not have a dedicated statute dealing with pollution, and more specifically Integrated Pollution Prevention and Control (IPPC). The environmental regulatory framework in South Africa provides some of

¹⁸² Lord DA, Anderson FP, Basson JK, cds.pipeline discharges of effluents to sea South Africa , National Science Programme Republic, (1984)

¹⁸³ Atkinson and Clark ,Marine and Coastal Ecosystems; OEAT state of the Coast; and DEAT Coastal Policy Green Paper (1998)

the “direct”¹⁸⁴ and “indirect”¹⁸⁵ regulatory instruments advocated by international best practices.

The South African legislative framework is regarded as being fragmented, and is characterized by legislative gaps, confusion, overlaps and inefficiency, which might affect the development and implementation of an integrated regulatory framework pertaining to marine pollution.¹⁸⁶

The regulatory fragmentation and the interrelationship between the National Environmental Management Act, the National Environmental Management: Waste Act, the National Environmental Management: Integrated Coastal Management Act and the National Water Act are carefully analyzed, and their implications are assessed for the regulation of marine pollution.¹⁸⁷ In terms of the institutional framework, the South African government is divided into three autonomous, yet interdependent governmental spheres.¹⁸⁸ Schedules 4 and 5 of the Constitution of the Republic of South Africa (1996) prescribes the main functional areas of concurrent and exclusive legislative competence between the governmental spheres”.¹⁸⁹ Such repartition of competencies and jurisdiction may create confusion as to which sphere might be responsible for marine pollution, or for which regulatory aspects of marine pollution regulation they might be respectively responsible.¹⁹⁰

In South Africa there are various sectorial departments and organs of state directly or indirectly involved in the regulation of marine pollution, including the Department

¹⁸⁴ Direct regulatory instruments Include water emissions standards, the water classification system, and the requirement for environmental impact assessments.

¹⁸⁵ Indirect regulatory instruments include water quality monitoring programmes, financial provisions, and ecological assessments like a stale of the environmental report.

¹⁸⁶ The Regulation of Land-Based Marine Pollution in South Africa 5 July 2011 – IUCN Presentation prepared & presented by Dr. Marie Parramon Warburton Attorneys and North West University

¹⁸⁷ Draft Strategic Environment Management Framework, found at website <http://www.overstrand.gov.za/908E9230-7661-4203-8B99-65AFACAC086F/FinalDownload/DownloadId-9C28BC867D3B14FF40093B42C976AD59/908E9230-7661-4203-8B99-65AFACAC086F/en/documents/strategic-documents/integrated-development-framework-idf/202-overstrand-idf-towards-2050-draft-strategic-environmental-management-framework/file> accessed on 18 August 2015 at 12:26 am

¹⁸⁸ Section 40 of the Constitution of the Republic of South Africa

¹⁸⁹ Schedule 4 and 5 of the Constitution of the Republic of South Africa Act 108 of 1996

¹⁹⁰ Professor Yonatan Fesha, Defining Provincial and Local Government Powers and Functions: The Management of Concurrency , Local Government Project Community Law Centre University of the Western Cape found on website <http://mlgi.org.za/publications/publications-by-theme/local-government-in-south-africa/powers-of-local-government/Defining%20Provincial%20and%20Local%20Government%20Powers%20and%20Functions%20The%20Management%20of%20Concurrency%20-2005.pdf> accessed 18/08/2015 at 12:46 AM

of Water and Environmental Affairs (DWEA),¹⁹¹ the Department of Health (DH), the Department of Agriculture and Fisheries (DAF), the Department of Minerals Resources (DM), the Department of Energy (DE) and the Department of Trade and Industry (DTI), as well as their provincial counterparts and municipalities. Despite a large number of sectorial departments and organs of state involved in the regulation of marine pollution, their participation is not effective and do not actively improve the idea of curbing marine pollution. This is caused by the fact that they invest only in little effort to addressing the issue of marine pollution.

Some of the main issues faced by South Africa is the implementation of a cohesive, comprehensive and effective regulatory framework to address coastal and marine protection. However, the Integrated Coastal Management(ICM) law which seeks to establish and strengthens national legal frameworks for integrated coastal management provides that the “primary purpose of ICM law is to establish a governance system that enables, facilitates and supports an integrated approach to managing human uses of coastal areas”.¹⁹² This will be the most important objective of any Integrated Coastal Management legislative and institutional programme.¹⁹³ It further provides that the “diversity of coastal environments, socio-economic factors, political and legal structures both between and within countries throughout the world, mean that it is important that legislation for ICM show a similar degree of diversity in order to be appropriate to local conditions”.¹⁹⁴

¹⁹¹ DWEA IS a newly created national Ministry (2009) which In principle combines the previous Department of Environmental Affairs and Tourism (OEAT) and the Department of Waters Affairs and Forestry (OWAF). The Ministry of Water and Environmental Affairs comprises two separate departments: the Department of Environmental Affairs and the Department of Water Affairs. The operational modalities of this new department are currently unclear.

¹⁹² The purpose of ICM law Integrated coastal management law Establishing and strengthening national legal frameworks for integrated coastal management legislative study 93 found on website <http://www.fao.org/docrep/012/a0863e/a0863e00.pdf> accessed on the 18/08/2015 at 1:34 PM

¹⁹³ Science Ideas and Concepts (See note 150 Above)

¹⁹⁴ *ibid*

5.3 MARINE POLLUTION: THE AUSTRALIAN LEGAL FRAMEWORK

5.3.1 The Flag State Enforcement of International Conventions

The flag state has the duty to ensure proper and safe regulation of merchant ships. The government of the flag state is responsible for promulgating laws and regulations to effectuate its international obligation.¹⁹⁵ Flag states are a bearer of primary legal obligation because international safety conventions can only have effect at the intergovernmental level and they cannot be enforced at the individual ship level.¹⁹⁶

In Australia the ratification of an international treaty does not automatically give the treaty document legal effect in domestic law. For it to have practical effect, the domestic legislature must incorporate the treaty provision into domestic law. Therefore, the flag state is a national entity that carries a high responsibility on its shoulder to legally control individual ship level and marine pollution issues. Merchant ships in recent times are registered under different flag nations and not all nations take the responsibility of the flag seriously. Some nations even have their vessel registries run by private corporations.

5.3.2 The enforcement of international obligation of port state

Under international law, the concept of port state control requires a “foreign vessel to comply both with the laws of its own flag state but also with those of the port state, this means that even if the flag state is not a party to a particular international convention, if the law of a port makes compliance of that particular international convention mandatory, the port state can enforce the foreign vessel for compliance if they are within the port state’s sovereignty territory”.¹⁹⁷ Conversely if a state ratifies an International Convention, it will have an obligation under international law to

¹⁹⁵ United Nations Convention on the Law of Sea (UNCLOS)

¹⁹⁶ Conventions, Protocol, Codes and resolutions agreed under the auspices of the IMO, ILO or other similar multilateral or bilateral intergovernmental gathering

¹⁹⁷ Whether a ship is sea worthy or not will be determined by the provision of the municipal law, which illustrate the importance of uniformity at an international level.

enforce the relevant provision as part of its port state control procedures irrespective of whether such provisions are contrary to domestic legislation.¹⁹⁸

The real issue regarding marine pollution is less related to insufficient international legislation but more with the fact that the relevant legislation is not complied with. The problem is the issue of complying with the legislation and how such compliance is enforced.

Australian Common Wealth V State of Tasmania (1983) 158 CLR 1, [1983] HCA 21

This case was a land mark decision in the Australian Constitution of hydro-electric dam on the Franklin River in Tasmania, which is supported by the Tasmanian government but opposed by the environmentalist groups. One of the legal issues concerns section 51(xix) of the Australian Constitution, which gives the federal parliament the power to make laws with regard to external affairs. Section 51(xxix) is a nebulously defined provision. The Federal Government passed a law under the provision to prohibit the Tasmanian government to clear and excavate the area for building a dam¹⁹⁹. The Australian federal government claimed that the law was enacted for fulfilling the obligation of an international treaty for which Australia was a party. The Tasmanian government argued that the Australian Constitution gave no authority to federal government to make such regulations. Both governments took their case to the High Court of Australia.

The High Court recognized the fact that when the Australian Constitution came into effect in 1980, there were few international organisations such as the United Nations in existence. The external affairs power under the Australian Constitution was intended to be ambiguous, which would give it the capability to expand. The High Court further explained that so long as the federal law implements an international law or treaty, it is sufficient that it acquires the international character under section 51(xxix).²⁰⁰

¹⁹⁸ *ibid*

¹⁹⁹ World Heritage Properties Conservation Act 1983

²⁰⁰ *Australian Common Wealth V State of Tasmania (1983) 158 CLR 1, [1983] HCA 21*

This case proves that the way the South African constitution is structured, particularly by the inclusion of the provisions which seek to protect the environment in terms of section 24(1) (a)-(b), and section 39(1), which advises us to recognize international law, this is in accordance with the practices of those developed countries such as Australia. Since Australia is managing its marine pollution fairly, following its footsteps can enable us to prevent, curb or combat marine pollution.

5.3.3 Australia's role in the Tokyo Memorandum of Understanding (TOKYO MOU)

Port state connects their control activities by establishing a memorandum of understanding. Australia is a member of the Tokyo Memorandum of Understanding. The first regional grouping of Memorandum of Understanding was the 1982 Paris Mou,²⁰¹ this memorandum of Understanding was on Port State Control in order to implement agreements on maritime safety and protection of the marine environment which had set a framework for subsequent Tokyo Mou".²⁰² The Tokyo Mou was established for Asian Pacific region, which binds the maritime authorities of Australia and other countries. It recognises the importance of avoiding competition, which is not healthy between the ports.

5.3.4 Detention powers of foreign ships based on the Australian Pollution Act

The Australian Pollution Act grants far more extensive powers to AMSA to regulate substandard shipping in case of actual or suspected marine pollution.²⁰³ The Marine Pollution Act authorises the AMSA "to detain a foreign ship if there is a clear grounds for believing that a pollution breach had occurred in the Australian territorial Sea or

²⁰¹ Binds the maritime authorities of Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, UK and Northern Ireland

²⁰² The Tokyo MOU is one of the most active regional port State control organizations in the world. The main objective of the Tokyo MOU is to establish an effective port State control regime in the Asia-Pacific region through co-operation of its members and harmonization of their activities, to eliminate sub-standard shipping so as to promote maritime safety, to protect the marine environment and to safeguard working and living conditions on board ships.

²⁰³ *ibid*

Economic Exclusive Zone (EEZ)²⁰⁴ that is related to the foreign ship even if the ship is in all respect compliant at all the times”.²⁰⁵ The Pollution Act also grants AMSA the power to detain and escort foreign vessels in the territorial sea and the EEZ of the Australian port if the ship is suspected of causing pollution²⁰⁶. Subject to Article 228, the Australian Authority may “prosecute against foreign ship for polluting Australian breaches up to three years after breach, with the service on the agent of the ship as deemed to be served on the owner or the master”.²⁰⁷

5.3.5 Australian distinction between ‘unseaworthiness’ and a ‘substandard’ vessel.

In IMO²⁰⁸ Resolutions A 787(19), the term unseaworthy and substandard ship are used interchangeably. However, the two terms are used differently in the Australian legal context.²⁰⁹

The Australian Insurance Law stresses the importance of seaworthiness in contents of marine insurance. Section 59 of the Navigation Act provides that in every contract of service between a ship owner and a seaman, there is an obligation upon the ship-owner to exercise reasonable care to ensure that the vessel is in a seaworthy condition at the commencement of and through every voyage.²¹⁰ This is basically to avoid oil spills and other possible marine pollutions that may result from the vessel.

²⁰⁴ Exclusive Economic Zone is an area beyond and adjacent to the territorial sea, subject to the specific legal regime established in this Part, under which the rights and jurisdiction of the coastal State and the rights and freedoms of other States are governed by the relevant provisions of this Convention.

²⁰⁵ (See note 202 Above)

²⁰⁶ *ibid*

²⁰⁷ Owen Tange, Australian Perspective: Port State Control on Marine Pollution, Department of logistics and maritime studies, The Hong Kong Polytechnic University, Hong Kong.

²⁰⁸ The purposes of the IMO, as set forth in the convention is to facilitate cooperation among governments on technical matters of all kinds affecting shipping engaged in international trade; to encourage the general adoption of the highest practicable standards in matters concerning maritime safety, efficiency of navigation, and the prevention and control of marine pollution; to encourage the removal of discriminatory action and unnecessary restrictions by governments engaged in international trade, so as to promote the availability of shipping services to world commerce without discrimination; to consider matters concerning unfair restrictive practices by shipping concerns; and to consider any matters concerning shipping that may be referred to the IMO by any UN organ or specialized agency. Found on website

<http://www.nationsencyclopedia.com/United-Nations-Related-Agencies/The-International-Maritime-Organization-IMO-PURPOSES.html#ixzz3efkKLdv4> accessed on the 07 JULY 2015

²⁰⁹ (See note 208 above)

²¹⁰ The Navigation Act 2012

Section 207 of the Navigation Act 2012, which became effective in July 2013, defines seaworthiness as a fit state to encounter ordinary perils of the sea.²¹¹ Section 207A of the Navigation Act 2012 states that the word 'substandard' has different meanings. It states that "a ship is substandard if is seaworthy but conditions on board of the ship are clearly hazardous to safety or health". In determining whether a ship is substandard, regard shall be heard to such matters as are prescribed.²¹² This means that even a brand new vessel with all the necessary equipment can be substandard.

Great China Metal Industries Limited V Malaysia International Shipping [1998] HCA 65; 196 CLR 161; 72 ALJR 1592; 158 ALR 1

This case provides for consignment of 40 cases of aluminium can body in coils loaded in Sydney on board was partly damaged during the passage from Sydney to Keelung, Taiwan on account of heavy weather. Great China Metal Industries Co. Ltd., to which the property in the goods had passed, claimed damages from the carrier, Malaysian International Shipping Corp. But the claim was rejected by the trial Judge whose decision was affirmed by the New South Wales Court of Appeal. The claimant appealed to the High Court of Australia contending that the exception of perils of the sea did not apply because damage to the cargo resulted from sea weather conditions could reasonably be foreseen and guarded against. The question to which the submission primarily was directed was the meaning and effect of art. IV r. 2(c) of the Hague Rules.

The High Court of Australia stated that seaworthiness must be judged with regards to the conditions that the vessel will encounter. The standard of fitness rises with improved knowledge of shipbuilding and navigation. In Art. 3 regulation (1), the term 'seaworthiness' should be given its common law meaning, and nothing suggests otherwise.

²¹¹ Ibid

²¹² These are contained in the Marine orders part 11, substandard ship issue 02

5.3.6 THE AUSTRALIAN MARITIME SAFETY AUTHORITY ACT 1990 (AMSA)

Australia has signed one of the most comprehensive domestic legislation to carry its port state control programme. The AMSA²¹³ conducts port state control on Australia and as a member of the Asian Pacific Mou. Australia does more than complying with its inspection target. In accordance with the Australian Government's responsibilities and policies, Australia's obligations under AMSA's functions is specified in Section 6(1) (a) of the Australian Maritime Safety Authority Act 1990. The act states that AMSA “coordinates a national pollution prevention and response strategy to protect Australia's marine environment from pollution caused by shipping and related activities”.²¹⁴

The AMSA give effect to Marine Orders which are a form of regulation, made under Australian Commonwealth legislation, that apply to Australian and foreign vessels. The legislation provides the substantive powers for the Australian Maritime Safety Authority (AMSA) to perform certain functions and operational activities, including monitoring and enforcement.²¹⁵

5.4 LESSONS TO BE LEARNED FROM AUSTRALIA

Australia regulates its flag state properly and prioritizes it more often. South Africa must not be like other nations that do not take the flag state seriously. It must take the flag state seriously and strive to adopt the Australian style which says that the fact that there is ratification of the international treaty does not automatically give the treaty document legal effect in domestic law. For it to have practical effect, the domestic legislature must incorporate the treaty provision into domestic law so that it can have a practical meaning. This will allow South Africa and its citizens to be aware of the laws that regulate marine pollution at international level. Equally, this will broaden the legal framework regulating marine pollution in South Africa.

South Africa should participate in a Memorandum of Understanding in matters relating to marine pollution. The memorandum will help the country to form a system

²¹³Coordinates a national pollution prevention and response strategy to protect Australia's marine environment from pollution caused by shipping and related activities

²¹⁴ Australian Maritime Safety Authority , Protection of the Sea

²¹⁵ Australian Maritime Safety Authority , factsheet on marine orders

of port state control through the exchange of information that can effectively be managed and maintained by making sure that there is compliance of rules and standards that are made in order regulate the relevant instrument and manage marine pollution. One interesting thing about the MOU is that there is no obligation which it imposes on any authority because it is a non-binding legal document. However, it can protect the marine environment in the sense that authority members will refrain from engaging in conducts which can cause marine pollution as they will have voluntarily chosen to be part of the MOU. As such, they will have the understanding that the MOU will require them to comply with the standard set out by other authorities who are also members of the MOU.

With regard to the Australian Maritime Safety Authority Act of 1990, South Africa can learn that it can promulgate a specific domestic legislation which specifically deals with the protection of marine pollution without trying to adopt the existing international convention. The legislation will be for the purpose of marine pollution within the territorial limits of South Africa. Whenever any foreign vessel or activity comes within the territory of South Africa, it is subjected to the rules and regulations stipulated in the domestic legislation of South Africa.

It is important to note that South Africa, in terms of legislation regulating the marine pollution, is not far from Australia. However, Australian domestic laws are more detailed than those of South Africa. Australia is active and is more interested in becoming a member state of many marine pollution legal frameworks. It advisable for South Africa to become a member state of the existing legal frameworks which seek to prevent marine pollution. Such legal frameworks play an important role in that all member states of these framework embark on the same journey to achieve the same outcome. So basically, all member states become a team that fights against marine pollution by adhering to the legislations in which they are member states.

5.5 CHALLENGES FACED BY SOUTH AFRICA AND AUSTRALIA

There is an extensive and complex array of commonwealth, state and territory organisation for the control of shipping, and the protection and the preservation of

the marine environment.²¹⁶ Merchant shipping represents a significant part of international transport of goods through oceans; it accounts for more than 95% of the world trade by weight.²¹⁷

The most crucial risk linked to shipping activities is the pollution of the marine environment due to accidental or deliberate discharge of oil.²¹⁸ However, this is not the only pollution concern in both countries as poor water and sediments quality poses a serious threat to the marine environment and coastal waters.²¹⁹ Land based pollution also plays a critical role in marine pollution because it hampers the beaches, and as a result, limits their use and enjoyment. It also deprives people their right to proper commercial use of marine resources.²²⁰

It is very important that this problem be fixed. This can safely be done by engaging in public awareness, encouraging people to refrain from using or engaging in conducts that may end up in accidental oil spills, thus creating serious damaging effects to the coastal marine environments as the currents tides in the coastal areas are not as strong as in the open sea.²²¹

5.6 CONCLUSION

The constitution of South Africa seeks to protect the marine environment in terms of Section 24(b), which “imposes a constitutional imperative on the state to ensure the right of individuals by reasonable legislative and other measures that:

- (i) prevent pollution and ecological degradation;
- (ii) promote conservation and;
- (iii) secure ecologically sustainable development and use of natural resources while

²¹⁶ M.W.D, Australian Marine Pollution Laws, (Leichhardt, N.S.W. : Federation Press 2007) 2nd edition

²¹⁷ V. Lan, Shipping and Transport Logistics, (2006)

²¹⁸ Impact of Oil and Related Chemicals and Wastes in marine environment GESAMP Reports and Studies.

²¹⁹ *ibid*

²²⁰ Chris Sanderson, Marine Pollution in Australia, found on website http://www.wwf.org.au/our_work/saving_the_natural_world/oceans_and_marine/marine_threats/pollution/marine_pollution/ on the 19 August 2015 at 5:07 PM

²²¹ Secretary of state for transport, Safer ships, Cleaner Seas, The report of Lord Donaldson’s inquiry into prevention of Pollution from Merchant Shipping (1994)

promoting justifiable economic and social development”.²²²

This compels the state to embark on the prevention of marine pollution. However, the level of marine pollution in South Africa is still escalating day by day, despite the incorporation of the protection of the environment in the constitution as a fundamental right. The Australian state has no constitutional obligation imposed to guard against marine pollution, but it manages its level of marine pollution far better than South Africa. This is because Australia actively participates in many legal frameworks initiated to deal with the issue of marine pollution.

This also serves as evidence that the real issue regarding marine pollution is less related to insufficient national or international legal frameworks, but more with the fact that the relevant legal frameworks promulgated to regulate marine pollution lack proper compliance and enforcement which can adequately deter any unnecessary marine pollution activity.

²²² Section 24(b) of the Constitution of the Republic of South Africa.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSION

There are many international conventions and legislation promulgated in order to address the issue of marine pollution. Despite the existing legal frameworks, the problem of marine pollution keeps escalating every day. This is caused by the lack of compliance by the states and perpetrators. If there can be compliance with international conventions and legislation regulating the marine pollutions, this problem can be solved. Lack of public awareness contributes to this problem in the sense that people litter into rivers under the impression that such waste will just be diluted by the water. They do not know that the river can flow up to the ocean. Such waste can cause harm to the marine species and the marine ecosystem by causing marine pollution.²²³ People should be informed about the dangers of littering and performing conducts which have the capability of causing marine pollution. The majority will refrain from performing such conducts.

6.2 RECOMMENDATIONS

Now that we have explored the causes of marine pollution and the effects that it has on the marine ecosystem and human health, it is imperative that we find a way to deal with this problem in a manner that will help us to prevent or mitigate this problem so that it may not have adverse impact on the future generation. We must act in a way that indicates that we are striving to protect the environment for the benefit of the current generation and to sustain it for future generations. Below are some recommendations to prevent, mitigate, reduce and combat marine pollution.

6.2.1 Beach clean-ups

There should be periodical clean ups of beaches in order to prevent dirt and substances to get discharged into them.

²²³Elizabeth Grossman, Radioactivity in the Ocean a publication of the Yale School of Forestry& Environmental Studies (2011).

6.2.2 Reduce rubbish

People should stop rubbish from entering the sea thereby causing marine pollution, which often make the marine species to get confused and then mistake them for food, feed on them and die.²²⁴ Sometimes they play with that rubbish and end up being tangled by it.²²⁵ For rubbish to enter the sea, it must have been on the land. So it is better to reduce it at the lowest possible level so that it does not reach the sea.²²⁶ The recycling of papers, cans and other recyclable materials can play an important role in reducing rubbish.

6.2.3 Take care of a local stream

It is important to prevent rubbish from entering local streams since oceans are stream terminals. We must also refrain from cutting plants situated near river beds as they help to reduce sedimentation. In most cases sediments will enter the sea but it becomes a problem if it is too much. So by way of preserving the plants situated near streams or riverbeds we are protecting the rivers from possible sedimentation.

6.2.4 Education

Education is needed in order to alert people about marine pollution. Hence the government must continuously create public awareness through campaigns about marine pollution. This will encourage the public to act, and will promote reduction, prevention and mitigation of marine pollution. Education by means of public awareness can be more effective than strict laws, which only seek to punish after the damage had been done, whereas education will enlighten and serves as a preventive mechanism.

²²⁴ Phillip V. Mladen, Marine Biology, (2013, 1st edition)

²²⁵ ibid

²²⁶ ibid

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