

Invasive Alien Species and Trade: Integrating Prevention Measures and International Trade Rules

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List of Acronyms

CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Fauna and Flora
CTE	Committee on Trade and Environment (under the WTO)
FAO	U.N. Food and Agriculture Organization
GATS	General Agreement on Trade in Services
GATT	General Agreement on Tariffs and Trade
GMO	Genetically modified organism
IMO	International Maritime Organization
IPPC	International Plant Protection Convention
LMO	Living modified organism
NTB	Non-tariff barrier
OIE	Office International des Epizooties
POPs	Persistent organic pollutants
RTA	Regional Free Trade Agreement
SPS Agreement	Agreement on the Application of Sanitary and Phytosanitary Measures
SWPM	Solid wood packaging material
UNCLOS	U.N. Convention on the Law of the Sea
TBT Agreement	Agreement on Technical Barriers to Trade
WTO	World Trade Organization

I. Introduction

The advent of humanity's movement across continents and more recently the globalization of trade and transport have intentionally and unintentionally spread species of all taxa throughout the world, often with devastating impacts on their new host environments. The introduction of the brown tree snake on Guam extirpated a range of native birds, lizards and bats. Yellow crazy ants have decimated red land crabs on Christmas Island with ripple effects on forest structure and habitat for endemic birds. In Lake Victoria, explosive growth of water hyacinth blocked waterways and led to the proliferation of parasites that attack the human liver, lungs and eyes. Meanwhile, deliberate introduction of Nile perch as a food source annihilated local fish species. Ocean-going vessels are renowned for moving injurious aquatic species in their ballast, transporting over 10,000 species every day with a long list of harmful introductions including the zebra mussel in the U.S. Great Lakes, comb jellyfish in the Black Sea, the northern Pacific seastar in Australia, and a cholera outbreak in Peru. Such examples do not even include threats to agriculture or the wide range of impacts on economic and social development. There have been notable successes in controlling the spread and mitigating the impacts of invasions in Lake Victoria, Australia, South Africa and elsewhere. Yet international trade continues to move species around the world, leaving countries increasingly vulnerable to new introductions.

Invasive alien species are plants, animals and pathogens introduced outside of their natural range and whose establishment and spread can adversely impact other species, habitats and ecosystems. These invasions pose one of the most significant, but least addressed, international threats to biodiversity, human health, livelihoods, local cultures and national economies. Most countries now face threats from non-native species and are struggling to prevent the influx of more invasive species as the global economy expands and the movement of goods, services and people continues to grow. Unfortunately, scientific knowledge and institutional mechanisms are currently insufficient to effectively predict, prevent or mitigate the impacts of invasive species – whether plant, animal, fish, insect or micro-organism – on native biodiversity and other human systems, such as agriculture and livestock.

Global trade has brought prosperity and benefits to societies around the world, much of which would be impossible without the exchange of goods, including food crops, fish and livestock products, raw materials, manufactured items, etc. The negotiation of multilateral and regional trade agreements, including the World Trade Agreements in 1994, reflect a consistent effort by countries to expand and facilitate international trade across national borders. However, the movement of goods through such trade has provided pathways for invasive alien species to spread and colonize new areas. The transfer of these species is often unintentional, but too many times they have been intentionally transported by the hand of humanity.¹

These invasive alien species can have an exceedingly broad range of economic, environmental and social impacts. Ecologically, invasive alien species and habitat destruction

¹ Unintentional introductions occur when a species "hitchhikes" to a new place, either aboard a vessel (e.g., aquatic organisms in ballast water or on ship hulls, seeds in muddied construction machinery, snakes in airplane landing gear); in natural materials (e.g., micro-organisms or insects on horticultural goods, bugs in raw wood and timber, seeds or insects in agricultural produce, diseases in animals); or with individuals (e.g., disease and viral infections, seeds and plants in boots and personal belongings). Deliberate introductions of invasive alien species generally are conducted with the best intentions, but unfortunately lead to dire consequences. These include species introduced for fodder and agricultural purposes, erosion control, fish and animal stocking, ornamental plants, exotic pets and even as predators to control other invasive alien species.

are the top two threats to the survival of endangered species. Impacts on ecosystem processes such as pollination patterns, fire regimes and hydrological cycles can also have profound environmental and economic impacts. Other economic impacts include reducing crop yields and infecting livestock; fouling ship hulls, intake valves or transport routes; requiring removal through mechanical harvesting or harmful chemicals and pesticides; and adversely affecting local livelihoods. Socially, invasive alien species threaten human health through the spread of disease, compromise the aesthetic and spiritual values of natural wonders and sacred spaces, and jeopardize food security and native plants used for medicinal or hygienic purposes in many places throughout the world.

Once introduced into a new ecosystem, invasive alien species can become widespread and have direct, adverse impacts on public goods. In their new host environment, invasive alien species essentially become a form of biological pollution. Unlike other forms of pollution, however, invasive alien species do not become less harmful over time but rather increase – often exponentially – in numbers, density, geographic range and most importantly adverse impacts. This lesson has been learned the hard way in several cases of highly destructive and costly invasive organisms such as the brown tree snake in Guam, water hyacinth throughout eastern and southern Africa and possum in New Zealand.

Even wealthy, developed countries such as the United States and members of the European Union have been largely unsuccessful in eradicating, containing or controlling invasive alien species once they have been introduced. The limited success that has occurred using post-introduction methods generally is restricted to invasive alien species that affect agriculture, forestry and transportation. Significantly less attention has been given to invasive alien species that pose broader environmental concerns, although failure to do so will eventually undermine any country's ability to maintain the ecological foundation that supports commercially valuable species. It is even less realistic to expect that developing countries with severe resource limitations can effectively address invasive alien species once they have been introduced or become established. For all of these reasons, adopting vigorous prevention measures to keep invasive alien species from being introduced in the first place plainly is the best way to decouple introductions from the increase in volume of trade.

A. Invasive Alien Species and Trade

There is a clear and direct relationship between international trade and the spread of invasive alien species. Through trade, transport, travel and tourism – the “four T’s” – invasive alien species are introduced through various channels or “pathways.” A pathway can be broadly defined as the *means* (e.g. aircraft, vessel or train), *purpose or activity* (e.g. agriculture, forestry or horticulture), or *commodity* (e.g. timber) by which an alien species may be transported to a new location, either intentionally or unintentionally. The vast majority of pathways for introductions are trade related (see Table 1 below).

Table 1 – Examples of Pathways of Invasive Alien Species Introductions²

Intentional Introductions		Unintentional Introductions
Direct Introductions into the Environment	Introductions into Captivity/Containment	
<ul style="list-style-type: none"> ▪ Agriculture ▪ Forestry ▪ Soil improvement ▪ Horticulture (<i>ornamentals, nursery stock, bulbs, house plant</i>) ▪ Conservation ▪ Fishery releases ▪ Hunting and fishing ▪ Release of mammals on islands as food sources ▪ Biological control ▪ International development assistance ▪ Smuggling 	<ul style="list-style-type: none"> ▪ Escapes from botanical and private gardens ▪ Zoos ▪ Animal husbandry, livestock ▪ Beekeeping ▪ Aquaculture ▪ Pet trade ▪ Aquarium and horticultural pond trade ▪ Research facilities 	<ul style="list-style-type: none"> ▪ Vessels, vehicles (<i>land, water, air</i>) ▪ Ballast water ▪ Hull fouling ▪ Sea cargo ▪ Sea containers ▪ Personal baggage/equipment ▪ Agricultural produce ▪ Seed contaminants ▪ Soil, gravel, sand, etc. ▪ Timber ▪ Packaging material ▪ Dirty equipment, machinery, vehicles (<i>military, construction</i>) ▪ International mail ▪ Solid waste ▪ Aquaculture (<i>hitchhiker parasites, diseases</i>) ▪ Cut flowers ▪ Nursery trade

Absent protective measures, the rate of introductions of invasive alien species likely correlates with the volume of trade. Thus, increased movement of goods through growing global trade has resulted in more introductions of invasive alien species.³ In 2004, global trade in merchandise increased by 21% to US\$8.9 trillion, and trade in commercial services expanded by 16% to US\$2.1 trillion, with growth rates generally higher in the developing world.⁴ This increase in trade affects the dynamics of invasive alien species' movements in several ways:

- increasing volumes of goods lead to more chances for introduction;

² This table is adapted from Global Invasive Species Programme: INVASIVE ALIEN SPECIES: A TOOLKIT OF BEST PREVENTION AND MANAGEMENT MEASURES (R. Wittenberg & M.J.W. Cock eds. 2001)[hereinafter INVASIVE ALIEN SPECIES: A TOOLKIT].

³ G.M. Ruiz & J.T. Carlton, *Invasion Vectors: A Conceptual Framework for Management*, in INVASIVE SPECIES: VECTORS AND MANAGEMENT STRATEGIES 461 (G.M. Ruiz & J.T. Carlton, eds. 2003); P. Jenkins, *Free Trade and Exotic Species Introductions*, 10 CONSERVATION BIOLOGY 1 (February 1996).

⁴ World Trade Organization, *World Trade Report 2005: Exploring the Links between Trade, Standards and the WTO* (2005) at 1-12; and World Trade Organization, *Stronger Than Expected Growth Spurs Modest Trade Recovery* (April 5, 2004), available at http://www.wto.org/english/news_e/pres04_e/pr373_e.htm (compared to 16% and 12% expansion respectively in 2003).

- more introductions lead to a greater probability that an invasive alien species will become established;
- an increasing variety of goods and means of transport increases both the potential array of species that may be moved and their pathways for transfer;
- more frequent delivery of goods from and to a wider range of countries and habitats increases the rate and variety of potential introductions; and
- faster modes of transport may improve an organism's chance of survival while in transit.⁵

New trade relationships in the form of bilateral and regional trade agreements, as well as growth in the WTO's membership, are clear indicators that global trade has increased and spread in the number of links and the volume of traffic. Governments and business interests push for increased liberalization as they seek to expand trade to more markets at ever faster rates. These factors have compounded the logistical and political problems faced by national regulatory regimes and their systems for border inspections, quarantine procedures and import approvals.

Trade agreements also establish the basic framework regulating invasive alien species while minimizing consequent economic and trade impacts.⁶ Such basic framework allows countries to protect human health, agriculture and the environment by way of, *inter alia*, quarantine, customs and safety measures that are considered legitimate. Also, trade agreements commonly proscribe arbitrary or unjustifiable discriminatory practices (i.e., disguised trade barriers). The present paper supports the notion of safe, clean and fair trade. In this sense, importers and exporters, including governmental and business actors, need to recognize and avoid the movement of invasive alien species. Proactive measures to prevent introductions in the long run will likely reduce the range of costs faced by governments and societies to address established invasive alien species. This may also reduce liability or more restrictive regulation on businesses and related pathways for trade in goods.

B. International Law and Prevention

Preventing the introduction of invasive alien species is generally recognized as the most effective way to mitigate the threat of invasives, as subsequent attempts to eradicate or control them are increasingly less successful and more expensive.⁷ To be effective, efforts to combat unintentional introductions must focus on pathways for invasion, while prevention of intentional introductions can be keyed primarily to species. Prevention measures must also be adopted and implemented in an efficient manner, without undue expenditure of time or money either in designing and justifying those measures or in carrying them out. Finally, prevention efforts also must be coordinated at the regional

⁵ Ruiz & Carlton, *supra* note 3, at 461-462 (internal citations omitted).

⁶ Regional and bilateral trade agreements, such as the North American Free Trade Agreement, Mercosur (the Southern Common Market), and U.S. agreements with countries like Singapore, Chile and Australia generally build on WTO commitments, particularly in the area of SPS issues.

⁷ See, for example, the following materials published through the Global Invasive Species Programme: *INVASIVE ALIEN SPECIES: A TOOLKIT, id*; *A GLOBAL STRATEGY ON INVASIVE ALIEN SPECIES* (J.A. McNeely, et al., eds. 2001).

and/or international level, since, depending on the circumstances, the problem of invasive alien species is quintessentially a regional or international problem.

Thus, invasive alien species prevention efforts are like a chain whose strength is determined by its weakest link. No matter how strong some national and regional links in that chain may be, the effectiveness of prevention efforts by one country will be compromised if efforts in nearby countries are inadequate.⁸ For example, weak domestic regulations in a few Caribbean countries may have led to the introduction of swine fever, which has subsequently spread to nearby countries that had import restrictions in place.⁹

Fortunately, there is a growing recognition among policy-makers, the public and the business community that the invasive alien species problem needs to be addressed. At the international level, control and prevention of invasive alien species depends upon a complex intersection of environmental, trade and transportation agreements. To date, these differing areas of law have not been well coordinated and generally have developed piecemeal. Additionally, there have been concerns that differing requirements could lead to conflicts, most particularly between trade and environmental agreements.

While discussions on these issues continue, this paper firmly argues that there is significant latitude for countries to take strong measures that are WTO consistent to prevent introductions. In the long term, effective and transparent national measures can actually be supportive of economic development by ensuring that traded goods and services are safe and by establishing reliable and predictable regulatory systems. Such experience will also hopefully turn the major focus of attention away from issues of WTO consistency and potential disputes and towards more proactive national and multilateral efforts to minimize introductions of invasive alien species.

The international community needs to clarify and strengthen the approaches countries can take to best prevent introductions of invasive alien species and thereby to protect public goods without unfairly raising barriers to trade. This paper intends to contribute to that goal by closely examining the framework of international trade law and related multilateral environmental agreements and exploring how countries can structure legitimate and effective systems to prevent the introduction of invasive alien species. It starts with a brief overview of prevention measures and proceeds to an in depth discussion of WTO legal obligations related to invasive alien species. It concludes with a set of general principles and suggestions for future work. Additionally, an appendix reviews international standard setting organizations.

II. Prevention Measures

Although on the surface regulating goods and pathways to prevent the introduction of invasive alien species may appear to restrict trade and thus cause adverse economic effects, such costs must be compared to the potential damage that invasive alien species can do to ecological

⁸ These reasons are summarized in A.M. Perrault & W.C. Muffett, *Turning off the Tap: A Strategy to Address International Aspects of Invasive Alien Species*, 11 RECIEL 211-214 (2002).

⁹ One result of swine fever's spread throughout the Caribbean was the exclusion of these countries' pork products from the U.S. market.

systems and economies. Calculating the cost of invasive alien species involves significant uncertainties as to whether an introduction might occur in a particular case, what damage introduction and establishment of an invasive alien species might cause, and the costs incurred by taking prevention measures. Despite these difficulties, there is no doubt that the costs of invasive alien species are real and increasing, and are attributable to growth in international trade. There is also no doubt that preventing introductions of invasive alien species is the first and most cost-effective option, from the point of view of environmental costs as well as monetary costs.¹⁰ In this regard, precaution, particularly in areas of uncertainty, is a key component to developing effective systems at all levels to prevent introduction of invasive alien species.

At the global level, multilateral environmental agreements and customary international law provide a solid basis for adopting rigorous prevention measures. The duty to take appropriate measures to prevent transboundary environmental harm has been affirmed by several international tribunals and is now part of the corpus of international environmental law. Even in the face of scientific uncertainty, the precautionary principle lends support to measures designed to prevent ecological damage. In parallel, multilateral environmental agreements such as the Convention on Biological Diversity and the UN Convention on the Law of the Sea, also require State parties to adopt effective measures to prevent invasive alien species.

The obligations in multilateral environmental agreements and customary law coexist, however, with the international trade regime, which seeks to facilitate trade in goods and services. The Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) is the WTO agreement that most directly relates to prevention efforts, although other WTO agreements, including the General Agreement on Tariffs and Trade (GATT), the Agreement on Technical Barriers to Trade (TBT Agreement), and the General Agreement on Trade in Services (GATS) also affect these efforts. The SPS Agreement establishes the basic framework and requirements for how countries can regulate imports of products that may contain alien species harmful to public health, animals or plant life. In this regard, the agreement contains numerous specific and detailed provisions that *could* be interpreted as limiting prevention efforts. Indeed, several decisions of the WTO Appellate Body have ruled that implementation of particular measures addressing invasive alien species have been inconsistent with the SPS Agreement (to be discussed in Section III).

A pessimistic view of WTO SPS decisions might be that effective prevention measures cannot be adopted consistent with the SPS Agreement. We do not share that view. Instead, we believe that the SPS Agreement and relevant WTO precedents can and should be interpreted as consistent with effective prevention measures. In fact, a central purpose of the SPS Agreement is to provide protection to plant and animal health from the risk of pests and diseases. For these and other reasons, it is appropriate to resolve uncertainties regarding the risks posed by invasive alien species in favor of adopting strong prevention measures. As explained below, we believe that doing so is consistent with the international trade regime.

¹⁰ See *INVASIVE ALIEN SPECIES: A TOOLKIT*, *supra* note 7.

A. Prevention Is Recognized in Multilateral Environmental Agreements and Customary International Law

The world community understands that measures to prevent introductions are more effective and cost-efficient than any other approach. This consensus is reflected in multilateral environmental agreements and decisions within these bodies. For example,

- the Convention on Biological Diversity (CBD) calls upon its Parties to prevent the introduction of, control or eradicate those alien species that threaten ecosystems, habitats or species, and these Parties have developed guiding principles for national action;¹¹
- the Cartagena Protocol on Biosafety, negotiated under the CBD's auspices, addresses the international movement of living modified organisms with the aim of minimizing the chance that such organisms might present an invasive threat to the environment;¹²
- the Ramsar Convention on Wetlands of International Importance calls upon its Parties to address the issue of invasive alien species and wetlands in a holistic manner, including recognition of the impacts of terrestrial species on water tables and hydrological flows;¹³
- The Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which primarily addresses trade in endangered species, have specifically called for consultations among Parties' CITES management authorities on how to prevent or better regulate the transfer of endangered species that may be invasive;¹⁴

¹¹ The Convention on Biological Diversity, June 5, 1992, art. 8(h), *available at* <http://www.biodiv.org/convention/articles.asp>. See also Convention on Biological Diversity, *Interim Guiding Principles for the Prevention, Introduction and Mitigation of Impacts of Alien Species*, 5th Conference of the Parties, Decision V/8, Annex 1 (2000), *available at* <http://www.biodiv.org/decisions/default.aspx?m=COP-05&id=7150&lg=0>. Guiding Principle 2 says: "Prevention is generally far more cost effective and environmentally desirable than measures taken following introduction of an alien invasive species. Priority should be given to prevention of entry of alien invasive species...."

¹² See Convention on Biological Diversity, *Programmes: Invasive Alien Species*, at <http://www.biodiv.org/programmes/cross-cutting/alien/> (last visited Nov. 11, 2004). This paper generally considers that GMOs have the potential to be invasive alien species, and therefore should be subject to similar requirements for testing, risk assessment and risk management.

¹³ Convention on Wetlands of International Importance especially as Waterfowl Habitat, Feb. 2, 1971, as amended in 1982 and 1987, *available at* http://www.ramsar.org/key_conv_e.htm. Resolution VII/14 (Invasive Species and Wetlands) also highlights the need for prevention measures as it acknowledges that eradication usually is impracticable. See The Ramsar Convention on Wetlands, *Invasive Species and Wetlands*, 8th Conference of the Parties, Resolution VIII.18 (2002), *available at* http://www.ramsar.org/key_res_viii_18_e.htm.

¹⁴ The Convention on International Trade in Endangered Species of Wild Fauna and Flora, Mar. 3, 1973, *available at* <http://www.cites.org/eng/disc/text.shtml> See The Convention on International Trade in Endangered Species of Wild Fauna and Flora, *Trade in Alien Species*, 20th Meeting of the Animals Committee, Decision 10.76 (2004), *available at* <http://www.cites.org/eng/com/AC/20/E20-20.pdf>.

- the Convention on Migratory Species of Wild Animals, requires range states to control the introduction of invasive alien species or to eliminate them if they present a threat to endangered migratory species.¹⁵
- the U.N. Food and Agricultural Organization (FAO) is responsible for codes of conduct on responsible fisheries and import and release of biological control agents, both of which relate to the introduction of non-native species; and¹⁶
- the U.N. Convention on the Law of the Sea (UNCLOS) requires Parties to take measures to prevent, reduce and control the intentional and unintentional introduction of species into the marine environment that may cause significant and harmful change.¹⁷

A range of specialized organizations and transport agreements also include language relevant to aspects of preventing invasive alien species introductions. For example, the International Plant Protection Convention (IPPC) and the Office International des Epizooties (OIE) are recognized by the WTO as having expertise to develop international standards to regulate the movement of plant pests and animal diseases, respectively (see Appendix I). In the area of transport, the International Maritime Organization recently adopted the International Convention for the Control and Management of Ships' Ballast Water and Sediments and could serve as a forum to address hull fouling. Finally, the International Civil Aviation Organization has recognized that airplane travel can serve as a pathway for the movement of invasive alien species and has called for further work and collaboration on the topic.

Additionally, exporting countries, under long-established principles of customary international law, have a general responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or to areas beyond the limits of national jurisdiction.¹⁸ Pursuant to their international obligations to act to prevent introductions of invasive alien species,¹⁹ countries have explored a range of prevention measures, examined next.

¹⁵ The Convention on the Conservation of Migratory Species of Wild Animals, June 23, 1979, art. III, *available at* http://www.cms.int/documents/convtxt/cms_convtxt.htm

¹⁶ Food and Agriculture Organization of the United Nations, *The FAO Code of Conduct for Responsible Fisheries* (1995), *available at*

http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/005/v9878e/v9878e00.htm;

Food and Agriculture Organization of the United Nations, *Code of Conduct for the Import and Release of Exotic Biological Control Agents* (1995), *available at*

http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/x5585E/x5585e0i.htm.

¹⁷ The United Nations Convention on the Law of the Sea, Dec. 10, 1982, *available at* http://www.un.org/Depts/los/convention_agreements/texts/unclos/closindx.htm.

¹⁸ *See, e.g.*, Trail Smelter (U.S. v. Canada), 3 R.I.A.A. 1905 (1941); Corfu Channel (U.K. v. Albania), 1949 I.C.J. 4 (Judgment of Apr. 9); Advisory Opinion on the Legality of the Threat or Use of Nuclear Weapons, 1996 I.C.J. 226 (July 8).

¹⁹ It seems prudent for States to cite these obligations in addition to their own national priorities when detailing the legal basis and purpose of prevention measures.

B. Categories of Effective Invasive Alien Species Prevention Measures

Invasive alien species prevention measures can be classified in many ways and do not always fall into neatly defined, discrete categories. National measures adopted by governments can focus on import procedures and requirements (pre-border, border or post-entry); species lists or pathways; and intentional or unintentional introductions. The following section provides a cursory overview of different types of prevention measures as a prelude to discussing how they should be integrated with countries' trade obligations.

1. Import Requirements and Procedures

In developing prevention measures, countries generally establish a series of requirements governing how imported goods are treated prior to their entry into a country, and how such goods are moved through customs and border control points. Occasionally, such requirements also cover post-entry follow-up. Such measures are typically implemented at the national level, however they can also be developed and applied regionally. A few prominent classes of measures and specific examples are discussed below (see Table 2).

Table 2 – Examples of Prevention Measures During Different Stages of Transport

Pre-Border Measures	At-Border Measures	Post-Entry Measures
<ul style="list-style-type: none"> • Pest control in production fields • Quality control measures in packing facilities • Inspection during production, packing and prior to shipment • Pest-proof packaging • Treatment (<i>fumigation, temperature treatments, ultra-violet sterilization</i>) • Timing of shipment (<i>e.g. use of seasonal differences to inhibit pest survival</i>) • Pre-shipment quarantine for live plants/animals, etc. • Certification • Mid-ocean ballast water exchange 	<ul style="list-style-type: none"> • Certification • Treatment • Visual inspection • Remote inspection (<i>X-ray, sniffer dogs, cameras</i>) • Defined ports of entry • Quarantine in border facilities 	<ul style="list-style-type: none"> • Domestic inspection, treatment • Environmental assessment of infrastructure development • Monitoring around ports of entry or of key at-risk areas • Tracking movement of certain products

Pre-Border Measures: Pre-border measures are intended to reduce the likelihood that invasive alien species will ever reach new countries (or ecosystems). They are inherently the best form of prevention; if effective, they virtually eliminate the possibility of accidental or intentional introduction. Regulatory officials are thereby in a better position to address potential concerns as opposed to dealing with a new species at border control points, which can never be 100% escape proof. Examples of pre-border measures include: requiring ships to discharge ballast water a certain distance from the coast prior to port entry; fumigation, quarantine or other processing

requirements carried out in the exporting country; and/or consultation of national lists of species that can or cannot be imported.

Border Measures: Border measures are intended to intercept invasive alien species at a political boundary, to complement pre-border measures, or where pre-border measures are not in place or are not fully effective. Border measures prohibit or restrict importation of potentially invasive species or regulate pathways of potentially invasive species. Customs rules, inspections and quarantine procedures are longstanding types of border measures that can be of significant value in addressing invasive alien species. For example, upon entering New Zealand, all goods that include living organisms go to either a transitional site or biosecurity clearance area, where they are inspected and either given a biosecurity clearance or forwarded to a containment facility.²⁰

In addition to these traditional border measures, an increasing number of countries employ stricter measures. In Argentina, an Environmental Impact Assessment is required for a new alien species to be introduced.²¹ In New Zealand, a person intentionally introducing a new species must fill out an extensive application, including the identity of the species, whether it has been considered for introduction by other governments and the results of those investigations, its possible adverse effects on the environment and its potential uses. The Environmental Risk Management Authority then considers the application, based on whether the species would result in significant displacement of native species, significant deterioration of natural habitats and other environmental and human health issues.²²

Post-Entry Measures: Even after a product has been allowed through the border, there are still a range of regulatory tools that can be used to prevent invasive alien species. For example, monitoring for high risk unintentionally introduced invasive alien species is common at nurseries and around high volume ports.

Some alien species introduced into a country may be benign in one area, but potentially invasive when transported to a different part of that country, with different ecological conditions. Measures applicable only to domestic commerce can prevent the further spread of an alien species that has become invasive in only one part of the country. In many instances, these measures may be quite similar to pre-border and at-border measures. In other situations, they may reflect the domestic character of post-entry prevention. Internal prevention measures are particularly important in archipelagic states and states with islands to prevent the spread of invasive alien species between islands or between islands and the mainland. Likewise, domestic prevention measures can be very useful with respect to vulnerable ecosystems and protected areas (such as national parks).²³ For example, South Africa's province of Mpumalanga has its

²⁰ M. Christensen, *Invasive Species Legislation and Administration: New Zealand*, in HARMFUL INVASIVE SPECIES: LEGAL RESPONSES 23, 37 (Marc L. Miller & Robert N. Fabian eds. 2004) [hereinafter HARMFUL INVASIVE SPECIES].

²¹ M.E. Di Paola & D.G. Kravetz, *Invasive Alien Species: Legal and Institutional Framework in Argentina*, in HARMFUL INVASIVE SPECIES, *supra* note 20, at 71, 74.

²² Christensen, *supra* note 20, at 33-34.

²³ Domestic measures are also important in that they may be needed in order to satisfy "comparable treatment" requirements under the SPS Agreement. See *infra* note 31.

own Nature Conservation Act, which does not allow a person to bring into or receive a declared invasive plant or exotic animal without a permit.²⁴

2. *Species Lists*

A frequently used approach to regulate invasive alien species utilizes lists of species developed by government agencies to assess whether a particular plant, animal or other organism can be imported. Such lists are most useful to prevent intentional introductions at the pre-border stage, as a potential exporter can check the relevant lists to see if the species in question is allowed or banned from imports, or, for unlisted species, request permission to import. This provides increased transparency and predictability for exporters before any products are gathered, packaged and shipped. Lists can also be used at the border by inspection and quarantine agents for purposes of searching baggage, package and cargo.

The success of such a listing system is inherently related to its adaptability and flexibility, particularly with regard to processing new submissions and proposals for movement from one list to another. The three types of lists are referred to as black, white and grey lists, and are sometimes used individually and sometimes in combination.

Black Lists: Black lists (also referred to as “dirty lists”) identify those species whose introduction is prohibited due to their potential adverse effects on the environment or human, animal or plant health. Such lists can be a significant component of an invasive alien species prevention regime since they clearly state which species are banned from import. Black lists are the most common type of listing mechanism and are found in a range of countries, including the United States, Australia, New Zealand, and Poland.²⁵ To add a species to a black list, there generally needs to be some type of risk assessment that gauges its potential invasiveness and impacts. The development of such lists also requires consideration of issues regarding the scope of listings (e.g., designation of an entire genus vs. identification of particular species within a genus) as well as species identification (e.g., if species look alike but have different potentials for invasiveness). Black lists are often reactive tools; a species is most often listed only after it has become invasive within the country. For this reason, black lists alone are not enough, and they should be used in conjunction with other species lists.

The efficacy of black lists depends largely on their scope and a country’s ability to add and amend them in a timely fashion. Governments are often notably reluctant to adopt stringent measures that would severely constrain or ban trade in a particular good or species given impacts on trade and scrutiny by other governments and the private sector alike. For example, the U.S.

²⁴ R. Stein, *Invasive Species Law and Policy in South Africa*, in HARMFUL INVASIVE SPECIES, *supra* note 20, at 51, 61, 63.

²⁵ Grazyna Krzywkowska, *The Polish Invasive Species Experience, Legislation and Policy in HARMFUL INVASIVE SPECIES*, *supra* note 20 at 110. The sophistication of black lists varies between countries. In Poland, the list of organisms “harmful to plants and plant products” was cobbled together in a “random way,” with no set method for identifying the invasiveness of species. In New Zealand, where the threat of invasive species is much more visible and monitored by the government and its populations, the Biosecurity Act allows national authorities to declare “unwanted organisms” that are capable of causing unwanted harm to natural resources or human health. Christensen, *supra* note 20, at 38.

government maintains a list of noxious weeds that are banned from import, but few species have been added since the list's inception. In 1993, there were approximately 93 taxa listed and a decade later there were only about 96 (two removed and five added), despite a number of new introductions of invasive alien species and a backlog of data on other potentially harmful noxious weeds. Similar reluctance to develop strict measures also has been identified within the European Plant Protection Organization.

Black lists and their bans on species can be fully consistent with international trade rules, and are extremely effective when countries have the flexibility to add and remove species as available information and necessary precaution dictate. Finally, attention needs to be given to the process for how species are removed from a black list, particularly in the case of temporary bans. Recent experience with national measures to prevent entry of BSE or avian flu in livestock and poultry has highlighted the need for countries to have transparent processes for re-assessing risk and re-opening trade.

White Lists: While black lists identify species that are denied access or import into a country, white lists (also referred to as “clean lists”) identify species that are low-risk and approved for introduction. The key idea behind a white list approach is that intentional introduction of an organism should be authorized only if the species is on this list of safe organisms. As with black lists, white lists are used in conjunction with risk assessments to determine whether a species may be intentionally introduced. The presence of a given species on a white list reflects that a risk assessment has determined the species to be safe (or, in some cases, white listed species may already be established and beyond hope of control). White lists can be used on their own or in tandem with black lists as a means to increase transparency for potential importers and, ultimately, to facilitate trade in those species.

White lists are commonly associated with agricultural and animal crops and are found in New Zealand, Argentina as well as in the Australian states of the Northern Territory and Western Australia.²⁶

Grey Lists: There may be instances in which the risk associated with an alien species cannot be determined conclusively, and hence the species cannot yet be listed on either a white or a black list. These species can be put on an intermediate “grey” or “pied” list, subject to further review. Sophisticated versions of grey lists place the species within a spectrum or matrix according to the likelihood of invasiveness based on presently available information. Grey lists are frequently developed as potential importers submit requests to a government to see whether their product or organism is eligible for import. The list serves as a virtual holding area as the appropriate regulatory agency makes the relevant determination. Grey lists thus serve a precautionary function by temporarily preventing the import of a species until further assessment can be conducted to determine whether a species is safe or potentially invasive. In some senses, grey lists function as provisional black lists.

In the context of the SPS Agreement, grey lists can be viewed as provisional measures, which require a process seeking to obtain further information for making a risk assessment (see

²⁶ Di Paola & Kravetz, *supra* note 21, at 74.

Section III B for more details). The regulatory authority of the importing country can request that the exporter facilitate this process by providing scientific evidence and analysis for the assessment and thereby decrease the importer's resource burden (it is also possible to require administrative fees to recoup costs incurred by the evaluation process). It generally is in the exporter's interest to assist, since that may facilitate a timely response to its import request. If there is still insufficient evidence to make a definitive assessment of risk, the species can be left on the grey list pending the collection of additional information and a subsequent re-assessment.

While each of these lists can be self-standing, they are most effective when all three are combined into a unified multiple listing approach. By looking at the white and black lists, an exporter can determine whether a species is already allowed for or banned from import into a particular country. If there is no listing, the species can be placed on a grey list at the request of the importer. Imports of the species would not be allowed until a risk assessment was performed, the results of which would move the species onto the white list if safe, or onto the black list if potentially harmful. The use of such a system does not have to catalogue all known species, which would be impossible in practical terms. Instead, it codifies allowed and banned species which are already known, and then places requests by other governments or importers of unlisted species on to the grey list for case by case evaluation.²⁷

For WTO Members, application of these listing systems must be in accord with their obligations under the SPS Agreement, particularly with regard to the conduct of risk assessments and the use of provisional measures, examined next. Lists that are not well or frequently maintained are more likely to run afoul of trade rules than those which have prompt, transparent timelines and procedures.

²⁷ Current application of this multiple listing approach is limited to a handful of countries, most specifically New Zealand and Australia. However, its use can be one of the most effective mechanisms to assess intentional introductions and to clearly define where a particular species falls in the regulatory process. More exchange of experiences with the application of the multiple list system as well as sharing of data from assessments of particular species can certainly help to promote and widen its application. As a tool, it does entail a commitment of resources to provide the institutional, regulatory and scientific processes necessary to assess and list species. It is also limited to intentional introductions and thereby requires associated instruments to address the threat of unintentional introductions.

New Zealand – A System to Address both Intentional and Unintentional Introductions

New Zealand's system to prevent the introduction of invasive alien species into the country is contained in two key pieces of legislation: the Hazardous Substances and New Organisms Act of 1996 and the Biosecurity Act of 1993. Together the two provide a broad framework for authorities to regulate both intentional and unintentional introductions.

Intentional Introductions and the Hazardous Substances and New Organisms Act: This Act generally requires any entity seeking to import a new organism (i.e., an intentional introduction) to apply to New Zealand's Environmental Risk Management Authority for approval. It further details the process for assessing risks of novel organisms, setting national controls to manage their potential impacts as well as mechanisms for monitoring and enforcement. The approvals process employs a combined listing approach using white, black and grey lists. The Ministry of Agriculture and Forestry and the Management Authority maintain lists and records of approved plant species on the Plant Biosecurity Index and of vertebrates, invertebrates and micro-organisms (the white list). The Act also contains a list of plants and animals that are completely banned from import (the black list). Finally, the Act contains procedures for the assessment of new organisms (not on either the approved or banned lists) proposed for import. The proposer of the import/introduction must submit an application including scientific and other information about the organism, as well as fees for the Authority to process the evaluation. The authority then puts the application in a public register of requests (the grey list) for an evaluation, which includes identification of foreseeable risks, costs and benefits; assessment of the significance of the risks; and an assessment of how the risks can be managed. Based on this information, the Authority then makes a decision based on a number of criteria and principles as to whether the organism can be imported (and if so what management controls may be necessary) or not. *See* Environmental Risk Authority New Zealand, at <http://www.ermanz.govt.nz> (last visited Sept. 6, 2005).

Unintentional Introductions and the Biosecurity Act: This Act is designed to manage risks associated with the importation of goods, such as invasive alien species unintentionally introduced in various products, packaging materials/containers and/or transport vehicles. The Act enables the development of Import Health Standards under the umbrella of the Ministry of Agriculture and Forestry to address the sanitary and phytosanitary regulations for a particular product or pathway, including required treatments, permits, quarantine and other safety measures for a range of products under the categories: animals and animal products (e.g., meat, fish, dairy products, pets, wool); plants and plant products (flowers, agricultural commodities, nursery stock, seeds); forest products (e.g., wood packaging, lumber, veneer); and miscellaneous (e.g., containers, vehicles). Such standards provide direction for those intending to import goods on how to treat their products prior to transport, while also providing guidance for border inspectors examining shipments entering New Zealand. If there is no standard for a particular product, a potential importer can submit an application to have one developed, in accordance with New Zealand's regulations on conducting risk analyses. Herein, the importer can provide scientific information and may be required to pay fees to cover the costs of the evaluation. *See* Ministry of Agriculture and Forestry New Zealand, at <http://www.biosecurity.govt.nz> (last visited Sept. 6, 2005).

III. International Trade Law

Prevention measures may be seen as potentially at odds with a global trade regime characterized narrowly as focused on promoting the flow of goods and the reduction of trade barriers. The WTO, however, encompasses the broader concept sustainable development, including the protection and preservation of the environment, according to the explicit wording of the preamble of the Marrakesh Agreement Establishing the WTO. To be sure, prevention measures can impact trade flows by requiring additional procedures for imported goods, but they can also facilitate trade in goods and services that are safer for the environment, human health and local economies.

In focusing on trade rules, some are concerned that key provisions of certain WTO agreements could pose obstacles to implementation of prevention measures. In legal challenges pursuant to WTO Agreements, the WTO's Dispute Settlement Body has ruled against a handful of national prevention measures and similar regulations in cases involving serious charges that the measures constituted disguised trade barriers. These rulings raise the question whether other prevention measures could withstand challenges pursuant to WTO agreements. We believe that the rulings have served to clarify *how* prevention measures should be applied rather than suggesting that invasive alien species cannot be independently regulated at all.²⁸ It should also be noted that in contrast to the size of world trade and the number of countries involved, only a small handful of WTO cases have arisen involving a few, primarily developed countries. This paper's attention to these disputes is not meant to represent them as the general rule, but instead to draw out the lessons and boundaries of WTO law so that countries can enact protective policies with confidence that they are WTO consistent.

Successful efforts by several countries to design and implement prevention measures, for example New Zealand's adoption of Import Health Standards and a species listing approach, also show that significant space exists for countries to act. Invasive alien species prevention measures require a proactive approach by governments to identify their priorities in protecting environmental, agricultural and public health. Such measures should also rely on certain design principles, discussed elsewhere in this paper, to maximize their effectiveness while minimizing the prospect that they will be found inconsistent with WTO requirements. Ultimately, well founded and transparent national rules and regulations to prevent introductions could generally be considered WTO consistent and therefore never come before the WTO's Dispute Settlement Body.

The following sections review the relevant WTO agreements; address trade issues related to prevention, including the precautionary principle; discuss the use of national measures and capacity; and briefly address regional and bilateral trade agreements in relation to invasive alien species as well as WTO obligations. These sections also suggest prevention strategies that can overcome or minimize potential trade obstacles.

²⁸ Ironically, while much of the trade-environment debate relating to the regulation of invasive alien species revolves around the issue of scientific uncertainty regarding introductions and impacts, there is also considerable uncertainty within the wording of the SPS Agreement and related instruments. This grey area has given rise to differing interpretations and means of national implementation, some more conservative or restrictive and others more liberal. This paper generally uses a more optimistic legal interpretation of rights and obligations under the SPS Agreement and international law that is also consistent with much of the stronger existing national policy measures on invasive alien species.

A. Relevant WTO Agreements

The following section briefly reviews the agreements administered by the WTO that have the most relevance to invasive alien species: the GATT, SPS Agreement, TBT Agreement and GATS.

1. General Agreement on Tariffs and Trade

The GATT is the WTO's core agreement with respect to trade in goods. Originally adopted in 1947, the GATT was incorporated into a larger set of agreements upon creation of the WTO in 1994. The GATT seeks to limit tariff and non-tariff barriers to trade in goods, and contains several "non-discrimination" provisions designed to prevent countries from discriminating between similar or "like" products from different origins. Generally, these non-discrimination provisions require that (1) products be treated no less favorably under national laws of the importing country than like domestic products (the "national treatment" obligation), and (2) products from one country be treated no less favorably than products from any other country (the "most favored nation" obligation).

Some have questioned whether such language could prevent a country from requiring different treatment of products from one country that might host a potential pest versus the same product from another country where the pest is not present. While on the surface such differential treatment might be seen as discriminatory, WTO jurisprudence under the GATT suggests otherwise.²⁹ In addition, reference to the WTO's SPS Agreement as well as to countries' past behavior in such cases has shown these measures to be legitimate. As will be discussed further in the section addressing the SPS Agreement, invasive alien species prevention measures that impose import restrictions have a strong legal basis, as long as the distinction in treatment is grounded in valid invasive alien species concerns and is not merely a cover for protectionist aims.³⁰

²⁹ See generally, NATHALIE BERNASCONI, DANIEL MAGRAW, JULIA OLIVA, MARCOS ORELLANA, AND ELISABETH TUERK, ENVIRONMENT AND TRADE: A GUIDE TO WTO JURISPRUDENCE (EARTHSCAN 2005).

³⁰ Discrimination questions are fact-specific and the legal standards introduce flexibility both for regulators and adjudicators and may pertain to the more specialized WTO Agreements, such as the SPS Agreement, rather than to the GATT. At least one panel ruling under the WTO dispute settlement system interprets the "like" product provisions as strongly suggesting that space exists for regulating otherwise "like" goods that harbor invasive alien species. In *European Communities – Measures Affecting Asbestos and Asbestos-Containing Products (EC-Asbestos)*, a case under GATT 1994 challenging import restrictions on otherwise-similar products containing asbestos, the Appellate Body interpreted "like product" to mean that the higher risk posed to human health by carcinogenic asbestos fibers was relevant to distinguish it from non-asbestos materials. In the context of livestock trade, this can clearly be seen where recent bouts of bovine spongiform encephalopathy (BSE) in cattle and avian influenza in poultry have touched off a wide array of bans on these animals from affected countries.

See *European Communities – Measures Affecting Asbestos and Asbestos-Containing Products (EC-Asbestos)*, WT/DS135/AB/R at ¶ 113 (adopted Apr. 5, 2001). In contrast, in *Japan – Measures Affecting Agricultural Products (Japan – Varietals)*, a case arising under the SPS Agreement, the Appellate Body appeared to question whether Japan had properly distinguished particular fruit varieties in claiming that they needed to be tested individually for the presence of an agricultural pest rather than testing them under a more general product category for purposes of applying a prevention measure. WT/DS76/AB/R (adopted Mar. 19, 1999). This suggests the need for differentiation according to known risks or for provisional regulations where the risks are still uncertain.

Article XX of the GATT is of central importance regarding efforts to stem the introduction of invasive alien species. It provides an exception to GATT rules for measures “necessary to protect human, animal or plant life or health” or “relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption.” According to Article XX, these measures cannot be designed or applied in a way that would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade. Yet clearly, protection of public health as well as animal and plant life falls under these Article XX exceptions.³¹

2. *Agreement on the Application of Sanitary and Phytosanitary Measures*

The SPS Agreement is the WTO instrument most applicable to the regulation of invasive alien species.³² It defines the basic rights and obligations of WTO members regarding use of domestic measures to protect animal or plant life or health from risks arising from the entry, establishment or spread of pests, where such measures may directly or indirectly affect international trade. The SPS Agreement recognizes that Parties have the right to protect the life and health of their human, animal and plant populations, and to determine their appropriate levels of SPS protection.³³ Measures to implement these rights, however, must be non-discriminatory, applied only to the extent necessary and based on scientific evidence and a risk assessment. The SPS Agreement also encourages the use of international standards to harmonize regulations among WTO members, and allows for the use of provisional measures in cases of insufficient information.

The WTO Dispute Settlement Body has heard several cases involving the SPS Agreement, which are relevant for the design and implementation of prevention measures. This case-law is addressed in detail further below, in the context of the discussion on principles for effective prevention measures.

3. *Agreement on Technical Barriers to Trade*

The TBT Agreement was established to ensure that a country’s regulations, standards, testing and certification procedures do not create unnecessary obstacles to trade. Similar to the

³¹ The WTO dispute settlement body has also interpreted this exception in a way that is consistent with the use of prevention measures that differentiate between whether and how a product was treated to mitigate the introduction of invasive alien species. In *United States – Import Prohibition of Certain Shrimp and Shrimp Products (Shrimp – Turtle)*, another GATT case, the Appellate Body ultimately upheld a U.S. measure restricting trade in shrimp based upon differences in production and processing methods that was adopted to protect endangered species of migratory sea turtles.

See United States – Import Prohibition of Certain Shrimp and Shrimp Products (Shrimp-Turtle), WT/DS58/AB/RW (adopted Nov. 21, 2001).

³² Although the SPS Agreement appears to apply to prevention measures, the extent of such coverage is presently in dispute (see discussion on *EC-Biotech* below).

³³ This is reflected in Article 2.1 of the SPS Agreement, as well as in a preambular reference to GATT Article XX(b) (allowance for measures necessary to protect human, animal or plant life or health). Agreement on the Application of Sanitary and Phytosanitary Measures, Apr. 15, 1994, Marakesh Agreement Establishing the World Trade Organization [hereinafter WTO Agreement], Annex IA [hereinafter SPS Agreement].

SPS Agreement, the TBT Agreement encourages the use of international standards to facilitate trade and harmonize national regulations, while providing guidance for the development and application of separate regulations at the national level. In meeting a country's objectives, which can include protection of human, animal and plant life and health or the environment, technical regulations should not be more trade-restrictive than necessary and should take into account the risks of non-action. The agreement includes a savings clause stating that it does not apply to measures covered by the SPS Agreement.³⁴ Although this clause would bar application of the TBT Agreement to many prevention measures, others not covered by the SPS Agreement, such as procedures related to identification, documentation, labeling and traceability systems, could fall under the scope of the TBT Agreement.

4. *General Agreement on Trade in Services*

The GATS also raises issues relevant to the implementation of prevention measures. Trade in services, such as transport, tourism, telecommunications, and refuse and sewage disposal, represents one of the most dynamic and fastest growing areas of global commerce, and often is a significant component of invasive alien species pathways. The GATS provides a framework for the increase in trade in services in these areas. In addition to the most favored nation and national treatment obligations, GATS includes specific obligations that apply only to service sectors in which an individual WTO member voluntarily "enters into a specific commitment." GATS also includes an exception for measures "necessary to protect human, animal or plant life or health."

Officials regulating service providers need to recognize how different economic sectors and activities can serve as pathways for the introduction of invasive alien species and need to identify the best options for reducing or eliminating such threats. For example, introductions of invasive alien species through marine and air transport are already well documented (e.g., hull fouling on ships, brown tree snakes in airplane landing gear). Tourism, including both the movement of individuals and recreational vehicles (e.g., yachts), can also serve as a pathway for introduction, particularly where ecologically sensitive areas are concerned. Internet sales of horticultural plants, insects and exotic animals is largely unregulated, and screening facilities at postal systems in many countries are inadequately equipped and regulated to address this burgeoning area of trade.

B. Trade Related Issues and Invasive Alien Species Prevention Measures

The framework of rules established by the WTO to facilitate trade and reduce trade barriers raises a number of issues regarding how countries can regulate trade in products or along pathways that can lead to the introduction of invasive alien species. Specific aspects to be addressed here include: the role of the precautionary principle in prevention; the use of national measures to prevent introductions; and capacity issues, including special and differential treatment in regard to developing countries.

³⁴ Agreement on Technical Barriers to Trade, Apr. 15, 1994, WTO Agreement, Annex 1A, art. 1.5 [hereinafter TBT Agreement].

1. *The Role of the Precautionary Principle*

Regulation and prevention of invasive alien species by their nature involve policy-making under conditions of uncertainty: Which species will become invasive? How might a species be introduced? What is the scope of damage that it might cause in terms of environmental, agricultural, human health, economic or socio-cultural impacts? Which prevention measures are effective? Are there any unforeseen impacts on trade? Although scientific research and methodological tools can help to reduce some of these uncertainties, rarely will it be the case that regulators can operate with 100% certainty. Additionally, science by its very nature can never be completely certain. Under such circumstances, countries can choose to be more cautious in their approach by limiting questionable introductions until further evidence is gathered. Alternatively, they can take a potentially riskier approach by allowing the introduction of species or goods that may present a hazard. We generally support the former approach, adopting a precautionary stance to protect environmental and human health and to reduce unnecessary exposure to risks. However, it is important to note that countries themselves, not the WTO or other international bodies, need to determine their own desired level of protection.

This position essentially embraces the application of the precautionary principle in crafting prevention measures and, if necessary, in defending them. A common formulation of the principle is cited in Principle 15 of the Rio Declaration on Environment and Development: “Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.”³⁵ However, use of the precautionary principle³⁶ has generated significant controversy within the broader context of the trade and environment debate. Although this paper will not repeat those arguments, we do support the view that precaution can be an effective tool in helping to prevent the introduction of invasive alien species while fully complying with trade obligations under the WTO Agreements.³⁷

Within the WTO’s dispute settlement system, the Appellate Body has made two essential points relevant to this discussion about the role of precaution in the context of risk assessment and other provisions of WTO Agreements.

First, the precautionary principle provides critical interpretive guidance for regulators and adjudicators in cases where scientific uncertainty is a prominent factor in addressing invasive alien species risks. As part of the broader corpus of international law and principles, the precautionary principle informs the proper application of trade provisions generally.³⁸ Thus, in

³⁵ Rio Declaration on Environment and Development, 14 June 1992, A/CONF.151/5 [hereinafter Rio Declaration]. Note that the preamble to the CBD and related provisions with the Cartagena Protocol on Biosafety omit reference to “cost-effectiveness” in the development of alternative measures. This has been the source of some concern when compared with WTO and SPS obligations to minimize impacts on trade when designing domestic measures.

³⁶ Some argue that it is a “precautionary approach” rather than a principle.

³⁷ In this context, we are fully supportive of those measures sincerely designed to protect the environment, human health and/or agriculture, and generally view use of the precautionary principle to establish disguised trade barriers as detrimental to the principle and genuine efforts to prevent the movement of invasive alien species.

³⁸ The precise status of the precautionary principle under customary international law is still evolving. For example, in *EC - Measures Concerning Meat and Meat Products (EC – Hormones)*, WT/DS26/AB/R, WT/DS48/AB/R (adopted Feb. 13, 1998), the Appellate Body appeared to draw a distinction between international environmental law and international law generally in this regard. *Id.* ¶ 123.

EC – Hormones, the Appellate Body pointed out that the precautionary principle provides a common-sense model of decision-making in framing SPS measures:

[a] panel charged with determining, for instance, whether "sufficient scientific evidence" exists to warrant the maintenance by a Member of a particular SPS measure may, of course, and should, bear in mind that responsible, representative governments commonly act from perspectives of prudence and precaution . . .³⁹

More specifically, the precautionary principle is directly embodied in key components of WTO Agreements. For example, the Appellate Body has pointed out that the precautionary principle is reflected in the right of members, under Article 3.3 of the SPS Agreement, to determine an appropriate level of protection that may be higher (i.e., more cautious) than provided by international standards.⁴⁰

The second essential point regarding the precautionary principle made by the Appellate Body is itself twofold: the precautionary principle cannot override either the specific requirements imposed by the SPS Agreement or the need to adhere to customary international law in interpreting those requirements.⁴¹ Merely pointing out that the precautionary principle cannot override specific SPS obligations, such as the need to prepare a risk assessment, does not limit its guiding role in the elaboration of a risk assessment. Although undoubtedly the precautionary principle has not been written as an "exception" to SPS disciplines, it may nevertheless be relevant if a conflict of norms arises.⁴² Likewise, it is not problematic that the precautionary principle cannot trump principles of treaty interpretation. The precautionary principle itself informs the context and other aspects of treaty interpretation, and for this reason it is highly relevant to the interpretation of WTO law. Thus, since scientific uncertainty is often a looming presence in the invasive alien species setting, the precautionary principle has a prominent role in guiding decision-makers to appropriate outcomes.

Given this framework, it seems clear that the best use of the concept of precaution in prevention measures is to follow the lead of *EC – Hormones* and integrate precaution into various aspects of risk analysis (see next section). Doing so would treat the precautionary principle as an analytically distinct basis for decision, relying on the risk assessment process, which is legitimately characterized as scientific in nature. For example, where data is limited, the best available scientific information might indicate that reliance on precaution is appropriate in determining whether a prevention measure is necessary to achieve a country's level of protection. This role for the precautionary principle is particularly relevant as a backdrop to the following discussion on the use of national measures in preventing introductions.

2. *Implementation of National Measures for Preventing Introductions*

The WTO agreements summarized in the previous section establish a basic framework for how countries can develop national measures to regulate trade to prevent and control the introductions of invasive alien species. The set of WTO requirements is rather elaborate, and the

³⁹ *Id.* ¶ 124.

⁴⁰ *Id.*

⁴¹ *Id.*

⁴² See generally J. PAUWELYN, CONFLICT OF NORMS IN PUBLIC INTERNATIONAL LAW: HOW WTO LAW RELATES TO OTHER RULES OF INTERNATIONAL LAW (2003).

following discussion is intended to highlight and review the key provisions that are relevant to the design and implementation of national measures. Generally, a concerted effort to look at prevention strategies in a holistic and iterative manner may be much more successful in the long run than a piecemeal approach that is uncoordinated or only addresses a few sectors or pathways. In this regard, the following section examines the following concepts:

- harmonization, international standards and stricter measures;
- transparency, equivalence, consistency and least trade-restrictiveness;
- scientific evidence;
- risk assessment;
- burden of proof; and
- provisional measures.

a. Harmonization, International Standards, and Stricter Measures

The SPS Agreement encourages the broad harmonization of SPS measures among WTO members by facilitating the use of existing international standards. A globally harmonized approach to trade-related prevention measures has obvious benefits for facilitating trade and can serve as a useful mechanism for countries without resources or domestic legislation to quickly establish minimum protections. However, experience to date generally shows that negotiation of standards reflects a lower common denominator of protectiveness that has trade facilitation as its foremost objective.

Turning to the SPS Agreement, it is possible to distinguish three types of measures: those that “conform to” international standards; those that are “based on” international standards; and those that provide for higher levels of protection than international standards.⁴³ For the first and third types of measures, requirements for satisfying the SPS Agreement are clear. National measures “conform to” international standards when they embody the standard completely. Such measures enjoy a rebuttable presumption that they are consistent with the requirements of the SPS Agreement and GATT.⁴⁴ The third type of measures includes those that provide a higher level of protection than is afforded by international standards. These measures are subject to requirements concerning scientific justification, risk assessment, non-discrimination, consistency and least trade-restrictiveness.⁴⁵

The second type of measures – measures that are “based on” international standards but do not precisely “conform to” them – may provide countries with greater leeway in tailoring the relevant standard to their national circumstances. Although such measures plainly do not enjoy an automatic presumption of consistency, it is safe to assume that they are not likely to be subject to the panoply of requirements set out for measures not based on international standards, such as

⁴³ SPS Agreement, *supra* note 33, art. 3.2, 3.1, and 3.3 respectively.

⁴⁴ SPS Agreement, *supra* note 33, art. 3.2.

⁴⁵ See SPS Agreement, *supra* note 33, art. 3.3, which in turn refers to specific obligations in Art. 5. In *Japan – Varietals*, the WTO Appellate Body found that these provisions require a “rational relationship” between the measures in question and scientific evidence. See *Japan – Varietals*, *supra* note 30, ¶¶ 84-85.

risk assessment and scientific justification. The Appellate Body has yet to rule squarely on the requirements applicable to this class of measures.⁴⁶

There is little doubt that conformity to international standards is the easiest and cheapest means of establishing domestic regulations, as the scientific basis for the measure has already been determined. Broad acceptance of standards by countries has the benefit of providing a relatively harmonized system of regulatory requirements across countries. This is obviously to the benefit of exporters that have to accord with the particular regulatory structures of multiple market destinations. Those standards, however, are not necessarily suited to particular environmental or agricultural conditions. Instead, they are the product of international negotiating processes that tend toward a lower common denominator of protection so as not to overly restrict international trade. Developing countries, in particular, often lack the resources, expertise or scientific information to effectively participate in the development of international standards, and thereby to ensure that their particular concerns are taken into account and reflected in technical standards.

The international standard-setting institutions identified in the SPS Agreement include the International Plant Protection Convention (IPPC), which sets standards for plant health; the Office International des Epizooties (OIE), which sets standards for animal health and animal diseases that impact human health; and the Codex Alimentarius Commission, which sets food safety standards (see Appendix I). The SPS Committee, the WTO body responsible for overseeing the implementation of the SPS Agreement, is charged with developing a list of relevant international organizations and associated standards, guidelines and recommendations relating to SPS measures that may have a major impact on trade.⁴⁷ With respect to invasive alien species, such guidance could include the CBD's work on "Guiding Principles" and the IMO's convention on ballast water and sediments.⁴⁸ To date, however, the SPS Committee has not focused on institutions outside of the three abovementioned bodies specified in the SPS Agreement.⁴⁹

⁴⁶ The Appellate Body has not ruled on the precise question of whether risk assessment and scientific justification requirements attach to measures "based on" but not "conforming to" an international standard, noting that was "left for another day and another case." *Id.*, ¶ 168. Nevertheless, in explaining that the presumption of consistency would not attach to such measures, the Appellate Body's reasoning implies that, conversely, such measures likewise would not be subject to risk assessment or scientific justification. Assuming this to be true, however, still leaves open the question of how much leeway countries have in crafting measures "based on" international standards. In this regard, the Appellate Body in *EC – Hormones* posited only the situation where "[s]uch a measure may adopt some, not necessarily all, of the elements of the international standard." *Id.*, ¶ 171. An example of such a measure would be one that incorporated only some of the compliance options offered by the international standard. Thus, a country might, out of concern for the ozone depletion caused by methyl bromide, adopt a national measure allowing only heat treatment to address invasive alien species risks from wood packaging material, even though the IPPC standard, ISPM No. 15, allows both options.

⁴⁷ See SPS Agreement, *supra* note 33, art. 12.4.

⁴⁸ The legitimate role of non-WTO agreements in guiding state actions that may impinge upon international trade has been supported in *Shrimp-Turtle*, *supra* note 31, ¶ 130-132; *European Communities - Trade Description of Sardines (EC-Sardines)*, WT/DS231/AB/R, ¶ 10, 110 (Sept. 26, 2002); and potentially the EC-GMOs.

⁴⁹ See WTO Committee on Sanitary and Phytosanitary Measures, *Revision of the Procedure to Monitor the Process of International Harmonization*, G/SPS/11/Rev.2 (Nov. 15, 2004) (In a 2004 review of its procedure for monitoring international harmonization issues, the SPS Committee simply stated that it may, at a future date, consider standards, guidelines or recommendations produced by other relevant international organizations if the need arises.)

Some have argued that the SPS Agreement establishes a regulatory floor with an unlimited ceiling pending a country's desired level of protection.⁵⁰ This view, however, presumes that 1) countries are able to adopt and properly implement the international standards defining that floor, and 2) the existing standards generally provide broad, if not comprehensive coverage of relevant areas. Both points are open to debate. In the first case, many developing countries are still in the initial implementation stage for applying international standards, and second, there are broad gaps in the standards' coverage of invasive alien species issues.⁵¹ Even looking at the IPPC and its focus on plants and plant pests, most of its standards relate to issues of process (i.e., providing guidance to authorities on how to conduct a risk assessment or develop quarantine, certification and/or surveillance systems) rather than to the regulation of particular species or pathways.⁵²

The following sections primarily relate to national measures that are stricter than international standards or that apply to areas where there are no standards. It should be noted that many of these principles can equally apply to measures based on standards as a matter of good practice within the constraints of available resources.

b. Transparency, Equivalence, Consistency, and Necessity/Least Trade-Restrictiveness

The SPS Agreement explicitly allows countries to adopt measures that are stricter than international standards. As noted, however, these measures do not enjoy the initial presumption of consistency with SPS requirements, and instead must meet a range of criteria set out in related provisions of the SPS Agreement.

Transparency: Transparency is required under the SPS Agreement through both procedural and substantive provisions. Member states must notify other countries of proposals to adopt new or changed measures, respond to requests for more information and provide the text of adopted measures.⁵³ These explicit transparency requirements need not interfere with adoption of effective prevention measures, except in the sense of adding to cost and process burdens. In addition, when measures go beyond international standards, the various substantive requirements of the SPS Agreement open the measures to scrutiny, for example through requirements for scientific justification and risk assessment. By requiring countries to create a record of the available information, applicable threats and possible responses, transparency obligations minimize the possibilities for obfuscation or disguised trade barriers.

⁵⁰ G.E. Isaac, *5 The SPS Agreement and Agri-Food Trade Disputes: The Final Frontier*, ESTEY CENTRE J. INT'L LAW & TRADE POLICY 47 (2004).

⁵¹ An expert group under the CBD has identified a range of pathways that are currently not regulated under international environmental law, which will serve as the basis for future discussions under the Convention. See Convention on Biological Diversity, *Report of the Ad Hoc Technical Expert Group on Gaps and Inconsistencies in the International Regulatory Framework in Relation to Invasive Alien Species*, UNEP/CBD/SBSTTA/11/INF/4 (2005), available at <http://www.biodiv.org/doc/meeting.aspx?mtg=sbstta-11&tab=1>.

⁵² Solid wood packaging material [SWPM] is the only pathway standard developed by the IPPC.

⁵³ SPS Agreement, *supra* note 33, art. 7 & Annex B.

Equivalence: By developing a national prevention measure to address specific concerns, a country essentially establishes an accepted level of risk regarding imports of a particular product or along a particular pathway.⁵⁴ From the trade perspective, adoption of that measure establishes a regulatory framework for commerce with other countries. Under the SPS Agreement an exporting country can choose to abide by the specific terms of the measure. Alternatively, it can demonstrate that an alternative measure can just as effectively meet the importing country's desired level of protection.⁵⁵ Thus, the importing country must recognize and accept "equivalent" regulations if it determines that those measures meet its required level of protection even if they do not meet the specific criteria of its domestic regulations.

In cases where an importing country is requested to recognize the equivalent level of protection provided by an exporting country's SPS regulations, the SPS Agreement specifically places the burden of proof on the exporting country. It is also incumbent upon the exporting country to initiate the process for determining equivalence by demonstrating that its measures meet the importing country's level of SPS protection. In assessing whether such measures are comparable, the importing country has the right to request the relevant data and findings, and to gain access for inspection, testing and other relevant procedures.⁵⁶ Finally, in cases where an exporting country may have populations of an invasive alien species in parts of its territories, it can designate particular pest- or disease-free areas (or areas of low pest or disease prevalence).. In such cases, the exporting country must provide the necessary evidence to demonstrate that such areas are and are likely to remain pest/disease free or low in prevalence.⁵⁷ This framework provides significant discretion to importing countries in deciding whether an exporter's regulations are truly equivalent. Accordingly, the need to accept equivalent measures need not undermine a country's ability to adopt effective invasive alien species measures.

Consistency: The SPS Agreement calls upon WTO members to act consistently in addressing risks. Thus, if a prevention measure requires a particular treatment for a particular invasive alien species, a country must similarly treat other pathways by which that same species could enter.

The consistency requirement reflects the need for a broad perspective on what level of risk a country is willing to tolerate in the flow of goods across its borders. A country's level of SPS protection thereby serves as the bar for evaluating whether a prevention measure is adequate. The SPS Agreement defines the appropriate level of sanitary or phytosanitary protection as "The level of protection deemed appropriate by the Member establishing a sanitary or phytosanitary measure to protect human, animal or plant life of health within its territory."⁵⁸ In *Australia - Measures Affecting the Importation of Salmon*, the Appellate Body has spoken of

⁵⁴ Optimally, countries will have previously determined their broader intent regarding acceptable risk, such that individual measures are consistent with the broader invasive alien species policy objective.

⁵⁵ *Id.* at art. 4.1.

⁵⁶ *Id.*

⁵⁷ *See id.* at art. 6 (Adaptation to Regional Conditions, Including Pest- or Disease-Free Areas and Areas of Low Pest or Disease Prevalence).

⁵⁸ *Id.*, Annex A, s. 5.

the prerogative – indeed, the obligation – of member states to determine the appropriate level of protection.⁵⁹

A country's level of protection should be consistent across a comparable range of threats, such that the level of protection for one pathway of introduction of a pest is not significantly different for another pathway of that same pest. For example, in *EC – Hormones*, the WTO's Appellate body found that the European Community's measures restricting hormone additives in imported meat were arbitrarily more protective than a range of comparable situations.⁶⁰ In *Australia – Salmon*, the dispute settlement body found that restrictions to prevent disease in imports of frozen salmon were arbitrary because they were significantly tighter than measures governing imports of live ornamental fish and frozen herring for bait, which present a similar level of risk.⁶¹

The consistency provisions of the SPS Agreement should also be viewed in the context of the overall anti-discrimination purpose of that agreement. Countries should ensure consistency in regulating similar risks in domestic and international commerce. For example, efforts by an importing country to stem the entry of an invasive alien species that already exists in the country might be called inconsistent by an exporting country. The exporter could assert that the risk presented is either not being regulated or is being regulated to a lesser level of protection than that associated with the import measure affecting foreign goods. Importing countries should be prepared to respond to the merits of such a claim. Nevertheless, they should not lose sight of the exporting country's burden to demonstrate that such inconsistency results in discrimination or a disguised restriction on international trade.

Where an invasive alien species has already been introduced and established to some extent within a country, the consistency principle in effect calls for adoption of a domestic regulatory regime for eradication, containment, and/or control. Otherwise, the maintenance of prevention measures designed to prevent additional introductions through international trade might come under scrutiny as an alleged discriminatory action. The mere fact that an invasive alien species is already present, but not yet established or pervasive, should not imply that the lack of a robust domestic response to that species represents a failure to meet the consistency requirements of the SPS Agreement. To begin with, as explained elsewhere, if the prevention measures are not designed or applied in a discriminatory fashion, the fundamental concerns of trade disciplines are not implicated. Moreover, any lack of consistency in the treatment of comparable threats may be more apparent than real. Thus, it may be the case that additional introductions through international trade create a different risk than that presented by existing populations of an invasive alien species – e.g., by causing the problem to pass a “tipping point”

⁵⁹ See *Australia - Measures Affecting the Importation of Salmon (Australia – Salmon)*, WT/DS18/AB/R (adopted Nov. 6, 1998). Establishing this level of protection is also critical because any regulations extending beyond the measure in terms of the protectiveness must contend with the provision that such measures cannot be more trade restrictive than necessary. See SPS Agreement, *supra* note 33, art. 5.6.

⁶⁰ The “comparable situations” included the same naturally occurring hormones in untreated meat and other foods, use of the same hormones for therapeutic and herd management purposes, and use of other growth promoters in swine production. The Appellate Body also found, however, that there was no showing of discrimination in connection with the inconsistent treatment of risks, and so held that the measures were not, under Article 5.5, inconsistent with the SPS Agreement. See *supra* note 38.

⁶¹ See *Australia – Salmon*, *supra* note 59.

of invasiveness, or by introducing the species to different ecological zones of the country.⁶² Nevertheless, countries should adopt, within their capabilities, domestic invasive alien species measures to counter established populations. This is particularly prudent in order to minimize the prospect of inconsistency with the SPS Agreement.

The notion that prevention measures need to be consistent across a range of similar threats, instead of targeting a single pathway or product raises another potential concern. Some have argued that WTO rulings in this area could be read as broadening the consistency obligation beyond comparing two pathways carrying a similar risk to the possibility of comparing a country's level of SPS protection to other health or environmental risks, such as air pollution or water quality.⁶³ This is not a reasonable literal reading of those rulings, nor has a case making this claim been brought to the dispute settlement body. Accordingly, a literal or overly restrictive interpretation of the consistency obligation that assumes risk management decisions are made in a laboratory setting rather than in the real world in which governments and people exist is unrealistic and should be rejected by regulators considering prevention measures.

In sum, although establishing the potential for risk and linking that to concrete measures has to be guided by objective scientific information and causal linkages, the process for determining a country's acceptable level of risk is ultimately a question of public policy. Such political decisions should weigh the costs and benefits across a range of interests, including legal, economic, administrative, social, cultural and environmental concerns.

Necessity/Least Trade-Restrictiveness: Article 2.2 of the SPS Agreement requires that SPS measures that might affect trade be “applied only to the extent necessary to protect human, animal or plant life or health.”⁶⁴ Similarly, Article 5.6 of the SPS Agreement provides that measures are “not more trade-restrictive than required to achieve their appropriate level of sanitary or phytosanitary protection, taking into account technical and economic feasibility.”⁶⁵ These provisions do not limit the prevention goals that states may pursue in addressing invasive alien species threats. Rather, they address the means chosen to achieve those ends, by instructing states developing prevention measures to tailor those measures so that they do not needlessly restrict international trade. A more preventive approach will most likely have impacts on trade,

⁶² The “tipping point” relates to the circumstances and/or population size of a particular alien species necessary for it to establish and present harm to its host ecosystem.

⁶³ See D.G. Victor, *Risk Management and the World Trading System: Regulating International Trade Distortions Caused by National Sanitary and Phytosanitary Policies*, in INCORPORATING SCIENCE, ECONOMICS, AND SOCIOLOGY IN DEVELOPING SANITARY AND PHYTOSANITARY STANDARDS IN INTERNATIONAL TRADE – PROCEEDINGS OF A CONFERENCE 118-69 (Board on Agriculture and Natural Resources of the National Research Council, 2000) (discussing *Australia – Salmon*).

⁶⁴ Cf. Article XX of the GATT 1994, which provides an exception to anti-discrimination rules for measures “necessary to protect human, animal or plant life or health” or “relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption.” General Agreement on Tariffs and Trade, Apr. 15, 1994, WTO Agreement, Annex 1A [hereinafter GATT 1994].

⁶⁵ Footnote 3 of the SPS Agreement clarifies that least trade-restrictiveness is satisfied unless “there is another measure, reasonably available taking into account technical and economic feasibility, that achieves the appropriate level of sanitary or phytosanitary protection and is significantly less restrictive to trade.” SPS Agreement, *supra* note 33.

and therefore undergo deeper scrutiny for consistency with the SPS Agreement by trading partners.

c. Scientific Evidence

The SPS Agreement requires that SPS measures that might affect trade be “based on scientific principles,” and “not maintained without sufficient scientific evidence.”⁶⁶ The use of scientific evidence is critical to provide a reasoned explanation for how potential threats link to prevention measures. Often, there are differing levels of scientific consensus, and disagreement among experts regarding the risks potentially associated with a particular import or pathway. WTO jurisprudence has shown that measures need not require scientific consensus or even a scientific “majority.” For example, in assessing the adequacy of a risk assessment, the Appellate Body found that decisions need not be based upon “mainstream” scientific opinion, but rather could reflect “divergent” views as long as it was adequate to support the necessary rational relationship between the SPS measure and the risk assessment.⁶⁷

Recognition that there is not always a scientific consensus and that some level of uncertainty may remain raises key questions for exactly what constitutes “sufficient scientific evidence.” While this may vary with every case, countries should resort to the test of whether the available data can be used to fulfill the requirements of a risk assessment and definitively link a potential risk to the desired SPS measure. If there is not enough information to do a risk assessment, countries most likely will have to revert to establishing provisional measures on the product or pathway under investigation until such time as more information becomes available. The processes for risk assessment under the SPS Agreement generally presume that additional and relevant information can be gathered to (re)assess the need for a particular measure, however it must be explicitly recognized that sufficient evidence may be extremely difficult to provide, and a thorough scientific understanding might never be possible.

Finally, as the Appellate Body found in *Japan – Varietals*, the provisions regarding scientific evidence require an “objective relationship” or “rational relationship” between the measures in question and scientific evidence.⁶⁸ At issue were quarantine treatment rules for several types of fruit suspected of harboring a pest, the codling moth. Japan required that exporters provide proof of efficacy of quarantine treatment that was specific to each particular variety of the fruits in question. The Appellate Body found that Japan had failed to explain why a separate testing program had to be conducted with respect to each fruit variety, in the absence of extensive evidence indicating that testing of a single variety would not be sufficient to determine the risk for all varieties of a fruit.⁶⁹ In reaching its decision, the Appellate Body made clear that “sufficiency” for purposes of Article 2.2 is a “relational concept.”⁷⁰ The decision also stated that sufficiency must be determined on a case-by-case basis, and it did not establish a fixed criterion for the quantity of information needed before a country can implement trade-

⁶⁶ *Id.* art. 2.2.

⁶⁷ EC – Hormones, *supra* note 38, ¶ 193. This reasoning should apply as well to the analogous obligation to base SPS measures on scientific evidence, which also reflects a “rational relationship” test. *See* Japan – Varietals, *supra* note 30, ¶ 79.

⁶⁸ Japan – Varietals, *supra* note 30, ¶ 79.

⁶⁹ *See id.* ¶ 84-85.

⁷⁰ *Id.* ¶ 73.

related measures to limit or prevent introductions of invasive alien species.⁷¹ Rather, in dealing with invasive alien species threats, countries must consider individual circumstances affecting risks, costs and the efficacy of available prevention measures.

d. Risk Assessment

As previously mentioned, a country developing measures not based on an international standard must use a risk assessment, which is the process for gathering and reviewing information regarding the potential threat of a non-native species.⁷² Under the SPS Agreement, a risk assessment must satisfy three cumulative requirements by: identifying the risks or threats to be prevented and the potential consequences; evaluating the likelihood of entry, establishment and spread of the invasive alien species and the potential consequences; and evaluating the likelihood of entry, establishment and spread of the invasive alien species in the event that a chosen SPS measure is applied. States should also consider: available scientific evidence; relevant process and production methods; inspection, sampling and testing methods; prevalence of specific diseases or pests; relevant ecological conditions; and quarantine and other treatments.⁷³ States must also consider relevant economic factors, potential damage caused by the introduction of an invasive alien species, control and/or eradication costs, and the cost-effectiveness of alternative measures. Regulators must also firmly recognize that further information may not be available, which may require the application of precaution and continuation of provisional measures.

The Appellate Body has interpreted the risk assessment provisions of the SPS Agreement as requiring a fair degree of rigor. Thus, risk assessments must evaluate not merely the “possibility” of harm, but “the “likelihood,” i.e., the “probability,” of entry, establishment or spread of diseases and associated biological and economic consequences.⁷⁴ Such an evaluation does not necessarily have to be quantitative and can include qualitative considerations, although the assessment process should still be scientific.⁷⁵ The Appellate Body has emphasized the fundamentally practical nature of the exercise:

It is essential to bear in mind that the risk that is to be evaluated in a risk assessment under Article 5.1 is not only risk ascertainable in a science laboratory operating under strictly controlled conditions, but also risk in human societies as they actually exist, in

⁷¹ *Id.* ¶ 84.

⁷² WTO jurisprudence regards the risk assessment process as a “specific application” of the basic obligations in SPS Article 2.2 regarding the use of sufficient scientific evidence to maintain a measure. *See EC – Hormones*, *supra* note 38, ¶ 180.

⁷³ *See* SPS Agreement, *supra* note 33, art. 5 (Assessment of Risk and Determination of the Appropriate Level of Sanitary or Phytosanitary Protection). Annex A ¶ 4 of the agreement defines risk assessment as “The evaluation of the likelihood of entry, establishment or spread of a pest or disease within the territory of the importing Member according to the sanitary and phytosanitary measures which might be applied, and of the associated potential biological and economic consequences; or the evaluation of the potential for adverse effects on human or animal health arising from the presence of additives, contaminants, toxins or disease-causing organisms in food, beverages or feedstuffs.”

⁷⁴ *See, e.g.,* Australia – Salmon, *supra* note 59, ¶ 123.

⁷⁵ *See id.*, ¶ 124. The ruling in *EC – Hormones* states that a scientific process is essentially one characterized by systematic, disciplined and objective enquiry and analysis, that is, a mode of studying and sorting out facts and opinions that follows the scientific method. *EC – Hormones*, *supra* note 38, ¶ 187.

other words, the actual potential for adverse effects on human health in the real world where people live and work and die.⁷⁶

The risk assessment needs to be sufficiently specific to the product or pathway risk under consideration, and general theoretical uncertainty or risk is not seen as a credible basis for determining SPS measures. For example, *Japan – Apples* involved a prevention measure affecting the export of apples from the United States to Japan. The Appellate Body ruled that an assessment of the risk associated with the introduction of fire blight into Japan through a collection of various hosts that did not evaluate apples as a “separate and distinct vector” was insufficient.⁷⁷ Instead, the Appellate Body called for the consideration of “a specific agent or pathway through which contamination might occur.”⁷⁸ In addition to determining baseline risk, the assessment must also address how the risk would be affected by the SPS measure in question.⁷⁹ Such a determination needs to look at the probability of entry under that particular measure.

Notwithstanding these requirements, WTO decisions addressing the contours of the risk assessment obligation indicate that Members adopting prevention measures have a substantial degree of flexibility. First, WTO jurisprudence suggests that there is no threshold level or particular magnitude of risk to be demonstrated in order to maintain consistency with the SPS Agreement.⁸⁰ Second, the Appellate Body has recognized that minority scientific opinions can legitimately be utilized in crafting measures for the protection of human, plant, or animal life and health.⁸¹ Third, SPS jurisprudence clearly indicates that not only quantitative but also qualitative risk assessments are valid under the SPS Agreement.⁸² Fourth, the Appellate Body has observed that the relevance of the precautionary principle is not exhausted in provisional measures, and that the determination of sufficient scientific evidence will be influenced by a precautionary approach to irreversible risks.⁸³

In addition to the flexibility apparent in SPS Jurisprudence, the text of the SPS Agreement itself provides the space necessary for countries to adopt effective prevention measures. Indeed, Article 5.1 states that SPS measures shall be based on a risk assessment “as appropriate to the circumstances.” Relevant circumstances with respect to invasive alien species may vary depending on the pathway, product, or activity. For example, the relevant scientific information assessing an intentional introduction, such as an exotic pet species, may differ from that required to make risk determinations for an unintentional introduction along a particular pathway, such as beetles in solid wood packaging material. Thus, if the exotic pet itself (as opposed to any pathogens that it might carry) were invasive, evaluation of process and

⁷⁶ *Id.*

⁷⁷ *Japan – Measures Affecting the Importation of Apple (Japan – Apples)*, WT/DS245/AB/R, ¶ 200 (adopted Dec. 10, 2003).

⁷⁸ *Id.* ¶ 204.

⁷⁹ *See EC – Hormones*, *supra* note 38, ¶ 187. Note also that in *Japan – Apples*, the Appellate Body appeared to decide that, since the measure in that case consisted of a set of requirements applied cumulatively, the risk assessment was flawed because it did not consider the impact on baseline risk of each individual requirement. *See Japan – Apples*, *supra* note 77, ¶ 209.

⁸⁰ *EC – Hormones*, *supra* note 38, ¶ 186.

⁸¹ *EC – Hormones*, *supra* note 38, ¶ 194.

⁸² *EC – Hormones*, *supra* note 38, ¶ 187.

⁸³ *EC – Hormones*, *supra* note 38, ¶ 124.

production methods, inspection and sampling, and quarantine and treatments would presumably be moot.

Risk Assessment and Pathways for Invasion: In considering how best to craft invasive alien species prevention measures that will satisfy SPS risk assessment requirements, it seems necessary to follow a fine line between specificity and generality. Thus, the Appellate Body has called for analyses that both address a specific disease, pest or other harm, and that consider a broad range of agents that may be responsible for that harm, as well as a spectrum of measures to prevent or remedy the harm, while assessing the impact of each harmful agent and corrective measure separately.

Given the range of potentially serious invasive alien species threats, meeting all these risk assessment requirements could be perceived as an overwhelming task, particularly for developing countries. Again, however, the Appellate Body has emphasized the flexibility available to importing countries in crafting risk assessments that meet these requirements. In particular, the Appellate Body has pointed out that FAO guidelines “expressly contemplate examining risk in relation to particular pathways.”⁸⁴ Thus, in *Japan – Apples*, it was noted that countries may organize risk assessments along the line of a disease or pest, considering specific agents or pathways through which contamination might occur.⁸⁵ By this same reasoning, a country might focus its risk assessment on a particular pathway – which many believe would be a more efficient approach to preventing introductions of invasive alien species – examining specific pests, hosts and vectors associated with that pathway. For example, the *International Standards for Phytosanitary Measures*, No. 11, was recently revised to specifically incorporate environmental considerations and expressly provides for a pathways approach.⁸⁶

One pathway approach to invasive alien species risk assessment that would satisfy WTO specificity requirements is to select one or more “indicator” species associated with a pathway that serves to subsume other invasive alien species risks from that pathway. For example, a particular species that hitchhikes on wood packaging material would be identified and subjected to a detailed risk assessment. That evaluation might then become the basis for an invasive alien species measure addressing the introduction pathway for the species in a way that also addresses other species which are not subject to a detailed assessment, but are suspected of being invasive and of being introduced through the same pathway. By employing a particular indicator species in this fashion, limited risk assessment resources might be leveraged to maximum effect.

Some have questioned the efficacy of such an approach in terms of the ability to extrapolate from one species to another, grouping species/risks and applying pathway approaches to species themselves or a class of risks. Such questions are useful for honing pathway approaches and it is likely that the method employed will vary with the product or vector under discussion. Ballast water treatments under the IMO and timber treatments under the IPPC are two good examples of regulating risky pathways. Their development also suggests that future pathway approaches will focus more broadly on the risk and its optimal management in a more

⁸⁴ *Japan - Apples*, *supra* note 77, ¶ 205 and notes 381, 382.

⁸⁵ *Id.* ¶ 204.

⁸⁶ See INTERNATIONAL PLANT PROTECTION ORGANIZATION, *No. 11: Pest Risk Analysis for Quarantine Pests, Including Analysis of Environmental Risks and Living Modified Organisms*, INTERNATIONAL STANDARDS FOR PHYTOSANITARY MEASURES 1(2001).

ad hoc manner than proceeding species by species or taxa by taxa. One potential path forward in this area could be a recommendation to the Global Invasive Species Programme or other international body to develop a broad set of guidelines on items and possible procedures that should be considered when developing pathway approaches.

Risk Assessment of Biological Organisms: It is useful to note, as a point of reference, that risk assessment methodologies employed for biological organisms are in part an outgrowth of chemical waste management. For example, the U.S. Environmental Protection Agency initially developed its risk assessment procedures to deal with chemical and physical stressors, and only later were they applied to biological risks.⁸⁷ Risk assessments for biological hazards generally are less developed because the impacts of an introduced species into an ecosystem structure are inherently more complex and difficult to quantify than chemical hazards.⁸⁸ The main qualitative differences between chemical and biological stressors are that biological organisms and systems can also:

- grow and reproduce;
- disperse actively and passively, including through unpredictable movements;
- interact with ecosystems in complex and unpredictable ways, including through positive feedback loops; and
- evolve in response to stimuli and changes in the environment.⁸⁹

Examination of ecological impacts also needs to take into consideration scalar issues including impacts on the genetic, individual, population and community levels, as well as potential positive feedback loops which further exacerbate effects.⁹⁰ More specific risk assessment methodologies do exist, and they address issues including biogeography, life history traits and other screening processes. Such techniques rely, however, on detailed ecological and biogeographical data, which are not always available. Over time, methods will continue to improve. Nevertheless, countries need to consider the limitations of their methodologies and available information when determining their desired levels of protection and establishing related measures.

Given these factors, it perhaps is not surprising that the U.S. National Research Council has concluded that “There are currently no known broad scientific principles or reliable procedures for identifying the invasive potential of plants, plant pests, or biological control agents in new geographic ranges.”⁹¹ In many cases, it will not be possible to predict the invasiveness of an organism. Those with a past history of invasions can present a high

⁸⁷ M. Andersen, *et al.*, *Risk Assessment for Invasive Species*, 24 RISK ANALYSIS 789 (2004).

⁸⁸ J.D. Stark, *An Overview of Risk Assessment*, in INCORPORATING SCIENCE, ECONOMICS, AND SOCIOLOGY IN DEVELOPING SANITARY AND PHYTOSANITARY STANDARDS IN INTERNATIONAL TRADE—PROCEEDINGS OF A CONFERENCE 60 (2000).

⁸⁹ D. Simberloff and M. Alexander, *Biological Stressors*, in ECOLOGICAL RISK ASSESSMENT ISSUE PAPERS (EPA/630/R-94/009) (1994).

⁹⁰ W.M. Lonsdale, *et al.*, *Risk Analysis and Weed Control*, in EVALUATING INDIRECT EFFECTS OF BIOLOGICAL CONTROL 185-210 (E. Wajnberg, J.K. Scott and P.C. Quimby eds., 2001).

⁹¹ NATIONAL RESEARCH COUNCIL, PREDICTING INVASIONS OF NON-INDIGENOUS PLANTS AND PLANT PESTS 9 (2002), available at <http://www.nap.edu/books/0309082641/html/> (last viewed Nov. 11, 2004).

probability of risk, but the converse is not true. A species that has never shown evidence of invasiveness cannot be regarded as benign because environmental or climatic changes could trigger a turn to invasiveness. In light of such state-of-the-art scientific conclusions regarding the adequacy of methodologies to assess risks presented by invasive alien species, the precautionary principle acquires paramount importance in the design of effective prevention measures.

e. Provisional Measures

One method of contending with scientific uncertainty in addressing invasive alien species threats is to adopt prevention measures on a provisional basis. This approach is addressed in Article 5.7 of the SPS Agreement, which provides that in cases where “relevant scientific evidence is insufficient,” a Member may adopt provisional measures “on the basis of available pertinent information.” Article 5.7 further obligates member states to “seek to obtain the additional information necessary for a more objective assessment of risk,” and to review the measure accordingly “within a reasonable period of time.”

Article 5.7 is not framed as a defense in cases of alleged breach of general obligations under the SPS Agreement. Rather, the affirmative right of members to take provisional measures in light of insufficient scientific evidence is an integral part of the agreement. As such, there is no reason to presume that some form of disfavored status attaches to provisional measures, although the agreement does impose an obligation to seek additional information and review those measures in a timely fashion.

The precautionary principle has particular – although not exclusive⁹² – relevance to provisional measures under the SPS Agreement. The precautionary principle supplies critical interpretive guidance for regulators where uncertainty renders scientific evidence insufficient to conclusively assess invasive alien species risks. In essence, the precautionary principle acknowledges that it is reasonable, in the face of scientific uncertainty, for regulators to make conservative assumptions regarding the degree of danger presented, and on that basis to take action to counter the threat.⁹³ It thus provides a scientific basis for establishing, even on very limited evidence, the existence of risk that justifies a provisional measure while additional steps are taken to reduce scientific uncertainty. In other words, the precautionary principle does not dispense with science, but in fact requires some scientific evidence to be operational. If this

⁹² For example, the Appellate Body has pointed out that the precautionary principle is addressed in the Preamble to the SPS Agreement and also relevant under Section 3.3. *See* EC – Hormones, *supra* note 38, ¶ 124.

⁹³ *See, e.g.,* Rio Declaration, *supra* note 42, art. 15. EC – Hormones, *supra* note 38, ¶ 124. As the Appellate Body has observed, “responsible, representative governments commonly act from perspectives of prudence and precaution where risks of irreversible, i.e., life-terminating, damage to human health are concerned.” Invasive alien species present such grave risks to human health. For example, in eastern Africa, water hyacinth introduced from Brazil provides habitat for water snails that transmit schistosomiasis, a major source of morbidity and mortality for developing countries. In actuality, of course, governments also commonly take precautionary measures when risks either to human health or to the environment are *not* immediate. For example, the U.S. Clean Air Act sets national air quality standards that are requisite to protect human health and the environment from all known or anticipated adverse effects of air pollution. *See* U.S. Clean Air Act, 42 U.S.C. § 7409(b) (2004). That statute goes on to establish another, precautionary program that further regulates air pollution even where air quality is better than national standards to address potential adverse effects on health and welfare that might occur notwithstanding compliance with those standards. *See* U.S. Clean Air Act, 42 U.S.C. § 7470(1) (2004).

were not so, and the lack of sufficient scientific information disallowed the adoption of even provisional prevention measures, then member states would be deprived of their right, guaranteed under the SPS Agreement, to choose an appropriate level of protection.

Article 5.7 of the SPS Agreement appears to place upon the country adopting a provisional prevention measure the ultimate responsibility for seeking additional information. But, as the Appellate Body has noted, although the additional information must be germane to the task at hand, Article 5.7 does not set out explicit directives regarding the additional information to be collected or a specific collection procedure.⁹⁴ Thus, nothing prohibits countries adopting provisional measures from placing upon exporters the practical obligation for and cost of obtaining this information. As noted previously, countries have for many years routinely placed these burdens upon exporters with respect to *permanent* prevention measures; it follows that it would be appropriate to do so with respect to provisional measures.

The requirement in Article 5.7 that additional information be obtained within a “reasonable time” likewise is unaccompanied by explicit directives for compliance. The Appellate Body has ruled that what constitutes a “reasonable time” should depend on the circumstances, including the difficulty of obtaining the additional information and the characteristics of the provisional measure.⁹⁵ Notably, nothing in Article 5.7 requires that sufficient scientific evidence actually be obtained, as there is no practical way to ensure that the requisite additional information will be obtained no matter how great the investigative endeavor. Thus, where significant scientific uncertainty remains despite efforts to reduce it, continued retention of provisional measures should be seen as consistent with Article 5.7.

f. Burden of Proof

Allocation of the burden of proof in making regulatory decisions and in responding to inquiries or potential disputes raised by other countries is another area of critical concern. Under the SPS Agreement, the WTO follows two general principles of international law that are important in determining the outcome of trade disputes. First, WTO members, as sovereign entities, are presumed to act in accordance with their WTO obligations.⁹⁶ Second, a party claiming that a member acted inconsistently with WTO rules bears the burden of proving that inconsistency.⁹⁷ Consequently, an importing country that adopts a prevention measure is presumed to have met its SPS obligations, and an exporting country that initiates a trade dispute has the initial duty of presenting a *prima facie* case. If the exporting country does present sufficient evidence to make out a *prima facie* case of inconsistency, the burden shifts to the importing country to present evidence showing that the relevant requirements of the SPS Agreement were satisfied. If the importing country comes forward with sufficient evidence to rebut the *prima facie* case, such that a reasonable finder of fact could rule in favor of either party, then the burden shifts back to the exporting party to persuade the adjudicative body that it has the stronger case. In other words, the exporting party retains the ultimate burden of persuasion.

⁹⁴ See Japan – Varietals, *supra* note 30, ¶ 92.

⁹⁵ *Id.* ¶ 93.

⁹⁶ Decision by the Arbitrators, EC – Hormones, Original Complaint by the United States, Recourse to Arbitration by the European Communities under Article 22.6 of the DSU, WT/DS26/ARB (July 12, 1999), ¶ 9.

⁹⁷ Appellate Body Report, *United States – Measures Affecting Imports of Woven Wool Shirts and Blouses from India*, WT/DS33/AB/R, (April 25, 1997), ¶ 14.

The burden of proof is relevant to a number of key policy issues under the SPS Agreement, including: development of a national measure; development of provisional SPS measures; challenge to an SPS measure; evaluation of whether an exporting country's alternative SPS measures are equivalent; and identification of pest-free areas in the country of export. As has already been stated, a country developing a national measure that is more protective than an existing international standard must provide the scientific evidence necessary for the risk assessment process. In such cases, the country can certainly use existing data from other sources and tailor them to its own needs. Yet, to be in accord with the SPS Agreement, the country is expected to have supporting scientific evidence for its measure.

If an importing country has insufficient scientific evidence, it must “seek to obtain the additional scientific information necessary for a more objective assessment of risk.”⁹⁸ Nothing prevents the importing country from requesting such information or assistance from the exporting country or exporter itself. In fact, providing such help might be in the interests of the exporter to facilitate the regulatory and approval process for goods subject to a provisional measure. As previously mentioned, should a provisional measure be challenged under the WTO dispute settlement process, it is incumbent upon the complaining Member to make the *prima facie* case regarding the particular fault.⁹⁹

3. *Capacity, Technical Assistance, and Special and Differential Treatment*

The juxtaposition of a state's sovereign right to protect its health and environment with the desire to pursue international trade presents severe resource difficulties for most countries. Even those in the “developed world” acknowledge the significant challenges posed by invasive alien species, but lack the capacity to fully address these threats in areas of prevention, eradication and/or control and management. Developing countries face even greater obstacles when comparing the threat of invasive alien species with other pressing concerns, such as economic development, poverty, public health and other environmental problems (e.g., deforestation, desertification, sea level rise). In many cases, managing invasive alien species presents an additional demand on an already limited pool of resources.

The international community recognizes the need for assistance to developing countries in both international environmental and trade fora, although contributions for desired resources may never meet the demand. In the environmental context, assistance is available through bilateral and multilateral donor programs and the Global Environment Facility. Similarly, trade assistance is available through the Standards and Trade Development Facility and bilateral and regional free trade agreements. The following discussion examines some of the related provisions within the WTO Agreements, focusing on how invasive alien species measures might impact market access and how the WTO's current Doha round of negotiations may impact these issues.

The difficulties that developing countries face in benefiting from the international trading system are ostensible when they seek access to export markets. For example, a study of trade between the E.U. and the Asian, Caribbean and Pacific countries (ACP) found a noticeable

⁹⁸ SPS Agreement, *supra* note 33, art. 5.7.

⁹⁹ *E.g.*, EC – Hormones, *supra* note 38, ¶ 108.

impact of the E.U.'s hygiene regulations on imports of fruits, vegetables and fish.¹⁰⁰ Additional requirements for traceability and equivalence place an even greater burden on these countries.¹⁰¹ Particular concerns highlighted by African countries and their exporters include:

- lack of adequate information on health and the SPS regulations applicable to their products in target markets;
- arbitrary and sometimes discriminatory application of SPS measures;
- use of measures to disguise trade restrictions; and
- little effort by developed countries to deal with negative trade effects of legitimate regulations.¹⁰²

Many of the WTO Agreements specifically recognize the difficulties faced by developing countries in implementing trade agreements. The SPS and TBT Agreements include articles on technical assistance and special and differential treatment. Provisions on special and differential treatment generally state that developing countries, and particularly the least-developed countries, should be accorded more favorable treatment. This allows, in practice, for time-limited derogations and some policy flexibility for specific obligations.

The ongoing Doha round of negotiations at the WTO is intended to address implementation issues and concerns of developing countries. For example, to ensure that temporary derogations from SPS regulations do not compromise an importing country's ability to protect public health, agriculture and the environment, developing countries must be provided financial and technical assistance to develop mechanisms that secure an equivalent level of protection. This support is necessary because, in addition to pursuing trade opportunities, developing countries also desire to adopt environmental protection measures. A CIEL/IISD study eloquently summarizes the difficulties:

[T]he Australian Salmon case places the level of assessment at a very rigorous level. The extent and detail of the risk assessment process required under that decision costs money and requires expertise. These financial and human resources may well be lacking in many developing countries. Indeed, they are lacking in many countries. Wherever such resources are lacking, a strict application of the SPS rules will become a full barrier to the taking of many measures because all measures must be based on a risk assessment unless they are directly based on an international standard.¹⁰³

¹⁰⁰ Technical Centre for Agriculture and Rural Cooperation (CTA), *Study of the Consequences of Sanitary and Phytosanitary (SPS) Measures on ACP Countries* (May 2003), available at http://agritrade.cta.int/CTA_SPS%20Study_EN.pdf

¹⁰¹ *Id.* For example, growing flowers in Kenya to meet EU standards costs 10 times more than if traditional conventional standards are used; Ugandan honey upgrading to ISP costs U.S. \$300 million; upgrading coffee increases cost by 200%. Hezron Nyangito, *Post-Doha African Challenges in the Sanitary and Phytosanitary and Trade Related Intellectual Property Rights Agreements*, KIPPRA Occasional Paper #4 (November 2002), available at <http://www.kippra.org/Download/OPNo4.pdf>.

¹⁰² *Id.*, at 8-9.

¹⁰³ H. MANN & S. PORTER, CENTER FOR INTERNATIONAL ENVIRONMENTAL LAW & INTERNATIONAL INSTITUTE FOR SUSTAINABLE DEVELOPMENT, *STATE OF TRADE & ENVIRONMENTAL LAW 2003: IMPLICATIONS FOR DOHA AND BEYOND* 35 (2003).

Within WTO discussion on these matters, many developing countries have called for either assistance to meet more stringent SPS regulations adopted by other countries or else for reducing such technical barriers. While assistance is certainly necessary, a requirement that barriers be reduced for those lacking capacity would compromise the SPS Agreement's recognition that countries can define their own desired level of protection as a matter of national sovereignty. Despite the SPS Committee's tacit support for reversion to international standards to harmonize regulations and minimize costs, consideration must be made for those countries that view such standards as inadequate.¹⁰⁴

In moving forward, countries should consider win-win options that benefit all countries by facilitating trade while preventing introductions of invasive alien species. In this regard, it is necessary to look at the use of assistance in three particular areas: 1) development of regulatory systems to protect agriculture, public health and the environment; 2) promotion of clean trade that focuses on the export of products that are "invasives free"; and 3) development of SPS facilities for export goods that can meet the requirements of other countries. Countries and relevant funding bodies should look at the synergies involved in each of these, rather than simply focusing on one aspect.

Aside from negotiating the elimination of subsidies and better access to developed country markets, developing countries should avail themselves of scientific information and cooperation with relevant academic and government research facilities in developed countries. For example, the U.S. Department of Agriculture and the University of Georgia have developed a long distance diagnostics and recommendation system to help Pacific island countries identify and rapidly assess potential pests. It is important that developing countries secure such technical expertise and domestic institutional structures that can incorporate the scientific information into a risk assessment framework. With such a framework in place, developing countries may be able to develop appropriate regulatory protections.

The WTO's Doha Ministerial Declaration also includes reference to technical cooperation and capacity building as related to market access for non-agricultural products, trade facilitation and the environment. The Doha round of negotiations has been dubbed a "development round," intended to address a broad range of implementation concerns raised by developing countries. The Declaration and a separate Ministerial decision recognize the constraints on developing countries and touch upon a wide range of areas that may impact the ability of developing countries to address invasive alien species.¹⁰⁵

¹⁰⁴ For more detail on the topic, see WTO Committee on Sanitary and Phytosanitary Measures, *Report on Proposals for Special and Differential Treatment*, G/SPS/35 (July 7 2005).

¹⁰⁵ Decision on Implementation-Related Issues and Concerns, Ministerial Conference of the World Trade Organization, 4th Sess., WT/MIN(01)/17(2001), available at http://www.wto.org/english/thewto_e/minist_e/min01_e/mindecl_implementation_e.pdf; Ministerial Declaration, Ministerial Conference of the World Trade Organization, 4th Sess., WT/MIN(01)/DEC/W/1 (Nov. 14, 2001), available at http://www.wto.org/english/thewto_e/minist_e/min01_e/mindecl_e.pdf. The areas touched upon include the GATT, agriculture, SPS measures, textiles and clothing, technical barriers to trade, trade-related investment measures, rules of origin, subsidies and countervailing measures, and intellectual property rights.

C. Other Bilateral and Regional Trade Agreements

A large number of trading nations are also pursuing bilateral and/or regional free trade agreements (RTAs) as a means to further facilitate their economic growth prospects. While many involve the United States or the European Union, there is also a wide range of agreements within the developing world, including MERCOSUR, CARICOM, the Pacific Islands Countries Trade Agreement, the South Asia Free Trade Agreement and the Southern African Customs Union to name a few.¹⁰⁶

These RTAs (both existing and prospective) do, and will continue to, increase the volume of inter-regional trade, creating larger challenges to addressing invasive alien species concerns. At the same time, such agreements might streamline or ease border inspection procedures, which may lead to increased invasive alien species introductions at existing levels of trade. For example, research shows that the primary threat of invasive alien species within the North American Free Trade Agreement is not in the spread of species that are native to Canada, Mexico or the United States, but is, instead, the introduction of an invasive from outside North America, which then spreads through regional trade.¹⁰⁷

These RTAs often support the international regulatory framework as established by the WTO, and sometimes develop improved mechanisms for dialogue or more explicit obligations for bilateral or regional trade. RTAs negotiated by the United States, for instance, explicitly recognize the obligations of the SPS Agreement and generally refer any SPS disputes to the WTO's Dispute Settlement Body. These agreements also develop a joint SPS committee to discuss regulatory issues, thereby increasing transparency. On the other hand, there is a danger that these agreements might incorporate provisions that could limit, beyond the constraints imposed by the SPS Agreement and other WTO Agreements, regulatory flexibility to deploy a full range of domestic policy tools to protect the environment and health against invasive alien species.

As much as RTAs augment the challenges involved in controlling invasive alien species, they may also provide opportunities for preventing the introduction of invasive alien species. First, additional mechanisms within RTAs, such as bilateral committees or working groups, are particularly valuable for ensuring the transparency of measures and that interested parties understand the basis of each other's SPS measures and underlying regulatory processes. Second, bilateral and regional mechanisms can facilitate cooperation on high-risk pathways through exchanging information (e.g., monitoring, interceptions, scientific information) and developing common regional standards or cooperative mechanisms. These agreements may also contain provisions for financial and technical assistance to build legal, scientific and institutional capacity to regulate invasive alien species and work with affected sectors and regions. For countries employing an environmental impact review of RTAs, such studies can identify high-risk pathways or goods and make those a priority focus within the negotiations.

¹⁰⁶ See <http://www.bilaterals.org> for a more extensive list of RTAs.

¹⁰⁷ A. Perrault *et al.*, *Invasive Species, Agriculture, and Trade: Case Studies from the NAFTA Context*, in NORTH AMERICAN COMMISSION FOR ENVIRONMENTAL COOPERATION, PROCEEDINGS OF THE SECOND NORTH AMERICAN SYMPOSIUM ON ASSESSING THE ENVIRONMENTAL EFFECTS OF TRADE (2003).

IV. The Way Forward – Principles and Recommendations

A. Principles of Effective Invasive Alien Species Prevention Measures

To be most effective, a system of prevention measures must be international or regional in scope, and implemented at the national level via strong legislative and regulatory systems. Prevention measures should give due regard to the trade provisions of the SPS Agreement and other relevant WTO Agreements. Some have expressed concern that WTO Agreements might be construed in a way that would hinder the ability of countries, regional agencies and even multilateral environmental agreements to adopt effective prevention measures. These concerns are discussed in greater detail in Section III. Here, we refer only briefly to WTO provisions in summarizing key design principles for invasive alien species prevention approaches. Much of the following discussion relates to findings of the WTO's Dispute Settlement Body. Our intent is not to highlight potential conflicts or how future disputes should be argued, but instead to clarify the rules such that future conflicts can be avoided.

1. Prevention Measures Should Be Designed to Be Consistent with the Legitimate Objectives of the SPS Agreement and other WTO Agreements

We have referred previously to countries' obligations under various multilateral environmental agreements and generally under customary law to adopt effective invasive alien species prevention measures. Designers of such measures should not attempt to contravene the fundamental objective of the WTO Agreements by adopting measures that plainly "result in discrimination or a disguised restriction on trade."¹⁰⁸ The vast majority of countries embrace the core trade liberalization goals of the WTO Agreements. Those goals will be defended vigorously by trade advocates in the face of measures that, while ostensibly addressed to the invasive alien species problem, in actuality are principally geared towards improper protection of markets. Conversely, measures that are intended to address invasive alien species can be crafted in a way that both fulfills obligations in multilateral environmental agreements and minimizes the possibility of conflict with WTO Agreements. To be sure, there is a substantial potential for tension between WTO Agreements and prevention measures. It would be preferable to amend the Agreement Establishing the WTO to clarify the relationship of WTO Agreements with multilateral environmental agreements in a way that facilitates adoption of prevention measures. Nevertheless, actual conflict between these normative regimes as they currently exist is not a necessary outcome. Rather, effective prevention measures can be adopted without undue cost and time expenditures in a manner consistent with WTO requirements. Three basic factors underlie this optimism.

a. The goals of WTO Agreements do not take primacy over prevention measures that further the goals of multilateral environmental agreements, since such agreements reflect the interests of the international community as a whole.

Principles of treaty interpretation dictate that WTO Agreements should be construed in a manner consistent with the environmental protection objectives of multilateral environmental agreements, including invasive alien species prevention. The WTO Appellate Body has never

¹⁰⁸ Such measures are prohibited by Article XX of the GATT and Article 5.5 of the SPS Agreement, *supra* note 33.

ruled otherwise. In fact, the Appellate Body *has* ruled that the framers of the WTO Agreements intended to take goals of multilateral environmental agreements into account, and this intent is clearly expressed in the preamble to the Agreement Establishing the WTO.¹⁰⁹ Thus, it would be improper to construe the provisions of WTO Agreements in a way that defeated the overarching purpose of accommodating environmental concerns as well as trade liberalization goals. This need for coordination of purposes should inform all relevant interpretations of the provisions of WTO Agreements in determining the acceptability of prevention measures.

b. The prohibition against trade discrimination implicates only prevention measures that are arbitrary or unjustifiable under WTO Agreements.

The fundamental purpose of the WTO Agreements is not to eliminate all restraints on international trade. Rather, their purpose is to remedy *arbitrary or unjustifiable discriminatory treatment* in trade.¹¹⁰ As noted by the Appellate Body, a balance must be struck between meeting health, safety, and environmental concerns and promoting international trade.¹¹¹ Article XX of the GATT, for example, recognizes explicitly that any contracting party may adopt measures that are “necessary” to protect human, animal, or plant life or health. Additionally, Article XX carves out an exception for measures relating to exhaustible natural resources, if such measures are in conjunction with restrictions on domestic production or consumption.

Should it come to the point of a WTO dispute, the Appellate Body has ruled that any evaluation of whether measures facially adopted for such purposes involve arbitrary or unjustifiable discrimination should include an examination of how these trade measures are *applied*. That is, in determining whether measures that restrict trade are WTO consistent, the Appellate Body will consider whether the restrictions were applied, *inter alia*, in an open and transparent way, with due publication and notification, and specifically tailored to address the conservation challenge. In particular, the Appellate Body will likely inquire whether account

¹⁰⁹ Thus, the first Report of the Appellate Body in *Shrimp – Turtle* held that the GATT “must be read by a treaty interpreter in the light of contemporary concerns of the community of nations about the protection and conservation of the environment.” *Shrimp-Turtle 1*, WT/DS58/AB/R, ¶ 129 (adopted Oct. 12, 1998). That decision also pointed out that the preamble to the umbrella Agreement Establishing the WTO “shows that the signatories to that Agreement were, in 1994, fully aware of the importance and legitimacy of environmental protection as a goal of national and international policy.” *Id.* The Appellate Body then cited to several multilateral environmental agreements that helped inform the meaning of the WTO Agreements. *Id.* ¶ 130.

¹¹⁰ See, e.g., GATT 1994, *supra* note 64, art. 3.1 (“The contracting parties recognize that . . . regulations and requirements . . . should not be applied to imported or domestic products so as to afford protection to domestic production”); SPS Agreement, *supra* note 33, Preamble (“no Member should be prevented from adopting or enforcing measures necessary to protect human, animal or plant life or health, subject to the requirement that these measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between Members where the same conditions prevail or a disguised restriction on international trade”) & art. 5.5 (“each Member shall avoid arbitrary or unjustifiable distinctions in the levels [of protection] it considers to be appropriate in different situations, if such distinctions result in discrimination or a disguised restriction on international trade”); *EC – Hormones*, *supra* note 38, ¶ 177 (“The ultimate goal of the harmonization of SPS measures is to prevent the use of such measures for arbitrary or unjustifiable discrimination between Members or as a disguised restriction on international trade”).

¹¹¹ As the Appellate Body has noted, the preamble of the WTO Agreement – which informs not only the GATT 1994, but also the other covered agreements – explicitly acknowledges “the objective of sustainable development.” *Shrimp-Turtle 1*, *supra* note 109, ¶ 129. Likewise, in *EC-Hormones*, the Appellate Body referred to “the delicate and carefully negotiated balance in the SPS Agreement between the shared, but sometimes competing, interests of promoting international trade and of protecting the life and health of human beings.” *EC – Hormones*, *supra* note 38, ¶ 177.

was taken for the different environmental conditions that surface in different countries and regions.

c. Prevention measures that pursue legitimate, non-discriminatory objectives and that are applied in a non-discriminatory fashion do not violate the WTO Agreements.

Where it is apparent that the purpose of a contested measure is to treat some nations less favorably than others or to provide favorable treatment to domestic industry, a reviewing tribunal is far more likely to conclude that discrimination in fact results from that measure. By the same token, to the extent it is obvious that the purpose of a measure is to protect health or the environment, a finding of discrimination is far less likely even if not all technical requirements are met and even if some degree of trade restraint also occurs.

Because the WTO Agreements are properly concerned only with arbitrary or unjustifiable discriminatory measures, the function of the technical requirements under the SPS Agreement is a secondary one.¹¹² Their sole legitimate purpose is to curb protectionism, mainly in agricultural trade, and this objective is effectuated by helping to distinguish between SPS measures adopted to manage health and environmental risks – which are permissible – from those that are arbitrary or unjustifiable discrimination – which are not allowed. In such a controversy, the Dispute Settlement Body will consider factors related to how these measures are applied and that shed light on whether the party is acting in “good faith.” This focus on “good faith” may also lead the Dispute Settlement Body in an inquiry over the efforts deployed to gather objective science, taking into account available financial and other resources. Even if scientific evidence is insufficient or inconclusive, trade measures that are intended to protect the environment and applied in a non-discriminatory fashion are likely to be consistent with WTO Agreements.

d. National prevention measures and objectives can serve as a catalyst for regional and/or multilateral efforts.

In examining national measures related to protecting the environment under GATT Article XX, the criteria laid down by the Appellate Body suggest that a country adopting a prevention measure should strive to engage potentially affected countries in an open, good faith dialogue, with the objective of arriving at multilateral solutions. As previously mentioned, national measures to prevent introductions of invasive alien species are generally most effective if done in concert with other proximate or affected states. Cooperation can thereby focus on regional efforts to prevent introductions, and also can look at trade in pathways that come from a variety of countries scattered throughout the world. Such efforts can establish the basis for development of coordinated SPS measures, such as standards and other guidance, that can protect a region or group of countries against key pathways for introductions.

Collaborative efforts should take into account the capacities of affected countries to deal with the financial, logistical, and other implications of the regional or international measures proposed, particularly as the efficacy of the system is largely dependent on the country with the least ability to prevent introductions. In addition, industrialized countries should also explore

¹¹² Nothing in the WTO Agreements suggests that countries intended to surrender sovereign authority to adopt SPS provisions or any other regulatory measures except as specified in the WTO Agreements. *See, e.g.*, SPS Agreement, *supra* note 33, art. 2.1 (“[M]embers have the right to take sanitary and phytosanitary measures necessary for the protection of human, animal or plant life or health, provided that such measures are not inconsistent with the provisions of this Agreement”).

adequate financial assistance to developing countries, both to enable participation in international conferences and to adapt their administrative systems to the exigencies of prevention measures. Finally, regular and prompt communication among partners, particularly for coordinating information on risks and movements of invasive alien species, benefits all states involved and increases transparency.

2. In Crafting Prevention Measures and Scientific Justifications for Them, Drafters Should Consider Common Factors Specific to Invasive Alien Species

Although the SPS Agreement appears to apply to prevention measures, the extent of such coverage is presently in dispute.¹¹³ As discussed, the SPS Agreement requires that measures going beyond international standards be based on scientific principles, including an assessment of the risks to human, animal or plant life or health. Rulings to date on these requirements indicate considerable ability to interpret them in a flexible manner. Although the precise degree of latitude afforded to WTO Members is uncertain and remains subject to case-by-case determinations, some guidance has emerged from the jurisprudence. For example, the WTO Appellate Body has made it clear that the SPS Agreement does not impose a hard and fast rule mandating a newly conducted, quantitative risk assessment in every case. Rather, Member states can rely upon pre-existing studies where appropriate.¹¹⁴ WTO precedents and other sources of law suggest that in designing systems of effective invasive alien species prevention, drafters should take certain key factors into account in shaping the terms of prevention measures and in preparing scientific justifications for them. These factors all militate in favor of lessening the technical resources needed to justify the invasive alien species measures.

a. Invasive alien species present a low-probability, high-risk threat

As a general matter, the probability of invasive alien species becoming established and widespread from a single introduction is very low. On the other hand, it is also well known that the ecological and economic cost of invasive alien species that do become established can be extremely high. This relationship can be set out more specifically, as follows:

¹¹³ In the pending case *European Communities – Measures Affecting the Approval and Marketing of Biotech Products*, WT/DS291, 292, & 293, the EU has argued to the WTO Dispute Resolution Panel that many of the disputed measures restricting trade in genetically modified organisms address broad environmental protection concerns based on a long term balance of natural systems, not the short term risk to the life or health of a particular animal or plant. Thus, the EU has argued, the SPS Agreement is not properly applicable to the measures in question. See EC Communities, *European Communities – Measures Affecting the Approval and Marketing of Biotech Products: First Written Submission by the European Communities* (May 17, 2004), available at <http://www.foeeurope.org/biteback/EUlinks.htm>. (A Panel ruling in *EC-Biotech* is expected in 2005.) Similar arguments could be made regarding broad-reaching invasive alien species prevention programs.

¹¹⁴ In *EC-Hormones*, the Appellate Body held that “Article 5.1 [of the SPS Agreement] does not insist that a Member that adopts a sanitary measure shall have carried out its own risk assessment. It only requires that the SPS measures be ‘based on an assessment, as appropriate for the circumstances’ The SPS measure might well find its objective justification in a risk assessment carried out by another Member, or an international organization.” *EC-Hormones*, *supra* note 38, ¶ 190.

- Increased international trade heightens the risk that invasive alien species will be introduced. As noted previously, increase in international trade results in a corresponding increase in the probability of invasive alien species introductions.
- Numerous introductions result in cumulative effects. Just as more trade leads to more introductions, so more introductions lead to a greater likelihood of establishment and spread. Stated differently, the likelihood of invasive alien species becoming established based on a single introduction is low; that probability increases as the number of introductions rises.
- Once introduced, invasive alien species are extremely difficult to eradicate, contain or control. As explained above, prevention is by far the most effective means of addressing invasive alien species. If prevention fails, other measures likely cannot remedy that failure.
- Once invasive alien species become widespread, the economic and ecological costs can be very high. If invasive alien species become established and widespread, they can do great damage to valuable agricultural crops and forest resources, and threaten biodiversity.

b. There is an inherent, ongoing lack of knowledge about the behavior of newly introduced species

Perhaps the single most important fact pertaining to the assessment of invasive alien species risks is that at present the scientific community knows very little about the likelihood that a particular alien species will become invasive following introduction. It is widely acknowledged that few factors – beyond a history of prior invasive behavior in similar circumstances – can reliably predict the likelihood of invasive behavior by organisms introduced into new environments. Lack of knowledge about histories of previous invasiveness does not connote their safety or that they will not become invasive in the future. Accordingly, the efficacy of even highly sophisticated – and costly and time-consuming – scientific justifications for prevention measures is limited.

c. There are severe economic and practical limitations on the ability of government agencies to conduct detailed, quantitative risk assessments

Quantitative risk assessments can be valuable in determining strategies to combat invasive alien species. Economic and practical constraints, however, severely limit the ability of government agencies to conduct a large number of such assessments.¹¹⁵ For example, the U.S. Department of Agriculture conducted five risk assessments regarding importation of raw logs during the 1990s at a cost of \$US700,000 exclusive of salaries.¹¹⁶ It is simply unrealistic to design a system of invasive alien species prevention that is premised upon conducting numerous, detailed and expensive quantitative risk assessments; doing so would place an overwhelming burden on the government agencies responsible for this work. This task would be particularly

¹¹⁵ See F.T. Campbell & S.E. Schlarbaum, FADING FORESTS II: TRADING AWAY NORTH AMERICA'S NATURAL HERITAGE 26 (2002), at 26.

¹¹⁶ See *id.*

unmanageable for developing countries, and imposing it would seem to be inconsistent with the need to accord them special and differential treatment.¹¹⁷

3. Drafters of Prevention Measures Should Take a Conservative, Precautionary, and Cumulative Approach Tailored to the Task at Hand

Given the previously discussed facets of the invasive alien species problem it is reasonable to take a conservative and precautionary approach in assessing the risks posed by invasive alien species and designing prevention measures. This approach should build upon prior knowledge and available analytical models wherever possible and should be firmly placed in the context of a general national invasive alien species framework or strategy that sets out desired levels of protection and tolerance for risk. It should also be tailored to match the task at hand. As noted, much is unknown and, in the short term, unknowable regarding the precise nature and extent of the risks posed by particular species and pathways. However, in light of the potential for tremendous costs due to invasive alien species that become established and widespread, risk managers are justified in relying on conservative assumptions in analyzing the risk presented, determining an appropriate level of protection and assessing the efficacy of invasive alien species measures. For example, when detailed factual data are limited or inconclusive, an appropriate choice may be to assign a relatively high risk factor based in part on expert advice. Such a conservative approach is consistent both with longstanding international law principles of territorial integrity and the more recent precautionary principle. The alternatives, given practical and economic constraints on the ability to conduct large numbers of highly detailed risk assessments, are to either make insufficiently protective assumptions about risks or to take no action at all. Those alternatives would be inconsistent, however, with the mandates of multilateral environmental agreements, and are by no means compelled by the trade liberalization goals of WTO Agreements.

4. Assessments of Invasive Alien Species Risks Should Seek to Link Species and Pathways, to Facilitate an Efficient, Comprehensive Approach to Prevention.

Historically, invasive alien species prevention has focused primarily on individual species. The SPS Agreement appears to address this, calling for assessments of risk that focus on the particular agents and circumstances at issue, rather than reliance on evaluations of entire categories.¹¹⁸ Designing prevention systems in ways that lead to measures addressing pathways while still assessing risks from particular species is a more effective way to address invasive alien species. The Appellate Body has expressly endorsed such an approach, balancing the need for specificity and generality in risk assessment.¹¹⁹

5. Systems of Prevention Should Require Appropriate Assignment of Costs and Analytical Burdens, Particularly Where Developing Countries Are Involved

¹¹⁷ See, e.g., SPS Agreement, *supra* note 33, art. 9, 10.

¹¹⁸ See, e.g., EC – Hormones, *supra* note 38, ¶ 199-200; Japan – Apples, *supra* note 77, ¶ 202-03.

¹¹⁹ See *supra* notes 84 - 86 and accompanying text.

The invasive alien species problem presents a classic example of the externalization of environmental costs flowing from economic activity: the benefits of growing international trade accrue predominantly to importers and exporters and their suppliers and customers, while the environmental and economic costs of the resulting invasive alien species introductions tend to be borne by society at large. Reversing this dynamic through prevention measures that require the beneficiaries of international trade to internalize costs associated with invasives provides a direct economic incentive to those parties to reduce introductions of invasive alien species. Doing so is also consistent with the “polluter pays” principle that is central to most modern environmental protection regimes.

Placing the burden and associated cost of risk analysis onto exporters is not a new concept. It is a routine feature of longstanding quarantine measures for agricultural pests, under which an exporter seeking to introduce a new species is required to conduct, at its own expense, testing sufficient to show that the species is not harmful.¹²⁰ The Cartagena Protocol on Biosafety includes a provision allowing developing countries to request assistance in conducting risk assessments of living modified organisms proposed for import. Additionally, the IPPC reflects that pest risk mitigation is a responsibility of the *exporting* country, and that signatories must be willing and able to issue phytosanitary certificates documenting that international commodity shipments are free of regulated invasive alien species.¹²¹ Those measures typically are targeted at protection of specific agricultural crops against known pests. More recently, some countries have adopted measures requiring exporters to conduct impact assessments that cover the full range of domestic ecosystem considerations when they seek to introduce new alien species.¹²² In addition to being consistent with longstanding practice in the quarantine area, burden- and cost-shifting appear consistent with the SPS Agreement as well. Although that agreement requires countries adopting prevention measures to ensure that measures are based on scientific evidence and risk assessments, nothing in the agreement specifies that the country undertaking the measure must bear all costs and burdens associated with that measure.

Requiring exporters to internalize the cost of invasive alien species prevention may be particularly appropriate in cases where developing countries adopt rigorous measures, given those countries’ right of special and differential treatment, since their capacity to implement effective prevention measures may be limited. In other circumstances, however, developing country exporters may need assistance in complying with prevention measures adopted by developed countries. A system of pathway user fees is one mechanism by which the costs of

¹²⁰ Thus, in *Japan – Varietals*, the United States did not complain about the burden on importers to conduct testing to demonstrate the efficacy of a treatment alternative (fumigation) to a prohibition on imports that was otherwise necessary to achieve Japan’s level of protection. Rather, the United States complained about the need to test again for different varieties of the same fruit. See *Japan – Varietals*, *supra* note 30, ¶ 2; Panel Report, *Japan - Varietals*, WT/DS245/R, ¶ 8.9-8.10 & 8.65 (July 15, 2003).

¹²¹ See, e.g., Importation of Nursery Stock, Plants, Roots, Bulbs, Seeds, and Other Plant Products; Phytosanitary Certificates, 66 Fed. Reg. 38137 (July 23, 2001) (policy statement by U.S. Animal and Plant Health Inspection Service stating that it will begin strict enforcement of longstanding phytosanitary certificate requirement and discussing its consistency with IPPC provisions).

¹²² C. SHINE *ET AL.*, A GUIDE TO DESIGNING LEGAL AND INSTITUTIONAL FRAMEWORKS ON ALIEN INVASIVE SPECIES 56-7 (2000); see also *infra* II. Prevention Measures B. Categories of Effective Invasive Alien Species Prevention Measures (discussing “species list” approach to invasive alien species prevention).

prevention measures can be allocated both equitably and in a manner that provides incentives to reduce invasive alien species risks to the actors most responsible for those risks.¹²³

B. Future Work

To effectively integrate prevention measures with trade objectives, governments, industry and civil society need to undertake a series of measures at the national, regional and international levels. At a minimum and as a matter of priority, national strategies or action plans should clearly articulate the desired level(s) of protection for risks and build on international standards and commitments in multilateral environmental agreements. More ideally, national strategies should employ a series of pre-, at- and post-border measures including pathway and multiple listing approaches. This work can be facilitated by an inter-agency process that brings together trade, environment, agriculture and other relevant ministries in concert with outreach to the private sector and civil society.

Regionally, a number of efforts are already underway to develop regional strategies or networks using existing trade or environmental fora, such as CARICOM, the Asia-Pacific Economic Cooperation organization (APEC), and the New Partnerships for Africa's Development (NEPAD). Minimally, countries should work on establishing basic communication structures, such as learning networks, eventually aiming for development of guidelines and approaches for joint regulation of priority pathways for introductions of invasive alien species.

At the international level, the most prominent multilateral fora addressing these policy issues are the WTO and the CBD. As mentioned, the WTO is moving forward on negotiations related to specific trade obligations in multilateral environmental agreements, observership of multilateral environmental agreements in WTO committees, market access for non-agricultural products, and special and differential treatment within the rubric of the Doha development round. These negotiations, along with the SPS Committee's regular discussions on work with other international organizations, would be ideal areas for developing a proactive agenda to prevent introductions and promote trade.

Almost concurrent with these discussions, in February 2004, the CBD's Conference of the Parties initiated a process to look at the gaps and inconsistencies in the international regulatory framework relating to invasive alien species. The process is designed to develop options to address identified gaps within existing international institutions, and, if needed, identify the appropriate institution to develop standards or other measures.¹²⁴ The process could also examine potential inconsistencies and problem areas regarding the regulation of invasive

¹²³ Such a system is summarized in Perrault and Moffett, *supra* note 8.

¹²⁴ Decision VII/13 identified a number of pathways for which there is no international coverage. Convention on Biological Diversity, Alien Species that Threaten Ecosystems, Habitats, or Species, 7th conference of the Parties, Decision VII/13 (2004). For intentional introductions, gaps identified include: aquaculture and restocking of marine and inland water systems; non-food purposes (e.g., horticulture, pet trade, aquarium trade); biocontrol agents; *ex situ* breeding projects; international assistance programs (e.g., conservation and development projects); and international incentives schemes. Gaps for unintentional or opportunistic introductions include: hull fouling, packaging material, import consignments, vehicular transport; international assistance/humanitarian programs, tourism, military, scientific research, cultural and other activities; *ex situ* breeding projects; and aquaculture escapes, bait/pet releases and water transfer schemes.

alien species within the trade and environmental regimes and provide possible avenues forward. These discussions could serve as a useful counterpoint and constructive contribution to the WTO discussions on specific trade obligations in multilateral environmental agreements. In the interim, the CBD can continue work with other efforts including development of a joint work plan with the IPPC, application by the CBD Secretariat for observership in the WTO SPS Committee, and collaboration with the WTO Secretariat in training, capacity building and information activities.

Finally, governments can work through other trade, environmental and transport-related agreements to develop guidance and further support measures to prevent introductions of invasive alien species.

Appendix I – International Standard Setting Bodies

A. WTO Recognized Bodies

As previously mentioned, the WTO's Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) explicitly recognizes three particular intergovernmental organizations as authorities in setting international SPS standards. The currently recognized organizations are the IPPC, the OIE and the Codex Alimentarius Commission. The SPS Agreement also mandates the SPS Committee to identify additional relevant international standardizing bodies, but to date, such work has not progressed.

International Plant Protection Convention: The IPPC is designed to promote measures to control or prevent the spread and introduction of pests of plants and plant products and, as specified by the WTO's SPS Agreement, is responsible for developing international standards for phytosanitary measures (ISPMs) to protect plants from harmful pests. ISPMs must be scientifically based and not present unjustified barriers to international trade. IPPC Parties can take phytosanitary measures, based on a corresponding risk analysis, to address pests and any plant, plant product, storage place, packaging, conveyance, container, soil or other potential carrier of pests. The current ISPMs address areas including: pest risk analysis, quarantine measures, export certification, pest risk status and risk free areas, reporting, surveillance and integrated measures in a systems approach. An ISPM on solid wood packaging material is the only pathway standard adopted to date by the IPPC.¹²⁵

The standards generated under the IPPC have tended to focus more on process and methodologies for how countries should address potential invasive alien species, rather than providing guidance on how to address particularly risky pathways beyond SWPM (e.g., horticultural materials). The IPPC also narrows the scope of government regulatory action to those that are defined as "quarantine pests," which must be identified through a risk assessment process and either absent in the country or under a national "official control program." Thus, efforts to prevent further introductions of a known invasive within a country will be inconsistent with the IPPC, and presumably the WTO, if federal authorities have not already created a control program. This obviously has significant implications for countries with scarce resources to address existing invasive alien species threats. Another critique is that the IPPC traditionally has focused on agricultural pests; however, this is changing as the agreement has expanded its focus to look at the effects of plant pests on biodiversity. This is particularly evident in the re-evaluation of ISPM-11 (Pest Risk Analysis for Quarantine Pests) to address environmental concerns.¹²⁶

The IPPC also promotes collaboration with and through nine regional plant protection organizations, which are intended to assist countries and develop standards attuned to the plant pests of that region. In some cases, the effectiveness of these organizations depends on external funding. For example, the Pacific Plant Protection Organization relies on internal funding from Australia and New Zealand in addition to assistance from the European Union. The Caribbean Plant Protection Organization is largely inactive due to a lack of funds and capacity. Participation in these fora is extremely important as the regional plant protection organizations can also serve as a starting point for the development of global standards under the IPPC (for example, the IPPC standard on solid wood packaging material originally came from the North American Plant Protection Organization).¹²⁷

¹²⁵ See <http://www.ippc.int> for a list of ISPMs adopted by the IPPC as well as draft ISPMs currently undergoing country consultations.

¹²⁶ See ISPM 11, *Pest Risk*, *supra* note 86.

¹²⁷ See <http://www.ippc.int/IPP/En/rppo.jsp> for links to the regional plant protection organizations.

Office International des Epizooties: Similar to the IPPC, the OIE is the WTO's recognized international standard setter for issues related to animal health and safety. These standards and guidelines are designed to: inform states of animal diseases and means to control them; coordinate studies on the surveillance and control of animal diseases; and harmonize regulations for trade in animals and animal products among member states. The OIE has developed a number of tools and health standards to prevent the introduction of infectious agents, diseases and pathogens, including: the International Animal Health Code; the International Aquatic Animal Health Code; the Manual of Standards for Diagnostic Tests and Vaccines; and the Diagnostic Manual for Aquatic Animal Diseases.

Of particular importance are two lists of animal diseases used to alert countries of the most threatening diseases to monitor. List A includes transmissible diseases with the potential for very serious and rapid spread, irrespective of borders, that are of serious socioeconomic and/or public health consequence and are significant in the international trade of animals and animal products (e.g., foot and mouth disease, classical swine fever, Newcastle disease, rinderpest and highly pathogenic avian influenza). List B includes transmissible diseases that are of socioeconomic and/or public health importance within countries that are significant in the international trade of animals and animal products (e.g., anthrax, rabies, bovine spongiform encephalopathy, salmonellosis, scrapie, equine influenza, porcine brucellosis, avian chlamydiosis, varroosis, MSX disease). The lists span a wide range of animals including cattle, horses, sheep, goats, pigs, poultry, rabbits, fish, molluscs, crustaceans and bees.¹²⁸

The OIE also has working groups on biotechnology, informatics and epidemiology, veterinary drug registration and wildlife diseases. The OIE has been actively coordinating with the World Health Organization (WHO) and U.N. Food and Agricultural Organization (FAO) on the increased incidence and spread of avian influenza and bovine spongiform encephalopathy (BSE).¹²⁹

Codex Alimentarius Commission: Codex was created in 1963 by the FAO and WHO to develop standards and guidelines to ensure food safety. The standards are designed to protect the health of consumers while promoting coordination of food standards work by other organizations and ensuring fair trade practices in the international food trade. Codex has developed over 200 standards relating to products such as milk, cheese, juices, fruits, vegetables, fish, meat, grains, flours and nuts.¹³⁰

Codex is relevant to invasive alien species in cases where a food product may contain a pathogen or other living contaminant that could present a transmissible health risk. Some have argued that the WTO's identification of Codex, and presumably the IPPC and OIE, in 1994, has deeply politicized the scientific basis of the institution. The result has been a change from developing voluntary standards that set a high bar for protecting environmental, agricultural and public health to a political process of negotiating to a lower common denominator. By setting a lower bar for safety, countries are thereby required to do more work on their own to provide scientific validation for more protective national regulations as required under the SPS Agreement.¹³¹

¹²⁸ See World Organization for Animal Health (OIE), *Diseases Notifiable to the OIE*, at http://www.oie.int/eng/maladies/en_classification.htm (last updated Sept. 24, 2004).

¹²⁹ See OIE home page, at <http://www.oie.int>.

¹³⁰ See Codex Alimentarius, *Complete List of Standards Adopted to the Codex Alimentarius Commission up to 2001*, available at http://www.codexalimentarius.net/web/standard_list.do?lang=en (last visited Nov. 12, 2004).

¹³¹ See A. COSBEY, INTERNATIONAL INSTITUTE FOR SUSTAINABLE DEVELOPMENT, A FORCED EVOLUTION? THE CODEX ALIMENTARIUS COMMISSION, SCIENTIFIC UNCERTAINTY AND THE PRECAUTIONARY PRINCIPLE 8-9 (2000), available at http://www.iisd.org/pdf/forced_evolution_codex.pdf; and Victor, *Risk Management*, *supra* note 63, at 162-4.

B. Other Standard Setting Bodies

Aside from the IPPC, OIE and Codex, the SPS Agreement leaves room for the definition and use of other international standards, guidelines and recommendations.¹³² The SPS Agreement also states that the SPS Committee should monitor and maintain contact with relevant international organizations in the field of sanitary and phytosanitary protection.¹³³ In this regard there are a range of other intergovernmental organizations and arrangements that are active in elaborating SPS standards related to invasive alien species, including:

U.N. Food and Agricultural Organization: The FAO is the U.N. agency responsible for addressing issues related to hunger, food security and food production.¹³⁴ FAO members have negotiated a number of codes of conduct to regulate environmental aspects of agriculture and fisheries. In regard to invasive alien species, the Code of Conduct for Responsible Fisheries addresses aquaculture and the need to consult with neighboring states before introducing non-native species into shared waters and also to minimize the adverse impacts of non-indigenous and genetically altered species. The Code of Conduct for the Import and Release of Biological Control Agents addresses environmentally safe means to import, export and release such agents to control pests and other invasive species.

International Maritime Organization: The IMO is generally responsible for ensuring safety in maritime shipping and related issues regarding the protection of the marine environment. Recognizing the role of the shipping industry in moving aquatic and marine invasives around the world, the IMO adopted the International Convention for the Control and Management of Ships' Ballast Water and Sediments in 2004. The Convention establishes standards, management and control requirements, and timetables for implementation by ships under the flag of countries that become Parties to the Convention. It addresses relevant aspects of reception facilities in ports for ballast tanks and sediments, ongoing research and monitoring, certification and inspection of ships and technical assistance. Also, Parties may take measures that are more stringent than those contained in the agreement,¹³⁵

Hull fouling is another significant pathway; invasive alien species enter foreign waters attached to ship hulls and underwater structures. However, despite efforts to phase-out the use of anti-fouling paints and hull coatings toxic to marine life, the IMO has yet to establish clear guidance or standards on the best means to prevent hull fouling.

Convention on Biological Diversity: invasive alien species are identified as a cross-cutting theme under CBD Article 8(h) (*In Situ* Conservation), which calls upon Parties to prevent the introduction of, control or eradicate those alien species that threaten ecosystems, habitats or species. In May 2002, the Conference of the Parties adopted, with some controversy, Decision VI/23.¹³⁶ The Decision includes a set of guiding principles on the management of invasive alien species, addressing: the precautionary approach; a three-stage hierarchical approach (prevention, eradication, control); the ecosystem approach;

¹³² SPS Agreement, Article 3.1

¹³³ SPS Agreement, Article 12.4

¹³⁴ See U.N. FAO website, <http://www.fao.org>.

¹³⁵ See International Convention for the Control and Management of Ships' Ballast Water and Sediments, Feb. 13, 2004, available at <http://www.imo.org> (last visited Nov. 12, 2004).

¹³⁶ The controversy over the adoption of the principles in Decision VI/23 addresses both procedural and substantive issues. On the substantive side, the key objections raised by Australia and a few other countries address the specific formulation of the precautionary approach, risk analysis and consideration of socioeconomic and cultural considerations.

the role of States; research and monitoring; education and public awareness; border control and quarantine measures; exchange of information; cooperation, including capacity building; intentional introduction; unintentional introductions; mitigation of impacts; eradication; containment; and control. There have been subsequent debates as to whether such guidance could effectively qualify under the SPS Agreement's language on recognizing other "international standards, guidelines or recommendations." Additionally, the subsequent political debate over the content of the Guiding Principles has also made countries reluctant to discuss the possibility within the WTO context.

Future work under the CBD will seek to identify gaps and inconsistencies in the international regulatory framework and evaluate potential pathways for introduction. Whether this gives rise to the development of additional guidelines or recommendations remains to be seen.¹³⁷

Cartagena Protocol on Biosafety: Negotiated under the CBD's auspices, the Protocol specifically addresses the safe international transfer of living modified organisms (LMO), which by their nature are also alien and may at times potentially become invasive. The agreement establishes an advance informed agreement procedure for exporters to gain permission from importing countries to bring in LMOs intended for intentional introduction into the environment. Additional provisions are established for LMOs intended for contained use, transit, pharmaceuticals for humans, and food, feed or processing. The Protocol incorporates the precautionary approach for making import decisions in cases of uncertainty. Further, the Protocol explicitly grants the importing Party the right to require the country or entity requesting approval for the entry of an LMO to cover the cost of the corresponding risk assessment.¹³⁸

¹³⁷ See INVASIVE ALIEN SPECIES, *supra* note 7.

¹³⁸ *Id.* art. 15.3.