

V884
VOGLER, Y.S.
Ships' ballast water ...

YVONNE SILKE VOGLER

**SHIPS' BALLAST WATER: THE USE OF THE
PRECAUTIONARY PRINCIPLE ON NATIONAL
AND INTERNATIONAL LEVEL**

LLM RESEARCH PAPER
LAWS 582: MASTERS LEGAL WRITING

LAW FACULTY
VICTORIA UNIVERSITY OF WELLINGTON

2004

LAW

741
JW
6
84
04



Victoria

UNIVERSITY OF WELLINGTON

*Te Whare Wānanga
o te Ūpoko o te Ika a Māui*



LIBRARY

TABLE OF CONTENTS

ABSTRACT	iv
I INTRODUCTION	1
II THE PRECAUTIONARY PRINCIPLE	3
A Definition of the Precautionary Principle	4
1 General.....	4
2 Distinction between precautionary and preventive measures.....	10
3 The precautionary principle as customary law on international level.....	10
4 The precautionary principle in domestic New Zealand legislation.....	11
B Application of the Precautionary Principle in the Marine Environment ...12	
1 The precautionary principle in the marine environment.....	12
2 What are invasive alien species?.....	13
3 Ships' ballast water as a vector.....	13
4 Assessment of impacts of invasive alien species in the marine environment.14	
(a) Impacts.....	14
(b) Uncertainty of impacts.....	16
III DOMESTIC LEGISLATION ON BALLAST WATER IN NEW ZEALAND	16
A Biosecurity Act 1993 and Import Health Standard	17
B Assessment of New Zealand Ballast Water Legislation regarding the Precautionary Principle	19
IV INTERNATIONAL LEVEL	19
A The IMO Guidelines: Predecessor of the Convention	19

B	General Regulatory Framework of the Convention	20
C	Consideration of other Conventions and International Agreements containing a Precautionary Approach	20
1	Convention on biological diversity 1992.....	20
2	Principle 15 of the rio declaration, article 196 (1) unclos and unced.....	23
D	Examination of the Articles of the Convention	23
1	Article 2 general obligations.....	23
2	Article 4 control of the transfer of harmful aquatic organisms and pathogens through ships' ballast water and sediments and Article 5 sediment reception facilities.....	25
3	Article 6 scientific and technical research and monitoring.....	26
4	Article 8 Violations.....	27
5	Article 9 inspection of ships.....	27
6	Article 10 detection of violations and control of ships.....	28
E	Examination of the Regulations of the Annex to the Convention	28
1	Regulation A-3 exceptions.....	28
2	Regulation B-1 ballast water management plan and regulation B-2 ballast water record book.....	28
3	Regulation B-3 ballast water management for ships.....	29
4	Regulation B-4 ballast water exchange.....	30
5	Regulation B-6 duties of officers and crew.....	31
6	Regulation C-1 additional measures.....	31
7	Regulation C-2 warnings concerning ballast water uptake in certain areas and related flag state measures.....	32
8	Regulation D-1 ballast water exchange standard.....	32
9	Regulation D-2 ballast water performance standard.....	33
10	Ballast water treatment technologies.....	34
(a)	Regulation D-4 prototype ballast water treatment technologies.....	34

(b) Best ballast water treatment technology..... 34

II Developing countries and the convention.....35

(a) Costs.....35

(b) Assistance..... 35

V CONCLUSION..... 35

BIBLIOGRAPHY..... 37

Management of Ships' Ballast Water and Sediments incorporates the precautionary principle well and recommends that New Zealand should ratify this Convention to sustain the precautionary principle.

Word Length

The text of this paper (including abstract, table of contents, foreword, bibliography and appendices) comprises approximately 10,351 words.

ABSTRACT

This paper analyses how well the International Convention for the Control and Management of Ships' Ballast Water and Sediments incorporates the precautionary principle. At first, this paper illustrates the precautionary principle. The international and domestic positions (New Zealand law) of this principle are provided. Then the Articles of the Convention and the Annex to the Convention are analysed.

Ultimately, this paper assesses that the International Convention for the Control and Management of Ships' Ballast Water and Sediments incorporates the precautionary principle well and recommends that New Zealand should ratify this Convention to sustain the precautionary principle.

Word Length

The text of this paper (excluding abstract, table of contents, footnotes, bibliography and appendices) comprises approximately 10,351 words.

I INTRODUCTION

Biological diversity faces many multifaceted threats.¹ One of the major threats to native biological diversity is caused by alien invasive species.² The impacts of alien invasive species are immense, insidious, and usually irreversible in ecological and economic dimensions.³ The ecological cost is the irretrievable loss of native species and ecosystems.⁴ Alien invasive species include viruses, algae, mosses, invertebrates etc. and have caused hundreds of extinctions all over the world.⁵ The economic costs of alien invasive species rise to billions of dollars annually.⁶ Economically, New Zealand relies heavily on marine biodiversity. The marine environment provides a significant proportion of the national revenue and the export of seafood is the fourth biggest export earner, at over \$ 1.49 billion annually.⁷ Moreover, the seafood industry employs over 26,500 people.⁸

New Zealand as an island nation is particularly affected by alien invasive species. The physical isolation of islands in general over millions of years has favoured the evolution of unique species and ecosystems.⁹ Consequently, islands and other isolated areas (for example mountains and lakes) usually have a high proportion of endemic species, those found nowhere else, and are centres of significant biological diversity.¹⁰ Nevertheless, “[v]irtually no habitat, community, or ecosystem now remains untouched by invasions, which in turn have led to profound challenges in our ability to formulate a coordinated and comprehensive national ocean policy”: stated James T. Carlton.¹¹

¹ FFI Global Programmes *Grappling with the Precautionary Principle* <<http://www.fauna-flora.org>> (last accessed 15 August 2004).

² IUCN *Guidelines for the Prevention of Biodiversity Loss caused by Alien Invasive Species* (February 2000) <<http://www.iucn.org>> (last accessed 15 August 2004).

³ IUCN, above n 2.

⁴ IUCN, above n 2.

⁵ IUCN, above n 2.

⁶ IUCN, above n 2.

⁷ Ministry for the Environment, Ocean Policy Secretariat *Working Paper Six 14 March 2003*, 2, available at: <<http://www.oceans.govt.nz>> (last accessed 27 October 2004).

⁸ Ministry for the Environment, Ocean Policy Secretariat, above n 7, 2.

⁹ IUCN, above n 2.

¹⁰ IUCN, above n 2.

¹¹ James T Carlton *Marine Bioinvasions: Vectors, Invasion Pulse, and Strategies* <<http://www.oceancommission.gov>> (last accessed 5 November 2004).

One vector for the introduction of alien marine species is ships' ballast water. The discharge of ballast water has led to unplanned and unwanted introductions of harmful aquatic organisms, including diseases, bacteria and viruses, in marine and freshwater systems.¹² Ballast water is seen as the most important vector for trans-oceanic and inter-oceanic movements of shallow-water coastal organisms.¹³ New Zealand has already received at least 148 accidentally introduced exotic marine species.¹⁴

Fatal is that once the alien species is introduced, it is virtually impossible to control an invasive marine species and marine impacts are usually irreversible.¹⁵ Whether or not a species may prove to be harmful is at present beyond the ability of science to determine.¹⁶ The assessment of marine species in New Zealand range from strongly negative to beneficial, and these views may change over time.¹⁷ The *Pacific oyster* for example was originally regarded as a pest but is now an important aquaculture species.¹⁸ On the other hand, three species of *Spartina cordgrass* that were originally regarded as beneficial are now largely viewed as undesirable.¹⁹

Solutions to manage the introduction of alien invasive species²⁰ are the introduction of legal or other instruments, the improvement of existing legal instruments and better enforcement measures.²¹ One possible way of improving the quality of legal instruments is the use of the precautionary principle.²²

On national level New Zealand has passed domestic laws to face the impacts of ballast water. However, domestic laws are insufficient as ballast water is a global

¹² IUCN, above n 2.

¹³ IUCN, above n 2.

¹⁴ Ministry for the Environment, Oceans Policy Secretariat, above n 7.

¹⁵ IMO *Global Ballast Water Management Programme* <<http://www.globallast.imo.org>> (last accessed 5 November 2004).

¹⁶ Meeting of the Biodiversity Committee (BDC) 20-24 November 2000 *Management requirements for ships ballast water to minimise or prevent the introduction of non-indigenous species* BDC 00/7/6-E <<http://www.seas-at-risk.org>> (last accessed 5 November 2004).

¹⁷ Forrest Barrie, Taylor, Mike and Hay Cameron 1997 *Foreign marine species in New Zealand: towards a risk assessment management model* Cawthron Report No. 424 <<http://www.cawthron.org.nz>> (last accessed 16 August 2004).

¹⁸ Forrest, Taylor and Hay above n 17.

¹⁹ Forrest, Taylor and Hay above n 17.

²⁰ Annotation of author.

²¹ Whybe Th Douma *The precautionary principle* <<http://www.eel.nl>> (last accessed 5 November 2004).

²² Douma, above n 21.

problem. Though several countries such as New Zealand²³ have unilateral controls in place to control ballast water from other countries, existing domestic laws are difficult to enforce on foreign flagged vessels in the absence of regulations through the International Maritime Organisation (IMO).²⁴ The IMO Secretary-General, Efthimios Mitropoulos, stated that “[g]iven the international nature of shipping, the only way to address the problem effectively is through the adoption and implementation of a global legally binding instrument”.²⁵ On 13 February 2004 the IMO finalised the *International Convention for the Control and Management of Ship’s Ballast Water and Sediments* (the Convention). This Convention will set the standard for ballast water management legislation.²⁶ The Convention is multilateral²⁷ and the enforcement of this Convention is provided.

This paper examines how well the precautionary principle is incorporated in the Convention and focuses on the use of this principle in the biodiversity area. At first the principle is illustrated. Secondly, the use of the principle in New Zealand is examined. Thirdly, the use of the principle with respect to the Convention is analysed. Ultimately, this paper assesses that the Convention incorporates the precautionary principle well and that New Zealand should ratify and implement the Convention to sustain the precautionary management of ships’ ballast water.

II THE PRECAUTIONARY PRINCIPLE

The precautionary principle is widely accepted as a policy principle.²⁸ Basically, it means an aid to make decision in the face of scientific uncertainty.²⁹ In particular, it provides guidance in the management of environmental decisions.³⁰ At its simplest, the precautionary principle is that people proposing to undertake activities with potential effects on the environment should carry out environmental impact as-

²³ Ministry of Fisheries <<http://www.mfish.govt.nz>> (last accessed 5 November 2004).

²⁴ Ministry of Fisheries, above n 23.

²⁵ Hon Marian Hobbs *International agreement on ballast water constraints* (18 February 2004) <<http://www.beehive.govt.nz>> (last accessed 5 November 2004).

²⁶ CQD Journal <<http://www.cqdjournal.com>> (last accessed 10 November 2004).

²⁷ Ministry of Fisheries, above n 23.

²⁸ John Salter and Peter Howsam *The Precautionary Principle and the law on risk* (20 March 2000) <http://www.ccpa.ca> (last accessed 5 November 2004).

²⁹ Salter and Howsam, above n 28.

³⁰ Simon Marr “The Southern Bluefin Tuna Cases: The Precautionary Approach and Conservation and Management of Fish Resources” (2000) 11 EJIL 815, 819.

assessments.³¹ Moreover, the principle reflects the need to take cautious actions in the face of potentially serious risks without awaiting the completion of further scientific research.³²

The principle has been incorporated in a vast amount of international treaties and international policy documents.³³ Additionally, the principle has become very important, because the identification of proof of cause and effect by scientists is difficult and in some cases scientists will never be able to make long-term predictions about the consequences of human activity due to the limitations of science.³⁴

A *Definition of the Precautionary Principle*

1 *General*

The precautionary principle is not uniquely defined. There is no uniform understanding of the meaning of the principle among the world's states and the literature offers different interpretations of the precautionary approach.³⁵ There are about 20 formulations of this principle.³⁶ In *R v Secretary of State for Trade and Industry ex parte Duddridge* J Smith commented that:³⁷

There is (...) no comprehensive and authoritative definition of the precautionary principle. It is an expression which has in recent years been used in a number of international declarations, conventions and treaties (...). In none of these documents is the principle comprehensively defined, although often the document describes what the principle is intended to mean in the context of the subject matter concerned.

In the following, formulations of the precautionary principle in international law with respect to the marine environment will be illustrated. They serve as a clue to develop instruments to examine the strength of the precautionary principle in the

³¹ Ministry for the Environment <<http://www.mfe.govt.nz>> (last accessed 20 August 2004).

³² CCPA *Discussion paper on the precautionary principle as it applies to public policy decisions March 2000* available at: <<http://www.ccpa.ca>> (last accessed 5 November 2004).

³³ Marr, above n 30, 819.

³⁴ Marr, above n 30, 820.

³⁵ Marr, above n 30, 821.

³⁶ Per Sandin "Dimensions of the precautionary principle" (1999) 5 *Human and Ecological Risk Assessment* 889-907.

³⁷ *R v Secretary of State for Trade and Industry ex parte Duddridge* [1995] Env LR 151.

International Convention on Sediments and Ships' Ballast Water (the Convention).

The most commonly cited formulations are:

In the Rio Declaration 1992:³⁸

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

Bergen Declaration of 1990.³⁹

In order to achieve sustainable development, policies must be based on the precautionary principle. Environmental measures must anticipate, prevent, attack the causes of environmental degradation. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

United Nations Conference on Environment and Development 1992 (UNCED):

Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

Convention on the Protection of the Marine Environment of the Baltic Sea Area (Article 3 (2)) 1992

The Contracting Parties shall apply the precautionary principle, i.e. to take preventive measures when there is reason to assume that substances or energy introduced, directly or indirectly, into the marine environment may create hazards to human health, harm living resources and marine ecosystems, damage amenities or interfere with other legitimate uses of the sea even where there is no conclusive evidence of a causal relationship between inputs and their alleged effects.

³⁸ Ragnar Lofstedt *The Precautionary Principle: risk, regulation and politics* available at: <<http://www.21stcenturytrust.org>> (last accessed 13 August 2004).

³⁹ James Cameron "The Precautionary Principle in International Law" in Tim O'Riordan, James Cameron and Andrew Jordan (ed) *Reinterpreting the Precautionary Principle* (London 2001) 113, 115.

Agenda 21 (Oceans Chapter 17, paragraph 17.21) 1992

A precautionary and anticipatory rather than a reactive approach is necessary to prevent the degradation of the marine environment. This requires, inter alia, the adoption of precautionary measures, environmental impact assessments, clean production techniques, ...and a comprehensive approach to damaging impacts from air, land and water. Any management framework must include the improvement of coastal human settlements and the integrated management and development of coastal areas.

Article 196(1) United Nations Convention on the Law of the Sea (UNCLOS):

States shall take all measures necessary to prevent, reduce and control pollution of the marine environment resulting from the use of technologies under their jurisdiction or control, or the intentional or accidental introduction of species, alien or new, to a particular part of the marine environment, which may cause significant and harmful changes thereto.

UNCLOS is particularly incorporated in the Convention. According to Article 16 of the Convention "Nothing in this Convention shall prejudice the rights and obligations of any State under customary law as reflected in UNCLOS".

Convention on Biological Diversity 1992:

(...) Noting also that where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimise such a threat (...).

Article 174 European Community Treaty states that:

Environmental policy shall aim at a high level of protection taking into account the diversity of situations in the various regions of the Community. It shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay.

Per Sandin of Stockholm University analysed a total of 19 formulations of the precautionary principle and demonstrated that they vary in subtle ways.⁴⁰ In particular, the formulations vary in the types of threats that are addressed, in the scientific

⁴⁰ Salter and Howsam, above n 28.

proof that is required to invoke the principle and in whether the principle commands action, either voluntary, or ground rules for dialogue about action.⁴¹ Per Sandin identified four dimensions of the precautionary principle. He persuasively argued that:⁴²

The Principle can be recast into the following if-clause, containing these four dimensions: If there is (1) a threat, which is (2) uncertain, then (3) some kind of action (4) is mandatory. The phrases expressing these dimensions may vary in (a) precision and (b) strength.

This formulation of Per Sandin is seen as useful to clarify the basis of the principle, namely the need for timely effective action in response to a threat, even when the scale of that threat cannot be precisely known.⁴³

By *threat* is meant one or other undesired possible state of the world (for example loss of biodiversity).⁴⁴ The *uncertainty* dimension expresses the knowledge of these possible states of the world.⁴⁵ A typical phrase is "lack of full scientific certainty."⁴⁶ For example, the Convention on Biological Diversity 1992, the Rio Declaration 1992, the Bergen Declaration 1990 and UNCED use the formulation "lack of full scientific certainty." The Convention on the Protection of the Marine Environment of the Baltic Sea Area (Article 3 (2)) 1992 uses the wording "no conclusive evidence of a causal relationship between inputs and their alleged effects". A phrase like "no conclusive evidence" allows a higher uncertainty than the phrase "lack of full scientific evidence" does. Moreover, the greater the uncertainty is allowed and the less plausible the threat has to be, the stronger (more cautious) is the principle.⁴⁷

The *action* dimension concerns what response to the threat is stipulated.⁴⁸ UNCLOS stipulates "all measures necessary", according to the Convention on Biological Diversity 1992 "measures to avoid or minimise such a threat (...)" are to be taken. More precisely is the formulation in Agenda 21 that gives examples of the ac-

⁴¹ Salter and Howsam, above n 28; Sandin, above n 36, 890.

⁴² Sandin, above n 36, 889; David Santillo and Paul Johnston *Conference Reports: A Precautionary Tale Report Back from the Precautionary Principle Debate held at the Third SETAC World Congress, Brighton, May 21-25, 2000* available at: <<http://www.scientificjournals.com>> (last accessed 10 November 2004).

⁴³ Santillo and Johnston, above n 42.

⁴⁴ Sandin, above n 36, 891.

⁴⁵ Sandin, above n 36, 892.

⁴⁶ Sandin, above n 36, 892.

⁴⁷ Sandin, above n 36, 893.

⁴⁸ Sandin, above n 36, 894.

tions to be taken "the adoption of precautionary measures, environmental impact assessments, clean production techniques, ...". The Rio Declaration 1992 refers to "cost-effective measures" and the Bergen Declaration 1990 determines that "[e]nvironmental measures must anticipate, prevent, attack the causes of environmental degradation." Altogether, action is scarcely defined.⁴⁹ In addition, the formulation that stipulates "cost-effective measures" is weaker than the others.⁵⁰ Per Sandin argues persuasively that "the more extensive action is prescribed, the stronger (more cautious) is the principle".⁵¹

The last dimension "(4) is mandatory" state what the status of the action is, for example, if the action is allowable, justified, recommended or mandatory.⁵² This dimension may vary in strength.⁵³ Oliver Godard stated:⁵⁴

It may be justifiable (weak version) or it is mandatory (strong version) to limit regulate, or prevent potentially dangerous actions before scientific proof is established.

Most formulations contain "shall" or "should" and indicate mandatory actions of some sort. The wording "shall" is stronger than "should". To assess the strength of the principle it must take into account whether there are wordings that weaken the expression of the precautionary principle. For example, it is a weaker element of the precautionary principle if there is wording relating to costs or "within capabilities".⁵⁵ Thus, for example the Rio Declaration 1992 (RD) is at first glance a strong version of the precautionary principle "the precautionary approach shall...". But States shall apply the precautionary approach "according to their capabilities". Thus, the precautionary principle appears in a weaker version in the RD as the capabilities of the individual state will fix its precautionary approach. The Convention on Biological Diversity 1992 (CBD) is similar in strength. Both formulations are in the negative "shall not be used" respectively "should not be used "as a reason for postponing ...measures...". At first, there is no positive instruction for precautionary action, the instruction is only not to use any of the named reasons in the RD/CBD to refrain

⁴⁹ Sandin, above n 36, 894.

⁵⁰ Sandin, above n 36, 894.

⁵¹ Sandin, above n 36, 895.

⁵² Sandin, above n 36, 895.

⁵³ Sandin, above n 36, 895.

⁵⁴ Cit. in Sandin, above n 36, 895.

⁵⁵ Catherine J Iorns Magallanes and Jan M Matthews "The Precautionary Principle in the New Zealand Fisheries Act: Recent Challenges in the New Zealand Court of Appeal" 4.

from taking action. Secondly, the CBD is weaker than the RD as "shall" is stronger than "should". The strongest is the Bergen Declaration 1990 that contains the wording "must" and is in contrast obligatory.

Arguably, "[i]t is the dimension containing the weakest phrase that determines the strength of the entire principle."⁵⁶ By *strength* Per Sandin means "degree of cautiousness, i.e. the number of cases which precaution were to be taken."⁵⁷

Basically, all precautionary measures have in common that they shift the burden of proof.⁵⁸ There is a wide range in the burden from proof without doubt, down to very low levels of evidence.⁵⁹ In general, the precautionary principle argues for placing the burden of proof that no harm will occur to the environment on the person that will act.⁶⁰ Consequently, in its strongest formulation, the precautionary principle can be seen as a reversal of the normal burden of proof⁶¹ so that potential actors must prove their activity will not cause harm before it can be sanctioned.⁶² The difference between a strong and a weaker formulation became for example apparent when the precautionary principle found application with respect to the marine environment (in particular in relation to fisheries management).⁶³

Moreover, the precautionary principle, concerning technology, is that the best available technology requirements should be imposed on activities that pose an uncertain potential to create substantial harm, unless those in favour of those activities can show that they present no appreciable risk.⁶⁴ In the weaker version of the precau-

⁵⁶ Sandin, above n 36, 889.

⁵⁷ Sandin, above n 36, 890.

⁵⁸ Cameron, above n 39, 120.

⁵⁹ Cameron, above n 39, 42.

⁶⁰ Cameron, above n 39, 120.

⁶¹ Jeffrey Weiss <<http://www.herecomesmongo.com>> (last accessed 20 August 2004); Marr, above n 30, 821.

⁶² Iorns Magallanes and Matthews, above n 55, 3, 4: For example the burden of proof is reversed for dumping waste in the marine environment.

⁶³ Marr, above n 30, 821; John M Macdonald "Appreciating the Precautionary Principle" (1995) 26 *Ocean Development and International Law* 255, 270: It evolved from a pollution control device into a fisheries management tool.

⁶⁴ Richard B Stewart "Environmental Regulatory Decision Making Under Uncertainty" (2002) 20 *Journal of Research in Law and Economics* 71, 78; Cass R Sunstein "Beyond the Precautionary Principle" (2003) 151 *UPALR* 1003, 1014.

tionary principle the costs or capabilities (of a state) are a relevant element.⁶⁵ In contrast, the stronger version is without weighing up costs or capabilities.⁶⁶

2 *Distinction between precautionary and preventive measures*

The preventive principle is concerned with the prevention of harms and risks which are known, which have been scientifically proven, and which can be reasonably avoided.⁶⁷ An example of the preventive principle stated Remi Parmentier from Greenpeace International with respect to the *Asbestos case*: “[w]hen speaking of asbestos we are not talking about scientific uncertainties, clearly everyone knows it is harmful to human health”. Basically, the precautionary principle distinguishes from the preventive principle, that positive action to protect the environment may be required before scientific proof of harm has been provided.⁶⁸

Consequently, the key element to define precaution is a lack of certainty about the cause and effect relationships or the possible extent of a particular environmental harm.⁶⁹ If there is no uncertainty about the environmental risks of a situation, then the measure is preventive, not precautionary.⁷⁰

3 *The precautionary principle as customary law on international level*

The status of the precautionary principle as a binding norm of customary law is in controversial debate among international legal authors.⁷¹ Article 38 of the Statute of the International Court of Justice defines customary international law as “evidence of general practice accepted as law”. International customary law appears when a practice among nations is extensive, virtually uniform and accompanied by a conviction that it is obligatory under international law.⁷² Some argue that (regarding the marine living resources⁷³), the precautionary principle has developed into a rule

⁶⁵ Iorns Magallanes and Matthews, above n 55, 4.

⁶⁶ Iorns Magallanes and Matthews, above n 55, 4.

⁶⁷ Weiss, above n 61.

⁶⁸ Weiss, above n 61.

⁶⁹ Cameron, above n 39, 116.

⁷⁰ Cameron, above n 39, 116.

⁷¹ Marr, above n 30, 823; Grant J Hewison “Precautionary Approach to Fisheries Management: An Environmental Perspective” (1996) 11 *International Journal of Marine and Coastal Law* 312, 313.

⁷² *West Germany v Denmark* and *West Germany v Netherlands* ICJ Reports (1969), 43-44 North Sea Continental Shelf Cases.

⁷³ Marr, above n 30, 824;

of customary international law.⁷⁴ Others say, that the principle is accepted worldwide, because it has been incorporated in a vast number of international marine management and conservation agreements.⁷⁵ There are a number of judgments by international juridical bodies that support the view that the principle is international customary law. For example, the precautionary principle was used as a principle of customary international law by the International Tribunal of the Law of the Sea in the Southern Bluefin Tuna cases (*New Zealand v Japan* and *Australia v Japan*).⁷⁶ In addition, in *New Zealand v France* Palmer J supported the development of the precautionary principle as a rule of customary international law when he concluded that the precautionary principle and a more specific requirement for an environmental impact assessment were to be carried out "where activities may have a significant effect on the environment".⁷⁷ In *Greenpeace NZ Inc. v Ministry of Fisheries*⁷⁸ the precautionary principle was argued by the Court, but found not to be legally relevant. However, the Court stated that the Ministry could not be criticised for not being cautious and applying the precautionary principle, because "it was a decision arrived at consistently with expert evidence placed before him and not controverted by his own advisors".

4 *The precautionary principle in domestic New Zealand legislation*

In New Zealand legislation the precautionary principle is included in a set of statutes. A stronger version of the precautionary principle is adopted by New Zealand for example in Section 104 (1) of the Resource Management Act 1991 that stipulates "[w]hen considering an application for a resource consent and any submissions received, the consent authority must...have regard to (a) any actual and potential effects on the environment of allowing the activity". The wording "must" contains a mandatory stipulation for the authority concerned. Moreover, the allowing of the activity must regard any potential effects. "Potential" is a term for uncertainty. Thus,

⁷⁴ Owen McIntyre and Thomas Mosedale "The Precautionary Principle as a Norm of Customary International Law" (1997) 9 J.Env't. L 221, 236; Marr, above n 30, 824.

⁷⁵ David Freestone "Implementing precaution Cautiously" in David Freestone and Ellen Hey (eds), *The Precautionary Principle in International Law: The Challenge of Implementation* (The Hague 1996) 261, 261; McIntyre and Mosedale, above n 74, 241.

⁷⁶ Cameron, above n 39, 115.

⁷⁷ Marr, above n 30, 826; Request for an Examination of the Situation in Accordance with Paragraph 63 of the Court's Judgment of December 1974 in Nuclear Tests; Dissenting Opinion of Judge Palmer, ICJ Reports (1995) 412.

⁷⁸ Unreported High Court of New Zealand, 27 November 1995, CP 492/93.

the authority must regard the uncertainty of the effects that the activity will cause. Hence, the precautionary principle appears in a strong version.

Other New Zealand Acts contain the formulation "shall take into account".⁷⁹ This is a weaker formulation than "must". The authority concerned must not (take into account), but "shall". Nevertheless, "shall" belongs to the stronger formulations as it is a mandatory stipulation to express the need to take precaution into account. Thus, New Zealand has already adopted the precautionary principle in strong versions into legislation. The ratification and implementation of the Convention will add to this precautionary approach of New Zealand (the Convention is analysed under IV C and D).

B Application of the Precautionary Principle in the Marine Environment

1 The precautionary principle in the marine environment

Since the 1990ties, the precautionary principle is widely accepted and applied in the marine environment.⁸⁰ States adopted a set of Conventions (mainly with respect to marine pollution and protection of fish stocks⁸¹) that contain the precautionary principle. For example, the 1992 Paris Convention for the protection of the marine environment of the north-east Atlantic, contains the precautionary principle.⁸²

The precautionary principle by virtue of which preventive measures are to be taken when there are reasonable grounds for concern that substances or energy introduced, directly or indirectly, into the marine environment may bring about hazards to human health, harm living resources and marine ecosystems, damage amenities or interfere with other legitimate uses of the sea, even when there is no conclusive evidence of a causal relationship between the inputs and the effects.

Other Conventions (as shown above under II A 1) adopted in the 1990ies, were the Baltic Sea Convention 1992, Convention on Biological Diversity 1992, the

⁷⁹ For example: Section 7 of the Hazardous Substances and New Organisms Act 1996; Section 10 of the Fisheries Act 1996.

⁸⁰ David Freestone "International Fisheries Law since Rio: The Continued Rise of the Precautionary Principle" in Alan Boyle and David Freestone (eds) *International Law and Sustainable Development* (Oxford, 1999) 135, 164.

⁸¹ Iorns Magallanes and Matthews, above n 55, 6.

⁸² Europa <<http://www.europa.eu.int>> (last accessed 11 November 2004).

Bergen Declaration 1990 and the Rio Declaration 1992. The formulations of the precautionary principle vary in strength and weakness in these Conventions.⁸³

In the following, this paper applies the precautionary principle concerning alien invasive species in the marine environmental area. It illustrates the role of ships' ballast water and assesses the impacts and the uncertainty of these impacts.

2 *What are invasive alien species?*

The Global Invasive Species Program defines invasive alien species as follows:⁸⁴

Invasive alien species are non-native organisms that cause, or have the potential to cause harm to the environment, economies, or human health. Invasive alien species are one of the most significant drivers of environmental change worldwide.

3 *Ships' ballast water as a vector*

Currently, shipping moves approximately 80 per cent of the world's commodities and the overall trade and traffic volume is continually expanding.⁸⁵ Consequently, around 10 billion tonnes of ballast water are carried around the world in ships' ballast each year.⁸⁶ While ballast water is essential to the safe operation of ships, it also means a serious environmental threat in that at least 7000 to possibly more than 10000 different species may be carried globally in ballast water each day.⁸⁷ These species include bacteria, microbes, small invertebrates and the eggs,

⁸³ See above under II A 1.

⁸⁴ Richard G Tarasofsky *Preventing and controlling invasive alien species in trade* The Royal Institute of International Affairs WTO Public Symposium 26 May 2004, Geneva.

⁸⁵ David Ciesla "Developments in vessel-based pollution: The International Maritime Organisation's Ballast Water Convention and the European's Regulations on phase out single-hull oil tankers" (2003) 15 *Colorado Journal of International Environmental Law and Policy* 107, 107.

⁸⁶ IMO *Stopping the ballast water stowaways*, <<http://www.imo.org>> (last accessed 10 November 2004): Studies are on the way to define this more clearly; In former times ships have carried solid ballast (rocks, sand or metal) to ensure their stability, trim and structural integrity. Nowadays, ships use water as ballast. To load on and off a ship is much easier by using ballast water than solid ballast. When a ship is empty of cargo, it fills ballast water. When it loads cargo, the ballast water is discharged.

⁸⁷ James T Carlton "Invasive Species and Biodiversity Management" in O T Sunderland, PJ Schei and A Viken (eds) *The scale and ecological consequences of biological invasions in the world's oceans* (Dordrecht, 1999) 195, 212.

cysts and larvae of various species.⁸⁸ Species that are in an adult stage would unlikely be taken on in ballast water, but may be transferred in ballast water during their planktonic phase.⁸⁹ The problem is compounded by the fact that virtually all marine species have life cycles that include a planktonic stage or stages.⁹⁰ The use of ballast water means that the natural barriers to the dispersal of species across the oceans are being reduced.⁹¹ Species have been prevented from dispersing in certain areas by natural barriers such as temperature.⁹² The pan-global tropical zone has separated the northern and southern and coldwater zones.⁹³ In tropical areas species have not faced the same barriers as the Indo-Pacific, from the east coast of Africa to the west coast of South America has a relatively homogenous marine biodiversity.⁹⁴ Ships provide for temperate marine species a way to pierce the tropical zones.⁹⁵ Some of them have involved northern temperate species invading southern temperate waters and vice visa.⁹⁶

4 *Assessment of impacts of invasive alien species in the marine environment*

(a) Impacts

Most species do not survive under the new environmental conditions after they are discharged, but if the factors are favourable, an introduced species may survive to establish a reproductive population in the host environment, it may even become invasive, out-competing native species and multiplying into pest proportions. There are hundreds of examples of catastrophic introductions around the world, causing severe human health, economic and/ or ecological impacts in their host environments.⁹⁷ The introduction of harmful aquatic organisms and pathogens to new environments has been identified as one of the four greatest threats to the world's

⁸⁸ IMO, above n 86.

⁸⁹ IMO, above n 86.

⁹⁰ IMO, above n 86.

⁹¹ IMO, above n 86.

⁹² IMO, above n 86.

⁹³ IMO, above n 86.

⁹⁴ IMO, above n 86.

⁹⁵ IMO, above n 86.

⁹⁶ IMO, above n 86.

⁹⁷ IMO, above n 86.

oceans.⁹⁸ In several countries the introduced red-tide algae (toxic dinoflagellates) has been absorbed by filter-feeding shellfish, such as oysters.⁹⁹ Paralysis and even death can be caused when these shellfishes are eaten by humans.¹⁰⁰ In Australia the introduced north pacific seastar *asterias amurensis* threatens commercial stocks of shellfish.¹⁰¹ This Seastar is a prolific breeder and reached alone in Tasmania an estimated total population of greater densities than in its native range. In addition, economical impacts result from the invasion of marine species. In the North American Great Lakes the European zebra mussel *dreissena polymorpha* was introduced and has spread to more than 40 per cent of US waterways.¹⁰² It fouls the cooling-water intakes of industry, what may have cost between US\$ 750 million and US\$ 1 billion for control measures.¹⁰³ In May 2004 a new toxic algae that can kill some marine life was discovered in the waters around New Zealand.¹⁰⁴ It is not yet clear whether these algae are part of New Zealand's natural flora, but there is a strong possibility that might have arrived in ship ballast water from other parts of the world.¹⁰⁵ Another invasive species in New Zealand's coastal waters is the bridled goby.¹⁰⁶ The bridled goby is most likely to have arrived in New Zealand via ship ballast water, because of its limited distribution and its presence in New Zealand's busiest international shipping port.¹⁰⁷ These examples show that the application of the precautionary principle is essential when ballast water management strategies are established.¹⁰⁸

⁹⁸ IMO *Global Ballast Water Management Programme*: The other three greatest threats are land-based sources of marine pollution, over-exploitation of living marine resources and physical alteration and destruction of coastal and marine habitats, above n 15.

⁹⁹ IMO, above n 86.

¹⁰⁰ IMO, above n 86.

¹⁰¹ IMO *Global Ballast Water Management Programme*, above n 15.

¹⁰² IMO *Global Ballast Water Management Programme*, above n 15.

¹⁰³ IMO *Global Ballast Water Management Programme*, above n 15.

¹⁰⁴ Hoe Chang and Geoff Baird *A different Concorde is common in New Zealand* Media Release (4 May 2004) <<http://www.niwa.co.nz>> (last accessed 22 June 2004).

¹⁰⁵ Chang and Baird, above n 104.

¹⁰⁶ National Institute of Water & Atmospheric Research: *New fish species invade our estuaries* <<http://www.niwa.co.nz>> (last accessed 22 June 2004).

¹⁰⁷ National Institute of Water & Atmospheric Research, above n 106.

¹⁰⁸ Meeting of the Biodiversity Committee, above n 16.

(b) Uncertainty of impacts

If the probability and the magnitude of risks are known, precaution is not a factor because the level of uncertainty involved is relatively low.¹⁰⁹ Risk obviates itself from the precautionary principle when its likeliness and severity are known.¹¹⁰

As already mentioned in the Introduction whether or not a species may prove to be harmful is at present beyond the ability of science to determine.¹¹¹ On the one hand the assessment of marine species range from strongly negative to beneficial. In addition, these views may change over time.¹¹² The *Pacific oyster* for example was originally regarded as a pest but is now an important aquaculture species.¹¹³ On the other hand, three species of *Spartina cordgrass* that were originally regarded as beneficial are now largely viewed as undesirable.¹¹⁴

Thus, what impacts alien species have at the end of the day is beyond the ability of science to determine. The introduction can be either negative or beneficial, but not until the impacts appear. Thus, the likeliness and severity of the risks of the introduction of alien species are *unknown*. In addition, the probability and magnitude of the risk alien invasive species pose are *unknown*. Consequently, the level of uncertainty with respect to the introduction of alien species is high.

In conclusion, there is a high uncertainty of environmental impacts of introduced alien marine species. Legislative measures such as the Convention are consequently precautionary measures not preventive.

III DOMESTIC LEGISLATION ON BALLAST WATER IN NEW ZEALAND

The relevant Act for managing ballast water (and consequently the introduction of alien invasive species) in New Zealand is the Biosecurity Act 1993. This Act includes the institution of precautionary actions with respect to pests and unwanted

¹⁰⁹ Cameron, above n 39, 117.

¹¹⁰ Cameron, above n 39, 117.

¹¹¹ Meeting of the Biodiversity Committee, above n 16.

¹¹² Forrest, Taylor and Hay, above n 17.

¹¹³ Forrest, Taylor and Hay, above n 17.

¹¹⁴ Forrest, Taylor and Hay, above n 17.

organisms.¹¹⁵ In the following, this paper illustrates the Biosecurity Act 1993 (and the Import Health Standard) and assesses the New Zealand ballast water legislation concerning the precautionary principle.

A *Biosecurity Act 1993 and Import Health Standard*

The Biosecurity Act 1993 is in its part 3 about the importation of risk goods. Ballast water can be defined as risk good under Section 2 of the Biosecurity Act 1993.¹¹⁶

Risk goods means any organism, organic material, or other thing, or substance, that (by reason of its nature, origin, or other relevant factors) it is reasonable to suspect constitutes, harbours, or contains an organism that may—

- (a) Cause unwanted harm to natural and physical resources or human health in New Zealand; or
- (b) Interfere with the diagnosis, management, or treatment, in New Zealand, of pests or unwanted organisms:

Ballast water is “reasonable to suspect constitutes, harbours, or contains an organism that may” has the effect as described under Section 2 (a) or (b). If a vessel charges ballast water, the vessel does not only take in water, but also marine species (organisms) that the charged water contains. Consequently, ballast water harbours or contains organisms. These marine species may destroy or change ecosystems and the economic impacts may exceed billions of dollars.¹¹⁷ Moreover, introduced alien marine species can cause harm on human health.¹¹⁸ Ultimately, it is reasonable to suspect that ballast water harbours or contains an organism that may cause unwanted harm to natural or physical resources or human health in New Zealand. Thus, ballast water is a “risk good” according to the Biosecurity Act 1993.

Section 22 (1) of the Biosecurity Act 1993 determines that an Import Health Standard may be issued to specify “the requirements to be met for the effective management of risks associated with the importation of *risk goods*...”. Such an Import

¹¹⁵ Handout from Catherine Iorns Magallanes Course LAWS 325 Advanced Environmental Law.

¹¹⁶ M McConnell, 2002 Globallast Legislative Review – Final Report. GloBallast Monograph Series No. 1. IMO London P.iv. 72.

¹¹⁷ McConnell, above n 116, 72.

¹¹⁸ McConnell, above n 116, 72; Ministry for the Environment, Ocean Policy Secretariat, above n 7.

Health Standard (IHS) replaced in 1998, voluntary guidelines for ballast water.¹¹⁹ The IHS for ballast water determines the conditions to be met before ballast can be discharged in New Zealand waters.¹²⁰ Under the IHS, ballast water that was absorbed at a foreign port cannot be discharged into New Zealand waters unless it has been exchanged in areas free from coastal influence (preferably mid-ocean).¹²¹ Mid-ocean water contains fewer organisms such as planktonic larvae of crabs, sea-stars, fan worms, shellfish, spores of seaweeds, and toxic algae and is unlikely to contain organisms that can thrive in a coastal environment.¹²² But ultimately, the mid-ocean exchange of ballast water only reduces the risk to a certain extent as some water from the foreign port always remains in the ballast tanks.¹²³

If a mid-ocean exchange is not safe, an inspector may grant an exemption.¹²⁴ An exemption will not be granted to discharge un-exchanged water from high-risk areas inside New Zealand's 12 mile territorial limit.¹²⁵ All vessels that arrive in New Zealand waters must complete a ballast water reporting form.¹²⁶ The form makes it possible to monitor compliance as the information provided can be cross-checked.¹²⁷

The IHS names Tasmania and the Port Philip Bay, Australia as "higher risk areas" due to the presence of the *Northern Pacific sea-star* and the toxic algae *Gymnodinium catenatum* that bloomed in New Zealand during 2000/2001.¹²⁸ These areas are considered higher risk areas.¹²⁹ "For this reason, ballast water loaded in these areas may not be discharged into New Zealand waters under any circumstances".¹³⁰ Particular care is taken to ensure ballast from these places has been exchanged before discharge in New Zealand.¹³¹

¹¹⁹ New Zealand Biodiversity Biosecurity Management <<http://www.biodiversity.govt.nz>> (last accessed 15 October 2004).

¹²⁰ Ministry for the Environment, Oceans Policy Secretariat, above n 7, Appendix One.

¹²¹ New Zealand Biodiversity, above n 119.

¹²² New Zealand Biodiversity, above n 119.

¹²³ New Zealand Biodiversity, above n 119.

¹²⁴ Ministry for the Environment, Oceans Policy Secretariat, above n 7, Appendix One.

¹²⁵ Ministry for the Environment, Oceans Policy Secretariat, above n 7, Appendix One.

¹²⁶ Ministry for the Environment, Oceans Policy Secretariat, above n 7, Appendix One.

¹²⁷ Ministry for the Environment, Oceans Policy Secretariat, above n 7, Appendix One.

¹²⁸ New Zealand Biodiversity, above n 119.

¹²⁹ Import Health Standard Annex 1.

¹³⁰ Import Health Standard Annex 1.

¹³¹ New Zealand Biodiversity, above n 119.

B Assessment of New Zealand Ballast Water Legislation regarding the Precautionary Principle

The Biosecurity Act 1993 and the IHS stipulate actions (or precautionary measures) to avoid the introduction of harmful alien marine species. For example, the discharge of ballast water in New Zealand water is only allowed if a mid-ocean exchange of the ballast water took place. The discharge of ballast water that was taken up in high-risk areas "may not be discharged under any circumstances" (exemptions relating to safety can apply). The precautionary principle appears strongly in the formulation "may not" as "may not" is a command. The prohibition to discharge this ballast water under *any* circumstances increases the strength of the precautionary measure. Moreover, the only exemptions relate to the safety of the ship operation (for example the ship is in danger to capsize). This strengthens the expression of the precautionary principle as other exemptions are excluded. In addition, the precise actions to be taken (ballast water exchange in certain areas, ballast water reporting form, and so on) express a strong version of the precautionary principle. In conclusion, New Zealand adopted a strong version of the precautionary principle in legislation on ballast water.

IV INTERNATIONAL LEVEL

On international level has been a gradual progress to international legally binding controls on ballast water. In the following, the Convention is introduced and examined. At first, the predecessor of the Convention is illustrated. Then this paper analyses the incorporation of International Agreements in the Convention containing a precautionary approach. After that, the Articles of the Convention and its Annex are examined concerning the precautionary principle.

A The IMO Guidelines: Predecessor of the Convention

New Zealand's controls are based on the IMO (International Maritime Organisation) Guidelines. These Guidelines prescribe the methods by which states, vessel owners, operators and port authorities can prevent alien invasive species introduc-

tions.¹³² They are not binding. In contrast, the Convention will be binding. Nevertheless, the IMO Guidelines incorporated precautionary measures, especially under "9 Ships' operational procedures" the IMO Guidelines recommend precautionary practices. For example, minimising uptake of Harmful Aquatic Organisms and Pathogens (HAOP) when loading ballast water by avoiding uptake in certain areas.

B General Regulatory Framework of the Convention

The *International Convention on Sediments and Ships' Ballast Water* will provide an uniform, standardised, global ballast water management regulatory regime.¹³³ To a certain extent, it is based on the existing IMO Guidelines, but adopts a two tier approach.¹³⁴ Tier one is the base level requirement that would apply to all ships, including the mandatory carriage of a Ballast Water and Sediment Management Plan, Ballast Water Record Book and a requirement to carry out certain ballast water management procedures after a phase-in period.¹³⁵ The Convention differs in Annex Regulation B-3 on the construction date of the ship and requires the meeting of different Ballast Water standards. Tier two would apply only in prescribed Ballast Water Management areas.¹³⁶

C Incorporation of other Conventions and International Agreements containing a Precautionary Approach

1 Convention on biological diversity 1992

The *International Convention on Sediments and Ships' Ballast Water* notes the objectives of the Convention on Biological Diversity 1992 (CBD) as well as decision IV/5 of the 1998 Conference of the Parties (COP4) to the CBD concerning the conservation and sustainable use of marine and coastal ecosystems (Annex/ Pream-

¹³² Lisa Brautigam "Control of Aquatic Nuisance Species Introductions Via Ballast Water In The United State: Is The Exemption Of Ballast Water Discharges From Clean Water Act Regulation A Valid Exercise Of Authority By The Environmental Protection Agency?" 6 *Ocean & Coastal L.J.* (2001) 33, 45.

¹³³ Steve Raaymakers *IMO Ballast Water Update – 2002* available at <<http://www.imo.org>> (last accessed 10 November 2004).

¹³⁴ Raaymakers, above n 133.

¹³⁵ Raaymakers, above n 133.

¹³⁶ Raaymakers, above n 133.

ble of the Convention).¹³⁷ Decision IV/5 (III.B.2.4.) refers to decision II/10, annex II, paragraph 3 (a): “The precautionary approach, as set out in decision II/10, annex II, paragraph 3 (a), should be used as a guidance for all activities affecting marine and coastal biological diversity...” . Decision II/10, annex II, paragraph 3 (a) states:

The work should not be impeded by the lack of full scientific information and will incorporate explicitly the precautionary approach in addressing conservation and sustainable use issues;

The wording “will” gives the precautionary principle a strong appearance in the decision. This tense formulates a dedicated situation in the future and strengthens the precautionary approach. In contrast, the formulation “should not” is a weaker version of the precautionary principle. But paragraph 3 is about “the work” that “should not be impeded”. Consequently, the non-hindering of the work is the first step towards a precautionary approach. The second step is that the work (if not impeded) will incorporate the precautionary approach. Thus, the precautionary principle, as expressed in paragraph 3, is at first limited to the version of the weaker formulation “should not”, before the precautionary principle is strengthened by the wording “will” after work is taken up. The transfer and introduction of HAOP via the ship’s ballast water threatens the conservation and sustainable use of biological diversity.¹³⁸ The Convention is about the problem of ballast water and explicitly addresses the named issues in providing a standard for the management of ballast water to ensure the conservation and sustainable use of marine and coastal ecosystems.

The Convention also notes decision VI/23 (COP 6) CBD on alien species that threaten ecosystems, habitats or species, including guiding principles on invasive species (Annex, Preamble). Decision VI/23 V. Annex A. states:

Given the unpredictability of the pathways and impacts on biological diversity of invasive alien species, efforts to identify and prevent unintentional introductions as well as decisions concerning intentional introductions should be based on the precautionary approach, in particular with reference to risk analysis, in accordance with the guiding principles below.¹³⁹ The precautionary approach is that set forth in principle 15 of the 1992 Rio Declaration on

¹³⁷ Available at: <<http://www.biodiv.org>> (last accessed 14 October 2004).

¹³⁸ Also stated in the Preamble of the Convention.

¹³⁹ These guiding principles will be considered in this paper under Part—where the Articles and so on of the Convention are examined.

Environment and Development and in the preamble of the Convention on Biological Diversity.

The precautionary approach should also be applied when considering eradication, containment and control measures in relation to alien species that have become established. Lack of scientific certainty about the various implications of an invasion should not be used as a reason for postponing or failing to take appropriate eradication, containment and control measures.

The precautionary principle appears in a weaker version in the wording "should". The negative formulation "should not be used" adds to the weakness of this version of the precautionary principle. Moreover, the decision and the Convention as it explicitly includes the decision, prefers the definition of the precautionary principle as stated in the Rio Declaration 1992 and the Convention on Biological Diversity 1992 regarding the marine environment (above under II A 1).

Regarding the risk analysis, "in accordance with the guiding principles of the decision (VI/23)", the Convention does not directly refer to these guiding principles, except in Annex Regulation A-4 1.4 to "the Guidelines on risk assessment developed by the Organisation [International Maritime Organisation]". Thus, at first glance it seems the Guidelines as stipulated in the guiding principles of the decision, the CBD principles are neglected in the Convention, as the IMO Guidelines only note the objectives of the Convention on Biological Diversity 1992. But a distinction has to be made between risk analysis and risk assessment. Risk analysis is about the examination of an issue. In contrast, risk assessment is about the effects and outcomes of the issue. Thus, the Convention does not neglect the decision of the CBD, because it only refers to the IMO Guidelines.

In addition, according to regulation A 4(1).4, "[a] Party...may grant exemptions to any requirements to apply regulations B-3 [Ballast Water management for ships] or C-1 [Additional measures]..., but only when they are granted based on the Guidelines on risk assessment...". Basically, risk assessment helps to determine the degree of scientific uncertainty.¹⁴⁰ Identification, implementation and selection of actions can be evaluated with a focus on minimising the serious and/or irreversible nature of the potential harm.¹⁴¹ Moreover, any precautionary measures should be

¹⁴⁰ Vinyl Council of Canada <<http://www.cpia.ca>> (last accessed 27 October 2004).

¹⁴¹ Vinyl Council of Canada, above n 140.

proportionate to the risk, the uncertainty and the degree to which the risk would be minimised.¹⁴² The wording "...grant exemptions...*but only*...when they are granted based on..." gives the risk assessment a high importance for the decision whether an exemption from regulations B-3 and C-1 will be granted or not. Hence, the requirement of risk assessment sustains the precautionary principle. Consequently, the Convention incorporates the precautionary principle well.

2 *Principle 15 of the rio declaration, article 196 (1) unclos and unced*

The Convention keeps in mind the precautionary approach as set out in Principle 15 of RD, Article 196(1) UNCLOS and UNCED. These International Agreements appear in the Preamble of the Convention. In conclusion, the Convention incorporates the precautionary principle as contained in other international agreements. How well the precautionary principle is incorporated in the Articles and Annex of the Convention is examined below under D and E.

D *Examination of the Articles of the Convention*

In the following this paper examines how well the Convention incorporates in its individual Articles the precautionary principle. Basically, the Convention contains provisions regarding the transfer of harmful aquatic organisms and pathogens (HAOP). As examined above, these HAOP present an uncertain threat to the marine environment.¹⁴³

1 *Article 2 general obligations*

According to Article 2 of the Convention, the Parties are given a set of actions to be taken. Firstly, it should be said that the Parties are obliged (according to Article 2 (1)):

[T]o give full and complete effect to the provisions of the Convention and the Annex thereto in order to prevent, minimise and ultimately eliminate the transfer of Harmful aquatic organ-

¹⁴² Vinyl Council of Canada, above n 140.

¹⁴³ Above under II B 4.

isms and pathogens through the control and management of ships' ballast water and sediments.

Moreover, Parties need to undertake to encourage the continued development of Ballast Water Management and standards to prevent, minimise and ultimately eliminate the transfer of HAOP (Article 2 (5)).

These provisions ensure that the Parties to the Convention follow the precautionary actions (or measures) of the Convention and ensure the development of Ballast Water management and standards to enforce precautionary measures.

According to Article 2 (7), "Parties should ensure that Ballast Water Management practices used to comply with [the] Convention do not cause greater harm than they prevent to their environment, human health, property or resources, or those of other States." The precautionary principle appears here in the form of risk assessment of the practices to avoid the practices causing greater harm than they prevent. This comprises that, if there is uncertainty whether the action (Ballast Water Management practices) will cause greater harm or not, the action should not be taken. "Should" is a rather weaker version of the status of action.

Under Article 2 (8), "Parties shall encourage ships...to avoid...the uptake of Ballast Water with potentially HAOP..." . The avoidance of collection of Ballast Water with potentially HAOP is a precautionary measure as it is uncertain whether the absorbed Ballast Water contains HAOP or not ("potentially"). "Shall" makes the provision mandatory. Thus, the Convention incorporates the precautionary principle in a strong form.

The precautionary principle is also incorporated in Article 2 (9). As a measure "to address threats and risks to...marine ecosystems and biodiversity...in relation to Ballast Water Management" Parties shall endeavour to co-operate under the auspices of the Organisation [IMO]. At first, the precautionary principle appears in a weak version in Article 2 (9) as the formulation is "shall endeavour". The Parties are only obliged to try to co-operate. Secondly, this formulation comprises the cooperation of Parties to the Convention as an action in accordance with the precautionary principle. The threats and risks of ballast water are uncertain (see above un-

der II B). Particularly, the co-operation serves to address these threats and risks. For example, the share of information on invasive alien species and their effects (or management tools concerning ballast water) between States can lead to the development of better and more effective precautionary measures.

2 *Article 4 control of the transfer of harmful aquatic organisms and pathogens through ships' ballast water and sediments and Article 5 sediment reception facilities*

According to Article 4 (1), Parties shall take effective measures to ensure that...ships comply with...[the] requirements...[set forth in the Convention and the Annex]. "Shall" is a mandatory and strong formulation. In addition, Article 4 (1) calls for the effectiveness of the measures. Thus, these stipulations support a strong appearance of the precautionary principle in the Convention.

Each Party "shall develop national policies, strategies or programmes for Ballast Water Management in its ports and waters...and promote the attainment of the objectives of [the] Convention" according to Article 4 (2). The objectives of the Convention are the control of the transfer of HAOP and Ballast Water Management. As the transfer of HAOP through ships' ballast water is an uncertain threat, the policies, strategies and programmes should consequently incorporate the precautionary principle. Thus, the Convention gives an instruction to the Parties to sustain the precautionary principle in their national policies, strategies and programmes with respect to ballast water.

Moreover, the precautionary principle is incorporated in Article 5 (1) that stipulates that "each Party undertakes to ensure...where cleaning or repair of ballast water tanks occurs, adequate facilities are provided for the reception of Sediments¹⁴⁴". Thus, precaution is to be taken to avoid sediments containing potentially HAOP coming in contact with the alien country's environment and may cause any harm.

¹⁴⁴ "Sediments" means matter settled out of Ballast Water within a ship, according to Article 1 (11) of the Convention.

3 *Article 6 scientific and technical research and monitoring*

According to Article 6 (1):

Parties shall endeavour, individually or jointly, to:

- (a) promote and facilitate scientific and technical research on Ballast Water Management;
- and
- (b) monitor the effects of Ballast Water Management in waters under their jurisdiction

This Article addresses for risk assessment and expresses the precautionary principle. Through the promotion, facilitation and technical research on Ballast Water Management and through monitoring the effects of Ballast Water Management, the risks of this Management will be better assessable. Precautionary measures could be improved or new precautionary measures can be taken if the research or monitoring leads to new scientific findings. In particular, monitoring is the key to early detection of new invasive alien species.¹⁴⁵ But the formulation “shall endeavour” gives the precautionary principle a weaker version. The Parties to the Convention have no obligation under Article 6 (1) to achieve any success in promoting and monitoring. The Parties are only obliged to an attempt under Article 6 (1). The precautionary principle is neglected in Article 6. The formulation “shall endeavour” may have been substituted by a stronger one (for example omit the wording endeavour). But the Convention need also take into account (for example) the technological and financial capabilities of a Party. If a country intends to ratify the Convention, but has no or less capabilities to promote and monitor according to Article 6 (1), then this country should not be kept from ratification due to the risk of violating obligations under the Convention. On example is, if the (e.g. developing) country cannot fulfil the obligations due to a lack of scientific or financial potentials. Ultimately, Articles 6 supports the precautionary approach, as poorer countries are not kept from ratifying the Convention that incorporates the precautionary principle.

According to Article 6 (2)

Each Party shall... promote the availability of relevant information to other Parties who request it on:

¹⁴⁵ CBD Decision VI/ 23 Guiding principle 5; The guiding principle 5 of the Decision VI/ 23 concretises monitoring.

- (a) scientific and technology programmes and technical measures undertaken with respect to Ballast Water Management; and
- (b) the effectiveness of Ballast Water Management deduced from monitoring and assessment programmes.

As mentioned above (under II A 1), the precautionary principle demands that the best available technology should be imposed on activities. Article 6 (2) obliges Parties (“shall”) to promote the availability of relevant information concerning the named issues under Article 6 (2) (a) and (b). This will lead to the faster development of effective technology concerning Ballast Water Management. If Parties share their information, the gathered information may add to the effort of a Party to develop a technology. For example, another Party may provide the urgently needed information for the development. Thus, Article 6 (2) supports the precautionary principle.

4 *Article 8 Violations*

Article 8 (1) and (2) stipulates that “any violation of the requirements of this Convention shall be prohibited and sanctions shall be established under the law of the Party”. This requirement ensures the enforcement of precautionary measures of the Convention and consequently supports the precautionary principle.

5 *Article 9 inspection of ships*

Article 9 (3) of the Convention stipulates that the *Party* “carrying out the inspection shall take such steps as will ensure that the ship shall not discharge Ballast Water until it can do so without presenting a threat of harm to the environment, human health, property or resources”. The wording is a strong version of the precautionary principle. The precautionary principle appears here in the stipulated measure that there “shall” be no discharge of Ballast Water until there is no threat of harm. At first, this stipulation is mandatory (“shall”). Secondly, this ultimately means in the steps to be taken that the Party needs to shift the burden of proof to the ship operator (“until it [the ship] can do so without presenting a threat...”). Thus, the precautionary principle appears in the strongest version as the burden of proof is reversed in the end.

6 *Article 10 detection of violations and control of ships*

Article 10 (3) determines that if ballast water sampling...

...[L]eads to a result,...indicating that the ship poses a threat to the environment, human health, property or resources, the Party in whose waters the ship is operating shall prohibit such ship from discharging ballast water until the threat is removed.

The sampling needs only to indicate that the ship poses a threat to the environment. There is no need for the certainty of the threat. Therefore, this measure is a precautionary one. The mandatory stipulation ("shall") to prohibit discharge ballast water until the threat is removed is a strong appearance of the precautionary principle.

E Examination of the Regulations of the Annex to the Convention

1 Regulation A-3 exceptions

In event of an accidental discharge or ingress of Ballast Water resulting from damage to a ship or its equipment, "...all reasonable precautions have to be taken before and after the occurrence of the damage or discovery of the damage or discharge for the purpose of preventing or minimising the discharge..." The accidental discharge of Ballast Water poses an uncertain threat to the environment. Consequently, as an "action" (according to the definition of Per Sandin) all reasonable precautions have to be taken. The wording "all reasonable" expresses the principle strongly. In addition, the stipulation that "the precautions have to be taken before *and* after the occurrence" as well as the direction "have to" increase the strength of the principle.

2 Regulation B-1 ballast water management plan and regulation B-2 ballast water record book

According to Regulation B-1 (2), each ship shall "provide a detailed description of the actions to be taken to implement the Ballast Water Management requirements and supplemental Ballast Water Management practices as set forth" in the

Convention. This regulation ensures that the measures required under the Convention are implemented on each ship. Consequently, the implementation of precautionary measures will be controlled. Thus, this regulation does strengthen the precautionary principle.

In addition, Regulation B-2 (5) determines that “each operation concerning Ballast Water shall be fully recorded without delay in the Ballast Water record book”. This ensures the compliance with the Convention and serves to enforce the precautionary measures. Moreover, the wording “shall” makes this stipulation mandatory. The precautionary principle appears in a strong version.

3 *Regulation B-3 ballast water management for ships*

Regulation B-3 (1-5) distinguishes between ships constructed before 2009 and in or after 2009, but before 2012. Depending on the year of construction, the ship shall meet a different standard. The Convention takes here into account the development of ballast water technology and is congruent with the ship construction. This ensures that the technically highest standard will be stipulated according to the Convention. Thus, the precautionary principle in the form of the use of the best available technology is expressed in this regulation. The precautionary principle appears here in a strong version. There are no determinations to weigh up the costs or capabilities that would weaken the appearance of the precautionary principle.

“Other methods of Ballast Water Management may also be accepted as alternatives...provided that such methods ensure at least the same level of protection to the environment, human health, property and resources...” according to regulation B-3 (7). That the same level of protection is ensured is the burden of the ship’s operator. This reversal of the burden of proof gives the precautionary measure (the method of ballast water management) a strong appearance. The wording “may...be accepted” adds to this strength as there is no right given, that the alternative method will be accepted and the decision of the acceptance can take the precautionary principle into account.

4 Regulation B-4 ballast water exchange

Under Regulation B-4, all ships using ballast water exchange shall:¹⁴⁶

- .1 whenever possible, conduct ballast water exchange at least 200 nautical miles from the nearest land and in water at least 200 metres in depth, taking into account Guidelines developed by the Organisation;
- .2 in cases where the ship is unable to conduct ballast water exchange..., [this should be] as far from the nearest land as possible, and in all cases at least 50 nautical miles from the nearest land and in water at least 200 metres in depth.

When these requirements cannot be met, areas may be designated where ships can conduct ballast water exchange.¹⁴⁷ All ships shall remove and dispose of sediments from spaces designated to carry Ballast Water, in accordance with the provisions of the ships' ballast water management plan (regulation B-4).¹⁴⁸

The nearer the Ballast Water exchange occurs to coastal areas, the likelier it is that alien invasive species pose a potential threat to the coastal State (uncertainty). Therefore (to take precaution), the exchange shall be under the conditions of regulation B-4. The precautionary measures are precisely defined (for example "at least 200 nautical miles..."). As the formulation "shall" makes this regulation mandatory, the precautionary principle appears at first glance in a strong version. But, the formulation "whenever possible" weakens the appearance of the precautionary principle. Ship operators are not absolutely obliged to conduct ballast water exchange, as regulation B-4 .1 determines – only "whenever possible". In turn, this weakening is cushioned by regulation B-4 .2 that stipulates that "in *all* cases at least 50 nautical miles" from coastal areas ballast water exchange must be conducted. It would have been better if the 200 nautical miles were stipulated for all cases. Due to the bigger distance from land, this would have reduced the risk (to a $\frac{3}{4}$ greater extent than 50 nautical miles do) that alien invasive species become established in a foreign coastal environment and cause harm. Nevertheless, the precautionary principle is expressed in a moderately strong version in regulation B-4. Moreover, "a ship conducting Ballast Water exchange shall not be required to comply with paragraphs 1 or 2 [of regu-

¹⁴⁶ IMO *Global Ballast Water Management Programme*, above n 15.

¹⁴⁷ IMO *Global Ballast Water Management Programme*, above n 15.

¹⁴⁸ IMO *Global Ballast Water Management Programme*, above n 15.

lation B-4]...if...such exchange would threaten the safety or stability of the ship...". This exception contains a serious reason for not complying. Moreover, no other less serious reason is mentioned in the regulation. This means neglecting precaution only in a serious circumstance and consequently strengthens the precautionary principle.

5 *Regulation B-6 duties of officers and crew*

Regulation B-6 determines that "[o]fficers and crew shall be familiar with their duties in the implementation of Ballast Water Management...and shall be familiar with the ship's Ballast Water Management plan". This mandatory ("shall") regulation enforces the compliance with the Convention, as the officers and crew will have the knowledge of precautionary measures concerning Ballast Water Management. This supports the precautionary principle as expressed in the Convention.

6 *Regulation C-1 additional measures*

According to regulation C-1 (1), Parties to the Convention can determine "measures in addition to those...[that] are necessary to prevent, reduce, or eliminate the transfer of HAOP through ships' Ballast Water..." This regulation takes into account the regional differences of the Parties to the Convention. The regional adaptation of measures strengthens the precautionary principle. One country may be more affected by HAOP than another country (for example, due to more vulnerable coastal areas). Therefore, the better the precautionary measure is adapted to the region, the more intensive the precautionary principle appears.

Regulation C-1 (4) assigns, that the Parties:

...[S]hall endeavour to make available all appropriate services, which may include but are not limited to notification to mariners of areas, available and alternatives routes or ports, as far as practicable, in order to ease the burden on the ship.

This regulation increases the compliance with the additional precautionary measures.¹⁴⁹ The mariners need to be informed about the additional measures of a

¹⁴⁹ Another aspect that increases the compliance with the Convention is the survey and certification of ships under regulations E.

Party. The better they are informed the likelier the compliance with the precautionary measures. Thus, the regulation sustains the precautionary principle. Nevertheless, the principle appears here in a weaker version, as "shall endeavour" determines only that the Parties to the Convention shall try to "make available...".

7 *Regulation C-2 warnings concerning ballast water uptake in certain areas and related flag state measures*

According to regulation C-2 (1), "[a] Party shall notify mariners of areas under their jurisdiction where ships should not uptake Ballast Water". This provision stipulates the disclosure of information to mariners not to uptake Ballast Water in biohazard areas as a precautionary measure. Consequently, the precautionary principle is expressed in this regulation.

In addition, regulation C-2 (2) determines that "...a Party shall notify the Organisation [IMO] and any potentially affected coastal States of any areas identified ...and the time period such warning is likely to be in effect". Under regulation C-3 the Organisation shall make available information communicated to it under C-1 and C-2. The warning about the areas where a ship should not uptake Ballast Water gives the concerned State the possibility to take precautionary measures itself (and early enough). The wording "potentially" indicates that there is no need that the State is actually affected. This uncertainty takes the Convention into account and stipulates cautiously "any potentially affected coastal State" shall be notified. Ultimately, the precautionary principle is strongly incorporated in regulation C-2(2), as "shall" is mandatory.

8 *Regulation D-1 ballast water exchange standard*

Ships performing Ballast Water exchange shall do so with an efficiency of at least 95 per cent volumetric exchange of Ballast Water (Regulation D-1 (1)).

Regulation D-1 (2) states:

For ships exchanging BW by the pumping-through method, pumping through three times the volume of each BW tank shall be considered to meet the standard.... Pumping through less

than three times the volume may be accepted provided the ship can demonstrate that at least 95 volumetric exchange is met.

This regulation determines a precise action to be taken in order to exchange ballast water in a precautionary way. The precautionary approach is that it "shall be considered" to pump the ballast water through three times the volume of each Ballast Water tank. "Shall" is mandatory. This is a strong aspect of the precautionary principle. The stipulation that "less than three times the volume may be accepted provided the ship demonstrates that at least 95 volumetric exchange is met" shifts the burden of proof (that 95 volumetric exchange is met) to the ship operator. This means a safeguard for the achievement of the precautionary measure. The formulation "may be accepted" also determines that the ship operator does not have the right to restrain from pumping through three times even if at least 95 volumetric exchange is met. This means a further safeguard to ensure the precautionary measure (three times pumping), as doubts may occur whether the ship can truly demonstrate 95 volumetric exchange. Ultimately, the precautionary measure has priority. Regulation D-1 incorporates the precautionary principle well.

9 *Regulation D-2 ballast water performance standard*

Regulation D-2 concretises how the consistency of Ballast Water discharged shall be. Ships shall discharge less than 10 viable organisms per cubic metre greater than or equal to 50 micrometres in minimum dimension and less than 10 viable organisms....(regulation D-2 (1)). In regulation D-2 (2), as a human health standard, indicator microbes shall include for example intestinal enterococci less than 100 cfu per 100 millilitres. The exact determination of the consistency "less than..." is a precautionary measure, because (for example), above "10 viable organisms per cubic metre...", the likelihood that invasive species become established in the area where the Ballast Water is discharged is bigger than if the consistency is less "10 viable organisms...". It is notable, that there is no scientific certainty that, if the consistency of Ballast Water discharge complies with regulation D-2 ("less than 10 viable organisms..."), marine invasive species will not become established in the foreign area.¹⁵⁰ Theoretically, even if there are less than 10 viable organisms (...) contained in the

¹⁵⁰ IMO, above n 86.

Ballast Water, these organisms may establish in the foreign environment.¹⁵¹ This regulation contains only an attempt to reduce the likelihood of the establishment and is therefore a precautionary measure. In conclusion, the precautionary principle appears here in a strong version. At first, the provision is mandatory (“shall”). Secondly, the precise description of the measure to be taken (“less than 10 viable organisms...”) adds to the strong appearance of the precautionary principle in regulation D-2.

10 *Ballast water treatment technologies*

(a) Regulation D-4 prototype ballast water treatment technologies

Regulation D-4 covers *Prototype Ballast Water Treatment Technologies*. It allows for ships, participating in a programme approved by the Administration to test and evaluate promising Ballast Water treatment technologies, to have a leeway of five years before having to comply with the requirements.¹⁵² According to Regulation D-4 (3) .2, “[i]n establishing and carrying out any programme to test and evaluate promising Ballast Water technologies, Parties shall:...allow participation only by the minimum number of ships necessary to effectively test such technologies”. The impacts of Ballast Water treatment technologies are uncertain. Nevertheless, the technologies must be tested to develop them and find a ballast water treatment procedure to eliminate HAOP and avoid the spread of alien invasive species. To minimise the risk of possible impacts of testing technologies, the Convention stipulates that only the minimum number of necessary ships shall participate in such testing programmes. This is a precautionary measure as the testing impacts are uncertain.

(b) Best ballast water treatment technology

Parties have, according to Article 2 (5), the general obligation “to encourage the continued development of Ballast Water Management and standards to prevent, minimise and ultimately eliminate the transfer of HAOP through the control and management of ships’ Ballast Water and Sediments”. In addition, Article 13 (2) of the Convention stipulates that “Parties undertake to co-operate actively...in the

¹⁵¹ IMO, above n 86.

¹⁵² IMO *Global Ballast Water Management Programme*, above n 15.

transfer of technology in respect of the control and management of ships' Ballast Water and Sediments". Moreover, the Preamble expresses that the Parties will encourage development of ballast water technology. These stipulations all aim at the development of the best available technology, without weighing up costs or capabilities. Ultimately, the precautionary principle appears here in a stronger version.

11 *Developing countries and the convention*

(a) Costs

The Convention is silent concerning the costs of its implementation of the Convention. Some argue that poor nations can ill afford the luxury of a precautionary approach and that precaution must be interpreted within the overriding priority of poverty alleviation.¹⁵³ But, the IMO helps less-industrialised member States to prepare for the implementation of the Convention through the GloBallast Management Programme.¹⁵⁴ This means that poorer countries are more likely to ratify the Convention. Ultimately, this sustains the precautionary principle as even poorer countries will implement the Convention.

(b) Assistance

Under Article 13, Parties undertake to provide support for those parties which request technical assistance inter alia to ensure the availability of relevant technology, equipment and facilities, and undertake action aimed at the effective implementation of the Convention. This assistance ensures that the precautionary measures will be carried out and consequently sustains the precautionary principle.

V *CONCLUSION*

The examination of the individual Articles of the Convention has shown that ballast water will be treated in a precautionary manner. Especially, measures for the management of ballast water (Sandin's if-clause "(3) kind of action") are stipulated.

¹⁵³ J Ohammed-Katerere "The Precautionary Principle: Implications for Development and Poverty Alleviation in Southern Africa" (2001) IUCN Environmental Law Programme Newsletter No 1 7-9.

¹⁵⁴ For more information about this Programme: IMO *Global Ballast Water Management Programme*, above n 15.

The precautionary principle appears predominantly in a strong version in the Convention. Ultimately, the Convention incorporates the precautionary principle well. The Convention provides a large amount of precautionary measures that States should take to stem the spread of alien invasive species in the marine environment. The implementation of the Convention into domestic legislations will lead to the adoption of a precautionary standard regarding the management of Ballast Water. Consequently, the establishment of alien invasive species in a foreign environment will be reduced and the impacts of alien invasive species will decrease. The protection of marine native species and ecosystems will improve.

Moreover, if New Zealand ratifies the Convention, the technical equipment for managing the invasion of alien marine species will be adjusted to the currently highest possible technical standards as determined in the Convention. In addition, the Convention aims at the development of ballast water treatment technologies that ultimately eliminate the transfer of HAOP.

In conclusion, this paper states that New Zealand should ratify and implement the Convention in its legislation to sustain the precautionary management of ships' ballast water.

BIBLIOGRAPHY

Brautigam, Lisa "Control of Aquatic Nuisance Species Introductions Via Ballast Water In The United State: Is The Exemption Of Ballast Water Discharges From Clean Water Act Regulation A Valid Exercise Of Authority By The Environmental Protection Agency?" 6 *Ocean & Coastal L.J.* (2001) 33.

Cameron, James "The Precautionary Principle in International Law" in Tim O'Riordan, James Cameron and Andrew Jordan (ed) *Reinterpreting the Precautionary Principle* (London 2001) 113.

Carlton, James T "Invasive Species and Biodiversity Management" in OT Sunderland, PJ Schei and A Viken (eds) *The scale and ecological consequences of biological invasions in the world's oceans* (Dordrecht, 1999) 195.

Carlton, James T *Marine Bioinvasions: Vectors, Invasion Pulse, and Strategies* <<http://www.oceancommission.gov>> (last accessed 5 November 2004).

CCPA *Discussion paper on the precautionary principle as it applies to public policy decisions March 2000* available at: <<http://www.ccpa.ca>> (last accessed 5 November 2004).

Chang, Hoe and Geoff Baird *A different Concorde is common in New Zealand* Media Release (4 May 2004) <<http://www.niwa.co.nz>> (last accessed 22 June 2004).

Ciesla, David "Developments in vessel-based pollution: The International Maritime Organisation's Ballast Water Convention and the European's Regulations on phase out single-hull oil tankers"(2003) 15 *Colorado Journal of International Environmental Law and Policy* 107.

CQD Journal <<http://www.cqdjournal.com>> (last accessed 10 November 2004).

Douma, Whybe Th *The precautionary principle* <<http://www.eel.nl>> (last accessed 5 November 2004).

FFI Global Programmes *Grappling with the Precautionary Principle* <<http://www.fauna-flora.org>> (last accessed 15 August 2004).

Forrest Barrie, Mike Taylor and Cameron Hay 1997 *Foreign marine species in New Zealand: towards a risk assessment management model* Cawthron Report No. 424 <<http://www.cawthron.org.nz>> (last accessed 16 August 2004).

Freestone, David "International Fisheries Law since Rio: The Continued Rise of the Precautionary Principle" in Alan Boyle and David Freestone (eds) *International Law and Sustainable Development* (Oxford, 1999) 135.

Freestone, David "Implementing precaution Cautiously" in David Freestone and Ellen Hey (eds), *The Precautionary Principle in International Law: The Challenge of Implementation* (The Hague 1996) 261.

Handout from Catherine Iorns Magallanes Course LAWS 325 Advanced Environmental Law.

Hewison, Grant J "Precautionary Approach to Fisheries Management: An Environmental Perspective" (1996) 11 *International Journal of Marine and Coastal Law* 312.

Hobbs, Marian Hon *International agreement on ballast water constraints* (18 February 2004) <<http://www.beehive.govt.nz>> (last accessed 5 November 2004).

IMO *Global Ballast Water Management Programme*
<<http://www.globallast.imo.org>> (last accessed 5 November 2004).

IMO "Stopping the ballast water stowaways", <<http://www.imo.org>> (last accessed 10 November 2004).

IUCN *Guidelines for the Prevention of Biodiversity Loss caused by Alien Invasive Species* (February 2000) <<http://www.iucn.org>> (last accessed 15 August 2004).

Lofstedt, Ragnar *The Precautionary Principle: risk, regulation and politics* available at: <<http://www.21stcenturytrust.org>> (last accessed 13 August 2004).

Macdonald, John M "Appreciating the Precautionary Principle" (1995) 26 *Ocean Development and International Law* 255, 270: It evolved from a pollution control device into a fisheries management tool.

Magallanes, Catherine J Iorns and Jan M Matthews "The Precautionary Principle in the New Zealand Fisheries Act: Recent Challenges in the New Zealand Court of Appeal" 4.

Marr, Simon "The Southern Bluefin Tuna Cases: The Precautionary Approach and Conservation and Management of Fish Resources" (2000) 11 *EJIL* 815.

McConnell, M 2002 *Globallast Legislative Review – Final Report*. GloBallast Monograph Series No. 1. IMO London P.iv. 72.

McIntyre, Owen and Thomas Mosedale "The Precautionary Principle as a Norm of Customary International Law" (1997) 9 *J.Env't. L* 221.

Meeting of the Biodiversity Committee (BDC) 20-24 November 2000 *Management requirements for ships ballast water to minimise or prevent the introduction of non-indigenous species* BDC 00/7/6-E <<http://www.seas-at-risk.org>> (last accessed 5 November 2004).

Ministry for the Environment <<http://www.mfe.govt.nz>> (last accessed 20 August 2004).

Ministry for the Environment, Ocean Policy Secretariat *Working Paper Six 14 March 2003*, 2, available at: <<http://www.oceans.govt.nz>> (last accessed 27 October 2004).

Ministry of Fisheries <<http://www.mfish.govt.nz>> (last accessed 5 November 2004).

National Institute of Water & Atmospheric Research: *New fish species invade our estuaries* <<http://www.niwa.co.nz>> (last accessed 22 June 2004).

New Zealand Biodiversity Biosecurity Management
<<http://www.biodiversity.govt.nz>> (last accessed 15 October 2004).

Ohammed-Katerere, J "The Precautionary Principle: Implications for Development and Poverty Alleviation in Southern Africa" (2001) IUCN Environmental Law Programme Newsletter No 1 7-9.

R v Secretary of State for Trade and Industry ex parte Duddridge [1995] Env LR 151.

Raaymakers, Steve *IMO Ballast Water Update - 2002*, available at <<http://www.imo.org>> (last accessed 10 November 2004).

Sandin, Per "Dimensions of the precautionary principle" (1999) 5 Human and Ecological Risk Assessment 889-907.

Salter, John and Peter Howsam *The Precautionary Principle and the law on risk* (20 March 2000) <<http://www.ccpa.ca>> (last accessed 5 November 2004).

Santillo, David and Paul Johnston Conference Reports: A Precautionary Tale Report Back from the Precautionary Principle Debate held at the Third SETAC World Congress, Brighton, May 21-25, 2000 available at:
<<http://www.scientificjournals.com>> (last accessed 10 November 2004).

Stewart, Richard B "Environmental Regulatory Decision Making Under Uncertainty" (2002) 20 Journal of Research in Law and Economics 71.

Sunstein, Cass R "Beyond the Precautionary Principle" (2003) 151 UPALR 1003, 1014.

Tarasofsky, Richard G *Preventing and controlling invasive alien species in trade* The Royal Institute of International Affairs WTO Public Symposium 26 May 2004, Geneva.

Vinyl Council of Canada <<http://www.cpia.ca>> (last accessed 27 October 2004).

Weiss, Jeffrey <<http://www.herecomesmongo.com>> (last accessed 20 August 2004).

West Germany v Denmark and West Germany v Netherlands ICJ Reports (1969), 43-44 North Sea Continental Shelf Cases.

AS7
VU
A66
V88
200-

	LAW LIBRARY A Fine According to Library Regulations is charged on Overdue Books.	VICTORIA UNIVERSITY OF WELLINGTON LIBRARY	

AS741
VUW
A66
V884
2004

VICTORIA UNIVERSITY OF WELLINGTON LIBRARY



3 7212 00834627 0