NAPPO
North American Plant Protection Organization
Organización Norteamericana de Protección a las Plantas
MEXICO - USA - CANADA

# NAPPO Discussion Documents

# DD 03: The Role of the North American Plant Protection Organization in Addressing Invasive Alien Species

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## Issue

Invasive alien species (IAS) are an issue of global concern. As the volume of worldwide trade and travel continues to rise, the opportunities for introduction and spread of new IAS are rapidly increasing. Internationally, there are a number of organizations involved in addressing IAS, in particular the International Plant Protection Convention (IPPC) and the Convention on Biological Diversity (CBD). Likewise, at the regional level in North America, organizations concerned about IAS include the North American Plant Protection Organization (NAPPO), the Commission for Environmental Cooperation (CEC), and the recently established North American Invasive Species Network (NAISN). At this point, the linkages and jurisdictions of the various organizations are not totally clear. The purpose of this paper is to clarify the role of NAPPO in addressing IAS in North America, and through doing so, to help define its relationship with other relevant organizations.

## Introduction and Scope

As a plant protection organization, NAPPO's activities have traditionally been focused on mitigating the risks of pests that threaten agriculture and forestry, primarily insect pests and diseases of plants with economic value. Until recently, environmental impacts related to biodiversity have been largely overlooked by the plant protection community. However, in 1997 the IPPC was specifically modified to include reference to wild flora, thereby broadening its scope. It is now widely recognized that many of the organisms regulated as quarantine pests by National Plant Protection Organizations (NPPOs) also fall into the category of IAS. As a result, and because of increased international focus on IAS, regional and national plant protection organizations are in turn revisiting the scope of their activities.

This paper will explore the overlap between IAS and more traditional concepts of plant pests, and make recommendations as to which IAS fall under the mandate of NAPPO, and what role NAPPO might play in broader IAS issues in North America. This paper is not intended to be prescriptive, and it is recognized that the resources for plant protection in each of NAPPO's member countries are limited. That is, even if a taxon is identified as falling within the scope of NAPPO in this paper, each country has the sovereign right to determine if they will regulate it.

## Definitions: What is an invasive alien species?

In order to effectively define the scope of IAS activities under NAPPO, it is important to first clarify terminology and ensure a common understanding of terms used. IAS have been defined in various ways and there are a number of different terms used to refer to similar things (e.g., see Richardson et al. 2000). Terms such as "non-native", "non-indigenous", "exotic", "foreign", "new" and "pest", for example, have been used by different authors and organizations in the same context as alien. The term alien is further complicated when concepts of time are included (e.g., see Crooks and Soulé 2001 for further discussion).

At the international level, the CBD provides definitions for a number of terms related to IAS. However, these definitions were developed in the context of a broad vision of biodiversity conservation, rather than a plant protection context and in some cases these

have quite different meanings. In 2009 the IPPC addressed this by producing an appendix to their own glossary (ISPM 5) to provide IPPC guidance on the CBD definitions.

Particular terms addressed include:

- Alien species
  CBD definition: A species, subspecies or lower taxon, introduced outside its natural past or present distribution; includes any part, gametes, seeds, eggs, or propagules of such species that might survive and subsequently reproduce;
  Explanation in IPPC context: An alien species (CBD) is an individual or population, at any life stage, or a viable part of an organism that is non-indigenous to an area and that has entered by human agency into the area.

- Invasive alien species
  CBD definition: An alien species whose introduction and/or spread threaten biological diversity.
  Explanation in IPPC context: An invasive alien species (CBD) is an alien species (CBD) that by its establishment or spread has become injurious to plants[1], or that by risk analysis (CBD) is shown to be potentially injurious to plants.

The appendix is quite detailed and complex, and the definitions include a number of footnotes not included here, with additional explanations of terms. However, the most important point to note is that the IPPC explanatory definition of an IAS expands the scope of the CBD definition beyond impacts on biodiversity to include injury to plants and plant products. The IPPC defines "pests" as "any species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products" and includes within its scope the protection of cultivated and natural flora, as well as plant products, and covers both direct and indirect damage by pests (ISPM 5).

For the purposes of this document, IPPC definitions will be used.

## Background

In 2005, NAPPO formed an Invasive Species Panel, which met initially in Raleigh, NC (March 2005), and then in Ottawa, Canada (February 2006), to discuss their role and possible assignments. There was considerable discussion of what "IAS" might mean in the context of NAPPO's mission, which at that time was to "*coordinate efforts among Canada, the United States and Mexico to protect their plant resources from the entry, establishment and spread of regulated plant pests, while facilitating intra/interregional trade*" (NAPPO 2004). It was agreed that there was a need for a discussion paper on the scope of IAS issues that could be addressed under NAPPO, and specifically to define what taxa could be considered as invasive alien plants or plant pests under NAPPO's

[1] The Appendix to ISPM 5 includes a footnote to the effect that "The context of the IPPC is the protection of plants. It is clear that there are effects on biological diversity that do not concern plants, and so there are invasive alien species (CBD) that are not relevant to the IPPC. The IPPC is also concerned with plant products, but it is not clear to what extent the CBD considers plant products as a component of biological diversity" (ISPM 5: 2010).

mandate, bearing in mind guidance on this topic provided by the International Plant Protection Convention[2].

In 2006/07 the NAPPO Invasive Species Panel was given the assignment to "define the scope of invasive alien species in the context of NAPPO" and work began on a draft document. In 2007/08 the assignment was carried over, and in 2008/2009, the assignment was expanded to read: "Complete the position paper describing NAPPO'S role in invasive alien species, including documentation of relevant federal legislative authority for regulation of aquatic plants in North America." Thus, the specific mention of aquatic plants was added to the original assignment.

**International and Regional Context**

In order to visualize the scope of NAPPO regarding IAS issues, it is helpful to examine the roles and activities of a number of related international and regional organizations, in particular the IPPC, the CBD, the CEC and the NAISN.

*International Plant Protection Convention (IPPC)*

The IPPC is a multilateral international convention adopted in 1952 and revised in 1997 for the purpose of securing common and effective action to prevent the spread and introduction of pests of plants and plant products and to promote appropriate measures for their control. As mentioned in Section 2, under the IPPC, the understanding of plant protection is broad, encompassing the protection of both cultivated and non-cultivated plants from direct or indirect injury by plant pests. In addition, since 2001 it has been recognized that the scope of the IPPC includes risks to the environment and biodiversity. Alien plants that are "invasive" and invasive alien pests that infect or infest plants clearly fall within the scope of the IPPC, and the IPPC recognizes that IAS that directly or indirectly affect plants or plant products are plant pests and should be assessed, monitored, and managed if necessary, according to IPPC provisions.

Some aspects of the IPPC standards (ISPMs) that address IAS are succinctly presented in the Report on the Consultation on the IPPC-CBD Cooperation that was held in Bangkok, Thailand in 2001 (Mosquin, 2003; IPPC, 2001). Further discussion of the role of the IPPC in IAS issues is provided in the Proceedings of another workshop held in Braunschweig, Germany, in 2003 (IPPC 2005).

*Convention on Biological Diversity (CBD)*

The CBD is a multilateral international convention, adopted in 1993, for the purpose of conserving biological diversity, promoting the sustainable use of the components of said diversity and ensuring the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, in order to sustain the world's ecological resources while continuing economic development. The CBD recognizes IAS as one of the primary threats to biodiversity, as well as the fact that their risks might be increased by global trade, climate change, transport and tourism. Article 8(h) of the Convention states that

[2] For example, the revised text of the IPPC (1997) extends its scope beyond the protection of cultivated plants and plant products to include the protection of wild flora, habitats and ecosystems. It takes into consideration both direct and indirect damage by pests, and considers environmental as well as economic impacts (e.g., FAO 1999; IPPC Secretariat 2005; Tanaka and Larson 2006).

every party shall prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species.

In 2004, the IPPC and the CBD signed a Memorandum of Cooperation, recognizing that IAS are a significant area of overlapping interest and responsibility. The purpose of the Memorandum is to promote cooperation, avoid overlaps and unnecessary duplication, and ensure effective cooperation in joint activities. Under this agreement, it is recognized that the IPPC is a standard-setting body while the CBD is not. As such, the IPPC, along with other standard setting organizations recognised by the SPS agreement, continue to liaise with the CBD to help ensure appropriate standards are developed to address areas of common concern (e.g., IAS).

*Commission for Environmental Cooperation (CEC)*

The CEC is a regional organization created by Canada, Mexico and the U.S. under the North American Agreement on Environmental Cooperation (NAAEC) and was "established to address regional environmental concerns, help prevent potential trade and environmental conflicts, and to promote the effective enforcement of environmental law. The Agreement complements the environmental provisions of the North American Free Trade Agreement (NAFTA)." The CEC, after examining the pathways of introduction of several insect pests, specifically recommended that NAFTA countries "develop a North American strategy to address IAS concerns, including the need to build technical and institutional capacity and encouraging the involvement of regional organizations in development of regional and international standards, to ensure that existing and future bilateral and regional free trade agreements provide sufficient leeway to develop sanitary phytosanitary and zoosanitary measures to prevent the introductions of invasive species" (Perrault et al. 2003). At a meeting of the CEC in December 2003, it was recognized that NAPPO and its member country NPPOs had an infrastructure in place to coordinate regional efforts on IAS. Early work at the CEC has focused on invasive aquatic species.

*The North American Invasive Species Network (NAISN)*

NAISN was formed in March 2010 and is a coordinated network to advance science-based understanding of, and effective response to, IAS in North America. The network is comprised of academics, government, and NGO representatives from all three countries, with the primary objective of facilitating information exchange and enhancing research capabilities across the region.

**The Need for a Regional North American Approach**

In a regional context, there is a need to clarify roles and responsibilities for IAS among existing organizations such as NAPPO, the CEC, and the NAISN. There are aspects of the IAS issue that particularly lend themselves to a regional approach. IAS do not respect political boundaries and cross-border trade and traffic are significant pathways for all three countries. Efforts that may benefit from a regional approach include for example: Strategic and operational planning; cross cutting actions among government agencies; pest risk analysis; public awareness and stakeholder engagement; biological control programs, and; emergency response. The entry of new IAS could be prevented using regional standards, early identification of threats could be based on regional pest alerts

and pest risk analyses could be coordinated among countries for maximum efficiency. Targeting species associated with areas of human activity such as tourism and trade, rather than specific pest species may also be an effective approach (Mosquin 2003).

Regional coordination could also have benefits at a national level. In each of the three countries that make up the North American region, IAS are the responsibility of a number of agencies that have varying degrees of involvement in their mitigation and control. These agencies may deal with, for example, agriculture, fisheries, wildlife, the environment, human health, energy production, transportation, parks, tourism, defense or aboriginal lands. In some cases there are responsibility and response gaps, and IAS may become quite well established before they are taken on by a specific agency if taken on at all. Efforts could be more efficient if IAS were to be addressed using a more coordinated approach.

**Defining the role of NAPPO in addressing IAS**

As a regional organization under the IPPC, it is clear that NAPPO has a role in addressing those IAS that also meet the definition of a plant pest. The task at hand is to identify what organisms clearly fall under the mandate of the IPPC, and by extension, NAPPO, and to determine to what extent the new focus on IAS may broaden the traditional scope of NAPPO activities. For some taxa, it is clearly apparent whether they fall within the intended scope of NAPPO. However, there are others that are less obvious. These include, for example, marine algae or marine plants, aquatic plants, earthworms, pests of bees and other pollinators, and vertebrate animals. Identifying organisms which fall under the scope of NAPPO will also highlight those that do not, so that other organizations may be notified in the hope that they may address the gaps.

The NAPPO Invasive Species Panel began exploring this issue by compiling tables of current plant protection legislation in the three member countries, to determine what categories of species were commonly addressed and which ones were more controversial.

**Review of current plant protection legislation in the United States, Canada and Mexico**

Members of the Invasive Species Panel were asked to fill out two tables indicating where member countries currently have legislation and active programs in place to protect plants and plant products from IAS that impact plant health, and to outline what types of organisms are considered as plant pests within their legislation and programs. For the purpose of these tables, an “active program” includes one of more of the following: permit requirements, port of entry inspection and exclusion activities, survey, eradication, control. Plants are broadly interpreted to include related organisms that are or may be protected under plant protection legislation. The intended focus of the tables was plant protection legislation and programs, however, in some cases an attempt has been made to note where there is authority under other national legislation to address IAS issues. This should not be considered a comprehensive analysis of all IAS legislation in each country. Rather, the identification of “other legislation” was used to help delineate plant protection activities, and to stimulate discussion as to which IAS issues were typically

addressed under other authorities, and where there were gaps. The following tables can be found in Annex 1:

Table 1: Plants & plant products protected under plant protection legislation
Table 2: Plant pests regulated under plant protection legislation

The tables indicate that addressing invasive plants and plants pests is bureaucratically complex. In each country, several government organizations may be involved depending on whether the pest in question impacts the forestry or agricultural sector, or natural ecosystems. Sometimes a pest has the potential to affect all three. The situation may be further complicated if, for example, the pest is aquatic or semi-aquatic, affects transportation infrastructure, or is found on aboriginal or crown lands.

*Plants & plant products protected under plant protection legislation*

Table 1 in Annex 1 (Plants & plant products protected under plant protection legislation) indicates that the plant protection legislation of the three NAPPO countries is generally consistent regarding the protection of terrestrial plants, and as expected, all three countries have active programs for the protection of terrestrial plants. Likewise, plant protection legislation in all three countries provides the authority to protect aquatic plants, however, only the U.S. currently has active programs in this area. In some cases other taxonomic groups are protected under plant protection legislation, for example some algae and fungi are protected as agricultural products in the U.S.

The three countries have subtle differences in the wording and focus of their plant protection legislation, which become meaningful in determining how far outside their traditional scope the acts may apply. In Canada, the *Plant Protection Act* aims to “prevent the importation, exportation and spread of pests injurious to plants and to provide for their control and eradication and for the certification of plants and other things”, thus indicating that it applies to the protection of plants in the taxonomic sense. In the U.S., the mission of APHIS under the *Plant Protection Act* is to protect the agriculture, environment, and economy of the U.S., which allows for a broader scope than just plants. In Mexico, the *Ley Federal de Sanidad Vegetal* is focused on plants, their products and sub products, and defines plants as those individuals belonging to the plant kingdom that are considered agricultural species, thus in fact making the scope narrower than all plants (i.e., it only applies to those that are agricultural species).

This is reflected in Table 1, which shows the legislation in the U.S. addressing the protection of all plants, as well as taxonomic groups beyond plants, including bryophytes (mosses, liverworts, hornworts), chlorophytes (green algae), phaeophytes (brown algae, kelp), rhodophytes (red algae, dulse), fungi, and lichens. The U.S. also has active programs for some of these organisms, although most are very limited. In Canada, the plant protection legislation may also extend to the protection of plant-like organisms in these categories in cases where they are agricultural products (e.g., algae, mushrooms), but there are no active programs. In Mexico, the plant protection legislation does not address these groups; it applies only to the protection of plants and some fungi that are considered agricultural species.

The trend is similar when examining the protection of other organisms essential to plants with legislation in the three countries applying to microorganisms and non-chordates (e.g., pollinators, biocontrol agents), and in the U.S. and Canada, potentially to chordates as well. Canada does not currently have active programs involving any of these groups, while the US and Mexico do.

All three countries also have legislation beyond their plant protection legislation that addresses IAS to some extent. Types of legislation include regulations to protect honey bees, to ensure the quality of seed, to protect species at risk, to ensure the sustainability of forests, and so on. However, none of these pieces of legislation are broad enough to address the risks of invasive plants and plant pests in the way that plant protection regulations are able to do.

*Plant pests regulated under plant protection legislation*

Table 2 in Annex 1 (Plant pests regulated under plant protection legislation), shows from what types of pests the U.S., Mexico and Canada protect plants. The diversity of organisms noted here reflects the broad nature of the IPPC definition of a 'pest', namely "any species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products". In terms of taxonomic groups, the plant protection legislation in all three countries includes within their scope vascular plants (terrestrial and aquatic), other plant-like organisms (e.g., mosses, liverworts, hornworts, algae), fungi, microorganisms, and non-chordates. All three countries have active programs for plant pests that are fungi, microorganisms and non-chordates (e.g., insects), and the U.S. and Mexico also have active programs for vascular plants (e.g., weeds). Canada has a limited program for weeds and invasive plants and discussions to expand its scope are underway. Other groups of organisms that may be pests but are less traditionally addressed by plant protection legislation include aquatic plants, algae, and chordates. In the case of aquatic plants, all three countries have the potential to regulate them as pests under their plant protection legislation, but only the U.S. has an active program, with several aquatic plant species listed as Federal Noxious Weeds. The U.S. and Canada also have the potential to regulate bryophytes and algae as pests under plant protection legislation, but only the U.S. has an active program, with one species of marine algae listed as a Federal Noxious Weed. Legislation in all three countries allows for the regulation of chordates as plant pests, but only Mexico has an active program (for rats).

**Aquatic Plants**

The Invasive Species Panel was specifically asked to address "documentation of relevant federal legislative authority for regulation of aquatic plants in North America" as part of the assignment to examine NAPPO's role in IAS issues.

Aquatic plants pose a particular challenge for NPPOs that have traditionally undertaken their activities in terrestrial ecosystems. Like terrestrial plants, aquatic plants may be imported intentionally for horticultural/ornamental purposes (e.g., for use in the aquarium and water garden trades), and in such cases, phytosanitary measures, such as requirements for permits, can be applied. However, unintentional introduction of aquatic plants may occur in a number of different ways less familiar to plant protection programs, such as through fragments entangled on boats, or through seeds or plant fragments in

ballast or bilge water. In addition, species imported for aquaria or water gardens may escape and spread beyond their intended use into unmanaged ecosystems. Many species, as they proliferate in waterways, have the potential to cause serious harm to the environment (including impacts on other plants and limiting access to water), health, the economy and society. Surveys and activities to eradicate aquatic plants in these areas require a certain type of equipment and expertise not necessarily held within the NAPPO NPPOs.

Despite these challenges, NPPOs may be the national institutions best positioned to coordinate the regulation of aquatic plants. Existing infrastructure for terrestrial plants (e.g., procedures for pest risk analysis, permits, inspections, and other phytosanitary measures) can be applied in the same way to aquatic plants, either as potential pests, or as commodities that may serve as pathways for other pests. Indeed, this is already the case in the U.S., where several aquatic plants are listed as federal noxious weeds, and in all three countries, where aquatic plants (as commodities) require an import permit prior to entry. Some additional points in favour of including aquatic plants within the scope of NAPPO are as follows:

- The wording of the IPPC does not exclude aquatic plants, and in fact its scope has been broadened to extend beyond the protection of cultivated plants and plant products to include the protection of wild flora, habitats and ecosystems. It also takes into consideration both direct and indirect damage by pests, and considers environmental as well as economic impacts. This implies that aquatic plants, both as commodities and as potential pests, would fall within the scope of the IPPC.

- Though some plant species are entirely aquatic (living only submerged in or floating on the water) and others entirely terrestrial (growing only in dry ground), there is a tremendous range and variety of plants growing within a spectrum of conditions intermediate between aquatic and terrestrial. A decision to exclude aquatic plants from plant protection activities would raise difficult questions about what plants fall within that category.

- As noted above, the plant protection legislation of all three NAPPO countries allows for the regulation of aquatic plants, and the U.S. already regulates aquatic plants as quarantine pests.

While NAPPO NPPOs may be in a position to coordinate the regulation of aquatic plants, it is recognized that relationships between plant protection and other sectors are different in each country, and partnerships with other government agencies related to waterways and natural areas will be necessary to implement comprehensive programs.

**Recommendations**

Given its regional and international recognition, expertise, infrastructure and mission, NAPPO should endeavor to establish itself as a coordinating body for protecting the continent's plant resource base against the entry and spread of invasive alien plants and plant pests. Standards development under the NAPPO umbrella will ensure that Canada, Mexico and the U.S. are using a harmonized approach to mitigating the risks associated

with invasive alien plants and plant pests in natural environments, as they have traditionally been doing in the agriculture and forestry sectors.

At the national level, NPPOs could provide support as a focal organization, however not all IAS will be quarantine pests. Based on the results of PRA and potentially other assessments, other organizations within each country may take primary responsibility for particular invasive plants or plant pests. The involvement of other government organizations, particularly departments with environmental protection mandates, will be crucial.

Specific recommendations include the following:

1) NAPPO should continue to maintain an Invasive Species Panel, to serve as a coordinating body between NAPPO and other regional organizations such as the CEC and the NAISN, and to facilitate the same kind of cross-disciplinary coordination at the national level.

2) Through the IAS Panel, NAPPO should continue outreach efforts to other national and international organizations in North America, particularly those related to the environment.

3) NAPPO's **scope of plants to be protected** should include all plants and plant-like organisms, including marine and freshwater, vascular and non-vascular plants, mosses, liverworts, hornworts, fungi and algae (brown, red, and green).

   - The Panel recognizes that although NAPPO's scope will include all plants as presented above, decisions for taking action will be determined within the national frameworks of the three countries, and subject to the availability of resources.

   - The Panel recognizes that not all IAS will be regulated pests. While NPPOs may provide support, cooperation with national agencies and other international conventions outside the historical channels of communication will be necessary. In some cases specific responsibilities for protection of some plants will best be provided by other non-agricultural national agencies and/or international conventions.

4) NAPPO's **scope of pests to protect plants and plant products from** should include direct and indirect effects of invertebrate pests and pathogens of plants, as well as terrestrial and aquatic plants in any of the categories identified above, if they meet the IPPC definition of a pest.

   - The Panel recognizes that although NAPPO's scope will include all invasive alien invertebrate plant pests and pathogens as presented above as well as plants as pests, decisions for taking action will be determined within the national frameworks of the three countries, and subject to the availability of resources.

   - The Panel recognizes that for the majority of cases, invasive vertebrates that can damage plant resources are covered under other national jurisdictions. However, the Panel was also aware that invasive alien vertebrate species are a recognized

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**Annex 1**

## TABLE 1: PLANTS & PLANT PRODUCTS PROTECTED UNDER PLANT PROTECTION LEGISLATION

| | | AUTHORITY UNDER PLANT PROTECTION LEGISLATION | | | ACTIVE PROGRAMS | | | AUTHORITY UNDER OTHER NATIONAL LEGISLATION* | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | CANADA | US | MEXICO | CANADA | US | MEXICO | CANADA | US | MEXICO |
| VASCULAR PLANTS | Terrestrial | Yes[1] | Yes[2] | Yes [2,3] | Yes | Yes | Yes (limited selection of species) | Yes[4,6] | | Yes [4,5, 7,15, 25, 26,27,33] |
| | Aquatic | Yes[1] | Yes[2] | Yes [12b] | Under discussion | Yes | No | Yes[4] | | Yes [5,8,15] |
| BRYOPHYTES | Mosses, Liverworts, Hornworts | Yes[1] | Yes[2] | No | No | Very limited | No | Yes[4] | | Yes [5, 9,29] |
| CHLOROPHYTES | Green Algae | Yes[1] | Yes[2] | No | No | Very limited | No | Yes[4] | | Yes [5, 9] |
| PHAEOPHYTES | Brown Algae, Kelp | Yes[1] | Yes[2] | No | No | Very limited | No | Yes[4] | | Yes [5, 9] |
| RHODOPHYTES | Red Algae, Dulse | Yes[1] | Yes[2] | No | No | Very limited | No | Yes[4] | | Yes [5, 9] |
| FUNGI (including lichens) | | Yes[1] | Yes[2] | Yes[1,12c] partially and No in the case of lichens | No | Yes | Yes | Yes[4] | | Yes [5, 9,15,28] |
| **OTHER ORGANISMS TO BE PROTECTED (ESSENTIAL TO PLANTS):** Many plant species depend on other organisms in order to thrive and survive. Pests that impact these secondary organisms therefore will affect plant growth. Examples include pollinators, biocontrol agents, vesicular-arbuscular mycorrhizae that facilitate nutrient assimilation in many vascular plants, and organisms such as earthworms that affect the environment in which a plant is growing. | | | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| MICROORGANISMS | Protozoa (Including Algae (E.G. Xanthophytes), Archaea, Bacteria (Including Algae (Cyanobacteria), Viruses, Fungi | Yes[1] | Yes[2] for bacteria & viruses | Yes[3] | No | Yes | Yes 14 | | | Yes [5, 10,11] |
| NON-CHORDATES | Arthropoda, Mollusca, Annelida, Nemata, Platyhelminthes, Etc. | Yes[1] | Yes[2,3] | Yes[3] | No | Yes | Yes [14] | Yes[3, 14] | | Yes [5, 10,11] |
| CHORDATES | Cephalochordata, Urochordata, Vertebrata (Fish, Amphibia, Reptilia, Birds, Mammalia) | Yes[1] | Yes[2] | No | No | No | No[,23] | | | Yes [5, 10, 11,19, 20,21,,22, 23] |

* active program may or may not exist

**TABLE 2: PLANT PESTS REGULATED UNDER PLANT PROTECTION LEGISLATION**

| | | Authority Under Plant Protection Legislation | | | Active Programs | | | Authority Under Other National Legislation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | CANADA | US | MEXICO | CANADA | US | MEXICO | CANADA | US | MEXICO |
| VASCULAR PLANTS | Terrestrial | Yes[1] | Yes[2] | Yes[12, 13, 24] | Under development | Yes | State level | | | Yes[25, 26,27] |
| | Aquatic | Yes[1] | Yes[2] | Yes[3,13] | Under discussion | Yes | No | | | Yes[5] |
| BRYOPHYTES | Mosses, Liverworts, Hornworts | Yes[1] | Yes[2] | Yes | No | No | No | | | Yes[7,29] |
| CHLOROPHYTES | Green Algae | Yes[1] | Yes[2] | Yes | No | Limited (one noxious weed) | No | | | Yes[17,18] |
| PHAEOPHYTES AND RHODOPHYTES | Brown Algae, Kelp, Red Algae, Dulse | Yes[1] | Yes[2] | Yes | Under discussion | Under discussion | No | | | Yes[17,18] |
| FUNGI | | Yes[1] | Yes[2] | Yes[1,12 a to e] | Yes | Yes | Yes | | | Yes[16,28,33] |
| MICROORGANISMS | Protozoa (Including Algae (E.G. Xanthophytes), Archaea, Bacteria (Including Algae (Cyanobacteria), Viruses | Yes[1] | Yes[2] | Yes[1, 3, 12 a to e] | Yes | Yes | Yes | | | Yes[11,33] |
| NON-CHORDATES | Arthropoda, Mollusca, Annelida, Nemata, Platyhelminthes, | Yes[1] | Yes[2] | Yes[3,19] | Yes | Yes | Yes[6,19] | | | Yes[5,6,10,30,31,32,33] |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Etc. | | | | | | | | | |
| CHORDATES | Cephalochordata, Urochordata, Vertebrata (Fish, Amphibia, Reptilia, Birds, Mammalia) | Yes[1] | Yes[2] | Yes [3] | No | No | Yes (rats)[3] | | | Yes [5, 10, 11,33] |

## Notes for Canada:

[1] Plant Protection Act and Regulations - The purpose of Canada's Plant Protection Act is to "prevent the importation, exportation and spread of pests injurious to plants and to provide for their control and eradication and for the certification of plants and other things". A pest is defined as "any thing that is injurious or potentially injurious, whether directly or indirectly, to plants or to products or by-products of plants, and includes any plant prescribed as a pest" and can be interpreted very broadly. Protection activities have historically been limited to the agriculture, horticulture and forestry sectors.

[4]Species at Risk Act – The purpose of Canada's Species at Risk Act is to prevent the extirpation or extinction of endangered species in Canada, to provide for their recovery and to manage other species in order to prevent them from becoming at risk

[5]Health of Animals Act and Regulations - honey bees

[6]Seeds Act – Weed Seeds Order – The purpose of the Weed Seeds Order is to list species the seeds of which are deemed to be weed seeds for the purpose of establishing seed grades under the Seeds Act and Regulations. Species listed as Class 1 (Prohibited Noxious) may not be found in seed imported or sold in Canada.

As indicated above, Canada defines a pest to be "any thing that is injurious or potentially injurious, whether directly or indirectly, to plants or to products or by-products of plants, and includes any plant prescribed as a pest". At present, Canada regulates a number of insects, fungi, nematodes, bacteria, mollusks, viruses, mites, phytoplasmids and plants (parasitic or disease vectors) that are plant pests in the agricultural and forestry sectors, under the *Plant Protection Act and Regulations*. For the most part, these have direct effects. Currently, Canada does not regulate noxious weeds (except for the purposes of seed quality under the *Seeds Act*). There are no aquatic plants or algae regulated under the *Plant Protection Act and Regulations* at present.

## Notes for the US:

The Plant protection Act defines "plant pest" and "noxious weed" very broadly. The definition of plant pest includes protozoa, nonhuman animals, parasitic plants, bacteria, fungi, viruses, viroids, infectious agents and other pathogens, and any article similar to or allied with any of the above. At present, protozoa, insects, mites, nematodes, slugs, snails, other invertebrate animals, parasitic plants, bacteria, fungi, viruses, viroids, infectious agents and other plant pathogens are regulated as plant pests. As noxious weeds, terrestrial and aquatic vascular plants, and one green alga, are currently regulated.

[2] Plant Protection Act - Under the Plant Protection Act, APHIS's mission is to protect the agriculture, environment, and economy of the United States. All categories are marked "Yes", because they are all within the scope of "the environment". That does not mean there are active programs to protect all of these organisms. Within the scope of the nursery stock quarantine, just vascular plants are currently included, but in the near future the scope may be expanded to include nonvascular plants, defined to include green algae, but not other forms of algae.

[3] Honeybee Act

## Notes for Mexico

The attributions corresponding to the protection of the environment are not included within the Ley Federal de Sanidad Vegetal (LFSV), these are the field of the Ministry of Environment (SEMARNAT). The LFSV falls under the competence of the Ministry of Agriculture (SAGARPA), and is focused on plants, their products and sub products, it does not regulate algae. LFSV defines plants as those individuals belonging to the plant kingdom that are considered agricultural species, that maintain their original qualities and that have not suffered any type of transformation. LFSV regulates and promotes plant health throughout the territory, it also covers the diagnosis and prevention of plant pest dispersion and introduction and the application, verification and certification of protocols to reduce risk of physical, chemical and microbiological contamination in the primary production of plants.
A biological control agent is defined by the LFSV as a parasite, predator, pathogen, or antagonistic organism used to control and regulate pests. A Pest is defined as: Any life form (plant or animal) or pathogenic agent that damages or has the potential to damage plants. Quarantine pest is defined as: Pest of potential economic importance for the area at risk even when the pest itself is not present, or if it is present is under official control (LFSV).

1 Regulation through requisite forms (HRF- hojas de requisitos). This is a tool used to establish import requirements, that are not yet considered by current regulations, for example mycelium for reproduction or fumigation requirements for importing forestry species or products.
2 Acuerdo que establece la clasificación y codificación de mercancías cuya importación está sujeta a regulación por parte de la Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación, publicado en el DOF el 30 de junio del 2007. Ley de los Impuestos Generales de Importación y de Exportación: This is an agreement handled through the Ministry of Economy, it establishes, through customs duties, what are the other Ministries obligations regarding specific import regulations.
3 Ley Federal de Sanidad Vegetal (LFSV)|
4 Ley General de Desarrollo Forestal Sustentable
5 Ley General de Equilibrio Ecológico y Protección al Ambiente
6 NOM-019-SEMARNAT-1999 LINEAMIENTOS TÉCNICOS PARA EL COMBATE Y CONTROL DE LOS INSECTOS DESCORTEZADORES DE LAS CONÍFERAS.
7 NOM-061-SEMARNAT-1994 ESPECIFICACIONES PARA MITIGAR LOS EFECTOS ADVERSOS OCASIONADOS EN LA FLORA Y FAUNA SILVESTRES POR EL APROVECHAMIENTO FORESTAL.
8 Code of conduct for responsible fisheries
9 Reglamento de la Ley General de Desarrollo Forestal Sustentable
10 Ley General de Vida Silvestre
11 Ley federal de Sanidad Animal
12 Normas Oficiales Mexicanas para la Importación

a) NOM-006-FITO-1995 Por la que se establecen los requisitos mínimos aplicables a situaciones generales que deberán cumplir los vegetales, sus productos y subproductos que se pretendan importar cuando éstos no estén establecidos en una norma oficial específica
b) NOM-007-FITO-1995 Por la que se establecen los requisitos fitosanitarios y especificaciones para la importación de material vegetal propagativo.
c) NOM-008-FITO-1995 Por la que se establecen los requisitos y especificaciones fitosanitarios para la importación de frutas y hortalizas frescas.
d) NOM-009-FITO-1995 Por la que se establecen los requisitos y especificaciones fitosanitarios para la importación de flor cortada y follaje fresco
e) NOM-028-FITO-1995 Por la que se establecen los requisitos fitosanitarios y especificaciones para la importación de granos y semillas, excepto para siembra.
f) NOM-062-FITO-1995 Por la que se establecen los requisitos y especificaciones fitosanitarias para la importación de vegetales, sus productos y subproductos por medio de correo o servicios de mensajería.

13 NOM-043-FITO-1999 Especificaciones para prevenir la introducción de malezas cuarentenarias a México.

14 Normas Oficiales que contemplan programas de control biológico:

a) NORMA Oficial Mexicana NOM-002-FITO-2000, Por la que se establece la campaña contra la broca del café. Publicada en el DOF el 18 de abril del 2001.

b) NORMA Oficial Mexicana NOM-023-FITO-1995, Por la que se establece la Campaña Nacional de Moscas de la fruta. Publicada en el DOF el 11 de febrero de 1999.

c) NORMA Oficial Mexicana NOM-026-FITO-1995, Por la que se establece el control de plagas del algodonero. Publicada en el DOF el 10 de septiembre de 1997.

d) NORMA Oficial Mexicana NOM-031-FITO-2000, Por la que se establece la campaña contra el virus tristeza de los cítricos. Publicada en el DOF el 10 de agosto del 2001.

e) NORMA Oficial Mexicana NOM-068-FITO-2000, Por la que se establecen las medidas fitosanitarias para combatir el moko del plátano y prevenir su diseminación.Publicada en el DOF el 21 de abril del 2000.

f) NORMA Oficial Mexicana NOM-075-FITO-1997, Por la que se establecen los requisitos y especificaciones fitosanitarias para la movilización de frutos hospederos de moscas de la fruta. Publicada en el DOF el 23 de 1998, modificada el 20 de marzo del 2003.

g) Acuerdo por el que se instrumenta el Dispositivo Nacional de Emergencia en los términos del artículo 46 de la Ley Federal de Sanidad Vegetal, con el objeto de controlar y mitigar el riesgo de dispersión de la cochinilla rosada del hibisco (Maconellicoccus hirsutus) en México, publicado en el Diario Oficial de la Federación el 31 de diciembre de 2007.

15 Norma Oficial Mexicana NOM-059-SEMARNAT-2001 Por la que se establecen la protección ambiental de especies nativas de México de flora y fauna silvestres – categorías de riesgo y especificaciones para su inclusión, exclusión o cambio- lista de especies en riesgo

16 NOM 013 SEMARNAT Que regula sanitariamente la importación de árboles de navidad naturales de las especies de los género Pinus y Abies; y la especie Pseudotzuga menziesii

17 Convenio Internacional para Prevenir la Contaminación por los Buques de 1973 y su Protocolo de 1978 (MARPOL 73/78)

Anexo I, sobre Reglas para prevenir la Contaminación por Hidrocarburos.

Anexo II, sobre Reglas para Prevenir la Contaminación por Sustancias Nocivas Líquidas Transportadas a Granel.

Anexo V, sobre Reglas para Prevenir la Contaminación por las Basuras de los Buques

18 Convenio Internacional para el Control y la Gestión del Agua de Lastre y los Sedimentos de los Buques, 2004, adoptado por la Organización Marítima Internacional.

19 NOM-002-ZOO-1994 Actividades técnicas y operativas aplicables al Programa Nacional para el Control de la Abeja Africana

20 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

21 PROCER Conservation Programme for Species at Risk (Maguey bats)

22 PCMM Conservation programme for Mexican bats

23 The North American Pollinator Protection Campaign

24 Ley Federal de Producción, certificación y comercio de semillas

25 NOM-006-SEMARNAT-1997 Que establece los procedimientos, criterios y especificaciones para realizar el aprovechamiento de hojas de palma

26 NOM-007-SEMARNAT-1997 Que establece los procedimientos, criterios y especificaciones para realizar el aprovechamiento, transporte y almacenamiento de ramas, hojas o pencas , flores, frutos y semillas

27 NOM-008-SEMARNAT-1996 Que establece los procedimientos, criterios y especificaciones para realizar el aprovechamiento, transporte y almacenamiento de cogollos

28 NOM-010-SEMARNAT-1996 Que establece los procedimientos, criterios y especificaciones para realizar el aprovechamiento, transporte y almacenamiento de hongos

29 NOM-011-SEMARNAT-1996 Que establece los procedimientos, criterios y especificaciones para realizar el aprovechamiento, transporte y almacenamiento de musgo, heno y doradilla
30 NOM-016-SEMARNAT-2003 Que regula sanitariamente la importación de madera aserrada nueva
31 NOM-142-SEMARNAT-2003 Que establece los lineamientos técnicos para el combate y el control del psílido del eucalipto Glycaspis brimblecombei Moore
32 NOM-144-SEMARNAT-2004 Que establece las medidas fitosanitarias reconocidas internacionalmente para el embalaje de madera que se utiliza para el comercio internacional de bienes y mercancías
33 NOM-152-SEMARNAT-2006 Que establece los lineamientos, criterios y especificaciones de los contenidos de los programas de manejo forestal para el aprovechamiento de recursos forestales maderables en bosques, selvas y vegetación de zonas áridas