

**A REEVALUATION OF INTERNATIONAL LAW AND POLICY
RELATED TO THE QUANTIFICATION OF ENVIRONMENTAL
HARM.**



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A Research Paper submitted in partial fulfillment of the requirements of the degree of Magister Legum in the Department of Law, University of Western Cape.

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I

DECLARATION

I, Lulamile Lester Peter, declare that *A Reevaluation of International Law and Policy Related to the Quantification of Environmental Harm* is my own work, and that all the sources I have used have been properly acknowledged by means of proper references.

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ACKNOWLEDGEMENTS

To my fiancée, Nomkhosi Madwe and to my family and in memory of my grandparents, Minnie Selane, Kholisile Peter and my uncle, Mbuyiseli Selane.

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TABLE OF CONTENTS

Title Page	I
Declaration	II
Acknowledgements	III

CHAPTER 1

Background and Introduction

1.1. Background.....	1- 3
1.2. Introduction to the Study.....	3
1.2.1 Delimitation of Study.....	3-6
1.2.2 Chapter Outline.....	6-8

CHAPTER 2

Environmental Damage

2.1 Introduction.....	9
2.2 The Concept of Environmental Damage.....	9
2.2.1 National Law Perspectives.....	9-10
2.2.2 Public International Law Perspectives.....	10-12
2.2.3 Views of Writers.....	12-13
2.3 The Scope of Environmental Damage.....	13
2.3.1 Introduction.....	13-14
2.3.2 Overview of the Scope of Environmental Damage.....	14
2.3.2.1 Toxic Spill in Sicily and Spain.....	14-15
2.3.2.2 Oil Spill in South Africa.....	15-17

2.4	Natural Resource Damage.....	17
2.4.1	General Overview.....	17
2.4.2	National Law Perspectives of Natural Resources Damage.....	18-21
2.4.3	International Law Perspectives of Natural Resources Damage.....	21
2.4.2.1	Common Concern of Mankind.....	21-22
2.4.2.2	Damage to the Global Common.....	22-23
2.4.2.3	Damage to the Local Common.....	23-24
2.4.4	Ownership of Environmental Natural Resources.....	24
2.4.4.1	Overview.....	24
2.4.4.2	Ownership of Natural Resources: National Law Perspectives.....	24-26
2.4.4.3	Ownership of Natural Resources: International Law Perspective.....	26-27
2.5	Natural Resource Damage Litigation.....	27
2.5.1	Background.....	27-28
2.5.2	Legal Standing (<i>Locus Standi</i>).....	28-29
2.5.2.1	National Law Perspective of Legal Standing.....	29-32
2.5.2.2	Public International Law Perspectives of Legal Standing.....	32-33

CHAPTER 3

Assessment of Environmental Damage

3.1	Introduction.....	34
3.2	The Natural resources Damage Assessment.....	34-36
3.2.1	Overview of the Type A Procedure.....	36
3.2.2	Overview of Type B Procedures.....	36-38
3.2.2.1	The Pre-assessment Process.....	38-39

3.2.2.2	Assessment Plan (Restoration planning Phase).....	40-41
3.3	Methods and Implementation of Assessment Process.....	41

CHAPTER 4

Quantification and Recovering of Damages

4.1	Introduction.....	43-45
4.2	Quantification of Natural Resources Damage.....	45-46
4.2.1	An Overview.....	44-45
4.2.2	Conceptual Approaches to the Quantification of Natural Resources Damage.....	46
4.2.2.1	Anthropocentric Approach.....	47
4.2.2.2	Biocentric Approach.....	47-48
4.3	Methods of Quantifying Environmental Damage.....	48-50
4.3.1	Indirect Methods of Quantification.....	50
4.3.1.1	Behavioural Use Valuation.....	50-51
4.3.1.2	The Hedonic Model.....	51
4.3.1.3	The Travel Cost Model.....	51-52
4.3.2	Direct methods of Quantification.....	52
4.3.2.1	Contingent Valuation Method.....	53-55
4.4	Compensation for Environmental Harm.....	55

CHAPTER 5

Summary And Recommendations

5.1	Summary of the Study.....	56-57
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5.2	Recommendations.....	57-58
5.2.1	Incorporation of National Laws to Public International.....	58-59
5.2.2	Law of Delict as Model Mechanism to Quantify and Recover Damages.....	59

BIBLIOGRAPHY

A. Books.....	60-62
B. Journals.....	61
C. Statutes and Bills.....	62
D. Conventions.....	62
E. Regulations and Resolutions.....	63
F. Case Law.....	63
G. Internet Articles.....	63-65

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CHAPTER 1

BACKGROUND AND INTRODUCTION

1.1 BACKGROUND

The doctrine of quantification of environmental damage is one of the most highly contested aspects of international law and also national policy. In the context of environmental law, there are various questions that are related to the quantification of damage, which are still uncertain and unresolved.¹ These questions are commonly found in environmental cases dealing with toxic-liability litigation.² This kind of litigation is related to damage caused by production and handling of hazardous materials such as asbestos. The questions of causation, liability and that of unclear methods of calculating damage are hallmark problems in international environmental law.³

It is also trite law⁴ that prior to the quantification of damage caused to an environmental natural resource asset, claimants or plaintiffs have a duty to establish and prove the damage and harm caused to the natural asset. The questions of causation and responsibility arise only when the harm or damage to a natural resource has been established and proven by

¹ J. Glazewski 'Environmental law in South Africa' at 645. Glazewski submits that 'it is difficult to quantify damage to the environment in monetary terms'.

² A Volokh 'Punitive Damages and Environmental Law' available at: <http://www.news.bbc.co.uk/hi/English/sci/tech/newsid> accessed on 26 June 2002.

³ *Ibid.*

For example, the damage to indigenous trees in a forest is perceived as being difficult, if not impossible, to evaluate objectively.

The survey and rationale provided in the above creates an assumption of duty on various state governments to formulate mechanisms for the quantification of the so-called unpriced assets. The wrong-doers cannot benefit from their wrong misdeeds, nor can they be allowed to escape liability and their duty to compensate for harm they caused to the environment on the basis of lack of precision in natural resources damage assessment.¹⁰

1.2 INTRODUCTION TO THE STUDY

1.2.1 Delimitation of the Study

This paper will focus on damage caused to various environmental natural resources. The study is based on the assumption that environmental natural resource damage can be quantified by using existing policies and methods provided in international laws, as long as they do not conflict with different states' domestic laws. The damages caused to the various natural resources are for the purposes of this study, perceived and interpreted as the damage caused to an environmental asset.¹¹

¹⁰ Glazewski fn.5 *supra* at 645, and *Esso Standard South Africa (Pty) Ltd v Katz* 1981 (1) SA 964 at 969-70.

¹¹ Kopp & Smith fn.7 *supra* at 10- 12.

The doctrine of quantification of environmental assets as provided in the above is wide and highly contested in international environmental law. The study will evaluate damage caused to various environmental natural resources, such as water, forests, other flora, fauna and land. The paper will further provide a re-evaluation of international policies and laws related to quantification of environmental natural resource damage.

In international environmental law a considerable difference of opinion exists regarding environmental damage assessment. The concept of environmental damage as set out in the above is wide and for the purposes of this paper, the assessment of environmental natural resource damage will be surveyed. This study will suggest that the scope of damage caused to the environmental asset is the value of the asset prior to the injury less the value of the harmed resource.¹² This study is also based on the assumption that environmental natural resource damage is 'sum of losses in the use and non-use values resulting from injury to the quantity or quality of service that flows from the natural resource'. This paper will further suggest that the loss suffered due to damage of an environmental asset is equivalent to damages payable for the injured natural resource.¹³ The modern economic methods of valuation as suggested by various writers will be evaluated to illustrate and substantiate the assumption that environmental damage can be

¹² Kopp & Smith fn.7 *supra* at 6.

¹³ *Idem* at 7.

quantified.¹⁴ This study will evaluate national and international *environmental law principles of responsibility and the principles of causation from the law of delict*. These principles and the issues concerning *locus standi* of the parties involved in the assessment and quantification of environmental natural resources damage compound the problem of quantification of environmental damages.

Furthermore, most of environmental natural resources are not privately owned and they are held in public trust by the designated trustees. The absence of private ownership also compounds the problem of quantification of damage caused to the environmental natural resource assets. For example, the question of *locus standi* to claim and prosecute environmental law offenders is often associated with the debate regarding ownership of the natural resources. These questions are common in environmental-litigation actions dealing with natural resource assets that are assumed to be held in public trust.

This paper will attempt to clarify the controversy pertaining to the ownership of environmental natural resources and the legal standing to prosecute and recover damages caused to environmental assets.

¹⁴ *Ibid.*

It is also common and trite law that subsequent to the assessment of damage caused to an environmental asset, the scope and extent of damage caused to the asset must be determined.

The extent of damage caused to the environmental asset involves the quantification of damages caused to the environmental asset. The question in this regard is how does one assess and quantify damage to an environmental asset? In international environmental law, many attempts have been made by researchers as well as academics to try and quantify environmental losses. However, current methods of quantification have been found by modern authors to lack precision.¹⁵ The current methods suggested by researchers are close to achieving the intended goal, the formulation of a policy for and methods of environmental damage assessment.

This paper will also evaluate the forms of compensation available for damage caused and the various forums in place to determine liability and enforce recovery of awards.

1.2.2 Chapter Outline

This study will be literature-based and will evaluate the problems outlined in the above survey. This study consists of five different chapters and is based on the assumption that environmental damage is

capable of being quantified. The chapters are not independent of each other and the debates in each chapter are closely linked.

Chapter two follows this brief introductory chapter and focuses on the evaluation of environmental damage. This chapter attempts to provide a clear international and national conception of environmental damage.

Chapter two also provides a practical study of the causes of environmental natural resource damage. Chapter three focuses on the assessment of environmental damage. This chapter provides an in-depth evaluation and examples of international and national laws, policies and case law regulating assessment of environmental damage.

Chapter four focuses on the main problem of this study, the quantification of environmental natural resource damage. This chapter is based on the assumption that environmental harm can be quantified. This chapter also attempts to provide a clear exposition on how to recover environmental damage caused to natural resources. Chapter five attempts to provide a concise summary of the study. This chapter is concluded by a survey that provides recommendations to resolve the problems associated with quantification of environmental damage.

¹⁵ Glazewski fn.1 *supra* at 645.

The chapters outlined above are literature-based and hypothetical scenarios have been used to illustrate the central problem of the research, namely quantification of environmental damage.



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CHAPTER 2

ENVIRONMENTAL DAMAGE

2.1 INTRODUCTION

Both domestically and internationally, society's concerns about damage caused to the environment have increased dramatically.¹⁶ For example, in South Africa the driving of motor vehicles on the beaches has been banned and criminalized.¹⁷ The object of banning driving of vehicles on the beaches was 'to provide for general prohibition on the recreational use of vehicles in the coastal zone'.¹⁸ Domestic and international law has also begun to recognize liability for environmental damage to various natural environmental resources that are not privately owned,¹⁹ including those owned or managed by private persons or various trustees on behalf of the public.²⁰

2.2 THE CONCEPT OF ENVIRONMENTAL DAMAGE

2.2.1 National Law Perspectives

The notion of environmental damage is very wide and has been defined differently in various sources of national and international law. The term

¹⁶ R B. Steward 'Issues and Controversies in Assessing Natural Resource Damage' available at <http://www.eli.org/ecw/stewar.htm> accessed on 28 June 2002.

¹⁷ 'Beach ban on 4x4 is to remain' Daily Dispatch, 29 April 2002. Also available at: <http://www.legalbriefs.co.za> accessed on 17 August 2002.

¹⁸ *Ibid.*

¹⁹ Comprehensive Environmental Response, Compensation and Liability Act of 1980, available at http://www.access.gpo.gov/nara/cfr/waisdx_98/43cfr11_98.html accessed on 15 October 2002.

²⁰ P Okowa 'State Responsibility for Transboundary Air Pollution in International Law' at 175 – 202.

“damage” is commonly perceived and understood in the perspective of delict law and tort systems of liability. Damage has been defined as ‘calculable pecuniary loss or diminution in the estate of the plaintiff.’²¹ In the context of international environmental law and policy, this definition by Havenga²² may prove problematic since damage is not only caused to privately owned estates or assets. It is evident from this survey that at national law level, the concept and notion of ‘environmental damage’ has not received the recognition it deserves and ‘liability issues are in a rudimentary state of development.’²³

2.2.2 Public International law Perspectives

In public international law, the Convention on Regulation of Antarctic Mineral Resources of 1988 (CRAMRA)²⁴ is amongst those international laws providing clarity of the concept of environmental damage. Article 1 (15)²⁵ of CRAMRA defines damage to the environment as ‘any impact on the living or non-living components of that environment or those ecosystems, including harm to atmospheric, marine or terrestrial life, beyond that which is negligible or which has been assessed and judged to be acceptable pursuant to the Convention’.

²¹ P Havenga ‘Liability for Environmental Damage’ (1995) 7 SA Merc LJ at 195. See generally PQR Boberg *The law of Delict Aquilian Liability* Vol1 at 475.

²² *Ibid.*

²³ See generally the position of South Africa discussed by Havenga fn.21 *supra* at 202.

²⁴ MN Shaw ‘International Law’ at 596.

²⁵ *Ibid.*

The Italian Court of Appeal, in *Commonwealth of Puerto Rico et al v SS Zoë Colocotroni*, has held that the concept of environmental damage included ‘...everything which alters, causes deterioration in or destroys the environment in whole or in part...’.²⁶ Because of the wide scope of the concept of environmental damage, its meaning has been extended in various international laws that deal with specific environmental damages. For example, in the International Convention on Civil Liability for Oil Pollution of 1969, the concept of environmental damage has been conceived and defined as ‘pollution damage’ because of several environmental-damage cases resulting from pollution.²⁷

In terms of the International Convention on Civil Liability for Oil Pollution Damage, pollution damage is defined as ‘...loss or damage caused outside the ship carrying oil by contamination resulting from the escape or discharge of oil from ship, wherever such escape or discharge may occur, and includes the costs of preventive measures and further loss or damage caused by preventive measures’. This definition has, however, been replaced by Article 2(6) of the 1992 Protocol.²⁸ In terms of this Protocol, pollution damage is defined as

- (a) loss or damage caused outside the ship by contamination resulting from the escape or discharge of oil from the ship, wherever such escape or discharge may occur, provided that compensation for impairment of the environment other than loss of profit from such impairment shall be

²⁶ (1980) 628 Fed R 2d 652. See generally Glazewski fn 1 *supra* at 802-03 and P Sands *Principles of International Environmental Law* at 663.

²⁷ Glazewski fn.1 *supra* at 801-02.

²⁸ See generally Broderick ‘New Definition of Pollution Damage’ 1985 *Lloyd’s Maritime and Commercial Law Quarterly* 382.

limited to costs of reasonable measures of reinstatement actually undertaken or to be undertaken;

(b) the costs of preventative measures and further loss or damage caused by preventual measures.²⁹

In terms of this Protocol environmental damage has been referred to as the impairment of the environment.³⁰ According to the Council of Europe Convention on Civil Liability for Environmental Damage of 1993, the 'impairment of the environment' includes the impairment of 'natural resources (both biotic and abiotic), property forming part of the cultural heritage and the characteristic aspects of the landscape.'³¹ In the context of transboundary environmental law, the concept of environmental damage has been referred to as the transboundary impact that includes 'any significant adverse effect on the environment resulting from a change in the conditions of transboundary waters caused by human activity'.³²

2.2.3 Views of Writers

Brownlie is of the view that the concept of damage denotes loss, *damnum*, whether this is a financial quantification of physical injury or damage, or of other consequences of a breach of duty'.³³ As pointed out by Havenga above, the issues pertaining to environmental damage and liability are still under development in various national legal systems and the theory

²⁹ See Glazewski and Sand fn 26 *supra* for a general discussion of this Protocol.

³⁰ *Ibid.*

³¹ Article 2(10). See generally, Shaw fn 24 *supra* at 596.

³² Convention on the Protection and Use of Transboundary Watercourses and International Lakes of 1992.

³³ I Brownlie 'Principles of Public International Law' at 458.

pertaining to the same is insufficient.³⁴ Okowa³⁵ perceives *environmental damage* ‘as harm to things such as air, water, and space, which cannot be appropriated, which are shared and used by everyone, and do not belong to anyone in particular’. He further submits that damage to the environment goes beyond interference by human beings and their property and requires a preservation of the natural order, including non-use values.³⁶ Acks is of the view that the definition of ‘environmental damage’ *varies in each case and is based on the source of the damage*.³⁷ Despite these definitions, Shaw submits that the problems pertaining to general environmental damage that cannot be defined in material form still remains.³⁸

2.3 THE SCOPE OF ENVIRONMENTAL DAMAGE

2.3.1 Introduction

Environmental damage can be divided into several categories based on the source of the damage or the result. Many of these categories overlap because of the principles of causation. In general, the sources of environmental damage include both toxic and non-toxic wastes.³⁹ The most common examples of toxic wastes include among others industrial

³⁴ Havenga fn 21 *supra*.

³⁵ Okowa fn 20 *supra* at 176.

³⁶ Kopp and Smith fn 7 *supra* at 341. Non-use values are defined by the respective authors as ‘component of the value of a natural that does not derive from the in situ consumption of the resource’.

³⁷ K Acks ‘Valuation of Environmental Damages to Real Estate’ (1995) available at: <http://www.damageevaluation.com/text/html/valredi4.htm> accessed on 23 August 2002.

³⁸ Shaw fn 24 at 596.

³⁹ Acks fn 37 *supra*.

chemicals, oil-spills and the mining of asbestos. An example of a non-point source environmental damage is the development of certain industrial areas.⁴⁰ These sources have a serious impact on natural resources, such as land, air, and water.⁴¹ Various damages to the environment also impact on the lives of human beings.⁴² Acks submits that 'the effects upon human beings include diminution of health, of aesthetic pleasures, of appropriate sensory stimulation, and of time'.⁴³ Environmental damage can also cause the extinction of animal and plant species and destroy natural resources forever.

2.3.2 Overview of the Scope of Environmental Damage

The following sub-paragraphs will attempt to provide an evaluation of recent environmental damage cases. Hypothetical scenarios will be used to illustrate central problems addressed in this study.

2.3.21. Toxic Spill in Sicily and Spain

Recently in Sicily about five hundred tons of toxic waste was illegally discharged into the sea. It is alleged that the discharge came from a petrochemical plant situated on the Italian coast.

⁴⁰ J Yeld 'Chapman's toll plaza talks to start' p.10. *Cape Argus*, 24 April 2003. This article is about the proposed development in the Western Cape, the building of a toll plaza on the Chapman's Peak Drive.

⁴¹ Acks fn. 37 *supra*.

⁴² DP Fidler 'International law and Public Health' at 333.

⁴³ *Ibid.*

The discharge of the toxic waste led to the ban of fishing and that the air was mostly covered by smog.⁴⁴

In Spain, a stricken tanker containing 70000 metric tons of heavy fuel oil was reported to have sunk on the northwest coast of Spain.⁴⁵ The tanker was leaking oil and several thousand tons of oil were discharged to the coast. The fears of ecological disaster led to the suspension of fishing along the coastline of Roncudo and Cape Tourinan. According to the report, the damage to the environment is estimated to be double as that of the Exxon Valdez disaster of 1989.⁴⁶

In both these cases a financial compensation to the local fishermen and public at large was promised to be recovered by respective governments from the ship owners.⁴⁷

2.3.2.2 Oil Spill in South Africa

As 'pollution knows no political boundaries',⁴⁸ South Africa has also experienced a similar incident to that of Spain and Sicily. In South Africa an Italian freighter, the Jolly Rubino, sailing from Durban to Mombasa caught fire and sank near the estuary of St. Lucia, a coastline known as habitat of South Africa's largest population of crocodiles and

⁴⁴ 'Toxic Spill Fears in Sicily' p.7, *Cape Times* 24 April 2003.

⁴⁵ 'Stricken Oil Tanker Sinks' BBC News, 19 November 2002. accessed 22 April 2003.

⁴⁶ See generally Volokh *fn.2 supra*.

⁴⁷ BBC News, 19 November 2002. See *fn.45 supra*.

hippos, species of birds and flamingoes.⁴⁹ More than 400 of the 1000 tons of fuel oil had leaked into the water causing severe damage to wildlife.

Despite the estimate of the amount of damage caused to the environmental assets in these cases, the wrong doers were not prosecuted to pay compensation for the loss suffered by the public due to the destruction or damage of the environmental assets. The perpetrators were required amongst other things, to minimize and rectify the damage or degradation caused to the environment.⁵⁰ In the Jolly Rubino case, the owners of the ship were only ordered to clean up the damaged coast or pay cleaning-up costs and no compensation was paid to the fishermen or public for their loss of natural resources.

The above submission suggests a failure and breach of fiduciary duties by trustees⁵¹ of the environment, to recover damages suffered by the public as the result of extinction or degradation of the environmental natural resource. This failure to prosecute and claim compensation from the wrong doers is due to deficiency of laws that provides for compensation to the public for their loss of environmental assets. The

⁴⁸ Glazewski fn 1 *supra* at 630.

⁴⁹ J Whitfield 'Oil Spill Clean-Up Enters a Critical Phase' available at: <http://www.nature.com/nsu> accessed on 12 November 2002.

⁵⁰ Section 28(1) of Act 107 of 1998 (NEMA).

⁵¹ Section 28(5) (e) of NEMA.

lack of expertise to quantify compensation payable to the public also compounds this problem.

The scope of environmental damage is not limited only to toxic substance pollution as described in the above survey. There are other categories that overlap with each other.⁵² The following discussion shall focus on natural resource damage caused by toxic and non-toxic substances.

2.4 NATURAL RESOURCE DAMAGE

2.4.1 General Overview

When compared to other national legal systems, the United States has made significant progress in development of laws pertaining to the prevention and regulation of natural resource damage, including the quantification of such damages. In other states, the laws regulating natural resources are silent about the quantification of and compensation for damages caused to natural resources.⁵³ In public international law there is a lack of theory and regulations in this regard. However, in public international law the law and principles of state responsibility are pre-eminent.⁵⁴

⁵² For example, in the case of development of certain areas environmental damage is caused by toxic and non-toxic substances. See generally Acks fn 37 *supra* and Yeld fn 40 *supra*.

⁵³ For example, South Africa and other African states. See generally Havenga fn 21 *supra* at 196.

⁵⁴ EB Weiss 'Environmental Change and International Law: New Challenges and Dimensions' at Ch.6

2.4.2 National Law Perspectives of Natural Resources Damage

As submitted in the above overview, the United States has played a huge and a significant role in developing laws related to natural resource damage. For example, the Comprehensive Environmental Response, Liability and Compensation Act of 1980 (CERCLA) and Regulation 43 CFR Part II of 1995 as amended by 61 Fed. Reg. 20609 of 7 May 1996, are among the first and prominent Federal Statutes that provides theories and methodologies of assessing and quantifying natural resource damage.

In terms of CERCLA, which is also known in the United States as the Superfund legislation, the natural resource damage is defined as ‘a measurable change in the chemical or physical quality or viability of that resource...’.⁵⁵ The term ‘natural resource’ is very wide in its scope, but *its interpretation is very limited. The wide or flexible interpretation of the term ‘natural resource’ is based on the rationale that an asset becomes or is a natural resource when it has value and benefits for a certain community or society. In strict sense, the term ‘natural resource’ is limited to objects such as land, air and water.*

⁵⁵ Section 11.14 (v)

CERCLA defines natural resources as 'land, fish, wildlife, biota, air, water, groundwater, drinking water supplies, and other resources...'.⁵⁶

James Peck submits that, 'natural resources are ...thought of as the individual elements of the natural environment that provide economic and social services to human society'.⁵⁷ The United States Department of Energy defines resource services as 'physical and biological functions performed by the natural resources, including human uses of those services and services to other resources and ecosystems'.⁵⁸ The resources include amongst others, the habitat, food, recreation, aesthetic value, drinking water, flood control and waste assimilation.⁵⁹

The above overview provides us with a clear exposition of the impact of natural resource damage on human activity. In this regard Acks⁶⁰ submits that damage to natural resources affect the sale value of properties. The courts have also recognized⁶¹ the effect of natural resource damage on property values and have in the various claims brought before it, made awards for compensation for damages suffered as the result of natural resource damage.

⁵⁶ Section 101(16). See FSF Sitzgerald, L Carroll *et al* 'Developments – Toxic Waste Litigation' (1986) Vol.99 Harvard Law Review 1458 at 1565.

⁵⁷ 'Measuring Justice for Nature: Issues in Evaluating and Litigating Natural Resources Damage' (1999) *Journal of Land Use & Environmental Law*. Also available and accessed on 20 September 2002 at: <http://www.law.fsu.edu/journals/landuse/vol142/peck.1.html>

⁵⁸ 'Natural Resource Damages under CERCLA' *The CERCLA Information Brief*. EH-231-017/0693 (June 1993). Available and accessed on 9 October 2002 at: <http://tis.eh.doc.gov>.

⁵⁹ *Ibid.*

⁶⁰ Acks fn 37 *supra*.

⁶¹ *Bixby Ranch Co v. Spectrol Electronics Corp*, Index No.BC052566 (Cal. LA Co. Sup.Ct.13 Dec 1993)

As stated in the above discussion, South African environmental law is still in a rudimentary state of development when it comes to the control of environmental natural resource damage.⁶² The National Environmental Management Act (NEMA) has failed to define and to make reference to environmental natural resource damage. The act refers to 'pollution or degradation'⁶³ of the environment and the meaning of these concepts is not clearly defined in Section 1 of the act as environmental damage. Pollution is defined in Section 1 as a change in the environment and the section fails to define degradation.

In the Oxford dictionary, degradation has been literally defined as 'reduction.'⁶⁴ This failure to define environmental damage presents a problem in natural resource damage litigation. The problem is that the act refers only to reduction or change of environmental assets and not to environmental assets that have been destroyed or damaged. The notion created by NEMA is that compensation will only be payable for environmental assets that have been changed or reduced. The act should provide a reference and distinction between environmental assets that are merely damaged (degradation or pollution) and those that are lost (destroyed). Even though Boberg's definition of damage has been criticized,⁶⁵ it is the most suitable definition that we have.

⁶² Havenga fn. 21 *supra*.

⁶³ Section 28(1) of NEMA.

⁶⁴ The Pocket Oxford Dictionary (1992) at 224.

⁶⁵ Havenga fn 21 *supra*.

Boberg defines damage as ‘...loss or diminution in the estate of the plaintiff.’⁶⁶ This definition refers to change or degradation (diminution) and destruction or damage (loss).

2.4.2 International Law Perspectives of Natural Resources Damage

The concept of natural resources damage in international law is not entirely different to that of domestic laws mentioned in the above survey.⁶⁷ In public international law, there are certain kinds of natural resources that are treated and regulated distinct from the others based on international law principles. For example, we have natural resources that fall under or within the jurisdiction of the sovereignty of the state and those located beyond the boundaries of natural jurisdictions.⁶⁸ In the context of public international law we shall evaluate those that are common both locally and globally in relation to the principle of a common interest of mankind.⁶⁹

2.4.2.1 Common Concern of Mankind

The global environmental change is not only a matter of concern among the states affected by such change, but it is a matter of concern for the entire international community, a common concern of all humans.⁷⁰

⁶⁶ PQR Boberg *The law of Delict Aquilian Liability* Vol.1 at 475.

⁶⁷ Section 101(16) of CERCLA fn 55 *supra*.

⁶⁸ For example, the Antarctica, high seas or deep sea-bed and outer space are treated distinctively from other natural resources.

⁶⁹ P Konz ‘Law and Global Environmental Management: some Open Issues’ in EB Weiss ‘Environmental Change and International Law: New Challenges and Dimensions’ Chapter 6.

⁷⁰ *Ibid*.

Peider Konz submits that the principle of common interest of humans is based on ‘a general recognition that humankind has a common interest in protecting and managing the climate system, the ozone layer, the rain forests, and biological diversity for both present and future generations’.⁷¹

In the context of international laws pertaining to natural resources, the above mentioned principle has been affirmed in United Nations (UN) Resolutions and in a number of Conventions. For instance, the UN General Assembly recognizes that climate change is a common concern of human kind, since it is an essential condition that sustains life on earth.⁷² In its preamble, the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) provides that ‘wild fauna and flora in their beautiful and varied forms are an irreplaceable part of the natural systems of the earth which must be protected for this and the future generations to come.’⁷³

2.4.2.2 Damage to the Global Common

The concept of global common refers to three vast areas that cannot be related to the sphere of any sovereign state, or ‘to the interest of its citizens.’⁷⁴ These areas are protected under customary international law

⁷¹ *Ibid.*

⁷² Resolution 43/54 of UN General Assembly (43rd Session). See generally Weiss fn.69 *supra*.

⁷³ See also preamble and Article 4 of the Convention for Protection of the World Cultural and Natural Heritage of 1973.

⁷⁴ See examples in fn 55 *supra*.

and treaty law.⁷⁵ For example, the Antarctic is protected amongst other *treaties and conventions by the Convention for the Regulation of Antarctic Mineral Resource Activities of 1988 and The Antarctic Treaty of 1959.*

The damage to these environmental assets is highly contested in public international law. For example, the issues pertaining to responsibility and compensation for damages to the global commons has been regarded as one of the major problems in international law.

2.4.2.3 Damages to the Local Commons

The concept of local commons has not received much attention nor been satisfactorily defined in international law and has been dealt with in various national laws. Weiss submits that it is to be found in private law and it refers to damage caused to the atmosphere, land and waters of a particular state.⁷⁶

In some countries like South Africa the legal liability and compensation for damage to these environmental assets is still under development.⁷⁷

However, the states have an international law obligation to protect and

⁷⁵ FO Vicunna 'States's Responsibility, Liability and Remedial Measures under International law: New Criteria for Environmental Protection' in Weiss fn 69 *supra* at Chapter 5.

⁷⁶ 'Environmental Change and International Law: New Challenges and Dimensions' fn 65 *supra*.

⁷⁷ Havenga fn 21 *supra*.

conserve these resources for the present and future generations.⁷⁸ Weiss submits that it is through this obligation that states are required to enact laws regulating and protecting natural resources.⁷⁹

2.4.4 Ownership of Environmental Natural Resources

2.4.4.1 Overview

As submitted in the above discussion, there are two kinds of environmental natural resources, those falling within the limits of the state's national jurisdiction and those outside the sovereignty of the state. The issues pertaining to the ownership of these resources are coherent. The following discussions will focus on the evaluation of ownership of these natural resources.

2.4.4.2 Ownership of Natural Resources: National law Perspectives

It is considered that natural resources are held in 'public trust' by designated trustees.⁸⁰ These trustees are often duly appointed persons of the community or the state where the natural resource is situated.⁸¹ For example in some countries like the United State and South Africa, the State and possibly traditional leaders and non-governmental

⁷⁸ Weiss fn 69 *supra*.

⁷⁹ *Ibid*.

⁸⁰ T Penn ' A Summary of the Natural Resource Damage Assessment, Regulation under the United States Oil Pollution Act' Available at: <http://www.europa.eu.int/> accessed on 09 September 2002.

⁸¹ *Ibid*.

organizations are authorized to act as trustees on behalf of the public in environmental natural resource damage protection and litigation.⁸²

In South African law it is submitted that the doctrine of public trust was first introduced into statutory regime by the National Water Act of 1998 (NWA).⁸³ Section 3(1) of the NWA provides that ‘as the public trustee of the nation water resources, the National Government, acting through the Minister, must ensure that water is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner, for the benefit of all persons and in accordance with its constitutional mandate’. It can be inferred that in terms of NWA, the National Government of South Africa is the trustee of water resources such as the coastal lines, sea-bed, inland waters and fish in all South African rivers.

This doctrine is also expressed in the National Environmental Management Act of 1998 (NEMA), National Heritage Act of 1999 and in the Minerals Development Bill of 2000.⁸⁴ Section 2(4) (o) of NEMA provides that ‘the environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people’s common heritage’.⁸⁵

⁸² For example, Section 101 (16) of CERCLA provides that Government of United State (Department of Interior) is the trustee of the environmental natural resources. Section 28(5) (e) of NEMA provides that ‘...State fulfilling its role as custodian holding the environment in public trust for the people’.

⁸³ PGW Henderson ‘Some Thoughts on Distinctive Principles of South African Law’ (2001) 8 *SAJELP* at 171- 73.

⁸⁴ See general discussion of Clause 3 of Minerals Development of 2000 and Section 5(1) (b) of the National Heritage Resources Act 25 of 1999 in D Barnard ‘Environmental Law for All’ at 41-44 and 265.

⁸⁵ See also Section 28(5) (e) of NEMA at fn 82 *supra*.

It can be assumed that in terms of Section 24 of the Constitution⁸⁶ and *the national legislations mentioned in the above, the ownership of South African environmental natural resources is vested to the people of South Africa.*

2.4.4.3 Ownership of Natural Resources: Public International law

In public international law the World Heritage Convention 49 of 1999⁸⁷ is amongst the significant laws that provide a clear exposition of the doctrine of 'public trust'. Article 4(1) (o) of this convention provides that 'the Cultural and natural heritage is held in public trust for the people...'. In public international law, the ownership of the environmental natural resources is based on the distinction between local and global commons.

The ownership of local commons is based on the principles of sovereignty of the state where the natural resource is situated. As submitted in the above survey, the global commons fall outside the national jurisdiction of the state's sovereignty and the international community as a whole (*erga omnes*) has an obligation to protect and conserve global commons for present and future generations.⁸⁸

⁸⁶ Act 108 of 1996.

⁸⁷ Section 4(1) (o) provides that, 'the cultural and natural heritage is held in public trust for the people...'

⁸⁸ *Case Concerning Barcelona Traction, Light and Power Company, Ltd (Belgium v. Spain)* 1970 ICJ. 4.

It can be assumed that the ownership of natural resources in public international law is vested in the international community and national governments are regarded as guardians or custodians or trustees.⁸⁹ For example, the Draft Convention on the Conservation and Sustainable Use of Biological Diversity of 1990 stipulates that the states are guardians to conserve biological diversity. It provides in Article 2 that ‘...Parties accept as a fundamental principle that biological diversity is a heritage of humankind and, where located within the limits of national jurisdiction, is under the sovereignty of the state where it is located ...states have the duty of guardianship of biological diversity, in time and space’.

2.5 NATURAL RESOURCE DAMAGE LITIGATION

2.5.1 Background

In international environmental law, it is a recognized principle and obligation that the activities in one country’s territory should not cause harm to the interests of other states.⁹⁰ This principle and obligation was clearly articulated and extended in the *Corfu Channel* decision.⁹¹ In this case the court held that states have an international law obligation ‘not to allow knowingly its territory to be used for acts contrary to the rights of the other state’.⁹²

⁸⁹ EB Weiss ‘The Planetary Trust: Conservation and Intergenerational Equity’ (1984) 11 *Ecology Law Quarterly Review* at 495.

⁹⁰ Glazewski *fn.1 supra* at 711.

⁹¹ *United Kingdom v. Albania* 1949 ICJ.

⁹² *Idem* at 4 and 22.

The breach of this obligation and principle⁹³ under international law places a responsibility on the infringing state to reinstate the original position or to pay compensation for loss suffered.⁹⁴ However, the loss or injury suffered needs to be ‘established by clear and convincing evidence’.⁹⁵ The onus of proof, as in the tort system of liability and law of delict, is on the plaintiffs to prove loss or injury and compensation.

2.5.2 Legal Standing (*Locus Standi*)

It is trite law that prior to any litigation, it must be determined whether the person or the people are entitled to bring the proceedings that are proposed.⁹⁶ In law, this is known as the legal standing (*locus standi*) to institute the proposed action. Bockrath defines legal standing as an individual’s (and the collective) right to judicial determination of a controversy.⁹⁷

In the context of international environmental law, this involves a number of questions. Amongst these questions, is the question of legal standing in natural resource damage litigation. Preston submits that the test for

⁹³ ‘that no state has the right to permit use of territory in such a manner as to cause injury by fumes in or to the territory of another or properties or persons therein...’ see: *Trail Smelter Arbitration (US v Canada)* 35. AJIL 1941 at p. 716.

⁹⁴ Article 1 of the Report on ‘Responsibility and Liability Under International Law for Environmental Damage’ (1998) 10 *The Goerge Town International Environmental Review*. See general discussion of this available at: http://www.law.georgetown.edu/journals/gielr/v10n2_ii.html.

⁹⁵ *Trail Smelter Arbitration (US v Canada)* at 716.

⁹⁶ BJ Preston ‘Environmental Litigation’ at 5.

⁹⁷ J Bockrath ‘Environmental Law for Engineers, Scientist & Managers’ at 8.

legal standing varies depending upon the nature of the proceedings and it is based either at common law or under statute law.⁹⁸

2.5.2.1 National law Perspective of Legal Standing

In most countries like South Africa, the legal basis for compensation of natural resource damage is still uncertain and unresolved. However it can be assumed by virtue of Section 38 (read with Section 24) of the Constitution Act 108 of 1996, interested parties have a legal standing to institute proceedings for environmental damage.⁹⁹ Section 38 focuses on the enforcement of rights contained in chapter 2 of the Bill of Rights. In terms of this section, the following persons have *locus standi* to approach a competent court for appropriate relief, when one or more of their rights contained in the Bill of Rights have been infringed or are being threatened:

- a) anyone acting in their own interest;
- b) anyone acting on behalf of others who cannot act in their own name;
- c) anyone acting as a member of, or in the interest of, a group or class of persons;
- d) anyone acting in the public interest; and
- e) an association acting in the interest of its members.¹⁰⁰

Section 24 of the Bill of Rights provides everyone a right to an environment that is not harmful to their health and well-being. The section provides further that everyone has the right 'to have their

⁹⁸ Preston fn 96 *supra*.

⁹⁹ South African Constitution Act 108 of 1996.

¹⁰⁰ *Idem* at Section 38(a)–(e).

environment protected, for benefit of present and future generations, through reasonable legislative and other measures that:

- prevent pollution and ecological degradation;
- promote conservation; and
- secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development'.¹⁰¹

The abovementioned section substantiates the rationale that anyone listed in that sections, has *locus standi* to institute action for damages caused to the environment. It can also be assumed that the people of South Africa can, by virtue of sections 38 and 24 (b) institute action against its Government for its failure to effectively and successfully prosecute environmental crimes or to enact laws regulating the protection of the environment damage. As submitted earlier in this paper, South African law is still in a rudimentary state of development in this regard.¹⁰²

In the United State and in response to public concern over environmental damage caused by the release of hazardous substances into the environment, the Congress enacted the Comprehensive Environmental Response, Liability and Compensation Act of 1980 (CERCLA).¹⁰³ The *Superfund Legislation (CERCLA) as amended by Superfund Amendments*

¹⁰¹ Section 24 (b) (i)–(iii).

¹⁰² P Havenga fn.21 at 202.

¹⁰³ 42 U.S.C. §9601-9657.

and Reauthorization Act of 1986 (SARA) was enacted to deal with the threats posed by abandoned hazardous wastes sites and hazardous substance release in general.¹⁰⁴

In terms of Section 11 (10), CERCLA is applied in assessing natural resource damage resulting from the discharge of oil or hazardous substances covered under the United States' Clean Water Act of 1990. However, environmental damage litigation is not only limited to this Act. In most cases, claims for natural resource damage due to oil spills are filed under various Federal Statutes such as the Oil Pollution Act of 1990.¹⁰⁵

In terms of Section 11 (14) (d) of CERCLA, the international law communities are not barred to bring claims on the basis of CERCLA. However the Superfund provides and requires a litigant, who in terms of the Act is considered to be an 'authorized official'. In terms of CERCLA, a litigant is an 'authorized official' when the public he purports to hold the natural asset or resource in trust for duly appoints him or her.

¹⁰⁴ See Kopp & Smith, fn.2 at 1-2. And also the Final Report of Workshop on 'Marine Pollution Environment Damage Assessment.' By. V Kerry Smith, available at [http://yosemite.epa.gov/ce/cpa/cermfile.nsf/VWAN/EE-0121-01.pdf/\\$File/EE-0121-01.pdf](http://yosemite.epa.gov/ce/cpa/cermfile.nsf/VWAN/EE-0121-01.pdf/$File/EE-0121-01.pdf) accessed on 2 October 2002.

¹⁰⁵ Kopp and Smith fn.2 *supra* at 2.

CERCLA does not only grant the designated trustee with litigation powers. It also requires a trustee to perform certain duties commencing at the preliminary stages of assessment of damages, until the completion of the claim. The designated trustees have amongst other duties in preparing for litigation, an obligation to ‘determine natural resources injuries, assess natural resource damages (including the costs of assessing damages), present claims, recover damages, and develop and implement plans for restoration, rehabilitation, replacement, or acquisition of the equivalent of the injured natural resources under trusteeship’.¹⁰⁶

As submitted in the above survey, the question of environmental damage litigation is most significant because it is often not the person who is harmed by the allegedly unlawful action who desires to bring the claim; rather it is a ‘public interest’ group which may not itself have been injured by the wrongdoing.¹⁰⁷ In public international law, these claims or actions are brought by the states’ governments on behalf of its nationals.¹⁰⁸

2.5.2.2 Public International Law Perspectives of Legal Standing

In public international law, the issue of legal standing is not highly contested as compared to national law. In international law, *locus standi*

¹⁰⁶ ‘Natural Resource Damage Assessment (NRDA) Regulations’ accessed on the 14 August 2002 at <http://www.gomr.mms.gov/homepg/regs/laws/nrda.html>

¹⁰⁷ J Bockrath fn 94 *supra* at 7.

¹⁰⁸ For example, the United States Government act as the trustee of the environment.

is often determined by certain principles of state responsibility, national jurisdiction and sovereignty of the state.

States' responsibility is recognized by legal doctrine and jurisprudence of relatively recent date and as well by some treaties dealing with potential hazardous activities.¹⁰⁹ Article 192 of the Law of the Sea Convention of 1982 provides that 'states have obligation to protect and preserve the marine environment'. Shaw submits that the breach of this duty enables the infringed state to maintain a claim against the violating state, whether by way of diplomatic action or by way of recourse provided in treaties or customary international law.¹¹⁰

Weiss is of the view that the responsibility of state in international law is in principle primary and direct (or subsidiary).¹¹¹ States responsibility is primary when the claimant state is representing damage to persons and property within its jurisdiction. A subsidiary or direct state's responsibility is assumed under treaty law. The legitimation or *locus standi* to present claims under public international law remains a state-to-state litigation.

¹⁰⁹ For example, the Trail Smelter arbitration, *Corfu Channel* case and Law of the Sea Convention of 1982.

¹¹⁰ Shaw fn 24 *supra* at 590.

CHAPTER 3

ASSESSMENT OF ENVIRONMENTAL DAMAGE

3.1 INTRODUCTION

In order to proceed with a detailed evaluation of the damage caused to environmental natural resources, the trustee(s) must have reasonable prospects of recovering the damages.¹¹² The reasonable prospects of *recovering the damage caused can be established by adoption of a process called Natural Resource Damage Assessment (NRDA).*¹¹³ The NRDA is a process whereby a natural resource trustee may pursue compensation on behalf of the public for injury to natural resources resulting from the release of hazardous substances.¹¹⁴

3.2 THE NATURAL RESOURCES DAMAGE ASSESSMENT PROCESS

Section 301(c) of CERCLA makes provision for the promulgation of natural resource damages assessment regulations. The regulations provide guidelines for the assessment of

¹¹¹ Weiss fn 69 *supra*.

¹¹² Kopp & Smith fn 7 *supra* at 124-126.

¹¹³ Charles.M. Denton 'Natural Resources Damages Assessments and Claims in the Great Lakes Basin' Available at: <http://www.bodmanlongley.com/a-013002.htm> accessed on 15 October 2002. See also, Report of the Natural Resource Damages Subcommittee (July 21, 2000) 'Alternatives for Assessing Injuries to Natural Resources at the Tar Creek Superfund Site' by Governor Frank Keatings, available at: <http://www.osc.state.ok.us/documents/tarck/NRDASubcommitteeFinalReport.pdf> accessed on 9 October 2002.

¹¹⁴ See the US Department of Energy Information Brief 'Natural Resource Damages Under CERCLA' Available at: <http://www.tis.eh.doe.gov> accessed on 9 October 2002.

natural resource damages from oil spills and hazardous substances.¹¹⁵ In the United States, the Department of the Interior (USDO I) was given the authority to develop the regulations and procedures for the assessment of damages. In terms of CERCLA the USDO I was instructed to develop two types of procedures. Section 301(c)(2) of CERCLA specified that these regulations ‘shall identify the best available procedures to determine such damages, including both direct and indirect injury, destruction or loss and shall take into consideration factors including, but not limited to, replacement value, use value, and ability of ecosystem or resource to recover’. CERCLA also provides that damage assessments developed using these regulations will create a rebuttable presumption of accuracy.¹¹⁶

These two types of procedures are Type A and Type B assessments. Type A provides for simplified and standardized assessments requiring a minimal field of observation. Type A also deals exclusively with damage assessment involving injury to coastal and marine environment.¹¹⁷ However, potentially responsible parties are given the option to request and use Type B assessments even when Type A procedures are applicable.¹¹⁸

The Type B assessments are not exclusive and they ‘include alternative protocols for conducting assessments in individual cases to determine the type and extent of short and long

¹¹⁵ ‘Natural Resource Damage Assessment (NRDA) Regulations’ available at: www.gomr.mms.gov/homepg/regs/laws/nrda.html accessed on 14 August 2002.

¹¹⁶ VK Smith ‘Marine Pollution and Environmental Damage Assessment’ available at: [http://www.yosemite.gov/cc/cpa/ceermfile.nsf/vwAN/EE-0121-01.pdf/\\$File/EE-0121.pdf](http://www.yosemite.gov/cc/cpa/ceermfile.nsf/vwAN/EE-0121-01.pdf/$File/EE-0121.pdf) accessed on 2 October 2002

¹¹⁷ *Ibid.*

¹¹⁸ *Ibid.*

- Quantifying the effects of this injury on the human uses of the services provided by these resources, and
- Determining natural resource damages.¹²²

The USDOJ's Regulations provide the trustees procedural steps and criteria for selecting methodologies to determine resource injury. The regulations mandate that the assessment process be performed at a reasonable cost.¹²³ In terms of the regulations, the costs of assessment of damages are reasonable when the 'injury, quantification and damage determination phases have well-defined relationship to one another and are coordinated and the increment of extra benefits obtained by using a more costly injury, quantification, or damage determination methodology are greater than the cost of that methodology'.¹²⁴ However, it is submitted¹²⁵ that certain factors have to be established prior to the implementation of the assessment activities. The following information is considered crucial in warranting the assessment process:

- When and where the damage occurred. This information refers to the characterization of environmental setting.¹²⁶
- Identify the products that led to the injury. For example, oil spill or hazardous substances.¹²⁷

¹²² *Ibid.*

¹²³ *Ibid.*

¹²⁴ Title 43: Part II of 'Natural Resource Damage Assessments' Regulations of USDOJ available at: http://www.accessed.gpo.gov/narac/vcfr/waisidx_98/43cfr11_98.html accessed on 15 October 2002.

¹²⁵ 'Framework for Environmental Damage Assessment and Restoration' available at: <http://www.ns.ec.gc/emergencies/edf.html> accessed on 13 September 2002.

¹²⁶ *Ibid.*

¹²⁷ *Ibid.*

- Identify the volume of injury to the environment and whether the assessment process is merited.¹²⁸

The Type B assessment is made up of three subparts that provide key methodologies for assessing environmental damage and these shall be discussed in the following paragraphs.

3.2.2.1 The Preassessment Process

This process is referred to in the USDOJ's regulations as Subpart B of the assessment process and it is provided in Section 11(23) of the regulations¹²⁹ issued under Section 301(c) of CERCLA. The secondary object of Subpart B is to set out procedural steps for initiating the damage assessment process and to provide a preliminary assessment of future impacts.¹³⁰ The primary or main objective is to determine whether the identified discharge or release warrants¹³¹ the assessment process.

The process (preassessment) encompasses notification and coordination activities and also the preassessment screen.¹³² The notification process refers to the process of informing the parties involved and the coordination of activities refers to the gathering of information that warrants the assessment process.¹³³

¹²⁸ Charles M Denton 'Natural Resource Damage Assessments and Claims in The Great Lakes Basin' available at: <http://www.bodmanlonglev.com/a-0134002.htm> 16 October 2002

¹²⁹ See fn 121 *supra*.

¹³⁰ VK Smith 'Marine Pollution and Environmental Damage Assessment' available at: [http://www.yosemite.epa.gov/ce/epa/eermfile.nsf/vwAN/EE-0121-01.pdf/\\$Dilc/EE-0121-01pdf](http://www.yosemite.epa.gov/ce/epa/eermfile.nsf/vwAN/EE-0121-01.pdf/$Dilc/EE-0121-01pdf) accessed on 2 October 2002.

¹³¹ Kopp & Smith fn 7 *supra* at 124.

¹³² Section 11(23) (a) of the USDOJ Regulations.

¹³³ See generally 'Framework for Environmental Damage Assessment and Restoration' fn 104 *supra*.

The preassessment screen determines whether the assessment should proceed. The decision of the preassessment screen to proceed is based on the following determination¹³⁴ by the trustees of the harmed environment:

- Whether the discharge or release is covered under the relevant sections of CERCLA;
- Whether the discharge or release has injured an environmental asset under the jurisdiction of the trustee instituting the action for recovery of damages;
- And whether the methodology for quantification of the harm caused to the environmental asset can be obtained at a reasonable cost?

The preassessment screen can be summarized to require the determination of the nature, extent of the injury, human uses of the injured environmental assets and likelihood that a damages action will be successful.¹³⁵ The results of the above-mentioned phase is the issuing of a notice¹³⁶ of intent to conduct a restoration plan.¹³⁷ However, if the *requirements and conditions set out in the above are not met as in terms of Section 11 (23) of the regulations*, the following stages of assessment are not warranted.¹³⁸

¹³⁴ Section 11(23) (e) (1) –(5).

¹³⁵ Smith fn 130 *supra*.

¹³⁶ The notice constitute a document which must be made available to the public and such document must provide for the basis of decision to conduct the assessment or to proceed to the next stage. See T. Penny on 'Summary of the Natural Resource Damage Assessment Regulations Under the United States Oil Pollution Act' available at: <http://www.europa.eu.int> accessed on 9 October 2002

¹³⁷ APBS&J Publication 'Summary of Natural Resource Damage Assessment Final Rule' (15 CFR Part 990) available at: <http://www.pbsj.com/publications/pdf/nrdasam.pdf> accessed on 15 October 2002

¹³⁸ Section 11 (23) provides that the trustee shall as the requirement of the assessment process, complete a preassessment screen and make a determination as to whether an assessment must be carried out.

3.2.2.2 Assessment Plan (Restoration Planning Phase)

Subsequent to the decision made in the preassessment, but before assessment of damages, the litigants (trustees of the injured resource) are required to formulate an assessment plan in accordance with Section 11 (31) of the regulations. The procedures to develop the assessment plan are set out in Subpart C of title 43 of the USDOJ regulations.

Section 11(31) requires from the trustees to establish a plan identifying all methodologies to be used in the assessment process and to determine whether the proposed assessment approach will be cost effective. The trustees are also expected to determine the quantification methods to be used in measuring the damage.¹³⁹

The assessment plan or restoration-planning phase includes components, such as the:

- a) injury assessment; which entails quantification of degree and spatial and temporal extent of injury to natural resources, translation of injury to reduction in service provided by the resources and the amount of services lost. This assessment is also perceived as the conceptual approach to injury quantification and will be discussed in chapter 4 of this study;
- b) and restoration selection which includes determining factors such as the sensitivity and vulnerability of the injured resource or service.¹⁴⁰

¹³⁹ Section 11 (35) (a) provides that the trustees of the resource injured can 'select the lesser of:
1) restoration or replacement costs or 2) diminution of use values as the measure of damages'.

This is a very important stage of quantification and it is regarded as the most burdensome stage for the trustees of the natural resource. The trustees are required in this phase to determine the injury and to ensure that the injured asset falls within the scope of the definition¹⁴¹ of injury. This requirement refers to what is called injury assessment.¹⁴² *The goal of injury assessment is to determine the nature and extent of the injuries to the natural resource.* Once the trustees have determined the injury, they must quantify the degree, spatial and temporal extent of the injury.

The second requirement in the restoration process is that the trustee must select a restoration plan that is adequate for the public and the environment.¹⁴³ The restoration actions can be either primary or compensatory.¹⁴⁴ The restoration plans and alternatives are selected and evaluated according to cost and success criteria and developed into a Draft Restoration Plan for public scrutiny.¹⁴⁵ After the public has reviewed and commented on the draft plan, the trustees present the plan to the responsible parties (the defendants in the main action) for funding and implementation.

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¹⁴⁰ See generally, 'Framework for Environmental Damage Assessment and Restoration' fn 104 *supra*.

¹⁴¹ Section 11(14) (v) of the Regulations defines injury as 'an observable or measurable adverse change in a natural resource or impairment of natural resource service.' See also 'Summary of Natural Resource Damage Assessment Final Rule (15 CFR Part 990) available at: <http://www.pbsj.com/publications/pdf> accessed on 12 October 2002.

¹⁴² *Ibid.*

¹⁴³ *Ibid.*

¹⁴⁴ A restoration action is primary when recovery is aimed at 'returning the injured asset to its baseline on an accelerated time frame / restoration is compensatory when the main action is aimed at compensating for interim losses of natural resource and services pending recovery.' See PBS&J Publication at fn.137 *supra*.

¹⁴⁵ *Ibid.*

3.3 METHODS AND IMPLEMENTATION OF ASSESSMENT PROCESS

After all plans and sketches of the damage assessment have been delivered to the interested parties, Subpart E ¹⁴⁶ of the regulation comes into play. This subpart of the regulations deals with the actual implementation of Type B assessments and lays out the steps to be followed by the trustees for choosing and implementing alternative methodologies for the three major phases in damages assessments process. These important phases are injury determination, service reduction quantification and the estimation of damages.

The injury determination ¹⁴⁷ involves an assessment of the occurrence and *determination of injury results based on the nature and upon the ‘exposure pathway of the injury’*. ¹⁴⁸ The injury determination phase is provided in section 11(61), which provides general introduction of the injury determination, Section 11(62) defines the injury to natural resources and Section 11(63) which provides for the exposure pathway. The service reduction quantification ¹⁴⁹ and estimation or quantification ¹⁵⁰ of damage process follows the injury determination phase and will be discussed in the following chapter of this study.

¹⁴⁶ See. Section 11(60)-(84) of the Regulations.

¹⁴⁷ *Idem*, Section 11(61).

¹⁴⁸ *Ibid*.

¹⁴⁹ *Idem*. at Section 11(71).

¹⁵⁰ *Idem*, at Section 11(70)

CHAPTER 4

QUANTIFICATION AND RECOVERING OF DAMAGES

4.1 INTRODUCTION

Pollution, in general, can cause damage to natural resource systems that are valuable though unpriced in the markets.¹⁵¹ Bennagen¹⁵² submits that, 'the harmful effects of pollution are not considered by the polluter in decision-making, thus creating excessive environmental externalities'. According to Barnard,¹⁵³ the term 'externalities' refers to the so-called external costs, spillovers or social costs.¹⁵⁴

To estimate the externalities generated by pollution or hazardous substances, it is necessary to develop economic measures of values¹⁵⁵ of the environmental and resource services¹⁵⁶ provided by the affected resource system.

Oil and mining pollution have historically been recognized as major sources of degradation of natural resource systems such as river, coastal, land and air.¹⁵⁷

¹⁵¹ MA Eugenia C. Bennagen 'Estimation of Environmental Damages From Mining Pollution: The Marinduqu Island Mining Accident' available at: <http://www.cepsea.org/publications/research1/ACF104.html> accessed on 13 August 2002.

¹⁵² *Ibid.*

¹⁵³ D Barnard 'Environmental Law for All' at 101.

¹⁵⁴ For example, Oil Pollution.

¹⁵⁵ Refers to the 'monetary value for a good or service.' See Kopp & Smith fn 7 at 338.

¹⁵⁶ *Idem* at 313

¹⁵⁷ See Bennagen fn.151 *supra*.

Although much of the world depends on the production or the trade of oil to upgrade its economies, these activities are causing severe harm¹⁵⁸ to the environment. For example, it is submitted that every year in Canada over 20 000 spills or release of oil into the environment and chemicals are reported.¹⁵⁹

More recently in South Africa, a ship (known as the *Jolly Robino*) carrying loads of oil caused a spill over the most important wetland in the KwaZulu-Natal Province.¹⁶⁰ This confirms the rationale that detailed studies are required to adequately measure the extent of the damages and to quantify the environmental impacts.¹⁶¹ In the South African context, this view is supported by the National Environmental Management Act 107 of 1998 (NEMA), which replaces the environmental management section of the Environmental Conservation Act 100 of 1982.¹⁶² Section 2(4)(i) of NEMA provides that, 'the social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriated in the light of such consideration and assessment'.

In international environmental case law, the *Amo Cadiz*¹⁶³ oil spill case of 1978 is a clear example that models the need for adoption of methods for valuation of

¹⁵⁸ For example, oil production, transportation, spillovers, dumping can disrupt the human population, animal species and can cause havoc on the surrounding wildlife and habitat. See W. Corbett Dabbs 'Oil Pollution and Environmental Damage' available at: <http://www.american.edu/ted/projects/tederos/oilprhtm#1> accessed on 13 September 2002.

¹⁵⁹ See: 'Framework for Environmental Damage Assessment and Restoration' available at: <http://www.ns.ec.gc/emergencies/cdf.html> accessed on 13 September 2002.

¹⁶⁰ J Whitfield 'Oil Spill Clean-Up Enters Critical Phase' (18 September 2002) available at: <http://www.nature.com/nsu/020916/020916-6.html-21k> accessed on 12 November 2002. See generally *fn44 supra*.

¹⁶¹ See *fn. 121 supra* for a general discussion.

¹⁶² Barnard *fn 166 supra* at 101.

¹⁶³ In *Re Oil Spill of 'Amo Cadiz'* 669 F 2d 909 (17th Cir. 1987).

environmental natural resource damage. This case concerns an oil spill which affected more than two hundred kilometres of French coastline and adjacent near-shore waters. In response to the oil spill, as trustees of the coastline and seashores, the French state and local governments (communes) submitted claims for damages caused to unowned natural resources. The claim was as an 'attempt to evaluate the species killed in the intertidal zone by the oil spill and to claim damages in accordance with that value determination.'¹⁶⁴ The case was rejected by the United States court, which decided the case purely on the basis of French law because the resources claimed to have been damaged were subject to the principle of *res nullius* and not compensable for lack of standing of any person or entity to claim thereof.¹⁶⁵ The court in its finding, found that neither the French government nor the communes has legal standing to assert claims for damages to any ecosystem or natural resources. This case does not only indicate the problems associated with legal standing as to unowned assets, but also indicates the need¹⁶⁶ for national and international courts of justice to acknowledge that there is a need to develop the law of natural resource damage.

4.2 QUANTIFICATION OF NATURAL RESOURCES DAMAGE

4.2.1 An Overview

Environmental injury quantification has been defined as the 'process by which trustee(s) determine the degree of both spatial and temporal extent of injuries relative to

¹⁶⁴ EHP Brans 'Liability for Damage to Public Natural Resources Standing, Damage and Damage Assessment' available at: <http://www.dundee.ac.uk/cemlp/journal/html> accessed on 27 June 2002.

Available also at: <http://www.wkap.nl/prod/b/90-411-1724-5> accessed on 29 June 2002.

¹⁶⁵ *Ibid.*

¹⁶⁶ Barnard fn 162 *supra* at 347.

baseline'.¹⁶⁷ The degree of damage can be expressed as percentage mortality, *proportion of species, community or habitat affected, extent of oiling and availability of substitute resources.*¹⁶⁸ The spatial extent of damage refers to the quantification of total area or volume of the harm and the temporal extent (or duration) of injury refers to the total length of time that the natural resources and services have been adversely affected. The temporal extent of damage starts at the time of injury of environment and continues until such time that the resources and services return to their baseline.¹⁶⁹ The purpose of *the quantification of environmental natural resource damage is to quantify the effect of discharge or release onto the injured natural resource asset for use in determining appropriate amount of compensation.*¹⁷⁰

4.2.2 Conceptual Approaches to the Quantification of Natural Resources

It is generally considered that there are two conceptual approaches to quantification of environmental harm.¹⁷¹ The two conceptual approaches of quantification of harm to environmental natural resources are the anthropocentric (or utilitarian) approach and the biocentrism (intrinsic values) approach.¹⁷² These approaches are not mutually exclusive,¹⁷³ but they often assign different values over the same asset in similar incidents.

¹⁶⁷ 'Summary of Natural Resource Damage Assessment Final Rule (15 CFR Part 990) available at: <http://www.pbsj.com/publications/pdf/nrdasam.pdf> accessed on 9 September 2002.

¹⁶⁸ *Ibid.*

¹⁶⁹ *Ibid.*

¹⁷⁰ Section 11(70)(b) of the USDOJ Regulations: Title 43.

¹⁷¹ J Peck 'Measuring Justice For the Nature: Issues in Evaluating and Litigating Natural Resources Damages' available at: <http://www.law.fsu.edu/journals/landuse/vol142/peck1.html> accessed on 01 August 2002.

¹⁷² *Ibid.*

¹⁷³ *Ibid.*

4.2.2.1 Anthropocentric Approach

Anthropocentric approaches are referred to as utilitarian because they assign value insofar as they provide satisfaction to humans and it is divided into calculation of:

- use values;
- existence values;
- and the direct and indirect worth of natural resource to the people.¹⁷⁴

The use values are the least controversial and are considered easy to identify and quantify.¹⁷⁵ These values are not limited to consumptive uses,¹⁷⁶ but it also includes non-consumptive uses such as recreation in a resource area.¹⁷⁷ The existence values refer to the individual and society values. This value is assimilated to natural resources because of the individual's or the community's knowledge of the existence of the resource in that area.¹⁷⁸

4.2.2.2 Biocentric Approach

The biocentric approach is a rights based approach and perceives the intrinsic value of the resource as independent from satisfying human needs. The measure of damage with this approach is for punitive damages¹⁷⁹, which often serves as a deterrent. The conceptual approaches of quantification of environmental harm can be summarily said to include:

¹⁷⁴ *Ibid.*

¹⁷⁵ *Ibid.*

¹⁷⁶ For example, timber production.

¹⁷⁷ Kopp & Smith in 7 *supra* at 264-265.

¹⁷⁸ 'Summary of Natural Resources Damage Assessment Final Rule (15 CFR Part 990)' at fn.132 *supra*.

¹⁷⁹ A Volokh 'Punitive Damages and Environmental Law' available at:

<http://www.news.bbc.co.uk/hi/English/sci/tech/newsid> accessed on 26 June 2002.

- the degree, spatial and temporal extent of harm to natural resources
- translation of harm to reduction in services provided by natural resources
- and the amount of services lost as result of the incident.

To understand these two conceptual approaches of quantification, it is trite law that we must evaluate methods used to quantify the effects of environmental degradation. The key questions in that regard, as provided by Reisch¹⁸⁰ are

- a) what costs should be included
- b) and how they should be measured?

The following discussion shall attempt to provide answers to these questions.

4.3 METHODS OF QUANTIFYING ENVIRONMENTAL DAMAGE

Section 11(70) (1)(a) of the USDOJ regulation provides that ‘upon completing the injury determination phase, the authorized official shall quantify for each resource determine to be injured and for which damages will be sought...’. The trustees and interested parties in quantification of environmental damage are also required in terms of the regulations ‘to quantify the effect of the discharge or release in terms of the reduction from the baseline condition in the quantity and quality of services’.¹⁸¹

¹⁸⁰ ‘Superfund and Natural Resource Damage’ (08 January 2001) available at:
<http://www.cnice.org/NLE/CRSreports/Waste/waste.35.cfm> accessed on 13 August 2002.

¹⁸¹ Section 11(70) (1) (a).

The USDOJ provides guidelines in sections 11(71) to 11(73) of what should be taken into account when measuring natural resource damage. In terms of these sections, the trustees or persons involved in the quantification process are required to take into account the effects of release to the environment, possibility of recovering or rehabilitation of the damaged resource and the extent of damage to the services provided by the resource. In terms of section 11(70)(2), the quantification phase consist of quantification of service reduction, resource recoverability and baseline determination.

Kopp and Smith¹⁸² submit that techniques for estimating damages to natural resources fall broadly into two categories. These categories are the indirect methods¹⁸³ and direct methods¹⁸⁴ of quantification. The indirect methods utilize behaviour methods to quantify damage to natural assets and the direct methods estimate natural resource damage on the basis of hypothetical surveys. The indirect methods of quantification encompass four methodologies of quantification of natural resources damage. Among the most significant behavioural use valuation we have the hedonic model,¹⁸⁵ travel cost model¹⁸⁶ and the random utility model.¹⁸⁷ A significant example of a direct method of quantification is contingency valuation,¹⁸⁸ but it has been severely criticized by writers¹⁸⁹ in international

¹⁸² Kopp & Smith fn 7 *supra* at 153.

¹⁸³ *Idem.* at 153-203.

¹⁸⁴ *Idem.* at 204-230.

¹⁸⁵ *Idem.* at 163.

¹⁸⁶ *Idem.* at 175.

¹⁸⁷ *Idem.* at 185.

¹⁸⁸ *Idem.* at 231.

¹⁸⁹ RK Niewijk 'Misleading Quantification: The Contingent Valuation of Environmental Quality' available at: <http://www.catoinstitute.com/pubs/regulation/reg17n1-nicwijk.html> accessed on 10 October 2002.

environmental law. Robert Niewijk¹⁹⁰ submits that the contingent valuation is misleading, *inconsistent and extremely biased*.

In international environmental law and policy, the following methods of estimation of damage to environmental assets have received highest consideration:

4.3.1 Indirect Methods of Quantification

The indirect methods of measuring environmental harm are based on the observation and assessment of individuals' behaviour.¹⁹¹ The objective of the assessment is to observe the change in behavior after the environmental asset has been damaged. McConnell submits that the change in behaviour causes a reduction of individual's welfare and thus, the welfare valuation¹⁹² must be inferred. The following indirect methods of quantification have been suggested:

4.3.1.1 Behavioural Use Valuation

As stated in the above survey, this model is a broad category of economic methods of valuation and encompasses four valuation methods to be taken into account when measuring harm to the environment. This method has been praised by writers as the 'less prone to error'¹⁹³ method of valuation.

¹⁹⁰ *Ibid.*

¹⁹¹ See KE McConnell 'Indirect Methods for Assessing Damages' in Kopp & Smith fn 7 *supra* at 154

¹⁹² *Idem* at 199.

¹⁹³ J Peck 'Measuring Justice For Nature: Issues in Evaluating and Litigating natural Resources Damages' available at: <http://www.law.fsu.edu/journals/landuse/vol142/pck1.html> accessed on 22 September 2002.



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For the purposes of this research we shall evaluate the following behavioural methods of valuation:

4.3.1.2 The Hedonic Model¹⁹⁴

Kopp and Smith perceive¹⁹⁵ this model as a strategic model with heterogeneous goods.

This model infers the change in value of marketed goods with characteristics influenced by harm to the environmental asset. The pricing of houses is used as the measured variable to evaluate natural resource damage value.¹⁹⁶ Despite the praise of the behavioural methods of valuation, this method has been criticized as it disregards the marginal value of environmental asset.¹⁹⁷

4.3.1.3 The Travel Cost Model¹⁹⁸

The travel cost valuation model has been described as the most straightforward valuation technique.¹⁹⁹ The objective of this method is to value the service flow of non-marketed goods. It is based on the rationale that the public uses the natural resources and they incur costs. The costs that the users incur are amongst other, the travelling costs to access the resource and to enjoy the use of the resource.²⁰⁰

¹⁹⁴ Kopp & Smith fn 7 *supra* at 163.

¹⁹⁵ *Idem.* at 339.

¹⁹⁶ Acks fn 37 *supra*.

¹⁹⁷ *Ibid.*

¹⁹⁸ Kopp & Smith fn 194 *supra* at 175.

¹⁹⁹ *Idem.* at 131

²⁰⁰ J Peck 'Measuring Justice For Nature: Issues in Evaluating and Litigating Natural Resources Damages' available at: <http://www.law.fsu.edu/journals/landuse/vol142/peck1.html> accessed on 20 August 2002.

Bennagen²⁰¹ submits that the travelling cost method is ‘ extensively used to value recreational goods and services, requires data on people’s observed visitation behavior to a recreational site’.

4.3.2 Direct Methods of Quantification

This method is also known as the survey method of valuation and its objective is to estimate environmental damages on the basis of hypothetical questions.²⁰² Hypothetical questions are posed to the users and non-users of the injured environmental assets. The direct method is based on two assumptions:

- the person being interviewed by the trustee or the researcher must be able to attach a meaning to the hypothetical valuation questions; and
- the responses to the hypothetical questions must be comparable to the responses of the actual circumstances.²⁰³

The hypothetical questions are used to indicate the values placed by beneficiaries on the natural resources. Unlike the indirect method, the direct method measures both the use and non-use values.²⁰⁴ The most significant indirect method of quantification is the contingent valuation method.

²⁰¹ ‘Estimation of Environmental Damages from Mining pollution: The Marinduque Island Mining Accident’ available at: <http://www.eeepsea.org/publications/research1/ACF104.html> accessed on 13 August 2002.

²⁰² KE McConnell ‘Indirect Methods for Assessing Damages’ in Kopp & Smith fn 7 *supra* at 154.

²⁰³ *Ibid.*

²⁰⁴ *Idem* at 204. The non use values are defined as, ‘the component of the value of a natural resource that does not derive from the in situ consumption of the resource’. According to Myrick Freeman III, this kind of value is normally associated with sustainable development, the notion of preserving the natural resource for future generation. See Kopp and Smith fn 7 *supra* at 264.

4.3.2.1 Contingent Valuation Method

This method is an economic technique that focuses on the gathering of information to measure the values of environmental assets.²⁰⁵ This technique ranges from purely hypothetical direct questions, to asking the public to place monetary value on the injured natural asset. The trustees or researchers evaluate the change of behaviour due to the destruction of the resource. To obtain precision and accuracy with this method, the writers have suggested certain characteristics. These characteristics have been described by Schulze²⁰⁶ as the Reference Operating Conditions (ROC) and they encompass the following:

- The individual giving answers to the hypothetical questions must understand the commodity or the resource to be valued;
- The individual must have had experience with respect to consumption levels of the resource;
- Willingness to pay (WTP)²⁰⁷ measures must be elicited; and
- There must be little uncertainty.

Despite the ROC proposed by Schulze and others, contingent valuation methods have been subject to various criticisms by some writers.²⁰⁸

²⁰⁵ R Kopp 'The Natural Resource Damage Provisions of CERCLA and OPA' prepared remarks delivered to the United States House Subcommittee on Water Resources and Environment in July 11, 1995 available at: <http://www.rff.org/testimony/remarks/cercla-opa.htm> accessed on 19 September 2002.

²⁰⁶ Barnard fn 162 *supra* at 211.

²⁰⁷ This is described as a monetary measure of the value of a change in the quantity or quality of an environmental asset as measured as the maximum amount that an individual would pay to have the specified change. See, WD Schulze 'Direct Methods for Valuing Damages' in Kopp & Smith fn 7 *supra* at 219, 342.

²⁰⁸ See A Volokh 'Punitive Damages and Environmental Law' available at: <http://www.news.bbc.co.uk/English/sci/tech/newsid> accessed on 26 June 2002. In his discussion, Volokh criticized the award made in terms of contingency valuation in *Exxon Valdez's* decision as 'inconsistent and exaggerated.'

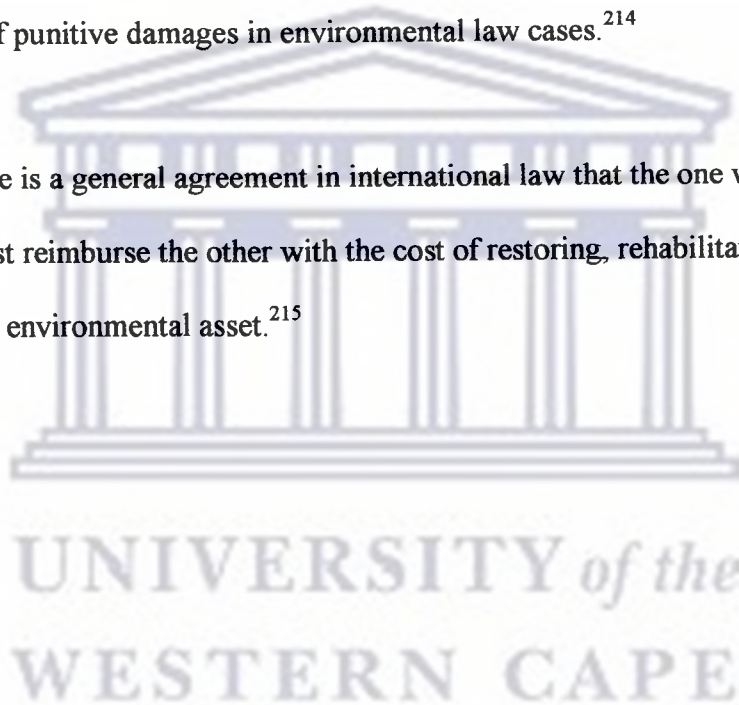
recovered.²¹² Even though the USDOJ regulations have been subject to criticism and court cases,²¹³ its models of quantification of environmental harm can be regarded as one step ahead in the development of quantification models in international environmental law.

4.4 COMPENSATION FOR ENVIRONMENTAL HARM

The main purpose of the quantification process is to enable the trustee and the interested parties to claim compensation for the injury caused to the natural resource asset.

Compensation for environmental harm has brought a lot of controversy and uncertainty in international environmental law and policy. Amongst the issues which are uncertain is the question of punitive damages in environmental law cases.²¹⁴

However, there is a general agreement in international law that the one who causes injury to another must reimburse the other with the cost of restoring, rehabilitating or acquiring the equivalent environmental asset.²¹⁵



²¹² Section 28 (10) provides that the costs claimed under the section must be reasonable, but the Act does not define the reasonable costs and quantification thereof.

²¹³ *Ohio v. The United States Department of the Interior*, 880 F.2d 432 (DC.Cir.1989)

²¹⁴ See a discussion by A. Volokh 'Punitive Damages and Environmental Law' available at: <http://www.news.bbc.co.uk/hi/English/sci/tech/newsid> accessed on 26 June 2002.

²¹⁵ D Sive & F Friedman 'A Practical Guide to Environmental Law' at 124. See also Section 107 of CERCLA, SAM Mclean *Compensation for Damage: An International Perspective* (1993) at 139-140.



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CHAPTER 5

SUMMARY AND RECOMMENDATIONS

5.1 SUMMARY OF THE STUDY

The need to quantify environmental harm is considered in public international law and policy.²¹⁶ The law of quantification of environmental harm is an emerging and developing branch of public international law and policy. Its place in public international law is yet to be determined. The United States is among the leading states²¹⁷ that have promulgated laws²¹⁸ regulating damage caused to environmental assets.²¹⁹ In comparison with other states, the issue of quantification of environmental damage in South African is still remote.²²⁰

This study has also recognized the need to quantify environmental harm. As one of its objectives, it has attempted to provide a clear exposition of assessment and quantification of damage in public international law and policy. The study was based on the assumption that environmental harm is capable of being quantified with precision.

The study has evaluated and provided examples of national law methods of quantification

²¹⁶ Havenga fn 21 *supra* at 187, Bennagen 'Estimation of Environmental Damages from Mining Pollution: The Marinduqu Island Mining Accident' available at: <http://www.cepsea.org/publications/research1/ACF104.html> accessed on 13 August 2002.

²¹⁷ For example, Michigan recognizes damage caused to environmental assets and provides for compensation for injuries caused to natural resources. See: Michigan Environmental Protection Act (MEPA) 344.1701 as discussed by CM. Denton 'Natural Resources Damages Assessments and Claims in the Great Lakes Basin' available at: <http://www.bodmanlongley.com/a-013002.htm> accessed on 15 October 2002.

²¹⁸ For example, Comprehensive Environmental Response Act of 1980 (42 USC).

²¹⁹ The notion of 'environmental assets' is expressed and discussed in Kopp & Smith fn 7 *supra* at 10.

²²⁰ Havenga fn 21 *supra* at 188 and 202.

of environmental harm, as provided by various national statutes.²²¹ The study has also attempted to provide a clear exposition of the concept of environmental damage. The study has evaluated and perceived environmental damage as damage caused to environmental assets. The assumption of this study is founded on the basis that natural resources damage can be quantified and the compensation will be guided by the cost of restoring, rehabilitating or acquiring the equivalent environmental asset.

5.2 RECOMMENDATIONS

The fears of environmental degradation have become matters of international public concern and debate.²²² In the United States, to enable the trustees of natural resources to bring claims for damages caused to the environment, the Government of the United States was required²²³ in terms of CERCLA to promulgate regulations for use in guiding the quantification of natural resources damage.

As submitted in this study, most countries are silent about issues concerning damage to their environment.²²⁴ It is further evident from this study that there is a need²²⁵ to develop an international covenant that regulates quantification of environmental damage. The United States has set a precedent for other states to promulgate laws regulating the assessment and quantification of natural resources damages that can be used by other

²²¹ For example, CERCLA and the USDOJ's Regulations.

²²² Havenga fn 21 *supra* at 187.

²²³ Section 301(c) of CERCLA. See also, *State of New Jersey et al. v. Ruckelshaus et al.* (1984) Cir. No. 84- 1668 (D.C.N.J.).

²²⁴ For example, '...environmental damage in South Africa is still in a rudimentary state of development.' See P Havenga fn 21 *supra*.

²²⁵ For example, in the past six months South Africa has been subject to various oils spills. See: John Whitfield 'Oil Spill Clean-up Enters Critical Phase' (18 September 2002) available at: <http://www.nature.com/nsu/020916/020916-6.html-21k> accessed on 12 November 2002.

states as well as in public international law. In the attempt to solve this rudimentary problem, this study submits the following recommendations:

5.2.1 Incorporation of National Laws to Public International Law

Various states' governments have a primary duty to protect and preserve natural resources for their nationals. This duty is a fiduciary duty derived from the 'public trust doctrine'.²²⁶ The validity and application of this doctrine has been questioned in various countries' legal systems.²²⁷ *In other countries like South Africa, the interested parties and the non-governmental organizations have a secondary duty to protect their environment.*²²⁸ This study as one of its recommendation proposes that various states' *governments in consultation with the non- governmental organizations, need to enact statutes and to pass laws that will regulate the protection against environmental natural resources damage. The statutes or laws to be enacted must provide procedures, methods of assessing and calculating damage caused to environmental natural resources.*

The study proposes that, as an alternative to promulgation of national laws regulating protection against natural resource damage, states must adopt and apply the existing principles from public international law. However, this alternative will depend on the country's reception of international law. For the South African legal system, this alternative can be regarded as suitable, based on the recognition of public international

²²⁶ Henderson fn 83 *supra* at 171.

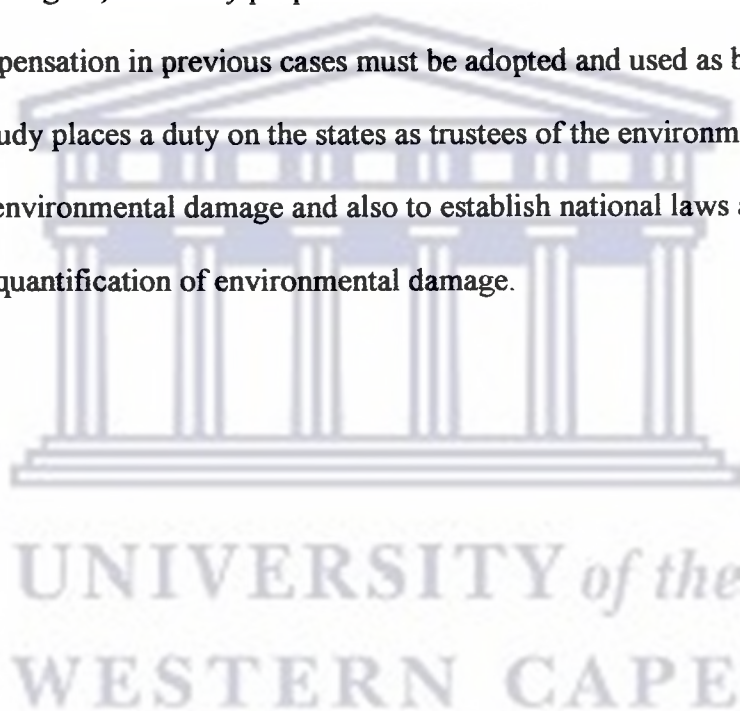
²²⁷ For example, in South Africa the doctrine of public trust is questionable on the basis that the national government is not the only trustee of natural resources. Non-governmental organization (NGO's) like *Wild Life of South Africa (WESA) are recognized trustees of the environment. See also, D Cowen 'Towards Distinctive Principles of South African Environmental Law of South Africa: Some Jurisprudential Perspectives and a Role for Legislation' at 197 – 200.*

²²⁸ *Ibid.*

law in its Constitution. Section 39(1)(b)(c) provides that when interpreting the rights in the Constitution, courts or forums must take international and foreign law into consideration.

5.2.2 Law of Delict as Model Mechanism to Quantify and Recover Damages

The study also recommends as a second alternative that states' government must adopt models or approaches of quantification of general damages²²⁹ used in the law of delict or tort law. In this regard, this study proposes that the mechanisms and strategies used for awarding compensation in previous cases must be adopted and used as basis in future claims. The study places a duty on the states as trustees of the environment to recognize the effects of environmental damage and also to establish national laws and models providing for quantification of environmental damage.



²²⁹ The model used to quantify general damages is normally based on the previous awards. In fact, *stare decisis* has to be applied.

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