

Legal and Policy Responses to Invasives Species

Background Paper

Prepared for the Commission for Environmental Cooperation

Author:

Meinhard Doelle
March 1, 2001

TABLE OF CONTENTS

INTRODUCTION	2
1. THE LEGAL FRAMEWORK	2
1.1. INTERNATIONAL CONTEXT	2
1.1.1. <i>United Nations Environment Program (UNEP)</i>	3
1.1.2. <i>Other UN initiatives on Aquatic Invasive Species</i>	4
1.1.3. <i>Other relevant international initiatives</i>	4
1.2. OVERVIEW OF THE US LEGAL FRAMEWORK ON AQUATIC INVASIVE SPECIES.....	6
1.3. OVERVIEW OF THE CANADIAN LEGAL FRAMEWORK ON AQUATIC INVASIVE SPECIES	8
1.4. OVERVIEW OF MEXICO'S LEGAL FRAMEWORK ON AQUATIC INVASIVE SPECIES	10
1.5. SUMMARY	13
2. PRINCIPLES OR APPROACHES TO BE CONSIDERED AS A BASIS FOR A FRAMEWORK FOR COLLABORATION	14
3. LAW AND POLICY TOOLS.....	17
3.1. ECOLOGICAL RISK ASSESSMENT	17
3.2. COORDINATING INSTITUTIONS	19
3.3. ECONOMIC INSTRUMENTS.....	21
3.4. PERMITTING	22
CONCLUSION	23

Introduction

Invasive species are a serious threat to biological diversity and can cause economic losses to such industries as agriculture, aquaculture, and forestry. The magnitude of the aquatic invasive species problem has increased as world trade has escalated. In response to this problem, efforts to prevent, eradicate or control aquatic invasive species have increased dramatically in recent years. At the same time, much remains to be done. New pathways and new invasions are still being discovered, often at a stage when they have become well established, thereby making prevention, eradication and control very expensive and difficult to achieve.

The purpose of this background study is to review existing legal frameworks in Canada, the US and Mexico as well as international instruments and institutions dealing with this issue. The study provides a brief survey of legal tools that address aquatic invasive species, and suggests possible approaches and tools for tri-lateral cooperation. This paper was prepared as a background document for discussions to be held at a workshop with representatives of the three North American countries in Montreal, Quebec in March 2001. It is not intended to be a complete survey of all aspects of the aquatic invasive species issue, nor is it intended to reflect the opinion or policy of the Commission for Environmental Cooperation nor of any of the institutions or their representatives who participated in the development and execution of the workshop.

1. The Legal Framework

1.1. International Context

There has been considerable international effort to address the issue of invasive species. The approach to invasives has evolved from a focus on specific pests and diseases that threaten human health or commercial plants and animals to a recognition that biodiversity and nature conservation issues also need to be considered. To date, however, much of the international effort has been fragmented, and efforts to develop a more cohesive approach to invasives are still in the early stages. There are over 40 binding and non-binding international agreements and other instruments that deal in some way with invasives. About half of these instruments have implications for aquatic invasive species in the North American region. Appended to this paper is Annex 2 from the IUCN Global Strategy on Invasive Alien Species (Draft Jan.2001). This gives an overview of the range and variety of these instruments. The lead international agencies working to better coordinate international efforts are the United Nations Environment Program (UNEP), the Food and Agriculture Organization (FAO), the International Maritime Organization (IMO), and the World Conservation Union (IUCN). The following are some highlights of what is currently in place internationally.

1.1.1. United Nations Environment Program (UNEP)ⁱ

Under the UNEP umbrella, considerable international effort has been made on the issue of invasives over the past few years. In Chapter 15 of Agenda 21, the contribution of invasive species to loss of biodiversity is formally acknowledged. Chapter 17 of this instrument provides for states to work individually and in cooperation to address the issue of aquatic invasives in the context of ballast water and aquaculture. Chapter 18 assigns responsibility for freshwater noxious species to individual states.

These chapters of Agenda 21, which are non-binding, build upon initial acknowledgement of the invasive aquatic species issue under the Law of the Sea Convention (LOS)ⁱⁱ, which was signed in 1982. Under Article 196 of LOS, states are required to take all measures necessary to prevent, reduce and control pollution of the marine environment resulting from the intentional or accidental introduction of species that may cause harm. The US and Canada have not ratified the LOS. Mexico ratified the Convention in 1983.

Article 8(h) of the 1992 Convention on Biological Diversity (CBD)ⁱⁱⁱ includes a very general commitment by parties “as far as possible and as appropriate” to prevent the introduction of, control or eradicate alien species that threaten ecosystems, habitats or species. The Convention endorses the application of the precautionary approach to issues of biodiversity. In addition there are general requirements under the Convention that provide tools for addressing the invasives issue. They include integration of biodiversity into sectoral and cross-sectoral plans, programs and policies, identification and monitoring processes, and a requirement to carry out environmental impact assessments for relevant projects, programs and policies^{iv}.

In 1995, efforts of the parties under CBD led to the Jakarta Mandate on Marine and Coastal Biological Diversity^v. It was followed up at COP 4 with a more detailed response, including the following three objectives that are relevant to the issue of invasive species: 1) to better understand the causes and impacts of introductions, 2) to identify gaps in legal instruments, and 3) to track incidents of invasions^{vi}. The Jakarta Mandate further endorses a precautionary approach and prevention over eradication and control^{vii}.

In 2000, the Cartagena Protocol on Biosafety was opened for signature under the CBD. It includes provisions for advance informed agreement by the receiving country for living modified organisms for intentional introductions into the environment (articles 7-10), as well as provisions for handling, transport, packaging and identification (article 18). The CBD Secretariat has taken the further step of developing interim Guiding Principles for the Prevention, Introduction and Mitigation of Impacts of Alien Species. These were presented to COP5 in May 2000^{viii}. While not formally endorsed, they do provide a preliminary indication of what international guiding principles and priorities might be adopted on this issue. They support a sequenced approach, with a focus on prevention, then eradication, and long term control where eradication is not possible. These

principles are to be further developed in time for COP6. They include the following additional priorities: standardized terminology, criteria for assessing risk, and processes for assessing socio-economic and biodiversity impacts.

The Scientific Committee on Problems of the Environment (SCOPE) has coordinated, with the collaboration of the Centre for Agriculture and Biosciences International (CAP International), IUCN and UNEP, the Global Invasive Species Programme (GISP), which was established in 1997 to address global threats caused by invasive alien species and, among other things, to provide support to the implementation of article 8(h) of the CBD. It has recently released a Global Strategy on Invasive Alien Species^{ix}.

Non-binding guidelines issued by the Global Program of Action for the Protection of the Marine Environment from Land-Based Activities in 1995 refer to the threat of invasive species to marine ecosystems, but do not offer any specific solutions^x.

1.1.2. Other UN initiatives on Aquatic Invasive Species

The Food and Agriculture Organization (FAO) of the UN has also taken steps to address certain aspects of the issue of aquatic invasive species. Most relevant, perhaps is the Code of Conduct for Responsible Fisheries adopted by the 28th Session of the Conference in November 1995^{xi}. The Code calls on states to develop international standards and procedures for the introduction and transfer of aquatic organisms. In the meantime, states are asked to minimize or prevent harmful effects of introducing stocks or species, both within their own borders and beyond. The Code includes specific recommendations on steps to be taken prior to introduction, prevention of unauthorized introductions, policies for ongoing introductions and transfers, and steps to be taken before releasing genetically modified organisms^{xii}. Pre-introduction discussions with neighboring states are an important part of the process. The Code covers fishing practices and aquaculture. Another related instrument is the 1994 Code of Practice on the Introduction and Transfer of Marine Organisms developed by the International Council for the Exploration of the Sea (ICES)^{xiii} in partnership with a European FAO subcommittee on inland fisheries.

In 1997, the International Maritime Organization (IMO), established under the UN, issued Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens^{xiv}. These guidelines are intended to assist states in their efforts to balance ship safety issues with minimizing the risk of introducing harmful aquatic organisms and pathogens through ballast water. Discussions are ongoing on a legally binding international instrument, either under MARPOL 1973, or as a separate agreement.

1.1.3. Other relevant international initiatives

The World Conservation Union (IUCN)^{xv} has recently developed Guidelines for the Prevention of Biodiversity Loss Caused by Alien Invasive Species. They provide

guidance on the prevention of introduction, re-introduction, and the eradication and control of alien invasive species.

There are a few other related international Codes. One is the 1995 FAO Code of Conduct for the Import and Release of Exotic Biological Control Agents. It outlines obligations for both the exporting and importing country, and was adopted under the International Plant Protection Convention (IPPC) as an international standard for phytosanitary measures. Sanitary and phytosanitary measures, such as those by the FAO and the IPPC, are among the more established and applied international initiatives.

The objective of these measures is to protect humans, animals and plants, either cultivated or wild, from damage as a result of the introduction of pests and diseases. These measures, which focus on import and export controls, generally do not have environmental protection as an objective. Much of the effort in this area relates to land based species, but they do have implications for aquatic species.

The International Health Regulations formulated by the World Health Organization contain goals and objectives, which include improving sanitation in ports, and the detection, reduction and elimination of sources of infections that pose a threat to human health^{xvi}. The International Plant Protection Convention (IPPC)^{xvii} provides a framework for action to prevent the spread and introduction of pests of plants and plant products and to promote appropriate control measures. Pests are defined broadly to include any species, strain or biotype, animal or any pathogenic agent that is a threat to plant or plant products. Parties are required to have national systems in place for inspection, reporting, control, risk analysis, phytosanitary security measures before export, and protection of endangered areas. Under the IPPC standards, a three-step pest risk analysis process is set out to justify measures when particular standards do not exist. In North America, the North American Plant Protection Organization^{xviii} was set up in 1976 through a trilateral agreement involving Mexico, Canada, and the US to prevent the introduction and spread of plant pests and noxious weeds and to foster the preservation of plant resources.

The issue of sanitary and phytosanitary measures is closely linked to the issue of international trade. Most directly related is the 1995 World Trade Organization (WTO) agreement on the application of Sanitary and Phytosanitary Measures (SPS Agreement)^{xix}. The WTO regime governs international trade among its 138 member states, based on the principles of non-discrimination, transparency, and predictability^{xx}. The SPS Agreement allows countries to restrict trade in the process of implementing sanitary and phytosanitary measures, if certain conditions are met. The measures must be based on recognized international standards. The IPPC standards, for example, are recognized by the WTO under the SPS Agreement. Risk assessment must be based on sound scientific principles and evidence, measures must be applied consistently, they must be transparent, and they must not be more trade restrictive than necessary^{xxi}.

In a regional context, under the North American Agreement for Environmental Cooperation^{xxii}, the Council of the Commission on Environmental Co-operation (CEC)

has discretion to consider and develop recommendations on the exotic species that may be harmful. Under the North American Free Trade Agreement, Articles 712(1) and 716 provide for state powers to take necessary sanitary and phytosanitary measures in the context of human health and the protection of plant or animal life.

Outside of the context of sanitary and phytosanitary measures, the issue of balancing trade with prevention of invasions has not been addressed. Specifically, the issue of how to balance principles of precaution and prevention under the proposed CBD guidelines with the principles of consistency, transparency, and least trade restrictiveness under the WTO has not been resolved at the international level.

Finally, there are a number of North American bilateral agreements worth noting. One is the Convention on Great Lakes Fisheries between the US and Canada^{xxiii}, whose purpose is the control and eradication of the Atlantic sea lamprey. Another is the 1992 Environmental Cooperation Agreement between the state of Washington and the province of British Columbia (discussed later in section 3.1 below), the scope of which includes invasive aquatic species^{xxiv}. The International Joint Commission has also carried out work on the issue of invasive aquatic species, particularly in the context of fresh water^{xxv}.

1.2. Overview of the US legal framework on Aquatic Invasive Species

Among the many US federal acts that pertain to non-native species, this paper discusses four major federal initiatives that relate most directly to the issue of invasive aquatic species in the US^{xxvi}. They include the Lacey Act of 1900^{xxvii}, the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, the National Invasive Species Act of 1996, and President Clinton's 1999 executive order regarding federal coordination of efforts to deal with invasive species.

The Lacey Act represents the first congressional effort to address the problem of invasive species introductions. It prohibits "importation into the United States...of such other species of wild mammals, wild birds, fish (including mollusks and crustacea), amphibians, reptiles, brown tree snakes, or the offspring or eggs of any of the foregoing which the Secretary of the Interior may prescribe by regulation to be injurious to human beings, to the interest of agriculture, horticulture, forestry, or to the wildlife resources of the United States."^{xxviii}

Other parts of the Lacey Act contained in Title 16 of the U.S. Code on Conservation make it illegal "to import, export, transport, sell, receive, acquire, or purchase in interstate or foreign commerce...any fish or wildlife taken, possessed, transported, or sold in violation of any law or regulation of any State or in violation of any foreign law."^{xxix} Its impact is limited to controlling intentional introductions of certain listed species of wildlife considered injurious. It uses a "dirty list" or black list approach, which means that it applies controls to only those species identified on the list. There are currently 12

mammals, four bird species, one reptile, one mollusk, and one crustacean listed under the Act^{xxx}.

The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA) was passed in response to the zebra mussel invasion of the Great Lakes. Zebra mussels were introduced to the Great Lakes through ballast water discharge. The Act provides for the creation of an Aquatic Nuisance Species Task Force, and requires the Secretary of Transportation^{xxxii} to pass rules preventing the release of aquatic invasive species into the Great Lakes from ballast water. Under this act a mandatory regime went into effect in 1993 applying to ballast water discharge from vessels putting into port in the Great Lakes.

The National Invasive Species Act of 1996 (NISA)^{xxxiii} creates a mandatory regime to require ships operating in the Great Lakes to exchange ballast water prior to putting into port^{xxxiii}. This regime contains an exemption from this requirement relating to ship safety, which is in the sole discretion of the vessel masters. The Act provides for the establishment of national guidelines to prevent the introduction of aquatic invasive species as a result of ballast water discharge. To date, only voluntary guidelines have been issued for ballast water outside the Great Lakes Region.

There continue to be numerous discussions about gaps in the policies under both NANPCA and NISA. Issues raised include the broad "safety exemption", the need for new vessel construction standards, the viability of the current salinity test, the use of alternative treatment methods, and the exclusion of NOBOBs (no ballast on board) from current policy initiatives.

In President Clinton's 1999 executive order on invasive species^{xxxiv}, all federal agencies are called upon to identify actions they are engaged in that could impact on the status of invasive species. The order commits agencies to various response measures to ensure that their actions contribute to solving the invasive species problem. The order furthermore establishes another interagency committee, the National Invasive Species Council. Members include the Secretary of State, the Secretary of the Treasury, the Secretary of Defense, the Secretary of the Interior, the Secretary of Agriculture, the Secretary of Commerce, the Secretary of Transportation, the Department of Health and Human Services, and the Administrator of the Environmental Protection Agency. The Council issued a Management Plan on January 18, 2001 that presents nine interrelated priority areas for addressing invasive species problems. They include such aspects as national coordination, prevention and international cooperation.¹

The ability of States to regulate the introduction, eradication and control of aquatic invasive species is based on their broad regulatory authority under the US Constitution to protect the health and safety of their citizens and the integrity of their natural resources.

¹ See <http://invasivespecies.gov/council/mp.pdf>

Pollution prevention and control is recognized as falling within the general "policing powers" of states. This is subject to two limitations: the commerce clause and the notion of federal supremacy. The commerce clause holds that states cannot discriminate against or unreasonably burden interstate commerce. This has been interpreted to allow for discrimination if it serves a legitimate local purpose and there is no reasonable nondiscriminatory alternative means to achieve that purpose. States can therefore regulate aquatic invasive species introductions under appropriate circumstances. The notion of federal supremacy prevents states from passing laws that are in conflict with laws passed by Congress. This means states have to consider federal laws when passing state law dealing with this issue.

Various surveys have been conducted of US state laws controlling exotic invasives^{xxxv}. They show a variety of attempts to deal with the issue of aquatic invasives but portray an overall inconsistent approach. California, for example has enacted legislation dealing with ballast water, including reporting requirements and exchange regulations specifically designed for aquatic invasive species introductions^{xxxvi}. California is using a "clean list" of aquatic invasive species, which means importation into the state of all but those species listed in regulations is prohibited. Similarly, the release of most aquatic invasive species is prohibited. However, aquatic invasive species regulations in California do not currently apply to pathogens, nor do they contain specific provisions for cooperation with and notification to other jurisdictions.

Michigan uses a clean list approach but only for aquaculture.^{xxxvii} Other states either use their own "dirty lists", or have no restrictions on the importation or release of aquatic invasive species that go beyond federal laws. With respect to aquaculture, some states such as Washington use ecological risk assessment as part of the licensing process. The states of Oregon and Washington are in the process of developing new regulations on aquatic invasive species, including ballast water^{xxxviii}.

1.3. Overview of the Canadian legal framework on Aquatic Invasive Species

Constitutionally, federal jurisdiction over aquatic invasive species stems from federal power over fisheries and shipping, and the "peace order and good government" clause. The overarching federal policy direction for action on aquatic invasive species in Canada appears to come predominantly from the Canadian Biodiversity Strategy (1995)^{xxxix}. The strategy calls for national and international databases to provide means to anticipate, identify and monitor alien organisms, screening standards, risk assessment, elimination of common sources of unintentional introductions, effective control and eradication measures supported by strong legislation and enforcement, public education and research. This is complemented by Canada's National Wildlife Policy, which states that no non-indigenous species should be introduced into a natural ecosystem, and that introductions into modified ecosystems should only be permitted under limited circumstances^{xl}.

At the federal level, the Fisheries Act^{xli} contains provisions governing the conservation and protection of fish and fish habitat. It is the federal act, which most directly addresses

threats from aquatic invasive species. It includes license requirements for the release of live fish into any fish habitat, any transfer of live fish to a rearing facility, and regulations dealing with live bait. Importation of cultured fish and eggs or wild fish also requires a permit. Responsibility for implementing this Act rests with Fisheries and Oceans Canada, although responsibility for inland fisheries lies with the provinces^{xlii}. Fisheries and Oceans Canada has developed a draft National Policy on Introductions and Transfers of Aquatic Organisms^{xliii}. The policy is primarily aimed at conserving the production capacity of the fisheries resource. As such, it may not address the full range of issues regarding aquatic invasives in a comprehensive manner^{xliv}. A recent report by the Auditor General of Canada highlighted areas of concern in how the federal government is meeting its legislative obligations under the Fisheries Act to protect wild Pacific salmon stocks and habitat from the effects of salmon farming including from the escape of farmed Atlantic salmon^{xlv}.

Section 657.1 of the Canada Shipping Act^{xlvi} provides for the power to pass ballast water regulations. No such regulations have been passed to date. Currently the Department of Fisheries and Oceans is administering voluntary guidelines known as the Great Lakes Ballast Water Control Guidelines^{xlvii}. These guidelines encourage vessels in the Great Lakes and Hudson Bay region to exchange near shore ballast water in open waters, to reduce the risk of introduction of aquatic invasive species in near shore ecosystems. The Port of Vancouver and two other British Columbia ports have used port legislation to implement a mandatory ballast water exchange regime^{xlviii}.

Other related federal legislation includes the Canadian Environmental Protection Act (CEPA (1999) and the Canadian Environmental Assessment Act (CEAA). Environment Canada considers alien species, including microorganisms, to be new substances under CEPA (1999), and thereby subject to regulation^{xlix}. Under this interpretation, anyone wishing to introduce a new alien species into Canada could be required to provide sufficient information to allow Health Canada and Environment Canada, the responsible government departments, to conduct a risk assessment to identify possible risks to human health or to the environment including its biodiversity^l. CEPA could then provide an opportunity for a federal assessment before intentional introductions of new species take place leading to prohibition or acceptance of the introduction or the imposition of conditions. The requirements of CEPA could be applied on an ecosystem basis, which means separate notification and risk assessment could be required for each ecosystem. The implementation of these provisions is left to the discretion of the Minister.

Under CEAA^{li}, the introduction of an alien species can be listed as an activity requiring an environmental assessment. This has, in fact, been done for certain introductions of animals licensed by the Canadian Food Inspection Agency under the Health of Animals Act^{lii}. The result is that a consideration of environmental implications are superimposed on the regulator, who previously only had to consider issues of human health and protection of certain commercially important plants and animals. CEAA also requires the consideration of cumulative effects, a crucial concept in the context of invasive species.

The Act does not, however, specifically identify the threat of invasive species as an environmental effect to be considered in conducting environmental assessments. This means in practice that unintentional introductions through projects that are assessed under CEAA may not always be addressed, unless the risk of invasion is identified in the scoping process.

The Wild Animal and Plant Protection and Regulation of International and Interprovincial Trade Act^{liii} (WAPPRIITRA) regulates international and inter-provincial trade in wildlife in order to protect Canadian ecosystems, wild animals and plants. It provides a national framework for coordinating animal and plant importation. Currently, only a limited number of species require a permit under the Act for importation into Canada, essentially a “dirty list” approach. With respect to inter-provincial transport, WAPPRIITRA adopts provincial regulations, which often exclude aquatic species as they are regulated under fishing regulations^{liv}

Provincial jurisdiction over aquatic invasive species in Canada arises primarily from the specific pathway or commercial activity affected. Examples of pathways and commercial activity over which provinces have jurisdiction include tourism, commerce in aquarium organisms, and regulation of the aquaculture industry. For example, a 1988 Memorandum of Understanding on Aquaculture Development between the Federal Department of Fisheries and Oceans and the Province of British Columbia assigns to the province primary responsibility for the management and development of the aquaculture industry. Effective implementation of prevention, eradication and control measures for these pathways therefore requires cooperation from the provinces.

The importance of provincial cooperation becomes even more obvious when one considers the delegation of federal power that has taken place for the inland fishery. It is provincial authorities that generally deal with the importation, transfer and release of fish into inland waters, with fish bait and with the regulation of fish stocking. Aquaculture is regulated provincially, even in marine waters. The general approach in provincial legislation for aquaculture is to require a permit for any aquaculture operation. Little guidance is provided in the legislation on how permit decisions will be made or who bears the risk of escapes. Moreover, provincial legislation on aquaculture fish bait and fish stocking, deals primarily with commercial considerations for these activities, not with any potential threat to biodiversity^{lv}.

In summary, provincial efforts to deal with aquatic invasives species are a patchwork initiative with little consistency among provinces. The focus is generally on commercial and direct human impact, not on environmental and biodiversity protection.

1.4. Overview of Mexico's legal framework on Aquatic Invasive Species^{lvi}

In Mexico, the regulatory framework for the protection of the environment in general has its underpinnings in a set of legal principles set out in Articles 25 and 27 of the Constitution, enshrining the right of the Nation to regulate the use of natural resources for

purposes of conservation. These principles are put into effect through government policies and agencies that regulate economic activities relating to natural resources, including fisheries and aquaculture.

Based on these constitutional principles, the General Law on Ecological Balance and Environmental Protection (*Ley General del Equilibrio Ecológico y la Protección al Ambiente*—LGEEPA) sets out the criteria to be observed in the preservation and sustainable use of flora and fauna. It empowers the federal government to regulate their protection and preservation, among other things, and it explicitly establishes the obligation to protect aquatic ecosystems. It empowers the Ministry of the Environment and Natural Resources (*Secretaría del Medio Ambiente y Recursos Naturales*—Semarnat) to issue technical standards for the protection of species^{lvii}. Specifically, this law authorizes Semarnat to impose restrictions on the circulation over national territory of wildlife species originating from or destined for other countries, and to coordinate with the Ministry of the Economy (*Secretaría de Economía*) the establishment of regulations or restrictions on the import and export of wildlife specimens.^{lviii}

Regarding the “use” and “enjoyment” of live aquatic resources, the LGEEPA^{lix} refers to the provisions of the Fisheries Law (*Ley de Pesca*)^{lx}. This latter derives its authority from Article 27 of the Constitution insofar as it relates “to the natural resources constituted by the flora and fauna whose habitat... is water”. Its object is to “... guarantee the conservation, preservation and rational use of fisheries resources and to establish the basis for their suitable development and administration...”^{lxi}.

Of relevance of the issue of aquatic species, is Article 3 of the Fisheries Law, which empowers the Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food (*Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación*—SAGARPA)^{lxii} to authorize the introduction of aquatic wildlife species, promote the development of aquaculture as well as to order measures — in coordination with SEMARNAT — for the conservation of aquatic species.^{lxiii}

This law provides that the introduction of live species into bodies of water requires the “authorization” of the SAGARPA^{lxiv}. The application for this authorization must contain general information on the species to be introduced, the proposed place of introduction, and specific information on the quantity to be introduced and the stage of development of the species, among other information.^{lxv} In addition, the Regulation to the Fisheries Law requires an aquacultural health certificate and a report stating that the genome of the species will not alter the species inhabiting the body of water in question. For imported species, there is the further requirement of a study on the disease history of the area of origin as well as the genetic history. For species that do not exist naturally, a technical study on the biology and habits of the species must also be submitted. The Regulation also provides that for exotic species, the potential effects of the introduction of the species on native flora and fauna must be described.

Furthermore, the Regulation states that the Ministry will only authorize the introduction of live species of aquatic flora and fauna onto national territory upon presentation of a health certificate issued by the competent authority of the country of origin.^{lxvi} The introduction of species causing harm to, altering or endangering fisheries resources is punishable under the Fisheries Law by a penalty ranging from a fine to seizure and revocation of the authorization (and in the case of aquaculture, of the concession to carry on the activity).^{lxvii}

To implement these regulations, a series of technical standards have been issued on the use and enjoyment of fish resources. In particular, the requirements for obtaining an authorization to introduce live aquatic flora and fauna into the Vicente Guerrero reservoir in Tamaulipas^{lxviii} and the El Infiernillo reservoir in Michoacán^{lxix} are set out in the relevant standards.

Also, since the previous “... indiscriminate introduction without sanitary controls...” of aquatic live organisms onto the territory “... was the mechanism whereby various pathogens were dispersed...” among the country’s aquaculture facilities, in 1994 a technical standard^{lxx} was published to establish health requirements for the import onto national territory of live aquatic organisms in any of their stages of development for use in aquaculture or as pets.

There is another legal tool which, in varying degrees, relate to the issue of species introduction in that the protection of aquatic species is one of its proximate objectives. This instrument is the National Fisheries Chart (*Carta Nacional Pesquera*). Developed by the SAGARPA, it is an indicator of the availability and conservation status of fisheries and aquaculture resources. It is intended to guide the management of these resources, but also to establish guidelines and strategies for the protection, restoration and use of aquatic resources as well as for the productive activities with a potential effect on ecosystems. The most recent version of this instrument^{lxxi} presents indicators in the form of charts or data sheets for various headings, categorizing the information and analyzing the status of the resources, identifying problems and recommending measures. Two examples are relevant to this issue. Regarding the status of shrimp, the Chart recommends research into biotechnological cultivation techniques for species native to the Gulf of Mexico and the application of standards for controlling the introduction of exotic species into the country. Regarding the San Quintin, Baja California coastal lagoon ecosystem, it recognizes the introduction of unauthorized species as having an environmental impact.

As may be noted, the legal tools so far commented regulate the intentional introduction of aquatic species and their main focus is not the biodiversity conservation but rather the sanitary issues affecting the use of the resource. That is, they tend to focus more on the introduction of diseases affecting the use of the resource than on protection of native species in maintaining ecological balance.

The EIA takes a different approach. It is an instrument whereby Semarnat establishes the conditions governing activities that may cause ecological imbalance. Specifically, the

LGEEPA Regulation on this matter provides that^{lxxii} anyone wishing to carry on aquaculture activities involving the stocking of aquatic ecosystems with exotic species, hybrids and transgenic varieties must possess the relevant EIA. This varies from the approach under the National Fisheries Chart, since the direct object of this instrument is the protection of ecological stability as such, not merely the use of the resource.

Also noteworthy is the Fisheries Law Regulation^{lxxiii}, whose aquaculture provisions characterize “Developmental Aquaculture” as being carried on for the purpose of scientific research and experimentation for the development of biotechnological techniques at any stage of the cultivation of aquatic species. For this activity, the Regulation provides that the interested party does not require a concession but rather a permit from the Ministry, which is granted where the applicant is in compliance with the aquacultural health standards and is contributing to the preservation of the environment and the conservation of species.

The competent agencies include SAGARPA and Semarnat. However, it is important to mention the inspection and enforcement role played by the Federal Attorney for Environmental Protection (*Procuraduría Federal de Protección al Ambiente—Profepa*). As a separate unit within Semarnat, it is empowered^{lxxiv} to enforce compliance with the environmental provisions relating to aquatic flora and fauna, and is specifically authorized^{lxxv} to conduct enforcement activities and prevent the unauthorized introduction of aquatic flora and fauna species. Its General Coordination of Ports, Airports and Borders (*Coordinación General de Puertos, Aeropuertos y Fronteras*) is in charge of verify that all legal requirements are accomplish when introducing aquatic species into the country.

1.5. Summary

- 1) The foregoing brief survey highlights the fact that many laws dealing with invasive species were drafted to address a narrower set of issues than those of concern today. Tools developed to deal with threats to agriculture or human health are incomplete or inconsistent for broader ecosystem concerns. It is beyond the scope of this paper to catalogue the gaps or inconsistencies in the legislation and policy in all three countries. The recent meeting (Montreal, March 12-16, 2001) of the Subsidiary Body on Scientific, Technical and Technological Advice reviewed existing measures and instruments to identify gaps and needs on a global basis. Their background paper “Review of the efficiency and efficacy of existing legal instruments applicable to invasive alien species” (UNEP/CBD/SBSTTA/6/INF/5 26 February, 2001) canvasses many of the gaps in existing instruments as well as other factors affecting the efficiency of existing efforts.

To address these concerns and others, some common themes have emerged in the

writings on this subject, both regionally in North America and internationally. Not only is there an effort to find better ways to collaborate internationally but there are also efforts to put into place effective law and policy tools. The rest of the paper discusses international principles or approaches as a foundation for collaboration; and aspects of a comprehensive law and policy framework.

2. Principles or approaches to be considered as a basis for a framework for collaboration

This section considers principles or approaches that could form the basis of either collaborative or individual actions within the various jurisdictions in Canada, Mexico, and the US. These are proposed in light of the international recognition they have received to date either in respect of the area of invasive species. It is important to recognize that such principles or approaches do not dictate or constrain the more specific actions that countries may choose to adopt. Rather they can serve as a common framework to help ensure that those actions and decisions work in a complementary fashion.

At its recent meeting in Montreal, March 12-16, 2001, the SBSTTA discussed its interim Guiding Principles for the Prevention, Introduction and Mitigation of Impacts of Alien Species. These guiding principles are annexed to this paper and are listed in summary fashion below:

- General
 - Guiding principle 1: Precautionary approach
 - Guiding principle 2: Three-stage hierarchical approach
 - Guiding principle 3: Ecosystem approach
 - Guiding principle 4: State responsibility
 - Guiding principle 5: Research and monitoring
 - Guiding principle 6: Education and public awareness
- Prevention
 - Guiding principle 7: Border control and quarantine measures
 - Guiding principle 8: Exchange of information
 - Guiding principle 9: Cooperation, including capacity building
- Introduction of species
 - Guiding principle 10: International introduction
 - Guiding principle 11: Unintentional introduction
 - Guiding principle 12: Mitigation of impacts
 - Guiding principle 13: Eradication
 - Guiding principle 14: Containment

- Guiding Principle 15: Control

Many of these principles are also found in the IUCN Guidelines for the Prevention of Biodiversity Loss caused by Alien Invasive Species, also attached to this paper for comparison purposes. These principles are intended to guide the workshop discussions.

Many of these principles already are at the root of efforts in North America and elsewhere. For example, Interim Guiding Principle 9 on Cooperation is based on the responsibility under international law that countries must ensure that activities within their jurisdiction or control do not cause harm to the environment of other countries. It implies having in place effective laws and institutions. While much work remains to be done at the international level, there is clearly considerable momentum on this issue within a number of international organizations, including the IMO, IUCN, FAO, and at UNEP in the context of the CBD. In North America, there are long-standing bi-national efforts between the US and Canada^{lxxvi} on Great Lakes water issues.

By way of illustration, the Great Lakes Fishery Commission was established under the Convention of Great Lakes Fisheries and is mandated to recommend appropriate measures to ensure maximum sustained productivity of fish stocks. Its recommendations on exotics in ballast water in 1988 prompted the development of the voluntary Canadian ballast guidelines and the enactment of NANPCA in the US. The Great Lakes Commission established a regional Panel on Aquatic Nuisance Species. In addition, the Great Lakes Water Quality Agreement (between the US and Canada) has mandated the International Joint Commission to provide advice to the US and Canada with recommendations on water quality. Although primarily focused on chemical contamination, exotic species and ballast water are mentioned in Annex 6 to this Agreement.

Much of the work at the international level has been driven by the recognition that the issue of invasive species must have a strong international coordination component coupled with national efforts. At COP5 of the Convention on Biological Diversity in May 2000, the Global Invasive Species Program (GISP) recommended a number of global, regional and national priorities. Global priorities identified include the following^{lxxvii}:

- Development of electronic and printed databases to assist in the sharing of most up to date information on alien invasive species and thereby improve opportunities for prevention and early eradication.
- Engaging key sectors involved in activities that can lead to new introductions, including shipping, pet trade, tourism, aquaculture, and botanical and zoological collections.
- Research for more effective alien species prevention and management approaches, including models for predicting invasiveness.
- Harmonization of terminology
- Harmonization of methodology (for example Environmental Risk

Assessment (ERA) approaches)^{lxxviii}

National and regional priorities were considered to include the following^{lxxix}:

- Development of national capacity in invasive species prevention and management
- Encouragement of regional cooperation to address regional threats.

To facilitate the CEC's member states' discussion on identifying regional priorities for addressing the aquatic invasive species problem, the following discussion questions are suggested:

- 1) Are there ongoing active international initiatives that make additional North American action an unnecessary duplication of effort?
- 2) Are there issues that would benefit from an independent North American solution/policy?
- 3) To what extent do the North American countries wish to set the standard for future international efforts at the global level? (i.e. what can be done to help international efforts move forward?)

Issues to be considered for tri-lateral cooperation include information-sharing with respect to possible threats of invasive species, joint training sessions on invasive species prevention and management, cooperation in identifying possible pathways, joint research initiatives, and coordination and joint decision-making in responding to any invasion that has the potential to cross political boundaries.

One example of active co-operation between jurisdictions in North America is the 1992 cooperative agreement between the U.S. Environmental Protection Agency (EPA) and the Canadian Department of Fisheries and Oceans (DFO). Under the agreement, the parties commissioned a report to assist the Washington and British Columbia Working Groups on Minimizing the Introduction of Exotic Species in developing their recommendations to the British Columbia/Washington Environmental Cooperation Council. The report, which came out in 1997, looks at the status and management of non-native invasive species introductions into the shared marine waters of British Columbia and Washington State. It evaluates pathways of invasive species introduction and management programs in place to address them. Recommendations include the development of baseline information and assessment methods, education, information exchange between jurisdictions, and the use of voluntary programs where effective^{lxxx}.

In addition, The Gulf of Maine Council on the Atlantic coast of Canada and the US may provide an effective vehicle to promote regional cooperation on this issue. This Council, which has been in existence for over ten years, involves five State and Provincial jurisdictions as formal parties to the Council, and is supported by the national governments of Canada and the US. It brings government officials from these seven jurisdictions together to identify and address common areas of concern with respect to the Gulf of Maine and the Bay of Fundy. The issue of aquatic invasive species was recently

identified as a suitable issue for the Council to address.

Finally, there are a number of existing trilateral initiatives in place among Mexico, Canada and the US that could play a role in future collaborations. They include the International Association of Fish and Wildlife Agencies (1902), the Waterfowl Management Plan-Eastern Habitat Joint Venture (1986), the North American Wildlife Enforcement Group (1995), and the Trilateral Committee for Wildlife and Ecosystem Conservation and Management (1996). These existing organizations may be potential partners to assist with inter-jurisdictional coordination. For example, the North American Wildlife Enforcement Group will be sponsoring a trilateral seminar on enforcement issues relating to invasives in 2002 and may be an appropriate body to assist in addressing certain enforcement issues common to all three countries.

3. Law and Policy Tools

This section outlines certain law and policy tools and responses that have been advocated in the context of invasive species. The tools and responses selected do not cover the complete range of options available, but are considered to be at the core of an effective policy response to the threat of aquatic invasive species. They are included here as a starting point for discussions on a tri-lateral approach to these tools.

They include:

- ecological risk assessment
- coordinating institutions
- economic instruments
- permitting

3.1. Ecological Risk Assessment

Risk analysis as a control mechanism has been used internationally for many years in the "invasives context". It is required under certain international agreements, such as the WTO SPS Agreement, the IPPC and the Cartagena Protocol on Biosafety.

Under the IPPC, Pest Risk Analysis standards have been developed that are recognized under the WTO SPS Agreement. These standards set out a three-stage process for risk analysis: initiating the risk analysis process, assessing the risk, and managing the risk. Following this process, parties make determinations as to whether phytosanitary measures are required. If such measures are found to be required, the process also directs how decisions are made about the appropriate response or options for response to the risks identified. The present version of the IPPC standards on Pest Risk Analysis focuses on economic implications^{lxxxix}. However, the need to revise the IPPC standards with the aim of broadening the scope to include environmental considerations has been identified^{lxxxii}.

There are a number of contexts in the US and Canada that already apply risk analysis in some form. In the US, at the federal level, the EPA has developed Ecological Risk Analysis standards^{lxxxiii}. There is also a Risk Assessment and Management process established under the Aquatic Nuisance Prevention and Control Act 1990. This review process was based on the Generic Non Indigenous Pest Risk Assessment Process^{lxxxiv}, which was developed by the Animal and Plant Health Inspection Service (APHIS) of the U.S. Department of Agriculture^{lxxxv}.

In addition, the Canadian Environmental Protection Act applies an ecological risk assessment process before permitting the introduction of any new species. So far, however, there is no recognized Canadian standard for ecological risk analysis. An effort is underway in Canada involving the Department of Fisheries and Oceans as well as its provincial counterparts to develop a standard ecological risk assessment process for implementation of the Fisheries Act, specifically in the context of fish stocking, live bait, and aquaculture. It is not clear to what extent this ecological risk assessment process currently under development may have broader application to invasives in other media^{lxxxvi}.

Aquaculture provides a good example of the application of risk analysis to invasives. British Columbia and Washington have both had risk analysis procedures in place for at least a decade. These procedures have resulted in intentional introductions of aquaculture species being more restricted now than in the past. Regulatory structures both in British Columbia and Washington require an extensive review process before fish, shellfish, or marine plants from other continents or from the east coast of North America (including species that have already become established on the Pacific coast) can be introduced to the shared Pacific waters^{lxxxvii}.

In both British Columbia and Washington, ecological, genetic, and animal health/disease issues are considered in evaluating permit requests; however, the health and disease requirements are far more specific than those for ecological and genetic issues. The disease-free requirements include inspection of source production facilities, health records from these facilities, disinfection procedures, and quarantine and testing of imported eggs. As a result, the risk of introducing infectious diseases with imported aquaculture products is markedly reduced and considered negligible by resource managers^{lxxxviii}.

One of the main variances among the various risk assessment processes being used is their scope. Most are directed to human health and economic risks. Only a few are starting to incorporate environmental factors in the risk analysis. Given the current trend toward reducing barriers to trade, how can countries design policies which balance the economic pressures for free trade against the need to impose restrictions to protect biodiversity?

As suggested by the WTO SPS agreement, standardized methodologies have the

advantage of providing a basis for distinguishing between appropriate regulatory responses and non-tariff barriers to trade. Furthermore, standards can provide consistency among the various jurisdictions involved, and can be an important step toward reducing the risk of introduction across political boundaries. Risk analysis standards can achieve this by ensuring that similar processes and criteria are being applied to determine whether and under what circumstances to allow activities that may lead to introduction of invasive species. Can a North American joint effort identify the parameters and standards needed for ecological risk assessment in the context of aquatic invasives?

3.2. Coordinating Institutions

There are two fundamentally different approaches to national or regional coordination of the regulation of invasive species introductions. One is to set up a coordinating body that includes representatives of all regulators currently dealing with some aspects of the issue. The other approach is to establish a new regulatory authority to ensure a comprehensive regulatory approach to the issue. New Zealand has adopted the latter approach, whereas the United States has adopted the former. In Canada discussions are underway to formulate a national strategy on invasives, a central part of which involves coordination issues.

The New Zealand approach of establishing a new central agency involves a comprehensive review and consolidation of existing measures on invasive species into a new legislative framework covering all categories of species, all sectors, all ecosystems, all potential pathways and a full range of response measures. The US approach under the National Invasive Species Council involves cooperation and coordination among existing regulators to ensure a comprehensive response to the threat of invasive species. It requires legislative and regulatory changes where there are gaps or inconsistencies that prevent an effective, standard, coordinated regulatory approach^{lxxxix}.

Isolated action by individual states can never be sufficient to manage the full extent of activities that lead to invasions. Institutional frameworks at the national, regional and international level can foster the coordination and collaboration needed to address gaps, weaknesses and inconsistencies. Efforts in British Columbia and Washington illustrate what has and can be done to respond to a specific pathway, and what role trilateral cooperation may play in enhancing existing efforts by various jurisdictions on invasives.

In Canada and the US, legislative, regulatory, and policy development regarding the aquaculture industry has taken place at the state and provincial level. The focus has often been to address conflicting-use issues, protection of commercial interests, and concern about human health. Aquaculture as a pathway for the introduction of aquatic invasive species has been recognized in some of the regulatory frameworks and policies that have been developed, particularly on the West Coast.

In British Columbia, aquaculture is regulated under the provincial Fisheries Act^{xc}. It provides for a permitting process for aquaculture^{xcⁱ}. Shellfish aquaculture has been practiced in British Columbia for over 100 years. An intensive salmon aquaculture has been a strong and growing industry since 1980. British Columbia has used risk assessment analysis for the introduction of aquatic invasive species through aquaculture for at least ten years^{xcⁱⁱ}.

In Washington State, the industry is similarly well established, although at a lesser scale than British Columbia. Similar to BC, there is a fairly extensive review process in place to be followed before non-indigenous species including fish, shellfish, or marine plants from outside the West Coast can be introduced. In addition to a permitting process implemented through the Washington Administrative Code, the state requires that the application undergo a multi-agency review at the state level^{xcⁱⁱⁱ}.

Both jurisdictions consider ecological, genetic, and animal health/disease issues in evaluating permit requests. One difference between the two jurisdictions is that Washington legislation applies to plant organisms, whereas British Columbia's does not. It would appear, overall, that through the work of the British Columbia/Washington Environmental Cooperation Council and related organizations, attempts have been made to coordinate efforts to prevent the introduction of aquatic invasive species through aquaculture activities^{xc^{iv}}.

A 1997 report on Pathways and Management of Marine Nonindigenous Species in the Shared Waters of British Columbia and Washington outlines threats associated with the aquaculture industry, including importation of Asian oyster seed, Atlantic salmon eggs and the Japanese scallop. Based on the study, the two jurisdictions have cooperated in either eliminating the need for importation, or have carried out extensive study of potential risk in at least one of the jurisdictions^{xc^v}.

The two jurisdictions are currently focussing on sharing information and identifying opportunities for cooperation. Working groups on this issue developed the following elements of a transboundary strategy:

- Education about the issues, pathways, and the role of the public
- Controlling pathways for introductions
- Rapid response and remediation
- Effective monitoring of control efforts and detection of new introductions
- Resources for management actions
- Research on invasive potential of alien species in the context of the local ecosystem, on possible pathways for introductions, and on control techniques
- Coordination involving governments and non-governmental organizations

The report also identified the need for cooperation in the following areas:

- 1) Joint clean lists as the basis for a coordinated regulatory response
- 2) A harmonized environmental risk assessment process
- 3) Ensuring that decisions about whether to permit the introduction of a species are consistent
- 4) Coordination in monitoring introductions that are permitted in the context of the aquaculture industry
- 5) Cooperation in responding to introductions that turn out to be invasive.

On the East Coast in Canada, the industry is less developed, as is the regulatory approach. While general permitting procedures exist in a number of Atlantic Provinces, such as New Brunswick and Nova Scotia, the risk of invasive species either through escapes or through pathogen contamination is generally not reflected in the regulatory approach. In New Brunswick, for example, a permit can be refused if the regulator determines that the proposed operation poses an unacceptable environmental risk^{xvii}. However, the threat of invasive species is not specifically identified as an unacceptable environmental risk, and the onus is on the regulator to identify unacceptable risk, rather than on the proponent to demonstrate that the risk is acceptable and can be minimized through mitigation measures.

The Gulf of Maine Council provides a possible mechanism for facilitating cooperation among jurisdictions on the eastern seaboard, but it is just starting to focus on this issue^{xviii}. It is an existing structure with experience in dealing with a range of marine environmental issues over its ten years of existence. One challenge on the East Coast in Canada and the US appears to be giving greater priority to the issue of aquatic invasive species.

The overriding challenge is how to link various regional initiatives to share information on pathways, control mechanisms and techniques as well as to coordinate research on ecosystem effects.

3.3. Economic instruments

Since invasions by alien species are a result of economic activity and have economic impacts, it makes sense to consider applying economic tools to influence or control these activities in tandem with traditional command and control regulatory responses. Many of them have been considered for invasive species regulation. The following is a non-exclusive list:

- **Insurance**, especially for commercial operations, is one measure to internalize the cost of responding to invasions. It may also encourage private regulation by the insurance industry by utilizing the insurer's motivation to reduce its exposure by reducing the risk of introduction of invasive species through activities of its insured. Availability of coverage and limitation of liability are related issues that would need to be addressed.

- **Deposits/performance bonds** can also help internalize costs but they place the financial incentive to reduce the risk more directly on the proponent of the activity that could lead to the introduction. For example, performance bonds could be required of commercial permit holders as a guarantee of compliance with conditions regarding alien species kept in containment.
- **Taxes/levies** can be designed to influence specific decisions, from the import stage to the final consumer. Such charges are most effective at improving decision making, if they target the decision-makers most likely to be in a position to prevent the introduction. Possibilities range from levies on shipments to cover the cost of inspections to taxes on sales of alien plants or animals by breeders or traders.
- **Fees/charges** are imposed on applicants for permits to carry out a controlled activity. These charges should be set at a level to recover all direct costs of permit applications. Recovering the hidden cost of use of natural resources could form the basis for imposing charges linked to the amount of such resources consumed.

There has been limited application of economic instruments in the context of aquatic invasive species. Some State and Provincial statutes on aquaculture are sufficiently broad to allow for insurance requirements, performance bonds, and fees as part of the permitting process. Similarly, where permitting processes exist for fish bait and fish stocking, the use of such economic instruments is either possible under the current regulatory regime, or could be with minor amendments. Finally, in the context of commercial fishing operations and their potential for introducing invasive species, economic instruments could be incorporated into licensing procedures.

3.4. Permitting

Permitting as a regulatory tool has been widely used by many jurisdictions in Mexico, the US and Canada to permit or disallow intentional introductions and to regulate activities with an inherent risk of introduction. The latter group includes permitting processes for aquaculture, live bait, and other fishing practices. Components of a permitting process as set out in the IUCN Guide on Designing Legal and Institutional Frameworks on Alien Invasive Species^{xcviii} include the following:

- A clear statement of what species are subject to the permit requirement
- A clear statement of information to be supplied by the applicant
- Public access to information on applications, criteria, hearings and decisions
- Risk analysis and environmental impact assessment, based on scientific principles and evidence
- Provision of objective and technically sound information to guide decision makers in

determining permit applications

- Possibility of permit conditions (monitoring, emergency plans, and containment procedures)
- Possibility of allocating the cost of the permit process to the applicant
- Sanctions for breach and non-compliance with the permit.

It is clear from this list that the issue of effective permitting is closely linked to a number of tools and principles already discussed. Permitting, if based on a clean list approach^{xcix}, for example, can be used to implement the principles of prevention and precaution. The concept of polluter pays can also become part of the permitting process, by requiring the applicant to bear the application cost, and through conditions for insurance or bonds as discussed under economic instruments. Setting appropriate fee structures and appropriate insurance requirement helps make use of these tools more effective. Finally, the permitting process ties in with ecological risk assessment, in a number of ways. It can be utilized in developing clean or dirty lists, to help regulators determine which permits can be granted without condition or further study, which ones should be refused, and which require more study.

Conclusion

Coordination and cooperation is key to effective regional control of invasives. Much of the experience to date in North America has been with bilateral coordination. The British Columbia/ Washington example shows coordination in responding to a specific pathway. Opportunities to expand these coordination efforts into such areas as research, information sharing, and public outreach should be explored as important elements for developing an effective tri-national response to aquatic invasive species problems.

While certain cooperative initiatives exist, there is potential for greater cooperation and coordination. Agreement among the North American countries on regional priorities to address the aquatic invasive species problem may be a useful first step. Such a framework could provide a foundation on which to build cooperation and coordination in such areas as research, information exchange, education, prevention, and controlling an effort to effectively address the threat of aquatic invasive species.

Bibliography

Biber, Eric, Exploring Regulatory Options for Controlling the Introduction of Non-Indigenous Species to the United States, 18 Virginia Environmental Law Journal (1999), 375 - 465

Casale, Gloria A., Welsh, Hugh H., The international Transport of Pathogens in Ships' Ballast Water, 65 Journal of Transportation Law, Logistics and Policy (1997), 79 - 87

Elston, Ralph, Ph. D., Pathways and Management of Marine Nonindigenous Species in the Shared Waters of British Columbia and Washington, (1997), Final Report, Puget Sound Water Quality Authority, USEPS, and DFO, Canada

Foster, Brent C., Pollutants without Half-lives: The Role of Federal Environmental Laws in Controlling Ballast Water Discharge of Exotic Species (2000), 30 Environmental Law 99

Glowka, Lyle, Bioprospecting, Alien Invasive Species, and Hydrothermal Vents: Three Emerging Issues in the Conservation and Sustainable Use of Biodiversity, 13 Tulane Environmental law Journal (2000), 329 – 360

GISP, Global Strategy on Invasive Alien Species, January 5, 2001 Draft, available at: <http://www.gisp.org>

Gruending, Lothar, Legal and Institutional Dimensions of Invasive Alien Species Introduction and Control, Report on IUCN Workshop in Bonn, December 10, 11, 1999

Hamilton, Jason R., All Together Now: Legal Responses to the Introduction of Aquatic Nuisance Species in Washington through Ballast Water, 75 Washington Law Review (2000), 251 – 279

Hedley J., The IPPC and Invasives, IUCN (2000)
http://www.iucn.org/themes/law/elp_invasives_Quarantine.htm

Keddy, Cathy, Smith, Murray, Tegler, Brent, The Role of Importation Control in Protecting Native Canadian Biodiversity (1999) Canadian Wildlife Service

Keddy, Cathy, Canada's Capability for Managing Alien Organisms: Implications for Conserving Native Biodiversity (1997) Canadian Wildlife Service

McNeely, Jeffrey A., Global Strategy for Addressing the Problem of Invasive Alien Species, Draft August 7, 2000, GISP

Nadol, Viki, Aquatic Invasive Species in the Coastal West: An Analysis of State Regulation within a Federal Framework, 29 Environmental Law (1999) 339

O'Shea, Sharonne and Cangelosi, Allegra, Trojan Horses in our Harbors: Biological Contamination from Ballast Water Discharge, 27 University of Toledo Law Review (1996), 381 – 400

Puget Sound/Georgia Basin International Task Force, Pathways to Our Optimal Future: A Five-Year Review of the Activities of the International Task Force, Draft for Discussion, October 1999.

Shine, Clare, Williams, Nattley, and Gruendling, Lothar, A Guide to Designing Legal and Institutional Frameworks on Alien Invasive Species, Environmental Policy and Law Paper No. 40, IUCN Environmental Law Centre (2000)

Relevant Web-sites

- Am. Fish. Society: <http://www.fisheries.org/resource/page1.htm>
- Can Fed Laws: <http://canada.justice.gc.ca/en/laws/index.html>
- Can BC Laws: http://www.qp.gov.bc.ca/stat_reg/statutes/
- Can NB Laws: <http://www.gov.nb.ca/justice/asrlste.htm>
- Can NS Laws: <http://www.gov.ns.ca/legi/legc/>
- Can Food I. Agency: <http://www.cfia-acia.agr.ca/english/toce.shtml>
- Can Wildlife Serv.: http://www.cws-scf.ec.gc.ca/cwshom_e.html
- CBD <http://www.biodiv.org/>
- CBD Conv. Text: <http://www.biodiv.org/chm/conv/default.htm>
- CBD Cartagena: <http://www.biodiv.org/biosafe/protocol/FAQs.html>
- CBD AIS Principles: <http://www.biodiv.org/sbstta5/Html/SBSTTA-5-05e.htm>
- CBD Jakarta: <http://www.biodiv.org/jm/7.html>
- FAO: <http://www.fao.org/>
- FAO (Fish. Code): <http://www.fao.org/fi/agreem/codecond/ficonde.asp>
- GISP: <http://www.iscu-scope.org/projects/gisp.htm>
<http://www.gisp.org>
- Gr. L. Sport Fish. C: <http://www.great-lakes.org/exotics.html>
- Gr. L. AIS Panel: <http://www.glc.org/ans/anspanel.html>
- Gulf of Mexico Pr.: <http://www.gmpo.gov/welcome.html>
- ICES Code: <http://www.ices.dk/pubs/pubs.htm>
- IMO <http://www.imo.org/>
- IPPC <http://www.fao.org/legal/treaties/004t-e.htm>

IUCN: <http://www.iucn.org/themes/ssc/index.htm>

IUCN AIS Guidel.: <http://www.iucn.org/themes/ssc/pubs/policy/invasivesEng.htm>

IUCN Dec 99 Rep: <http://www.iucn.org/themes/law/WorkshopReport.htm>

IUCN ISSG: <http://www.issg.org/>

LOS 1982 <http://www.un.org/Depts/los/losconv2.htm>

United Nations: <http://www.un.org/english/>

UNEP: <http://www.unep.org/>

US Coast Guard http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2000_register&docid=fr13ap00-125

US Inv. Sp. Council: <http://www.invasivespecies.gov/council/main.shtml>

US EPA <http://www.epa.gov/>

US Ex Order 13112: <http://www.invasivespecies.gov/laws/execorder.shtml>

US Fed Acts: <http://www.invasivespecies.gov/laws/fedacts.shtml>

US Fish and Wildl.: <http://invasives.fws.gov/Index4.html>

US NANPCA: <http://anstaskforce.gov/toc.htm>

US AIS state laws: <http://invasivespecies.gov/laws/state/statemain.shtml>

Wash/BC 1997 Rep.: http://www.wa.gov/puget_sound/shared/nis.html

Glossary

AIA	Advance Informed Agreement (CBD Cartagena Protocol)
APHIS	Animal and Plant Health Inspection Service (US Department of Agriculture)
BCH	Biosafety Clearing-House (CBD Cartagena Protocol)
CBD	1992 Convention on Biological Diversity
CEAA	Canadian Environmental Assessment Act
CEPA	Canadian Environmental Protection Act
CFC's	Chloroflourocarbons
COP	Conference of the Parties under a UN Convention
DFO	Department of Fisheries and Oceans (Canada)
EPA	Environmental Protection Agency (US)
ERA	Ecological Risk Analysis
FAO	Food and Agriculture Organization (UN)
GISP	Global Invasive Species Programme
ICES	International Council for the Exploration of the Sea
IPPC	International Plant Protection Convention
IMO	International Maritime Organization (UN)
IUCN	World Conservation Union
LEGEEPA	Mexico's National Law on Environmental Protection
LOS	Law of the Sea Convention of 1982 (UN)
LMO's	Living Modified Organisms (CBD Cartagena Protocol)
NAFTA	North American Free Trade Agreement
NANPCA	Nonindigenous Aquatic Nuisance Prevention and Control Act (1990) (US)
NISA	National Invasive Species Act (1996) (US)
SAGARA	Environmental Secretary (Mexico)
SARA	Species at Risk Act (Canada)
SEMARNAP	Secretary of Agriculture, Livestock, Rural Development, Fishery and Food (Mexico)
SPS	Sanitary and Phytosanitary Measures
UNEP	United Nations Environment Program
WAPPRIITA	Wild Animal and Plant Protection and Regulation of International and Interprovincial Trade Act
WTO	World Trade Organization

Endnotes

-
- ⁱ See UNEP web site: <http://www.unep.org/>
- ⁱⁱ For copy of LOS, see: <http://www.un.org/Depts/los/losconv2.htm>
- ⁱⁱⁱ For information on the CBD, see: <http://www.biodiv.org/>
- ^{iv} See Article 6, Article 7 (plus Annex I), and Article 14 of the Convention respectively
- ^v For more information on the COP 4 follow-up to the Jakarta Mandate, see:
<http://www.biodiv.org/Decisions/Cop4/html/COP-4-Dec-05.html>
- ^{vi} *ibid*, see COP 4: Programme element 5. Alien species and genotypes
- ^{vii} *ibid*, see COP 4: B. Basic Principles
- ^{viii} See COP 5 decision at: <http://www.biodiv.org/decisions/cop5/html/cop-5-dec-08-e.htm>, Annex I
- ^{ix} <http://www.gist.org>
- ^x www.unep.org/unep/gpa/pol2a.html
- ^{xi} A copy of the Code of Conduct is available at: <http://www.fao.org/fi/agreem/codecond/ficonde.asp>
- ^{xii} *ibid*, Articles 6 - 10
- ^{xiii} For a copy of the ICES Code, see: <http://www.ices.dk/pubs/pubs.htm>
- ^{xiv} For more information see IMO Global Ballast Web Site: <http://globallast.imo.org/>
- ^{xv} The Guidelines, which were formally adopted by the IUCN Council in Feb 2000, are available at the IUCN web site at: <http://www.iucn.org/themes/ssc/pubs/policy/invasivesEng.htm>.
- ^{xvi} For more information, see: <http://www.who.int/emc/IHR/IHRtrade.pdf>
- ^{xvii} See <http://www.fao.org/legal/treaties/004t-e.htm>, Articles 2 and 6
- ^{xviii} See http://www.nappo.org/menu_e.shtml
- ^{xix} For more information on the SPS agreement, see: <http://www.fao.org/UR/manual/III-11e.htm>, and for the text, see: http://www.wto.org/english/tratop_e/sps_e/spsagr.htm
- ^{xx} For a general overview of WTO policy on trade and the environment, see: <http://www.fao.org/UR/manual/I-06e.htm>
- ^{xxi} *supra*, xviii, Articles 2, 3 5, and 7
- ^{xxii} Article 10 (2)(h), see:
http://www.cec.org/pubs_info_resources/law_treat_agree/naaec/index.cfm?varlan=english
- ^{xxiii} Web site: <http://www.glf.org/pubs/conv.htm>
- ^{xxiv} For a copy of the 1997 report prepared under this agreement, see:
http://www.wa.gov/puget_sound/shared/nis.html
- ^{xxv} For more information on the IJC, see: <http://www.ijc.org/ijcweb-e.html>, and for a copy of the Great Lakes Water Quality Agreement, see: <http://www.ijc.org/agree/quality.html>
- ^{xxvi} Several other federal laws deal with plant invasives and are not discussed here.
- ^{xxvii} Ch. 553, 31 Stat. 187, partially repealed by Lacey Act Amendments of 1981, Pub L. No. 97-79, 95 Stat. 1073 (codified as amended at 16 U.S.C. [subsection] 701, 3371-3378, 18 U.S.C. [sections] 42 (1994))
- ^{xxviii} 18 U.S.C. 42(a)(1)
- ^{xxix} 16U.S.C. 3372(a)(2)
- ^{xxx} *Supra*, xxviii
- ^{xxxi} The Guidelines were more specifically developed by the US Coast Guard, which is an agency of the Secretary of Transportation
- ^{xxxii} 16 U.S.C. [subsections] 4701 – 4751 (Supp. II 1996); See: http://www.nemw.org/nisa_summary.htm
- ^{xxxiii} 16 U.S.C. [section] 4711(b) (2) (B) (I) (Supp. III 1997)
- ^{xxxiv} This replaces an earlier executive order issued by President Carter in 1977.

^{xxxv} Aquatic Nuisance Species Task Force, Findings, Conclusions and Recommendations of the International Introductions Policy Review, report to Congress under Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 1207 [16 U.S.C. 4727] and Analysis of Laws and Policies Concerning Exotic Invasions of the Great Lakes: A Report to the Michigan Department of Environmental Quality (March 15, 1999).

^{xxxvi} See Nadol, Viki, Aquatic Invasive Species in the Coastal West: An Analysis of State Regulation within a Federal Framework, 29 Environmental Law (1999) 339

^{xxxvii} Mich. Comp. Laws 286.875 (1)

^{xxxviii} Nadol, Viki, Aquatic Invasive Species in the Coastal West: An Analysis of State Regulation within a Federal Framework, 29 Environmental Law (1999) 339

^{xxxix} A copy of the strategy is available at: http://www.bco.ec.gc.ca/documents/CBS_E.pdf; see also Environment Canada's web site on biodiversity at: http://www.ec.gc.ca/biodiv_e.html

^{xl} See Keddy, Cathy, Smith, Murray, Tegler, Brent, The Role of Importation Control in Protecting Native Canadian Biodiversity (1999) Canadian Wildlife Service, at page 104

^{xli} R.S.C. 1985 c. F-14

^{xlii} See Chapter 4 in Canadian Environmental Law (1996), 2nd Edition, Butterworths, paragraphs 4.85 to 4.110

^{xliii} DFO, (1998)

^{xliv} See Keddy, Cathy, Smith, Murray, Tegler, Brent, The Role of Importation Control in Protecting Native Canadian Biodiversity (1999) Canadian Wildlife Service, at page 91

^{xlv} "The Effects of Salmon Farming in British Columbia on the Management of Wild Salmon Stocks", Ch.30, Report of the Auditor General of Canada, December 2000.

^{xlvi} R.S.C. 1985, c.S-9

^{xlvii} See Keddy, Cathy, Canada's Capability for Managing Alien Organisms: Implications for Conserving Native Biodiversity (1997) Canadian Wildlife Service, at 29

^{xlviii} See Chris Wiley, Ballast Water Management in Canada: National Direction, Regional Realities (2000) Tol. J. Gr. Lakes L. Sci & Pol'y 249

^{xlix} See Canadian Environmental Protection Act (1999), S.C., CHAPTER C-15.31 (1999, c. 33), S. 3(1), definition of substance

¹ Based on discussions with Paul Chamberland, Canadian Wildlife Service, February 2001. This is an interpretation generally accepted within Environment Canada, but it has not been applied in practice to date.

^{li} S.C. 1992, c. 37

^{lii} S.C. 1990, c. 21

^{liii} S.C. 1992, c. 52

^{liv} See Keddy, Cathy, Smith, Murray, Tegler, Brent, The Role of Importation Control in Protecting Native Canadian Biodiversity (1999) Canadian Wildlife Service

^{lv} See discussion in Keddy, Smith, Tegler, The Role of Importation Control in Protecting Native Canadian Biodiversity (1999) Canadian Wildlife Service.

^{lvi} Much of the content of this section is based on information generously provided by Dr. Porfirio Alvarez Torres, Director General de Investigación en Acuicultura Instituto Nacional de Pesca

^{lvii} LGEEPA Article 5, par. XI, Article 88, par. I and Article 96.

^{lviii} LGEEPA Article 85, in relation to the reforms to Article 32 bis par. XX of the Organic Law of the Federal Public Administration (*Ley Orgánica de la Administración Pública Federal—LOAPF*), published in the Official Gazette of the Federation (*Diario Oficial de la Federación*) on 30 November 2000.

^{lix} Article 94.

^{lx} Published in the Official Gazette of the Federation on 25 June 1992.

^{lxi} Article 1 of the Fisheries Law.

^{lxii} Prior to the amendments to the LOAPF of 30 November 2000, these powers were exercised by the Ministry of the Environment, Natural Resources and Fisheries (*Secretaría del Medio Ambiente, Recursos Naturales y Pesca—SEMARNAP*).

-
- lxiii Article 3 par. IV, VI and VIII of the Fisheries Law.
- lxiv Article 15 par. IV of the Fisheries Law.
- lxv Article 125 of the Fisheries Law Regulation, published 29 September 1999.
- lxvi Article 128 of the Fisheries Law Regulation, published 29 September 1999.
- lxvii Articles 24 par. XXIV and 25 of the Fisheries Law.
- lxviii Mexican Official Standard NOM-024-PESC-1999, published in the Official Gazette of the Federation on 9 February 2000.
- lxix Mexican Official Standard NOM-027-PESC-2000, published in the Official Gazette of the Federation on 31 October 2000.
- lxx Mexican Official Standard NOM-010-PESC-1993, published in the Official Gazette of the Federation on 16 August 1994.
- lxxi Published in the Official Gazette of the Federation on 17 August 2000.
- lxxii Article 5 par. U) III of the LGEEPA Regulation on Environment Impact, published in the Official Gazette of the Federation on 30 May 2000.
- lxxiii Article 114.
- lxxiv Article 62 par. I of the Internal Regulation of the Semarnat.
- lxxv Article 72 par. VI Internal Regulation of the Semarnat.
- lxxvi For efforts by the IJC, see: <http://www.ijc.org/ijcweb-e.html>. For a copy of the Great Lakes Water Quality Agreement, see: <http://www.ijc.org/agree/quality.html>. For a recent white paper by the IJC on aquatic invasive species see also <http://www.ijc.org/milwaukee/wrkshps/eplegal.html>.
- lxxvii These recommendations were prepared by GISP for COP 5. For a copy, contact Martha Chouchena-Rojas at mtr@hq.iucn.org. There was no formal response at COP 5, other than to identify invasives as a priority issue for COP 6. For information on decisions at COP5, see: <http://www.biodiv.org/decisions/cop5/html/cop-5-dec-08-e.htm>, and <http://www.biodiv.org/doc/meetings/cop/cop-05/official/cop-05-12-en.pdf>. See also Glowka, Lyle, *Bioprospecting, Alien Invasive Species, and Hydrothermal Vents: Three Emerging Issues in the Conservation and Sustainable Use of Biodiversity*, 13 *Tulane Environmental Law Journal* (2000), 329 – 360
- lxxviii *supra*, xxxviii
- lxxix Based on personal communications with Murray Hill, Nova Scotia Department of Agriculture and Fisheries, January 2001. This process appears to be in the early stages, there do not appear to be any written documents available.
- lxxx See (1997) Report at http://www.wa.gov/puget_sound/shared/nis.html at page 40-41
- lxxxi See current text of IPPC at: <http://www.fao.org/legal/treaties/004t-e.htm>
- lxxxii See R. Griffin, Module 11, Risk Analysis and IPPC, Plant Production and Protection Division, at <http://www.fao.org/ur/manual/III-11e.htm>; See also Hedley, J. *The IPPC and Invasives*, at http://www.iucn.org/themes/law/elp_invasives_Quarantine.htm
- lxxxiii So far, this USEPA standard appears to be non-binding, available to be applied by any jurisdiction.
- lxxxiv Risk Assessment and Management Committee 1996; Orr et al. 1993
- lxxxv There is not indication on the APHIS website that this Risk Assessment Process is still being applied or published by the APHIS
- lxxxvi Based on personal communications with Murray Hill, Nova Scotia Department of Agriculture and Fisheries, January 2001. As this process appears to be in the early stages, no written documents are available.
- lxxxvii (1997 Report), *supra*, xli, at page 16 - 20
- lxxxviii *Ibid*
- lxxxix For a general discussion of this issue, see Shine, *supra* xlix, at pg 41
- xc Act RSBC 1996 c. 149
- xc1 BC Regulation 364/89, as amended October 31, 2000 sets out the permitting process.
- xcii (1997 Report), *supra*, xli, at page 16 - 20
- xciii (1997 Report), *supra*, xli, at page 16 - 20

^{xciv} (1997 Report), supra, xli, and Puget Sound/Georgia Basin International Task Force, Pathways to Our Optimal Future: A Five-Year Review of the Activities of the International Task Force, Draft for Discussion, October 1999.

^{xcv} (1997 Report), supra, xli, at page 20

^{xcvi} s. 11, New Brunswick regulations under Aquaculture Act

^{xcvii} Based on personal communications with Larry Hildebrandt, Environment Canada, and Andrew Cameron, Nova Scotia Department of Agriculture and Fisheries, January, 2001. State of Massachusetts recently requested that this issue be included in the Council's priorities

^{xcviii} Shine, Clare, Williams, Nattley, and Gruending, Lothar, A Guide to Designing Legal and Institutional Frameworks on Alien Invasive Species, Environmental Policy and Law Paper No. 40, IUCN Environmental Law Centre (2000)

^{xcix} Or perhaps a three list approach, with a clean list, a gray list and a black list, each on an ecosystem basis to take into account special ecosystem conditions and sensitivities.

ANNEX 2
INTERNATIONAL AND REGIONAL INSTRUMENTS AND INSTITUTIONS WITH
PROVISIONS/PROGRAMMES/DECISIONS/RESOLUTIONS
PERTAINING TO ALIEN INVASIVE SPECIES

Instrument/Institution	Relevant Provisions/Decisions/Resolutions
1. Convention on Biological Diversity (Nairobi, 1992) http://www.biodiv.org	Article 8 (h). Parties to “prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species”.
2. Cartagena Protocol on Biosafety to the Convention on Biological Diversity (Montreal, 2000) http://www.biodiv.org	Protocol’s objective is to contribute to ensuring adequate level of protection in the safe transfer, handling and use of living modified organisms resulting from modern biotechnology that may have adverse effects on the conservation and sustainable use of biological diversity.
3. United Nations Convention on the Law of the Sea (Montego Bay, 1982) http://www.un.org/Depts/los/losconv1.html	Article 196. States to take all measures necessary to prevent, reduce and control 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.
4. The Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971) http://www.ramsar.org	COP7 -- Resolution VII.14 on Invasive Species and Wetlands
5. Convention on Migratory Species of Wild Animals (Bonn, 1979) Http://www.wcmc.org.uk/cms/	Range State Parties of Endangered Migratory Species (Annex 1) to prevent, reduce or control factors that are endangering or likely to further endanger the species, including exotic species. (Article III (4)(c)). Agreements for Annex II Migratory Species to provide for strict control of the introduction of, or control of already introduced exotic species detrimental to the migratory species (Article V (5)(e)).

<p>6. Agreement on the Conservation of African-Eurasian Migratory Waterbirds (The Hague, 1995) Http://www.wcmc.org.uk/cms/aew_bkrd.html</p>	<p>Parties to prohibit the deliberate introduction of non-native waterbird species into the environment and measures to prevent the unintentional release of such species if this would prejudice the conservation status of wild fauna and flora; when non-native waterbird species have already been introduced, Parties to prevent them from becoming a threat to indigenous species. (Article III(2)(g)), Action Plan §2.5: Parties to prohibit non-native animal and plant introductions if detrimental to listed species, to prevent accidental escape of captive non-native birds, and to ensure that already introduced species do not threaten listed species.</p>
<p>7. Convention on the Law of Non- navigational Uses of International Watercourses (New Work, 1997) Http://www.un.org</p>	<p>Watercourse States shall take all necessary measures to prevent the introduction of species, alien or new, into an international watercourse. (Article 22).</p>
<p>8. International Plant Protection Convention (Rome, 1951, as amended in 1997) http://www.fao.org/legal/treaties</p>	<p>Creates an international regime to prevent spread and introduction pests of plants and plant products through the use of sanitary and phytosanitary measures by Contracting Parties. Parties establish national plant protection organisations and agree to cooperate on information exchange and on the development of International Standards for Phytosanitary Measures. Regional agreements for Europe and the Mediterranean, the Asia-Pacific, Near East, Pacific, Caribbean, North American, South America and Africa.</p>
<p>9. Plant Protection Agreement for the Asia and Pacific Region (Rome, 1956) http://www.fao.org/legal/treaties</p>	<p>Contracting Governments to prevent the introduction into and spread within the South East Asia and Pacific Region of plant diseases and pests. A supplementary agreement under Article III of the IPPC.</p>
<p>10. Agreement for the Establishment of the Near East Plant Protection Organisation (Rabat, 1993) http://www.fao.org/legal/treaties</p>	<p>Promotes implementation of the provisions of the IPPC with particular attention to measures for the control of pests, and advises Governments on the technical, administrative and legislative measures necessary to prevent the introduction and spread of pests of plants and plant products.</p>
<p>11. Convention for the Establishment of the European Mediterranean Plant Protection Organisation (Paris, 1951) Http://www.fao.org/legal/treaties</p>	<p>Organisation to act, in agreement with FAO, as a recognised regional plant protection organization under the IPPC; to advise Member Governments on the technical, administrative and legislative measures necessary to prevent the introduction and spread of pests and diseases of plants and plant products.</p>
<p>12. Phytosanitary Convention for Africa (Kinshasa, 1967)</p>	<p>Heads of African States and Governments of the Organization of African Unity, to (a) prevent the introduction of diseases, insect pests, and other enemies of plants into any part of Africa; (b) eradicate or control them in so far as they are present in the area; and (c) prevent their spread to other territories within the area.</p>

<p>13. Agreement on the Application of Sanitary and Phytosanitary Measures (Marakech, 1995) http://www.wto.org/english/tratop_e/sps_e/spsagr.htm</p>	<p>A supplementary agreement to the WTO Agreement. Applicable to all sanitary and phytosanitary measures directly or indirectly affecting international trade.</p>
<p>14. International Health Regulations (Geneva, 1982) (adopted by the 22nd World Health Assembly in 1969 and amended by the 26th World Health Assembly in 1973, and the 34th World Health Assembly in 1981) http://www.who.int/emc/IHR/int_regs.html</p>	<p>To ensure maximum security against the international spread of diseases with a minimum interference with world traffic. Regulations strengthen the use of epidemiological principles as applied internationally, to detect, reduce or eliminate the sources from which infection spreads, to improve sanitation in and around ports and airports, to prevent the dissemination of vectors and to encourage epidemiological activities on the national level</p>
<p>15. Agreed Measures for the Conservation of Antarctic Fauna and Flora (Brussels, 1964) http://www.antcrc.utas.edu.au/opor/treaties/</p>	<p>Participating governments shall prohibit introduction of non-indigenous plants and animals into the Treaty Area except in accordance with a permit. Permits to be drawn in terms as specific as possible and issued to allow importation only of the animals and plants listed in Annex C (Article IX (1-4).</p>
<p>16. Protocol to the Antarctic Treaty on Environmental Protection (Madrid, 1991) http://www.antcrc.utas.edu.au/opor/treaties/</p>	<p>No species of animal or plant not native to the Antarctic Treaty Area to be introduced onto land or ice shelves, or into water of the Antarctic Treaty Area, except in accordance with a permit. (Annex II, Article 4(1))</p>
<p>17. Convention on the Conservation of Antarctic Marine Living Resources (Canberra, 1980) http://www.antcrc.utas.edu.au/opor/treaties</p>	<p>Parties to prevent changes or minimise the risk for changes in the marine ecosystem not potentially reversible over two or three decades, based on available knowledge including the effect of the introduction of alien species.</p>
<p>18. Convention Concerning Fishing in the Waters of the Danube (Bucharest 1958)</p>	<p>Acclimatisation and breeding of new fish species, other animals and aquatic plants prohibited in Danube waters without consent of Convention Commission (Annex Part V Article 10).</p>
<p>19. Convention on the Conservation of European Wildlife and Natural Resources (Bern, 1979) http://www.coe.fr/eng/legaltext/104e.htm</p>	<p>Each Contracting Party undertakes to strictly control the introduction of non-native species. (Article 11(2)(b))</p>
<p>20. Benelux Convention on Nature Conservation and Landscape Protection (Brussels, 1982) http://sedac.ciesin.org/pidb/texts/benelux.landscape.protection.1982.html</p>	<p>Parties to prohibit introduction of non-native animal species into wild without authorisation from national authority; pre-introduction assessment required; communications between parties about planned introductions. (Benelux Council of Ministers Decision 17.10.83)</p>
<p>21. Protocol for the Implementation of the Alpine Convention in the Field of Nature Protection and Landscape Conservation (Chambery, 1994)</p>	<p>Parties guarantee that species of wild fauna and flora not native to the region in the recorded past are not introduced; exceptions possible when introduction needed for specific use will not “disadvantage” nature and landscape. (Article 17).</p>
<p>22. Protocol Concerning Mediterranean Specially Protected Areas (Geneva, 1982) http://sedac.ciesin.org/pidb/texts/acrc/mspecp.txt.html</p>	<p>Parties to prohibit the introduction of exotic species into marine protected areas, regulate acts likely to harm or disturb the fauna or flora, including the introduction of indigenous zoological or botanical species. (Article 7)</p>

<p>23. Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (Barcelona, 1995) http://sedac.ciesin.org/pidb/texts/</p>	<p>Parties to regulate the introduction of any species not indigenous to the specially protected area in question, or of genetically modified species (Article 6). Parties to regulate the intentional or accidental introduction of non-indigenous or genetically modified species to the wild and prohibit those that may have harmful impacts on the ecosystems, habitats or species in the area to which the protocol applies (Article 13(1)). Parties to eradicate species that have been introduced when it appears that such species cause or are likely to cause damage to ecosystems, habitats or species. (Article 13(2)).</p>
<p>24. ASEAN Agreement on the Conservation of Nature and Natural Resources (Kuala Lumpur, 1985) http://sunsite.nus.edu.sg/apcel/kl treaty.html</p>	<p>Parties endeavour to regulate and, where necessary, prohibit the introduction of exotic species. (Article 3(3)(c)).</p>
<p>25. Protocol for the Conservation and Management of Protected marine and Coastal Areas of the South East Pacific (Paipa, 1989)</p>	<p>Parties to take measures to prevent or reduce and control the extent possible the introduction of exotic species of flora and fauna, including transplants. (Article (VII (2))).</p>
<p>26. Convention on the Conservation of Nature in the South Pacific (Apia, 1976) http://sedac.ciesin.org/pidb/texts/nature.south.pacific.html</p>	<p>Parties shall carefully consider the consequences of deliberate introduction into ecosystems of species not previously occurring therein. (Article V (4)).</p>
<p>27. African Convention on the Conservation of Nature and Natural Resources (Algiers, 1968) http://www.unep.org</p>	<p>In any strict nature reserve or national park, Parties to take measures against any act likely to harm or disturb the fauna and flora, including the introduction of zoological or botanical specimens, whether indigenous or imported, wild or domesticated, is to be strictly prohibited. (Article III (4)(a)(ii) and (b)).</p>
<p>28. Agreement for the Preparation of a Tripartite Environmental Management Programme for Lake Victoria (Dar es Salaam, 1994)</p>	<p>Kenya, Tanzania and Uganda agree to implement a 5 year programme to strengthen regional environmental management of Lake Victoria including control of water hyacinth; biological control to proceed when environmental risks are found acceptable by national authorities; other forms of control to be explored. (Article 1, Attachment I, para. 7)</p>
<p>29. Convention for the Establishment of the Lake Victoria Fisheries Organization (Kisumu, 1994)</p>	<p>Organisation to consider and advise on the effects of direct or indirect introduction of any non-indigenous aquatic animals or plants into the waters of Lake Victoria or its tributaries and adopt measures regarding introduction, monitoring, control or eliminating of such animals or plants.</p>
<p>30. Protocol concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region (Nairobi, 1985)</p>	<p>The Contracting Parties to prohibit the intentional or accidental introduction of alien species which may cause significant or harmful changes to the Eastern African region. (Article 7). to regulate any activity likely to harm or disturb the fauna or flora, including the introduction of non-indigenous animal or plant species. (Article 10).</p>

<p>31. Convention on Great Lakes Fisheries Between the United States and Canada (Basic Instrument for the Great Lakes Fisheries Commission - GLFC) http://www.gllfc.org/pubs/conv.htm</p>	<p>The Convention establishes the GLFC whose purpose is to control and eradicate the non-native, highly invasive Atlantic sea lamprey from the Great Lakes.</p>
<p>32. North American Free Trade Agreement (1982) http://www.sice.oas.org/tradee.asp#NAFTA</p>	<p>Each Party may adopt, maintain or apply any sanitary or phytosanitary measure necessary for the protection of human, animal, plant life or health in its territory (Article 712(1)). Each party shall adapt any of its sanitary or phytosanitary measures relating to the introduction, establishment or spread of an animal or plant pest or disease taking into account conditions relating to transportation and handling, between those areas. (Article 716).</p>
<p>33. North American Agreement on Environmental Cooperation (1993) http://www.cec.org</p>	<p>The Council of the Commission on Environmental Cooperation may develop recommendations regarding exotic species which may be harmful (Article 10 (2)(h)).</p>
<p>34. Convention for the Conservation of the Biodiversity and the Protection of Wilderness Areas in Central America (Managua, 1992)</p>	<p>Parties agree that all mechanisms shall be established for the control or eradication of all exotic species which threaten ecosystems, habitats and wild species. (Article 24).</p>
<p>35. Protocol Concerning Specially Protected Areas and Wildlife to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (SPAW) (Kingston, 1990) http://www.cep.unep.org/pubs/legislation/spaw.html</p>	<p>Each Party shall take all appropriate measures to regulate or prohibit intentional or accidental introduction of non-indigenous or genetically altered species to the wild that may cause harmful impacts to the natural flora, fauna or other features of the Wider Caribbean Region. (Article 12)</p>
<p>36. IUCN-Guidelines for the Prevention of Biodiversity Loss Caused by Alien Invasive Species (2000) http://www.iucn.org/themes/ssc/pubs/policy/invasiv evseng.html</p>	<p>Guidelines designed to increase awareness and understanding of the impact of alien species. Provides guidance for the prevention of introduction, re-introduction, and control and eradication of alien invasive species.</p>
<p>37. Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens. (Resolution A.868 (29)1997, International Maritime Organisation) http://www.imo.org</p>	<p>Provides guidance and strategies to minimise the risk of unwanted organisms and pathogens from ballast water and sediment discharge. Revokes the "Guidelines for preventing the Introduction of Unwanted Organisms and Pathogens from Ships' Ballast Water and Sediment Discharges" (IMO Resolution A.774 (18) 1991).</p>
<p>38. Recommendation No. R (84) 14 (1984) of the Committee of Ministers to the Council of Europe Member States Concerning the Introduction of Non-native Species http://www.coe.int</p>	<p>Recommends that Member State governments prohibit non-native species introductions into the natural environment; exceptions allowed provided study undertaken to evaluate probable consequences for wildlife and ecosystems.</p>

<p>39. Agenda 21 – United Nations Conference on Environment and Development (Rio, 1992)</p>	<p>Calls for increasing protection of forests from disease and uncontrolled introduction of exotic plant and animal species 11.14); Acknowledgement that inappropriate introduction of foreign plants and animals has contributed to biodiversity loss and continues (15.3);. appropriate rules on ballast water discharge to prevent spread of non-indigenous organisms.. 17.30(vi)); controlling noxious aquatic species that may destroy other aquatic species (chap. 18-40(e)(iv)).</p>
<p>40. Programme of Action for the Sustainable Development of Small Island States (1994) http://www.unep.ch/islands/dsidscnf.htm</p>	<p>Notes introduction of non-indigenous species of significant causes of biodiversity loss. (Para. 41). Countries to formulate strategies at the national level for conservation and sustainable use of marine and terrestrial biodiversity including protection from non-indigenous species.(Para. 45A(i)).</p>
<p>41. Code of Practice on the Introductions and Transfers of Marine Organisms (ICES/EIFAC 1994)</p>	<p>Recommends practices and procedures to diminish risks of detrimental effects from marine organism introduction and transfer, including those genetically modified. Requires ICES members to submit a prospectus to regulators, including a detailed analysis of potential environmental impacts to the aquatic ecosystem.</p>
<p>42. Code of Conduct for Responsible Fisheries (FAO, 1995) http://www.fao.org/fi/agreem/codecond/ficonde.asp</p>	<p>Encourages legal and administrative frameworks to facilitate responsible aquaculture. Including pre-introduction discussion with neighbouring states when non-indigenous stocks are to be introduced into transboundary aquatic ecosystems. Harmful effects of non-indigenous and genetically altered stocks to be minimised especially where significant potential exists for spread into other states or country of origin. Adverse genetic and disease effects to wild stock from genetic improvement and non-indigenous species to be minimised.</p>
<p>43. Code of Conduct for the import and release of exotic biological control agents (FAO, 1995) http://www.fao.org</p>	<p>Aims to facilitate the safe import, export and release of such agents by introducing procedures of an internationally acceptable level for all public and private entities involved, particularly where national legislation to regulate their use does not exist or is inadequate. Outlines specific responsibilities for authorities of an exporting country, who should ensure that relevant regulations of the importing country are followed in exports of biological control agents.</p>
<p>44. Preventing the Introduction of Invasive Alien Species. Resolution A-32-9, International Civil Aviation Organisation (ICAO) (1998). http://www.icao.int/icao/end/res/a32_9.htm</p>	<p>Urges all Contracting States to use their civil aviation authorities to assist in reducing the risk of introducing, through civil air transportation, potentially invasive species to areas outside their natural range. Requests the ICAO Council to work with other United Nations organisations to identify approaches that the ICAO might take in assisting to reduce the risk of introducing potential invasive species.</p>

45. Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (UNEP, 1995) http://www.unep.org/unep/gpa/pol2a.htm	Introduction of Alien Species acknowledged to have serious effects upon ecosystem integrity. (para. 149).
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------

Source: Shine, C., N.Williams, & L. Gündling., 2000 Note: Several other international and regional agreements with provisions that relate to IAS issues are not yet in force.