

Invasive Species Pathway Risk Analysis for California

Prepared by:

Christiana Conser, University of California Davis
Ph.D. Student, Department of Plant Sciences



Table of Contents

INTRODUCTION.....	3
DEFINITIONS.....	3
OVERVIEW.....	4
California Invasive Species Advisory Committee (CISAC)	4
CISAC Strategic Framework.....	4
CISAC Invasive Species List.....	4
METHODOLOGY	5
RESULTS	8
Invasive Species Pathway Risk Analysis by Taxonomic Group.....	8
Arthropods.....	8
Diseases.....	39
Invertebrates.....	59
Plants.....	61
Vertebrates	69
Invasive Species Pathway Risk Analysis Results by Pathway Code.....	73
Results by Main Pathway Types.....	73
Results of Transportation Pathways Invasive Species Risk Analysis.....	74
Air Travel.....	74
Tourism & Relocation.....	74
Ship Ballast Water	75
Boat Hull or Surface Fouling.....	75
Cars, Buses, Trucks, ATVs, Boat Trailers.....	75
Trains & other Railways	75
Construction & Firefighting Vehicles	75
Shipping & Packing Materials	77
Stowaways in Holds	77
Transportation of Animals	77
Results of Plant-Related Living Industry Pathways Invasive Species Risk Analysis.....	78
Plants as Food or Medicine.....	78
Nursery Stock Contaminant.....	83

Potting Soils & Planting Mediums.....	87
Seed Trade and Seed Contamination.....	87
Hay	89
Firewood	89
Biological Research	91
Results of Animal-Related Living Industry Pathways Invasive Species Risk Analysis.....	92
Pet & Aquarium Trade	92
Non-Pet Animals	93
Live Food Animals	94
Aquaculture.....	94
Bait	95
Stocking for Fishing & Hunting.....	95
Farm & Crop Protection	95
Release of Organisms for Cultural Reasons	96
Intentional Release	96
Accidental Introduction or Escape from Captivity	96
Minimally Processed Animal Products.....	96
RECOMMENDATIONS – NEXT STEPS.....	96
LITERATURE CITED	97

PURPOSE

The purpose of this invasive species pathway risk analysis is to provide a scientific analysis and policy recommendations in support of the *CISAC Strategic Framework for Prevention and Exclusion*, which is to *"Identify and address new and existing pathways for entry and movement of invasive species"*.

The first line of defense and the most cost-effective strategy against the establishment of new invasive species is exclusion to prevent their entry into California (CISAC 2011). Likewise, with invasive species already in California, it is critical to employ effective prevention practices to keep from spreading them to new areas. Both efforts require intervention into an extensive network of activities that can spread invasive species into and around the state. These "pathways" range from aquatic organisms carried on boat hulls to food items and plants smuggled into the state, and programs to address these pathways require significant sophistication and resources to be effective.

Experts in invasive species detection continue to identify new and previously unrecognized pathways associated with the movement of people and trade; such as interstate and intrastate transport of firewood and express parcel shipments. Internet sales represent a rapidly expanding potential source of invasions. California needs a comprehensive study of entry and spread pathways for invasive species, including the most effective options for addressing each pathway. Research is needed to identify novel pathways, and to determine which pathways pose the greatest risk for new introductions. A range of disciplines, including anthropology and sociology, can make contributions to developing effective approaches to address each pathway. Researchers should work in partnership with public and private land managers to develop Best Management Practices for identifying new potential pathways and preventing the introduction and spread of invasive species.

INTRODUCTION

Invasive species (IS) can be transported into California via a variety of different manmade pathways, many as a result of trade. The volume of imports is forecasted to grow exponentially at an average rate of 6% per year (Levine and D'Antonio 2003). Understanding which pathways are at a high risk to introduce IS that could be potentially devastating to CA agriculture or native species is key in a successful prevention strategy.

DEFINITIONS

Invasive Species

An invasive species is legally defined by Executive Order (1999) as "an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health".

Pathways

Pathways are the means by which invasive species are transported from one location to another. Natural pathways can include wind or water dispersal. Man-made pathways are those pathways "which are enhanced or created by human activity" (NISC 2007). There are two types of man-made pathways: intentional and unintentional. Intentional pathways are the result of deliberate actions that result in the translocation of organisms. Unintentional pathways are those man-made pathways that unintentionally move organisms such as ballast water discharge (e.g. red-tide organisms), soil associated with the trade of nursery stock (e.g. imported red fire ant), importation of fruits and vegetables (eg. plant pests), and

the international movement of people (e.g. pathogens). With unintentional pathways, the movement of species is an indirect byproduct of human activity. This focus of this analysis is on man-made, unintentional pathways.

OVERVIEW

California Invasive Species Advisory Committee (CISAC)

In 2009, state agencies created the Invasive Species Council of California (ISCC), following the lead of the federal government (National Invasive Species Council) and more than a dozen other states. The ISCC is led by Secretary Karen Ross from California Department of Food and Agriculture (CDFA), along with Secretary John Laird from California Natural Resource Agency, Matthew Rodriguez from California Environmental Protection Agency, Acting Secretary Tracy Stevens from Business, Transportation and Housing Agency, Secretary Diana S. Dooley from Health and Human Services, and Acting Secretary Mike Dayton from California Emergency Management Agency.

The ISCC appointed 24 stakeholder representatives to the California Invasive Species Advisory Committee (CISAC). The purpose of the ISCC and CISAC is to bring relevant agencies—state, federal and local—together with external stakeholders to develop and implement effective measures to forestall the harm caused by invasive species. In 2010, these collaborative bodies produced the state’s first comprehensive list of invasive species (online at www.ice.ucdavis.edu/invasives).

CISAC Strategic Framework

In 2008, the National Invasive Species Council generated a revised federal management plan, laying out a blueprint for action. Increasingly, states are following this lead, seeking the benefits of a coherent plan to coordinate the many agencies whose missions touch on the problem. Our plan for California builds on two existing plans, the California Noxious & Invasive Weed Action Plan (2005) and the California Aquatic Invasive Species Management Plan (2008). These plans provide extensive and detailed recommendations for improving particular aspects of the state’s invasive species response infrastructure. This current plan consolidates important themes from those plans and fills gaps.

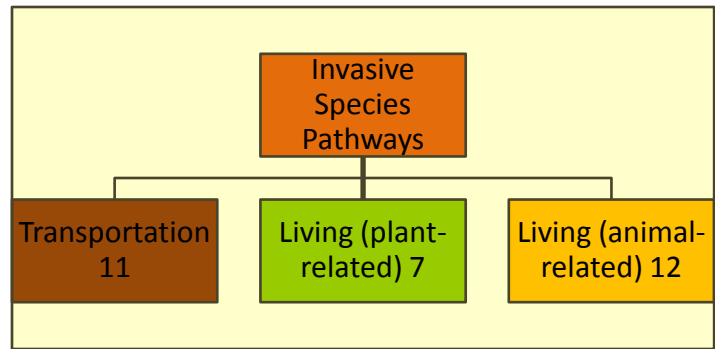
CISAC Invasive Species List

A Recommended Action in the CISAC Strategic Framework is to develop and maintain a list of invasive species that harm or could harm California. In 2009, the CISAC formed five taxonomic working groups (arthropod, disease, invertebrate, plant, and vertebrate) tasked with developing the first comprehensive invasive species list for California. This effort commenced with the compilation of the California Invasive Species List, a living document released in April 2010. Using a numerical grading system based on a standard list of analytical criteria, the list provides a common foundation for assessing the full range of species and impacts. This will serve as a baseline with which to measure future trends and progress. The list for California is compiled from a range of authoritative sources and covers all taxonomic areas. Scorecards rate each species’ detrimental impacts (and any beneficial impacts) to California’s environment, agriculture, infrastructure, culture, and public health. Scorecards also rate the difficulty of addressing the impacts of the species, and what level of tools are already in place to do so. The list is set up to accept and display online comments from expert reviewers, and over 100 reviewers are currently signed up to contribute information. This is an essential aspect in that the information evolves rapidly, and the range of expertise on diverse taxa is difficult to assemble. This listing effort should continue and

be further refined. Though no list can be truly comprehensive, this resource is a key foundation for work on invasive species in California.

METHODOLOGY

We adapted the pathway definitions and methodology from the *Training and Implementation Guide for Pathway Definition, Risk Analysis and Risk Prioritization* developed jointly by the Aquatic Nuisance Species Task Force (ANSTF) and National Invasive Species



Council (NISC) Prevention Committee via the Pathways Work Team to conduct the CISAC invasive species pathway analysis. The CISAC developed a list of pathways relevant to invasive species entering California and used the coding system from the NISC (2007) guide to code each pathway. We organized the pathways analysis into three main types of pathways that invasive species can enter in California: transportation, plant-related living industries and animal-related living industries (Figure 1). Each main pathway was divided into subcategories and each were given a unique code (Tables 1-3).

Table 1. Transportation pathway codes

(T) Transportation Pathways	
T 1	Modes of Transportation
T 1.1	Air
T 1.2	Water/Aquatic
T 1.2.1	Ship Ballast Water
T 1.2.2	Hull/Surface Fouling (i.e., Recreational Boats and Vessels)
T1.2.3	Stowaways in Holds
T 1.2.4	Superstructures/Structures Above Water Line
T 1.2.5	Transportation of Dredge Spoil Material
T 1.3	Land Terrestrial
T 1.3.1	Cars, Buses, Trucks,ATVs, Trailers for recreational boats
T 1.3.2	Trains, Subways, Metros, Monorails
T 1.3.3	Construction/Firefighting Vehicles
T 1.3.4	Hikers, Horses, Pets
T 2	Military Travel and Transportation of Military Vehicles
T 2.1	Baggage/Gear
T 2.2	Equipment
T 3	Items used in the Shipping Process
T3.1	Containers
T 3.2	Packing Materials
T3.2.1	Wood Packing Materials
T 3.2.2	Seaweed
T 3.2.3	Other Plant Materials
T 3.2.4	Sand/Earth

T 4	Mail/Internet Overnight Shipping
T 5	Travel Tourism/Relocation
T 5.1	Travelers Themselves
T 5.2	Baggage/Gear
T 5.3	Pets/Plants and Animals Transported for Entertainment
T 5.4	Travel Consumables
T 5.5	Service Industries

Table 2. Living industry pathway codes

(L) Living Industry Pathways	
L 1	Plant Pathways
L 1.1	Importation of Plants for Research
L 1.2	Potting Soils, Growing Mediums, Sods, etc.
L 1.3	Plant Trade (agricultural, nursery, landscape, floral, logs)
L 1.3.1	Plant Parts
L 1.3.1.1	Above-Ground Plant Parts
L 1.3.1.2	Below-Ground Plant Parts
L 1.3.1.3	Seeds and the Seed Trade
L 1.3.1.4	Aquatic Propagules
L 1.3.1.5	Hay
L 1.3.1.6	Seed contaminant
L 1.3.1.7	Nursery stock contaminant
L 1.3.1.8	Firewood
L 1.3.2	Whole Plants
L 1.4	Illegal entry
L 1.5	Accidental introduction
L 2	Food Pathways
L 2.1	Live Seafood
L 2.2	Other Live Food Animals
L 2.3	Plants and Plant Parts as Food or Medicine
L 2.4	Illegal entry
L 3	Non-Food Animal Pathways
L 3.1	Bait
L 3.2	Pet/Aquarium Trade
L 3.3	Aquaculture
L 3.4	Non-Pet Animals
L 3.5	Release of Organisms for Religious, Cultural or Other Reasons
L 3.6	Medicinal uses
L 3.7	Farm or crop protection
L 3.8	Stocking species for recreation (fishing, hunting)
L 3.9	Biological research
L 3.10	Accidental escape from zoos or aquariums
L 3.11	Intentional release

L 4	Nonliving Animal and Plant-Related Pathways
L 4.1	Processed and Partially Process Meat and Meat Processing Waste
L 4.2	Frozen Seafood
L 4.3	Minimally Processed Animal Products
L 4.4	Minimally Processed Plant Products

Table 3. Miscellaneous pathway codes

(M) Miscellaneous Pathways	
M 1	Biocontrol
M 2	Other Aquatic Pathways
M 2.1	Interconnected Waterways
M 2.1.1	Freshwater Canals
M 2.1.2	Marine/Estuarine Canals
M 2.1.3	Domestic Waste Streams
M 2.2	Interbasin Transfers
M 3	Natural Spread of Established Populations
M 3.1	Wind Dispersal
M 3.2	Water Dispersal
M 3.3	Animal movement (seed dispersal, disease)
M3.4	Migration of vertebrate and invertebrate pests
M3.5	Native plants serve as host for pest/disease
M 4	Ecosystem Disturbance
M 4.1	Long-Term (highway and utility rights-of-way, clearing, logging)
M 4.2	Short-Term (habitat restoration, enhancement, prescribed burning)
M 4.2.1	Phytomining
M 4.2.2	Gravel contaminant
M 5	Garbage
M 5.1	Garbage Transport
M 5.2	Garbage Landfill
M 6	Ecoterrorism
M 7	Biofuel
M 8	Unknown Pathway

The CISAC Invasive Species list was divided into five taxonomic categories: Arthropods, Diseases, Invertebrates, Plants, and Vertebrates. We sorted each taxonomic group into two groups of invasive species: currently in California and not yet found in California. For the pathway analysis we used only the invasive species not yet found in California. Each invasive species was ranked for the risk of introduction (high, medium or low) by the CISAC taxonomic working groups. For each species (not in CA) we conducted a brief internet and literature search (search terms included the Latin taxonomic name, common name and each name + pathway or invasive species) and recorded all pathways in which that species could enter California. Pathways were ranked as primary, secondary or tertiary. We documented all references and recorded any relevant notes describing the specifics about the pathway, specific

commodities impacted, or country of origin for the invasive species. The data was compiled by taxonomic group, species, and pathway.

RESULTS

Invasive Species Pathway Risk Analysis by Taxonomic Group

Arthropods

Table 4. Results of Arthropod invasive species pathway risk analysis. Species are listed by taxonomic subcategories and ranked by risk of introduction. Species considered to be a threat to biosecurity were not included in the report. Refer to Tables 1-3 for invasive species pathway codes.

<i>Scientific name</i>	<i>Common Name</i>	<i>Extent</i>	<i>Primary Pathways</i>	<i>Notes for Primary Pathways</i>
Bees and Wasps				
High Risk				
<i>Apis mellifera capensis</i>	Cape honeybee	not present	L 2.2, L3.4	beekeeping, honey, parasite of African honeybee
<i>Diprion similis</i>	introduced pine sawfly	not present	T3.2.1, L1.3.1.7	wood packing material, nursery stock
<i>Dryocosmus kuriphilus</i>	chestnut gall wasp	not present	L2.3, L1.3	attacks <i>Castanea crenata</i> (Japanese chestnut), <i>Castanea dentata</i> (American chestnut), <i>Castanea mollissima</i> (Chinese chestnut) and <i>Castanea sativa</i> (European chestnut) and their hybrids
<i>Fenusa pusilla</i>	birch leafminer	not present	L1.3	pest of birch (gray, paper, yellow, black, European white, and river)
<i>Leptocybe invasa</i>	Blue gum chalcid	not present	L2.3, L1.3, L1.3.1.7	attacks eucalyptus spp.
<i>Quadrastichus erythrinae</i>	Erythrina gall wasp	not present	L1.3	pest of <i>Erythrina variegata</i>
<i>Solenopsis geminata</i>	tropical fire ant	not present	L1.3, L 1.3.1.3	pest of grass seed & granaries
<i>Solenopsis richteri</i> X <i>Solenopsis invicta</i> hybrid	hybrid fire ant	not present	M3.4	hybrid population spreading northward from MS & AL
Moderate Risk				
<i>Chrysis</i> spp.	cuckoo wasps	not present		
<i>Diastrophus radicum</i>	raspberry root gall wasp	not present	L1.3, L1.3.1.7	pest of raspberry
<i>Sirex noctilio</i>	sirex woodwasp	not present	T3.2.1	wood packing material

Solenopsis saevissima	red imported fire ant	not present	L2.3, L1.3	pest of ornamental plants
Low Risk				
Coelioxys spp.	cuckoo bees	not present		
Beetles				
High Risk				
Acalymma vittatum	striped cucumber beetle	not present	L2.3, L1.3	pest of cucumber fruit
Adoretus sinicus	chinese rose beetle	not present	L1.2, L1.3.1.7	nursery stock from Asia
Adoretus spp.	Adoretus spp.	not present	L1.2, L1.3.1.7	nursery stock from Asia
Agrilus planipennis	emerald ashborer	not present	L1.3.1.8, L1.3.1.3, L1.3., L1.3.1, T3.1, T3.2,	firewood of all hardwood (non-coniferous) species; nursery stock, green lumber, and other material living, dead, cut, or fallen, including logs, stumps, roots, branches, and composted and uncomposted chips of the genus Fraxinus.
Agrilus ruficollis	rednecked cane borer	not present	L1.3, L1.3.1.7	pest of raspberry, blackberry, dewberry
Anoplophora chinensis	citrus longhorned beetle	not present	L1.3, L1.3.1.7, L1.3.1.8	pest of citrus, trifoliolate orange, apple, Australian pine, poplar, willow. Potential pest of maple, silk tree, alder, birch, camellia, hickory/pecan, chestnut, Japanese cedar, wild olive, loquat, beech, fig, 'Nagami' kumquat, ash, mallow, holly, walnut, spicebush, amur, mulberry, sycamore/plane tree, cherry/peach/apricot/plum, firethorn, pear, oak, sumac, locust, rose, blackberry/raspberry, pagoda tree, Stransvaesia, snowbell tree, elm
Anoplophora glabripennis	Asian longhorned beetle	not present	L1.3, L1.3.1.8, T3.2.1	firewood, wood packing material. Host plants include maple, horsechestnut, birch, plan-tree, poplar, willow, elm
Anthonomus grandis grandis	boll weevil	not present	L 1.3.1	pest of cotton

<i>Anthonomus signatus</i>	strawberry bud weevil	not present	L1.3.1.7	pest of strawberry
<i>Atrichonotus taeniatulus</i>	small lucerne weevil	not present	L1.3, L1.3.1.5, L1.3.1.6	pest of lucerne seed and hay
<i>Cathartus quadricollis</i>	squarenecked grain beetle	not present	L2.3, L1.3, , L1.3.1.7	pest of coffee, cereals, dried fruit and cacao
<i>Cerotoma trifurcata</i>	bean leaf beetle	not present	L2.3, L1.3, L1.3.1.7	pest of soybean
<i>Chalcodermus aeneus</i>	cowpea curculio	not present	L2.3, L1.3, L1.3.1.7	pest of southern peas
<i>Conoderus rufangulus</i>	<i>Conoderus rufangulus</i>	not present		
<i>Conotrachelus aguacatae</i>	small avocado seed weevil	not present	L2.3, L1.3, L1.3.1.6, L1.3.1.7	pest of avocado seed
<i>Conotrachelus nenuphar</i>	plum curculio	not present	L2.3, L1.3, L1.3.1.7	pest of <i>Amelanchier arborea</i> , <i>A.canadensis</i> , cherries (<i>Prunus avium</i> and <i>P. cerasus</i>), <i>Crataegus</i> spp., <i>Malus domestica</i> , <i>Malus</i> spp., peaches, pears, plums, <i>Prunus alleghaniensis</i> , <i>P. americana</i> , <i>P. maritima</i> , <i>P. pensylvanica</i> , <i>P. pumila</i> , <i>P. salicina</i> , <i>P. serotina</i> , <i>P. virginiana</i> and <i>Sorbus aucuparia</i> . Also found on <i>Ribes</i> spp. and <i>Vaccinium</i> spp.
<i>Conotrachelus perseae</i>	small seed weevil	not present	L2.3, L1.3, L1.3.1.7	pest of avocado
<i>Copturus aguacatae</i>	avocado stem weevil	not present	L2.3, L1.3, L1.3.1.7	pest of avocado
<i>Curculio elephas</i>	chestnut weevil	not present	L2.3, L1.3, L1.3.1.6	pest of chestnut & oak
<i>Curculio nucum</i>	hazelnut weevil	not present	L2.3, L1.3	pest of hazelnut
<i>Cylas formicarius elegantulus</i>	sweetpotato weevil	not present	L2.3, L1.3, L1.3.1.7	pest of sweet potato
<i>Diabrotica barberi</i>	northern corn rootworm	not present	L2.3, L1.3, L1.3.1.7	pest of corn (roots)
<i>Diabrotica undecimpunctata howardi</i>	spotted cucumber beetle	not present	L2.3, L1.3, L1.3.1.7	pest of cucumbers, soybeans, cotton, beans and many others

<i>Diabrotica virgifera virgifera</i>	western corn rootworm	not present	L2.3, L1.3, L1.3.1.7	larvae are a pest of corn; adults may also feed on other Poaceae, Asteraceae, Fabaceae & Cucurbitaceae
<i>Diaprepes</i> sp.	exotic weevil	not present	L2.3, L1.3, L1.3.1.7	pest of ~2700 spp. from 59 plant families incl. citrus, peanut, sorghum, guinea corn, corn, Surinam cherry, dragon tree, sweet potato, sugarcane, panicum grasses, coffee weed (sesbania), Brazilian pepper & other ornamental plants
<i>Epilachna borealis</i>	squash beetle	not present	L2.3, L1.3	
<i>Epilachna tridecimnotata</i>	ladybird beetle	not present	L1.3	
<i>Epilachna varivestis</i>	Mexican bean beetle	not present	L2.3, L1.3, M3.5	pest of snap beans, lima beans, soybeans, beggars ticks
<i>Euscepes postfasciatus</i>	Indian sweetpotato weevil	not present	L2.3, L1.3	pest of sweet potato
<i>Exosoma lusitanica</i>	leaf beetle	not present	L1.3	
<i>Harmonia axyridis</i>	Multicolored asian ladybeetle	not present	M1, L1.3, L1.5	IPM, hitchhikes on nursery plants, accidental introduction
<i>Heilipus lauri</i>	avocado seed weevil	not present	L2.3, L1.3	pest of avocado
<i>Hylobius pales</i>	pales weevil	not present	L1.3, L1.3.1.8	pest of pines
<i>Hylotrupes bajulus</i>	old house borer	not present	L1.3, L1.3.1.8	larvae are a pest of softwoods particularly pine. Infects timber for new home building.
<i>Hylurgus ligniperda</i>	redhaired pine bark beetle	not present	L1.3, L1.3.1.8	larvae are a pest of pine species, spruce, true firs, Douglas fir, and larch
<i>Leptinotarsa decemlineata</i>	Colorado potato beetle	not present	L2.3, L1.3	attacks potatoes and various other cultivated and wild solanaceous plants
<i>Listroderes subcinctus</i>	Chilean vegetable weevil	not present	L2.3, L1.3	
<i>Macroductylus subspinosus</i>	rose chafer	not present	L1.3	
<i>Maladera castanea</i>	Asiatic garden beetle	not present	L1.3, L1.3.1.7	pest of pasture and landscaping grasses

Orthotomicus erosus	Mediterranean pine engraver	not present	L1.3, L1.3.1.8	pest of pine trees
Oulema melanopus	cereal leaf beetle	not present	L2.3, L1.3, L1.3.1.3	feeds on all cereals; barley (Hordeum spp.), wheat (Triticum spp.), oats (Avena spp.) rye (Secale spp.), corn (Zea mays) and wild grasses.
Phloeotribus liminarius	peach bark beetle	not present	L2.3, L1.3, L1.3.1.7	pest of peach & black cherry
Pissodes nemorensis	eastern pine weevil	not present	L1.3, L1.3.1.8	pest of pine and cedar
Popillia japonica	Japanese beetle	not present	L1.3	pest of more than 300 species of turf-grass, landscape & ornamental plants
Popillia lewisi	scarab beetle	not present	T1.1, T2, L1.3	presumably arrived in Guam via an airforce flight from Okinawa, Japan
Rhynchophorus ferrugineus	red palm weevil	not present	L1.3	pest of palm species
Sinoxylon anale	dunnage beetle	not present	T3.2.1	wooden pallets
Tomicus piniperda	pine shoot beetle	not present	L1.3, L1.3.1, L1.3.1.8	pest of Scots pine and other Pinus spp. Transported via firewood.
Xyleborinus andrewesi	Asian ambrosia beetle	not present		
Xyleborus glabratus	Redbay ambrosia beetle	not present	L2.3, L1.3	pest of avocado (Persea americana), California bay laurel (Umbellularia californica), northern spicebush (Lindera benzoin), redbay (Persea borbonia), sassafras (Sassafras albidum) swampbay (Persea palustris)
Anomala orientalis	Oriental beetle	not present	L2.3, L1.3, L1.3.1.7	pest of lawn grass, maize, pineapple, sugarcane (larvae) and Alcea rosea, Dahlia spp. Iris spp. Phlox spp. and roses (adults)
Anomala sulcatula	Anomala sulcatula	not present	L1.3, L1.3.1.7	pest of bamboo
Brachycerus spp.	garlic beetles	not present	L2.3, L1.3, L1.3.1.7	pest of garlic
Coccotorus scutellaris	plum gouger	not present	L2.3, L1.3, L1.3.1.7	pest of peaches and plums

<i>Conotrachelus juglandis</i>	butternut curculio	not present	L2.3, L1.3,, L1.3, L1.3.1.7	pest of butternut (<i>Juglans cinera</i>) and vector of butternut canker caused by fungus <i>Sirococcoc clavigignenti-juglandacearum</i>
<i>Conotrachelus retentus</i>	black walnut curculio	not present	L2.3, L1.3, L1.3.1.7	pest of walnut
<i>Conotrachelus</i> spp.	hidden snout weevils	not present		
<i>Curculio caryae</i>	pecan weevil	not present	L2.3, L1.3, L1.3.1.6	pest of pecans
<i>Cylas</i> spp.	exotic weevil	not present	L2.3, L1.3, L1.3.1.7	
<i>Diabrotica virgifera zea</i>	Mexican corn rootworm	not present	L2.3, L1.3, L1.3.1.7	larvae are a pest of corn; adults may also feed on other Poaceae, Asteraceae, Fabaceae & Cucurbitaceae
<i>Diocalandra</i> spp.	coconut weevils	not present	L2.3, L1.3	
<i>Diocalandra taitensis</i>	Tahitian coconut weevil	not present	L2.3, L1.3	
<i>Elytroteinus subtruncatus</i>	Fijian ginger weevil	not present	L2.3, L1.3	pest of white ginger root, avocado seed, bird-of-paradise tubers, cycad trunk, lemons, Marrattia fern, sugarcane, taro roots, and ti cuttings
<i>Gerstaeckeria nobilis</i>	weevil	not present		
<i>Holotrichia mindanaona</i>	white grub	not present		
<i>Hypothenemus hampei</i>	coffee berry borer	not present	L2.3, L1.3	pest of coffee
<i>Lophocateres pusillus</i>	Siamese grain borer	not present	L2.3, L1.3, L1.3.1.3	pest of rice
<i>Megalometis chilensis</i>	<i>Megalometis chilensis</i>	not present		
<i>Metamasius</i> spp.	bromeliad weevils	not present		
<i>Myllocerus undecimpustulatus undatus</i>	Sri Lanka weevil	not present		

Naupactus xanthographus	South American fruit tree weevil	not present	L2.3, L1.3	pest of Actinidia chinensis (Chinese gooseberry), Annona cherimola (cherimoya), Citrus, Eriobotrya japonica (loquat), Glycine max (soyabean), Malus domestica (apple), Medicago sativa (lucerne), Mespilus germanica (medlar), Olea europaea subsp. europaea (olive), Persea americana (avocado), Prunus armeniaca (apricot), Prunus avium (sweet cherry), Prunus domestica (plum), Prunus dulcis (almond), Prunus persica (peach), Prunus salicina (Japanese plum), Pyrus (pears), Pyrus communis (European pear), Solanum tuberosum (potato), Vitis vinifera (grapevine)
Omphisa anastomosalis	sweetpotato vine borer	not present	L2.3, L1.3	pest of sweet potato and other species of Ipomoea
Phyllophaga congrua	May beetle	not present	L2.3, L1.3, L1.3.1.7	pest of turf-grass, forage grass, corn, small grains, sugar cane, strawberries, potatoes, and young nursery trees
Prostephanus truncatus	larger grain borer	not present	L2.3, L1.3	pest of maize, cassava
Protaetia fusca	mango flower beetle	not present	L2.3, L1.3	adults feed on tree sap, a wide variety of ripening fruits, corn, and the flowers of apple, thistle, mock orange, milkweed, dogwood, sumac, yarrow, daisies, and goldenrod
Protaetia orientalis	oriental flower beetle	not present	L2.3, L1.3	pest of ornamental trees
Rhabdoscelus obscurus	New Guinea sugarcane weevil	not present	L2.3, L1.3	pest of sugarcane and coconut
Rhizotrogus majalis	European chafer	not present	L1.3	pest of turf-grass
Sphenophorus maidis	maize billbug	not present	L2.3, L1.3	pest of maize
Sternochetus mangiferae	mango seed weevil	not present	L2.3, L1.3	pest of mango
Trogoderma granarium	khapra beetle	not present		
Trogoderma granarium	khapra beetle	not present		

<i>Typophorus nigritus viridicyaneus</i>	sweetpotato leaf beetle	not present	L2.3, L1.3	pest of sweet potato
<i>Xyleborus</i> spp.	ambrosia beetles	not present		
<i>Zygogramma exclamationis</i>	sunflower beetle	not present	L2.3, L1.3	pest of sunflower
<i>Agrilus biguttatus</i>	Oak splendour beetle	not present	L1.3.1.8,, T3.1, T3.2, L1.3, L1.3.1	dunnage, crating, grape leaves, unspecific cargo
<i>Anomala foraminosa</i>	scarab beetle	not present	L2.3, L1.3, L1.3.1.7	pest of sugarcane
<i>Anomala insitiva</i>	scarab beetle	not present	L2.3, L1.3, L1.3.1.7	pest of sugarcane
<i>Anomala luteipennis</i>	scarab beetle	not present		
<i>Anomala undulata</i>	scarab beetle	unknown		
<i>Cryptorhynchus mangiferae</i>	mango seed weevil	not present	L1.3, L2.3	pest of mango
<i>Callidiellum rufipenne</i>	Lesser Japanese cedar longhorned beetle	not present	L1.3, L 1.3.1.1, L1.3.1.8	pest of timber from Taxodiaceae and Cupressaceae, also some firs and pines
<i>Chlorophorous annularis</i>	Bamboo longhorned beetle	MISSING	L2.3, L1.3, L1.3.1.7	pest of bamboo
<i>Hesperophanes campestris</i>	Chinese longhorned beetle	MISSING	L2.3, L1.3	pest of apple and mulberry
<i>Hylurgus palliatus</i>	A bark beetle	MISSING	L1.3, L1.3.1.8	larvae are a pest of fir, true cedar, larch, spruce, and pine
<i>Ips sexdentatus</i>	Six-toothed bark beetle	MISSING		
<i>Ips typographus</i>	European spruce bark beetle	MISSING		
<i>Mononychellus alternatus</i>	Japanese pine sawyer	MISSING	L1.3, L1.3.1.8	
<i>Mononychellus sutor</i>	Small white-marmorated longhorned beetle	MISSING		

Pityogenes chalcographus	Spruce engraver	MISSING	L1.3, L1.3.1.8	pest of Norway spruce, fir, Douglas-fir, pine and other spruce species
Platypus quercivorus	Oak ambrosia beetle	MISSING	L1.3, L1.3.1.8	pest of oak, chestnut, cypress, holly, Lauraceae, ash, Prunus sp.
Tetropium castaneum	A longhorned beetle	MISSING	L1.3, L1.3.1.8	pest of Norway spruce, Scots pine
Tetropium fuscum	Brown spruce longhorned beetle	MISSING		
Tomicus destruens	Pine shoot beetle	MISSING	L1.3, L1.3.1, L1.3.1.8	pest of Pinus spp. Transported via firewood.
Tomicus minor	Lesser pine shoot beetle	MISSING	L1.3, L1.3.1, L1.3.1.8	pest of Scots pine and other Pinus spp. Transported via firewood.
Trypodendron domesticus	An ambrosia beetle	MISSING		
Urocerus gigas	A horntail	MISSING	L1.3, L1.3.1, L1.3.1.8	pest of Norway spruce and common fir
Butterflies and Moths				
High Risk				
Acrobasis nuxvorella	pecan nut casebearer	not present	L2.3, L1.3	pest of pecan, peach fruit
Acrolepiopsis assectella	leek moth	not present	L2.3, L1.3	pest of leek, onion, garlic, chives & shallot
Adoxophyes orana	summer Fruit Tortrix Moth	not present	L2.3, L1.3, L1.3.1.7	pest of apple & pear fruit (incl asian pear)
Alabama argillacea	cotton leafworm	not present	L1.3, L1.3.1	pest of cotton
Argyrotaenia velutinana	redbanded leafroller	not present	L2.3, L1.3, L1.3.1.7	pest of cherry, peach, plum, grape and other small fruits, and ornamental crops. This species has a broad host range, tying leaves of most plant species except conifers.
Cactoblastis cactorum	cactus moth	not present	M1, M3.4	biological control for invasive Opuntia spp.
Chilo suppressalis	Asiatic rice borer	not present	L2.3, L1.3, L1.3.1.3, L1.3.1.7	pest of rice, maize, sorghum

Cryptophlebia leucotreta	false codling moth	not present	L2.3, L1.3, L1.3.1.7	pest of ~70 plants, including: avocado (<i>Persea americana</i>), banana (<i>Musa paradisiaca</i>) bur weed (<i>Triumfeta</i> spp.), bean (<i>Phaseolus</i> spp.), bloubos (<i>Royena pallens</i>), boerboon (<i>Schotia afra</i>), buffalo thorn (<i>Zizyphus mucronata</i>), cacao (<i>Theobroma cacao</i>), carambola (<i>Averrhoa carambola</i>), castorbean (<i>Ricinus communis</i>), chayote (<i>Sechium edule</i>), citrus (<i>Citrus sinensis</i> , <i>Citrus</i> spp.), coffee (<i>Coffea arabica</i> , <i>Coffea</i> spp.), cola (<i>Cola nitida</i>), corn (<i>Zea mays</i>), cotton (<i>Gossypium hirsutum</i> , <i>Gossypium</i> spp.), cowpea (<i>Vigna unguiculata</i> , <i>Vigna</i> spp.), custard apple (<i>Annona reticulata</i>), elephant grass (<i>Pennisetum purpureum</i>), English walnut (<i>Juglans regia</i>), grape (<i>Vitis</i> spp.), guava (<i>Psidium guajava</i>), governor's plum (<i>Flacourtia indica</i>), Indian mallow (<i>Abutilon hybridum</i>), jakkalsbessie (<i>Diospyros mespiliformis</i>), jujube (<i>Zizyphus jujuba</i>), jute (<i>Abutilon</i> spp.), kaffir plum (<i>Harpephyllum caffum</i>), kapok/copal (<i>Ceiba pentrandia</i>), khat (<i>Catha edulis</i>), kudu-berry (<i>Pseudolachnostylis maprouneifolia</i>), lima bean (<i>Phaseolus lunatus</i>), litchi (<i>Litchi chinensis</i>), loquat (<i>Eriobotrya japonica</i>), macadamia nut (<i>Macadamia ternifolia</i>), mallow (<i>Hibiscus</i>)
<i>Cydia funebrana</i>	red plum maggot	not present	L2.3, L1.3, L1.3.1.7	pest of plum, cherry, peach & other Rosaceae
<i>Cydia splendana</i>	chestnut moth	not present	L2.3, L1.3	

<i>Darna pallivitta</i>	limacodid moth	not present	L2.3, L1.3, L1.3.1.7	Observed completing its life cycle on <i>Arecaceae</i> : <i>Areca</i> , <i>Caryota</i> (fishtail palm), <i>Cocos</i> (coconut palm), <i>Phoenix</i> (<i>Phoenix</i> palm), <i>Rhapsis</i> (<i>Rhapsis</i> palm), <i>Veitchia merrillii</i> (<i>Manila</i> palm); <i>Asteraceae</i> : <i>Adenostemma</i> ; <i>Commelinaceae</i> : <i>Commelina diffusa</i> (<i>honohono</i> grass); <i>Euphorbiaceae</i> : <i>Breynia</i> ; <i>Fabaceae</i> : <i>Vigna marina</i> (<i>beach</i> pea); <i>Liliaceae</i> : <i>Cordyline terminalis</i> (<i>ti</i> plant), <i>Dracaena</i> (<i>cane</i> plant, 'Compacta' & 'Massangeana' varieties), <i>Iris</i> ; <i>Moraceae</i> : <i>Ficus</i> ; <i>Oxalidaceae</i> : <i>Averrhoa carambola</i> (<i>starfruit</i>); <i>Rubiaceae</i> : <i>Coffea arabica</i> (<i>coffee</i>) and <i>Urticaceae</i> : <i>Pipturus albidus</i> (<i>mamaki</i>).
<i>Endopiza viteana</i>	grape berry moth	not present	L2.3, L1.3	pest of grapes (cultivated and wild)
<i>Harrisina americana</i>	grapeleaf skeletonizer	not present	L2.3, L1.3	pest of grapes (cultivated and wild) & Virginia creeper
<i>Heliocoverpa armigera</i>	cotton bollworm	not present	L2.3, L1.3	pest of cotton, corn, tomato, legumes and tobacco
<i>Laspeyresia</i> spp.	<i>Laspeyresia</i> spp.	not present	L3.4	sold as "Mexican jumping beans"-a seed capsule of <i>Sebastiana pavoniana</i> with a live larvae inside
<i>Malacosoma americanum</i>	eastern tent caterpillar	not present	L2.3, L1.3	pest of cherry, plum, peach, apple, hawthorn and related plants
<i>Maruca testulalis</i>	bean pod borer	not present	L2.3, L1.3	pest of mung beans
<i>Maruca vitrata</i>	bean pod borer	not present	L1.3	pest of cowpea
<i>Opogona sacchari</i>	banana moth	not present	L2.3, L1.3	pest of bananas, pineapples, bamboo, maize, sugarcane, <i>Cactaceae</i> , <i>Dracaena</i> , <i>Strelitzia</i> and <i>Yucca</i>
<i>Ostrinia nubilalis</i>	European corn borer	not present	L2.3, L1.3	pest of maize, millet, hemp, hops, peppers, sorghum, soybean, cotton.
<i>Pectinophora scutigera</i>	pink-spotted bollworm	not present	L2.3, L1.3	pest of cotton

Rhyacionia buoliana	European pine shoot moth	not present	L1.3, L1.3.1.8	pest of pine trees (red, mugho, Scots & Austrian)
Spodoptera dolichos	armyworm	not present		
Spodoptera eridania	southern armyworm	not present	L2.3, L1.3	pest of beet, cabbage, carrot, collard, cowpea, eggplant, okra, pepper, potato, sweet potato, tomato, and watermelon. Other crops damaged include avocado, citrus, peanut, sunflower, velvet bean, tobacco and various flowers. Many weeds are consumed, but pigweed, Amaranthus spp.; and pokeweed, Phytolacca americana; are especially favored. Grasses are rarely eaten. There are numerous reports of armyworm infestations beginning with pigweed and pokeweed, with adjacent crops damaged only after the more favored weeds are consumed.
Spodoptera exempta	nutgrass armyworm	not present	L1.3	
Spodoptera latifascia	lateral lined armyworm	not present	L1.3	
Spodoptera littoralis	Egyptian cottonworm	not present	L1.3	
Spodoptera mauritia	lawn armyworm	not present	L1.3	
Spodoptera sunia	Costa Rican armyworm	not present	L1.3	
Stenoma catenifer	avocado seed moth	not present	L2.3, L1.3	pest of avocado and other plants in the Lauraceae
Thyridopteryx ephemeriformis	bagworm	not present	L1.3	pest of arborvitae, juniper, pine, spruce, and many other evergreen species. It also attacks certain deciduous trees such as black locust, honeylocust, and sycamore.
Zeuzera pyrina	leopard moth	not present	L2.3, L1.3	hosts are trees and shrubs of the genera Malus, Tilia, Pyrus, Acer, Rhododendron, Ulmus, Castanea, Populus, Fraxinus, Quercus, and Juglans.

<i>Acrobasis juglandis</i>	pecan leaf casebearer	not present	L2.3, L1.3	pest of pecan, walnut fruit
<i>Acrolepia assectella</i>	leek moth	not present	L2.3, L1.3	pest of leek, onion, garlic, chives & shallot
<i>Antaeotricha leucillana</i>	stenomine oecophorid	not present	L1.3, L1.3.1, L1.3.1.8, L2.3	pest of ash, basswood, birch, elm, maple, oak, poplar, willow
<i>Apamea apamiformis</i>	riceworm	not present	L2.3, L1.3, L1.3.1.7	pest of rice (esp. wild rice)
<i>Attacus atlas</i>	atlas silk moth	not present	L1.3, L3.4	cocoons used to make Fagara silk
<i>Celama sorghiella</i>	sorghum webworm	not present	L2.3, L1.3, L1.3.1.3, L1.3.1.7	pest of grain sorghum, Sudan grass, Johnson grass, corn, rye & timothy
<i>Chilo plejadellus</i>	rice stalk borer	not present	L2.3, L1.3, L1.3.1.3, L1.3.1.7	pest of rice
<i>Choristoneura fumiferana</i>	spruce budworm	not present	L1.3, L1.3.1.3, L1.3.1.7, L1.3.1.8	pest of spruce
<i>Chrysodeixis chalcites</i>	golden twin spot moth	not present	L2.3, L1.3, L1.3.1.7	pest of tobacco, tomato, cotton, Cruciferae, legumes, corn, soybeans, potatoes, artichokes, greenhouse crops, and cauliflower
<i>Conogethes punctiferalis</i>	yellow peach moth	not present	L2.3, L1.3, L1.3.1.7	pest of peaches, durian, citrus trees, papaya, eggplant and castor.
<i>Corcyra cephalonica</i>	rice moth	not present	L2.3, L1.3, L1.3.1.6, L1.3.1.7, M1	pest of rice, used for IPM research
<i>Cydia caryana</i>	hickory shuckworm	not present	L2.3, L1.3, L1.3.1.6	pest of pecan & hickory
<i>Diaphania hyalinata</i>	melonworm	not present	L2.3, L1.3, L1.3.1.7	pest of Cucurbitaceae: summer squash, winter squash, pumpkin.
<i>Diatraea crambidoides</i>	southern corn stalk borer	not present	L2.3, L1.3	pest of corn and eastern gamagrass (<i>Tripsacum dactyloides</i>)
<i>Diatraea grandiosella</i>	southwestern corn borer	not present	L2.3, L1.3	pest of corn, sorghum & other Poaceae
<i>Diatraea saccharalis</i>	sugarcane borer	not present	L2.3, L1.3	pest of sugarcane, corn, rice, sorghum, sudangrass, Johnsongrass, <i>Paspalum</i> spp., <i>Panicum</i> spp., <i>Holcus</i> spp., <i>Adropogon</i> spp. and other

				Poaceae
<i>Dyspessa ulula</i>	onion carpenter worm	not present	L1.3, L2.3	
<i>Earias fabia</i>	spotted bollworm	not present	L2.3, L1.3	pest of cotton
<i>Gonodonta pyrgo</i>	citrus fruitpiercing moth	not present	L2.3, L1.3	
<i>Halysidota tessellaris</i>	pale tussock moth	not present		
<i>Helicoverpa hawaiiensis</i>	Hawaiian bud moth	not present	L1.3	
<i>Lampides boeticus</i>	bean butterfly	not present	L2.3, L1.3	attacks the flowers, seeds and pods of many Fabaceae spp., incl. Medicago, Crotalaria, Polygala, Sutherlandia, Dolichos, Cytisus, Spartium & Lathyrus spp.
<i>Lampides boeticus</i>	bean butterfly	not present	L2.3, L1.3	
<i>Leucinodes orbonalis</i>	eggplant fruit borer	not present	L2.3, L1.3	pest of eggplant, potato, black nightshade, tomato, sweet pepper, and other Solanum spp, Cucurbita spp. & pea
<i>Leucoptera malifoliella</i>	pear leaf blister moth	not present	L2.3, L1.3	pest of Betula (birches), Chaenomeles (flowering quinces), Cotoneaster, Crataegus (hawthorns), Cydonia oblonga (quince), Malus domestica (apple), Malus sylvestris (crab-apple tree), Mespilus germanica (medlar), Pistacia vera (pistachio), Prunus armeniaca (apricot), Prunus avium (sweet cherry), Prunus cerasus (sour cherry), Prunus domestica (plum), Prunus persica (peach), Prunus salicina (Japanese plum), Prunus spinosa (blackthorn), Pyrus (pears), Pyrus bretschneideri (yali pear), Pyrus communis (European pear), Rhamnus frangula (alder buckthorn),

				Sorbus aucuparia (mountain ash)
<i>Lymantria dispar</i>	Gypsy moth	not present	T 1.2.3, T3.1, T3.2.1, L3.1, L1.3.1.8	egg masses can infest cargo ships, cargo containers, wood packing materials, firewood
<i>Lymantria</i> spp.	exotic moth	not present		
<i>Mamestra brassicae</i>	cabbage moth	not present	L1.3	
<i>Melittia calabaza</i>	southwestern squash vine borer	not present	L2.3, L1.3	caterpillars attack squash and wild cucurbits
<i>Melittia cucurbitae</i>	squash vine borer	not present	L2.3, L1.3	caterpillars attack cultivated and wild cucurbits
<i>Orgyia leucostigma</i>	whitemarked tussock moth	not present	L1.3	pest of sycamore and a variety of other trees
<i>Papaipema nebris</i>	stalk borer	not present	L2.3, L1.3	pest of small grains, grasses, corn and ragweed
<i>Papilio demoleus</i>	lime swallowtail	not present	L2.3, L1.3	pest of citrus & Fabaceae
<i>Plathypena scabra</i>	green cloverworm	not present	L2.3, L1.3	pest of soy beans
<i>Sannina uroceriformis</i>	persimmon borer	not present	L2.3, L1.3	pest of persimmon
<i>Sesamia cretica</i>	durra stalk borer	not present	L2.3, L1.3	pest of maize, sugarcane, sorghum
<i>Syngrapha epigaea</i>	inscribed looper moth	not present		

Thaumatotibia leucotreta	False codling moth	not present	L2.3, L1.3	pest of ~70 plants, including: avocado (<i>Persea americana</i>), banana (<i>Musa paradisiaca</i>) bur weed (<i>Triumfeta</i> spp.), bean (<i>Phaseolus</i> spp.), bloubos (<i>Royena pallens</i>), boerboon (<i>Schotia afra</i>), buffalo thorn (<i>Zizyphus mucronata</i>), cacao (<i>Theobroma cacao</i>), carambola (<i>Averrhoa carambola</i>), castorbean (<i>Ricinus communis</i>), chayote (<i>Sechium edule</i>), citrus (<i>Citrus sinensis</i> , <i>Citrus</i> spp.), coffee (<i>Coffea arabica</i> , <i>Coffea</i> spp.), cola (<i>Cola nitida</i>), corn (<i>Zea mays</i>), cotton (<i>Gossypium hirsutum</i> , <i>Gossypium</i> spp.), cowpea (<i>Vigna unguiculata</i> , <i>Vigna</i> spp.), custard apple (<i>Annona reticulata</i>), elephant grass (<i>Pennisetum purpureum</i>), English walnut (<i>Juglans regia</i>), grape (<i>Vitis</i> spp.), guava (<i>Psidium guajava</i>), governor's plum (<i>Flacourtia indica</i>), Indian mallow (<i>Abutilon hybridum</i>), jakkalsbessie (<i>Diospyros mespiliformis</i>), jujube <i>Zizyphus jujuba</i>), jute (<i>Abutilon</i> spp.), kaffir plum (<i>Harpephyllum caffum</i>), kapok/copal (<i>Ceiba pentranda</i>), khat (<i>Catha edulis</i>), kudu-berry (<i>Pseudolachnostylis maprouneifolia</i>), lima bean (<i>Phaseolus lunatus</i>), litchi (<i>Litchi chinensis</i>), loquat (<i>Eriobotrya japonica</i>), macadamia nut (<i>Macadamia ternifolia</i>), mallow (<i>Hibiscus</i>)
Tildenia gudmannella	pepper flower bud moth	not present	L1.3	
Zeiraphera canadensis	spruce budworm	not present	L1.3	pest of white spruce
Zophodia convolutella	gooseberry fruitworm	not present	L2.3, L1.3	pest of current & gooseberry

<i>Argyrotaenia pulchellana</i>	grey red-barred twist	not present	L2.3, L1.3, L1.3.1.7	major pest of grapes, apricot, citrus crops, kenaf
<i>Capua tortrix</i>	<i>Capua tortrix</i>	not present		
<i>Carposina niponensis</i>	peach fruit moth	not present	L2.3, L1.3, L1.3.1.7	pest of apples, peaches, pears
<i>Chrysodeixis eriosoma</i>	green garden looper	not present	L2.3, L1.3, L1.3.1.7	pest of basil, cabbage, celery, Chinese pea, corn, eggplant, green beans, lettuce, mint, parsley, peas, potato, spinach, sweet potato, and tomato. Ornamental crops attacked are chrysanthemum, orchid, ti and tropical foliages such as Aglaonema, Diffenbachia, Ficus and Syngonium.
<i>Conopomorpha cramerella</i>	cocoa pod borer	not present	L2.3, L1.3, L1.3.1.7	pest of cocoa
<i>Conopomorpha litchiella</i>	lychee leaf miner	not present	L2.3, L1.3, L1.3.1.7	pest of lychee fruit
<i>Euproctis chrysorrhoea</i>	browntail moth	not present	L2.3, L1.3	pest of apple, black cherry, northern red oak & black oak
<i>Hemimene juliana</i>	nut fruit tortrix	not present	L2.3, L1.3.1.6	pest of chestnut seeds
<i>Lymire edwardsii</i>	Edwards' wasp moth	not present	L2.3, L1.3	pest of Ficus spp. including F. altissima, F. aurea, F. auriculata, F. benghalensis, F. benjamina, F. continifolia, F. elastica, F. lyrata, F. retusa and F. rubiginosa
<i>Megalopyge opercularis</i>	puss caterpillar	not present		
<i>Pammene fasciana</i>	chestnut leaf roller	not present	L2.3, L1.3	pest of Quercus, Fagus sylvatica, Castanea sativa acorns/nuts
<i>Prays endocarpa</i>	citrus pock caterpillar	not present	L2.3, L1.3	pest of citrus and other Rutaceae
<i>Proeulia</i> spp.	<i>Proeulia</i> spp.	not present	L2.3, L1.3	pest of Acer pseudoplatanus (sycamore), Actinidia deliciosa (kiwifruit), Citrus sinensis (navel orange), Diospyros (malabar ebony), Malus domestica (apple), Mespilus germanica (medlar), Platanus orientalis (plane), Prunus armeniaca (apricot), Prunus domestica (plum), Prunus persica (peach), Pyrus communis (European pear), Simmondsia chinensis

				(jojoba), Vitis vinifera (grapevine)
Scrobipalpa ocellatella	sugarbeet crown borer	not present	L2.3, L1.3	pest of sugarbeet, table beet and fodder beet.
Tischeria marginata	moth	not present		
Risk Unknown				
Dendrolimus superans sibiricus	Siberian silk moth	MISSING	L1.3, L1.3.1.7, L1.3.1.8	pest of conifer species incl. Abies, Pinus, Larix, Picea & Tsuga
Lymantria mathura	pink gypsy moth		L1.3, L1.3.1.8	attacks many species of Betula, Castanea, Juglans, Malus, Quercus, Salix, Tilia, Ulmus and other deciduous trees
Lymantria monacha	nun moth		L1.3, L1.3.1.8	attacks Scots pine and Norway spruce.
Phyllocnistis citrella	Citrus leafminer	MISSING	L2.3, L1.3	pest of citrus and other Rutaceae
Flies				
High Risk				
Anastrepha fraterculus	South American fruit fly	not present	L2.3, L1.3, L1.3.1.7	pest of citrus, apple
Anastrepha grandis	South American cucurbit fruit fly	not present	L2.3, L1.3, L1.3.1.7	pest of cucumber fruit
Anastrepha sp.	exotic fruit fly	not present	L2.3, L1.3, L1.3.1.7	pest of fruit
Moderate Risk				
Anastrepha ludens complex	Mexican fruit fly complex	not present	L2.3, L1.3, L1.3.1.7	pest of grapefruit, oranges, pear, peach, and apple

Anastrepha obliqua	West Indian fruit fly	not present	L2.3, L1.3, L1.3.1.7	pest of mango (<i>Mangifera indica</i> L.), guava (<i>Psidium guajava</i> L.), hog plums (<i>Spondias</i> sp.), <i>Anacardium occidentale</i> (cashew), <i>Annona hayesii</i> , <i>Averrhoa carambola</i> (carambola), <i>Citrus aurantium</i> (sour orange), <i>Citrus grandis</i> (pumelo), <i>Citrus x paradisi</i> (grapefruit), <i>Dovyalis hebecarpa</i> (kitambilla or Ceylon gooseberry), <i>Eriobotrya japonica</i> (loquat), <i>Eugenia jambos</i> (jambos, rose-apple, or pomarosa), <i>Eugenia malaccensis</i> (Malay-apple or pomerack), <i>Eugenia nesiotica</i> , <i>Mangifera indica</i> (mango), <i>Diospyros digyna</i> (black sapote), <i>Pouteria mammosa</i> (sapote), <i>Prunus amygdalus</i> (bitter almond), <i>Prunus dulcis</i> (almond), <i>Psidium guajava</i> (guava), <i>Spondias dulcis</i> (vi-apple or Otaheite-apple), <i>Spondias mombin</i> (yellow mombin), <i>Spondias nigrescens</i> , <i>Spondias purpurea</i> (purple or red mombin), <i>Coffea arabica</i> (arabica coffee)). The species also has been reared experimentally from <i>Achras sapota</i> (sapodilla), <i>Annona glabra</i> (pond-apple), <i>Chrysobalanus icaco</i> (coco-plum), <i>Passiflora quadrangularis</i> (a passion-flower, the giant granadilla), <i>Prunus persica</i> var. <i>nectarina</i> (nectarine), and <i>Vitis vinifera</i> (California grape).
<i>Anastrepha suspensa</i>	Caribbean fruit fly	not present	L2.3, L1.3, L1.3.1.7	pest of guava, citrus, mango, and various other cultivated fruits
<i>Bactrocera correcta</i>	Guava fruit fly	not present	L2.3, L1.3, L1.3.1.7	pest of guava, mango, oranges, sweet almond, peaches (occasionally nectarine), plums

Bactrocera dorsalis	Oriental fruit fly	not present	L2.3, L1.3, L1.3.1.7	pest of Tropical Fruits: Guava, persimmon, banana, papaya, mango, pomegranate, quince, kumquat, avocado; Date palms, Figs; Citrus: Oranges, grapefruit, lemons, limes, tangerines; Cashew, walnut, sweet almond; Cucurbits: Cucumbers, watermelon; Other Fruits/Vegetables: Tomatoes, bell peppers, chili peppers, gooseberries.
Bactrocera facialis	Tongan fruit fly	not present	L2.3, L1.3, L1.3.1.7	pest of Tropical Fruits: Guava, pineapple, avocado; Citrus: lemons, Tree Nuts: Cashew, sweet almond; Temperate Tree & Vine Fruits: peaches (occasionally nectarine); Cucurbits: watermelon; bell peppers
Bactrocera latifrons	solanaceous fruit fly	not present	L2.3, L1.3, L1.3.1.7	pest of Tropical Fruits: Guava, banana, mango, Citrus: Oranges, grapefruit, lemons, Cucurbits: cucumbers, tomatoes, chili peppers, eggplant
Bactrocera tryoni	Queensland fruit fly	not present	L2.3, L1.3, L1.3.1.7	pest of Tropical Fruits: Guava, persimmon, banana, papaya, mango, pomegranate, quince, kumquat, avocado; Citrus: Oranges, grapefruit, lemons, limes, mandarin oranges, citrons; Datepalms; Figs; Olives; Tree Nuts: Cashew, walnut, sweet almond; Temperate Tree and Vine Fruits: Apples, peaches (occasionally nectarine), pears, plums, apricots, cherries, mulberries, grapes (esp. wine grapes); blackberries, gooseberries, cauliflower, okra.
Bactrocera zonata	Peach fruit fly	not present	L2.3, L1.3, L1.3.1.7	pest of Tropical Fruits: Guava, papaya, mango, pomegranate, quince; Date palms; Citrus: Oranges; Tree Nuts: sweet almond; temperate Tree and Vine Fruits: Apples, peaches (occasionally nectarine); Cucurbits: Gourds, watermelon, other melons.

				Other Fruits/Vegetables: Tomatoes
<i>Ceratitis capitata</i>	Mediterranean fruit fly	not present	L2.3, L1.3, L1.3.1.7	wide range of hosts including coffee, <i>Solanum pseudocapsicum</i> , apples, avocados, citrus, figs. Kiwifruits, mangoes, medlars, pears, <i>Prunus</i> sp.
<i>Ceratitis rosa</i>	Natal fruit fly	not present	L2.3, L1.3, L1.3.1.7	pest of apples, apricots, avocados, Citrus, Fortunella, guavas, figs, grapes, litchis, mangoes, pawpaws, peaches, pears, plums, quinces & tomatoes
<i>Cerodontha iridophora</i>	leafminer fly	not present		
<i>Dacus bivittatus</i>	African pumpkin fly	not present	L2.3, L1.3	
<i>Dacus</i> sp.	exotic fruit fly	not present	L2.3, L1.3	
<i>Rhagoletis boycei</i>	walnut husk fly	not present	L2.3, L1.3	pest of walnut
<i>Rhagoletis cingulata</i>	cherry fruit fly	not present	L2.3, L1.3	pest of cherry
<i>Rhagoletis fausta</i>	black cherry fruit fly	not present	L2.3, L1.3	pest of cherry
<i>Rhagoletis juglandis</i>	walnut husk fly	not present	L2.3, L1.3	pest of walnut
<i>Rhagoletis mendax</i>	blueberry maggot	not present	L2.3, L1.3	pest of blueberry
<i>Rhagoletis</i> spp.	exotic fruit fly	unknown	L2.3, L1.3	
<i>Rhagoletis suavis</i>	walnut husk fly	not present	L2.3, L1.3	pest of walnut
<i>Toxotrypana curvicauda</i>	papaya fruit fly	not present	L2.3, L1.3	pest of papaya, mango, milkweed. May attack other species.
<i>Toxotrypana curvicauda</i>	papaya fruit fly	not present	n/a	n/a
<i>Zonosemata electa</i>	pepper maggot	not present	L2.3, L1.3	pest of pepper & eggplant

<i>Anastrepha striata</i>	guava fruit fly	not present	L2.3, L1.3, L1.3.1.7	pest of guava (and other myrtaceous fruits), mango, mombins, orange, peach
<i>Bactrocera albistrigata</i>	White Striped Fruit Fly	not present	L2.3, L1.3, L1.3.1.7	pest of sweet almond
<i>Bactrocera cucurbitae</i>	melon fly	not present	L2.3, L1.3, L1.3.1.7	pest of Tropical Fruits: Guava, papaya, mango, quince, avocado; Date palms, Figs; Citrus: Oranges, grapefruit, lemons; Tree Nuts: walnut, sweet almond; Temperate Tree and Vine Fruits: Apples, peaches (occasionally nectarine), pears, apricots; Other Fruits/Vegetables: Tomatoes, bell peppers, eggplant, garden beans, lima beans, cauliflower, okra.
<i>Bactrocera irvingiae</i>	irvinge fruit fly	not present	L2.3, L1.3, L1.3.1.7	pest of mango (<i>Mangifera indica</i>), guava (<i>Psidium guajava</i>), citrus fruits (<i>Citrus</i> spp.) (Photo 4), papaya (<i>Carica papaya</i>), bush mango (<i>Irvingia gabonensis</i>), avocado (<i>Persea Americana</i>), star apple (<i>Chrysophyllum albidum</i>), badamier (<i>Terminalia catappa</i>) and other wild species such as <i>Sclerocarya birrea</i> , <i>Vitellaria paradoxa</i>
<i>Bactrocera scutellata</i>	Striped fruit fly	not present	L2.3, L1.3, L1.3.1.7	pest of pumpkin
<i>Cochliomyia hominivorax</i>	screwworm	not present	L3.4	parasitic pest of livestock
<i>Contarinia johnsoni</i>	grape blossom midge	not present	L2.3, L1.3, L1.3.1.7	pest of grapes
<i>Dacus cucurbitae</i>	Melon fruit fly	not present	L2.3, L1.3	
<i>Horidiplosis ficifolii</i>	Ornamental fig pest	not present	L2.3, L1.3	pest of <i>Ficus</i> , incl. <i>F. benjamina</i> & <i>F. microcarpa</i>

<i>Ophiomyia phaseoli</i>	bean fly	not present	L2.3, L1.3	pest of <i>Cajanus cajan</i> (pigeon pea), <i>Crotalaria juncea</i> (sunn hemp), <i>Crotalaria pallida</i> (smooth crotalaria), <i>Cyamopsis tetragonoloba</i> (guar), Fabaceae (leguminous plants), <i>Glycine max</i> (soyabean), <i>Lablab purpureus</i> (hyacinth bean), <i>Macrotyloma uniflorum</i> (horsegram), <i>Medicago sativa</i> (lucerne), <i>Mucuna pruriens</i> (Buffalobean), <i>Phaseolus</i> (beans), <i>Phaseolus coccineus</i> (runner bean), <i>Phaseolus lathyroides</i> (Phasey bean), <i>Phaseolus lunatus</i> (lima bean), <i>Phaseolus vulgaris</i> (common bean), <i>Pisum sativum</i> (pea), <i>Psophocarpus tetragonolobus</i> (winged bean), <i>Vigna aconitifolia</i> (moth beans), <i>Vigna angularis</i> (adzuki bean), <i>Vigna mungo</i> (black gram), <i>Vigna radiata</i> (mung bean), <i>Vigna sinensis</i> ssp. <i>sesquipedalis</i> (asparagus bean), <i>Vigna unguiculata</i> (cowpea)
<i>Rhagoletis cerasi</i>	European cherry fruit fly	not present	L2.3, L1.3	pest of sweet cherry and cherry
<i>Tipula oleracea</i>	common crane fly	not present	L1.3	pest of turf-grass
<i>Dasineura leguminicola</i>	clover seed midge	unknown	L1.3	pest of clover
<i>Eumerus aurifrons</i>	exotic bulb fly	unknown	L1.3	
<i>Amphitetranychus viennensis</i>	fruit tree spider mite	not present	L2.3, L1.3, L1.3.1.7	pest of apple
<i>Brevipalpus chilensis</i>	false grape mite	not present	L2.3, L1.3, L1.3.1.7	pest of grapes, lemons, kiwifruit, persimmons, privet and other ornamentals.
<i>Eriophyes gossypii</i>	cotton blister mite	not present	L1.3	
<i>Euvarroa sinhai</i>	<i>Euvarroa sinhai</i>	not present	L3.4, L2.3	parasitic pest of honeybees

Raoiella indica	Red Palm Mite	not present	L2.3, L1.3	pest of palm species
Steneotarsonemus spinki	panicle rice mite	not present	L2.3, L1.3	pest of rice
Tropilaelaps clareae	honeybee mite	not present	L3.4, L2.3	attacks honeybees
Moderate Risk				
Eriophyes litchii	lychee erinose mite	not present	L2.3, L1.3	pest of lychee fruit
Mononychellus tanajoa	green spider mite	not present		
Scales and Aphids				
High Risk				
Abgrallaspis aguacatae	armored scale	not present	L2.3, L1.3	pest of avocado fruit from Mexico
Abgrallaspis palmae	tropical palm scale	not present	L2.3, L1.3	pest of banana, coconut palm, manihot, oil palm, cocoa & orchids
Acutaspis albopicta	albopicta scale	not present	L2.3, L1.3	pest of avocado fruit from Mexico
Acutaspis tingi	ting scale	not present	L2.3, L1.3, L1.3.1.7	pest of coconut palm
Aleurocanthus spiniferus	orange spiny whitefly	not present	L2.3, L1.3, L1.3.1.7	pest of citrus, rose, grape, peach, pear, guava
Aleurocanthus woglumi	citrus blackfly	not present	L2.3, L1.3, L1.3.1.7	pest of citrus, avocado, banana, cashew, coffee, ginger, grape, guava, lychee, mango, pawpaw, pear, pomegranate, quince, rose
Aonidiella orientalis	oriental scale	not present	L1.3, L1.3.1.7	pest of citrus, ficus, mango, papaya, bananas and other fruits; tea (Camellia sinensis); and palm trees, including coconut and arecanut (Areca catechu). Host records include species of: Acacia, Aegle, Agave sisalana, Albizia, Annona spp., Areca catechu, Azadirachta, Bauhinia, Bombax, Calotropis, Camellia sinensis, Camellia spp., Carica papaya, Cassia, Citrus spp., Cocos nucifera, Codiaenum, Cucurbita, Cycas, Dalbergia, Diospyros, Elaeis guineensis, Eugenia spp., Feijoa, Ficus spp., Ficus carica, Gossypium hirsutum, Hedera, Hibiscus,

				Jasminum, Laelia, Litchi chinensis, Litsea, Mangifera indica, Manilkara, Melia, Metroxylon, Morus, Musa sapientum, Myrrhinium, Myrtaceae, Nerium, Olea europaea, Orchidaceae, Osbeckia, Palmae, Persea americana, Phoenix dactylifera, Pistacia, Podocarpus, Polyalthia, Poncirus, Prunus persica, Prunus spp., Psidium guajava, Punica granatum, Ricinus communis, Ricinus, Rosa, Roystonea, Salix, Santalum, Schleicheria, Solanum melongena, Solanum spp., Spondias, Tamarindus, Vitis vinifera, Weinmannia, Ziziphus spp.
Aphis glycines	soybean aphid	not present	L2.3, L1.3, L1.3.1.7	pest of soybean
Aspidiotus destructor	coconut scale	not present	L2.3, L1.3, L1.3.1.7	pest of coconut & banana
Asterolecanium epidendri	orchard scale	not present	L1.3, L1.3.1.7	pest of orchids, bromeliads and tropical indoor plants
Aulacaspis yasumatsui	cycad aulacaspis scale	not present	L1.3, L1.3.1.7	pest of cycads
Ceroplastes ceriferus	Indian wax scale	not present	L2.3, L1.3, L1.3.1.7	pest of mostly fruit crops (e.g. apple, avocado, citrus, fig, pear, plum, quince, Vaccinium and many tropical fruit crops) and ornamentals (e.g. Acer, Berberis, Buxus, Cornus, Deutzia, Euonymus, Ficus, Ilex, Lagerstroemia, Laurus, Magnolia, Platanus, Populus, Pyracantha, Rhododendron, Salix, Viburnum)
Ceroplastes floridensis	Florida wax scale	not present	L2.3, L1.3, L1.3.1.7	
Ceroplastes rubens	red wax scale	not present	L2.3, L1.3, L1.3.1.7	
Ceroplastes rusci	fig wax scale	not present	L2.3, L1.3, L1.3.1.7	
Chionaspis furfura	scurfy scale	not present	L1.3, L1.3.1.7	pest of aspen, cottonwood and willow

Clavaspis herculeana	herculeana scale	not present	L1.3	
Coccus viridis	Green scale	not present	L2.3, L1.3, L1.3.1.7	pest of citrus, Annona (cherimoya, atemoya, sugar apple), anthurium, avocado, cacao, celery, coffee, flowering ginger, guava, lime, macadamia, orange, orchid and plumeria.
Fiorinia theae	tea scale	not present	L2.3, L1.3, L1.3.1.7	pest of camellias, tea, olives, citrus
Furcaspis biformis	red orchard scale	not present	L1.3	pest of orchids (including cattleya, oncidium, and vanda) and philodendron
Furcaspis oceanica	coconut red scale	not present	L2.3, L1.3	pest of coconut
Gymnaspis aechmeae	aechmea scale	not present	L1.3	
Hemiberlesia palmae	tropical palm scale	not present	L1.3	
Howardia biclavis	mining scale	not present	L2.3, L1.3	pest of acacia, allamanda, bougainvillea, cassia, ficus, ebony, gardenia, hibiscus, ixora, jasmine, kelumpang, lantana, lychee, mango, papaya, plumeria, poinsettia, pulasan, sapodilla, and sapote

Ischnaspis longirostris	black thread scale	not present	L2.3, L1.3	pest of Agavaceae: Agave americana (century plant), Anacardiaceae: Mangifera spp. (mango), Apocynaceae: Nerium oleander (oleander), Plumeria acutifolia (frangipani tree, temple tree), Araceae: Anthurium scandens, Dieffenbachia seguine, Philodendron spp. and Monstera deliciosa (ceriman, swiss cheese plant, fruit salad plant, Mexican breadfruit)Arecaceae: Chamaedorea elegans (parlor palm), and Elaeis spp. (oil palms), Bromeliaceae: Bromelia sp., Cyperaceae: Cyperus sp., Fabaceae: Acacia spp., Lauraceae: Cinnamomum spp., Persea americana (avocado), Liliaceae: Aloe spp., Magnoliaceae: Magnolia sp., Malvaceae: Gossypium sp. (cotton), Hibiscus sp.Moraceae: Ficus spp., Myrtaceae: Eucalyptus sp., Eugenia sp.,Oleaceae: Jasminum spp., Ligustrum japonicum (Japanese privet), Orchidaceae: Cattleya sp., Oncidium sp., Rosaceae: Prunus armeniaca (apricot), Rubus sp., Rubiaceae: Coffea spp. (coffee), Ixora sp., Gardenia sp., Rutaceae: Citrus spp., Litchi spp.Theaceae Camellia spp., Verbenaceae: Duranta sp., Lantana sp.
Kilifia acuminata	acuminate scale	not present	L2.3, L1.3	pest of Gardenia jasminoides; Bay laurel (Laurus nobilis); Ilex vomitoria; Eugenia sp; Anthurium sp.; Guava; Lemon; Mango (Mangifera indica); Brazilian pepper (Schinus terebinthifolius).
Lopholeucaspis cockerelli	Cockerell scale	not present		
Massileurodes chittendeni	rhodendron whitefly	not present	L1.3	

Morganella longispina	plumose scale	not present	L2.3, L1.3	pest of Alectryon connatus, Artocarpus integrifolia, Averrhoa carambola (carambola), Bauhinia variegata (butterfly tree), Broussonetia papyrifera (paper mulberry), Camellia japonica (camellia), Cananga odoratum, Carica papaya (papaya), Cedrela toona, Cinnamomum zeylanica, Citrus aurantium (sour orange), Citrus limon (lemon), Citrus maxima (shaddock), Citrus paradisi (grapefruit), Citrus reticulata (tangerine), Cupania supida, Ficus carica (piku), Ficus macrophylla, Fraxinus berlandieri, Gleditsia delavayi, Hibiscus rosa-sinensis (chinese hibiscus), Hibiscus syruacus, Jasminum sambac (Arabian jasmine), Lagerstroemia flos-reginae, Ligustrum sinense (Chinese privet), Macadamia integrifolia (macadamia nut), Mangifera indica (mango), Michelia champeca, Michelia flava, Nerium oleander, (oleander), Olea europaea (olive), Psidium cattleianum, Psidium guajava, Tecoma stans (trumpetbush)
Mycetaspis spaerioides	armored scale	not present		
Myndus crudus	American palm cixiid	not present	L2.3, L1.3	pest of coconuts, dates, and Canary Island date palm; grasses: St. Augustine grass, Paspalum notatum, Cynodon dactylon
Neomaskellia bergii	sugarcane whitefly	not present	L1.3	
Nilotaspis halli	Hall scale	not present		
Oebalus pugnax	rice stink bug	not present	L2.3, L1.3	pest of rice
Paratachardina pseudolobata	Lobate lac scale	not present	L1.3	
Parlatoria blanchardi	parlatoria date scale	not present	L2.3, L1.3	

Parlatoria proteus	sanseveria scale	not present	L1.3	
Parlatoria pseudaspidotus	vand orchid scale	not present	L1.3	
Parlatoria theae complex	tea parlatoria scale - species complex	not present	L1.3	
Parlatoria vandae	vanda parlatoria scale	not present	L1.3	
Parlatoria ziziphi	black citrus scale	not present	L2.3, L1.3	
Phenacoccus aceris	apple mealybug	not present	L2.3, L1.3	pest
Pinnaspis buxi	boxwood scale	not present	L2.3, L1.3	pest of anthurium, banana, coconut palm, dendrobium, hala, hibiscus, monstera, orchids, persimmon, philodendron
Pinnaspis strachani	lesser snow scale	not present	L2.3, L1.3	pest of asparagus, avocado, bird of paradise, carambola, cherimoya, chinaberry, citrus, coconut palm, croton, cycads, dracaena, ferns, geranium, hala, hi'aloa, hibiscus, jacaranda, lychee, mango. Mexican creeper, native cotton, oleander, pikake, plumeria, poinciana, red pepper, sweet potato, ti and wisteria
Planococcus lilacinus	coffee mealybug	not present	L2.3, L1.3	
Planococcus minor (Maskell)	Passionvine mealybug	not present	L2.3, L1.3	pest of more than 250 host plants (see ref for list)
Poliaspis cycadis	Poliaspis cycad scale	not present	L1.3	pest of Cruciferae; Microsema sp. Cycadaceae; Cycas circinalis L., Cycas revoluta, Dioon edule Ericaceae; Gaultheria depressa Hook.f, Gaultheria rupestris (G. Forst.) R.Br.
Pseudaonidia paeoniae	peony scale	not present	L1.3	pest of camellias and azaleas
Pseudaulacaspis pentagona	white peach scale	not present	L2.3, L1.3	pest of peach, privet, mulberry, paper mulberry, catalpa, and chinaberry
Pseudococcus cryptus	citriculus mealybug	not present	L2.3, L1.3	pest of citrus and species from 20 different families

<i>Pseudococcus dendrobiorum</i>	Orchid mealybug	not present	L1.3	pest of orchids: <i>Ascoglossum</i> sp., <i>Cymbidium</i> sp., <i>Dendrobium</i> sp., <i>Phalaenopsis</i> sp., <i>Pholidota</i> sp. and <i>Promatocalpum</i> species.
<i>Pseudoparlatoria parlatoriodes</i>	false paralatoria scale	not present		
<i>Quadraspidiotus ostreaeformis</i>	European fruit scale	not present	L2.3, L1.3	
<i>Scotinophara lurida</i>	rice stinkbug	not present	L2.3, L1.3	pest of rice
<i>Toxoptera citricida</i>	Brown citrus aphid	not present	L2.3, L1.3	pest of citrus
<i>Trialeurodes floridensis</i>	avocado whitefly	not present	L2.3, L1.3	pest of citrus
<i>Crisicoccus azaleae</i>	azalea mealybug	not present	L1.3, L1.3.1.7	
<i>Dinaspis aculeata</i>	armored scale	not present	L1.3	
<i>Dysmicoccus alazon</i>	alazon mealybug	not present	L2.3, L1.3, L1.3.1.7	pest of pineapple, <i>Andrea inermis</i> , sugar apple, papaya, seagrape, Arabian coffee, calabash tree, <i>Dasyllirion longissimum</i> , <i>Eupatorium odoratum</i> , weeping fig, <i>Guazuma tomentosa</i> , mango, banana, passionflower, pomegranate, chayote, teak, india almond, cacao
<i>Icerya aegyptiaca</i>	Egyptian fluted scale	not present	L1.3, L1.3.1.6	pest of seed grasses used for erosion control
<i>Leptocorisa acuta</i>	rice seed bug	not present	L2.3, L1.3	pest of rice and <i>Echinochloa</i> sp.
<i>Leptoglossus chilensis</i>	brown Chilean leaf-footed bug	not present		
<i>Mesolecanium nigrofasciatum</i>	terrapin scale	not present	L2.3, L1.3	attacks maple, oak, birch, elm and flowering fruit trees
<i>Phenacoccus manihoti</i>	cassava mealybug	not present	L2.3, L1.3	pest of cassava, red spiderling, bell peppers, citrus, flatsedge, poinsettia, soyabean, sweet potato, ceara rubber
<i>Phylloxera devastatrix</i>	pecan phylloxera	not present	L2.3, L1.3	pest of pecans
<i>Pseudococcus importatus</i>	imported mealybug	not present	L1.3	pest of Bromeliaceae, Orchidaceae & Sapindaceae

Saccharicoccus sacchari	pink sugarcane mealybug	not present	L2.3, L1.3	pest of sugarcane and other Poaceae
Selenaspidus articulatus	rufous scale	not present		
Singhiella simplex	Fig whitefly	not present	L2.3, L1.3	pest of ficus benjamina
Sogatodes orizicola	rice delphacid	not present	L2.3, L1.3	pest of rice and vector of virus that causes 'hoja'blanca' disease
Trioza tripunctata	blackberry psyllid	not present	L2.3, L1.3	pest of blueberry
Unaspis citri	citrus snow scale	not present	L2.3, L1.3	pest of citrus
Velataspis dentata	dentate scale	not present	L1.3	
Low Risk				
Magicialada septendecim	periodical cicada	not present		
Pseudococcus elisae	banana mealybug	not present	L2.3, L1.3	pest of banana and other tropical fruits
Springtails				
Low Risk				
Sminthurus viridus	lucerne flea	not present	L2.3, L1.3	pest of lucerne (alfalfa) and other Fabaceae
Thrips				
High Risk				
Danorthrips trifasciatus	thrips	not present	L2.3, L1.3.1.7	pest of citrus
Frankliniella tritici	flower thrips	not present	L1.3	
Haplothrips chinensis	thrips	not present	L1.3	
Scirtothrips dorsalis (Hood)	Chilli thrips	not present	L2.3, L1.3	pest of bananas, beans, chrysanthemums, citrus, corn, cotton, cocoa, eggplant, ficus, grape, grasses, holly, jasmine, kiwi, litchi, longan, mango, onion, peach, peanut, pepper, rose, soybean, strawberry, tea, tobacco, tomato, viburnum, among others
Selenothrips rubrocinctus	redbanded thrips	not present	L2.3, L1.3	pest of avocado, cacao mango & sweetgum tree; numerous tropical fruit, ornamental and shade trees.
Thrips angusticeps	cabbage thrips	not	L2.3, L1.3	pest of Allium, horseradish,

		present		oats, sugarbeet, cabbage, broccoli, caraway, daisy, carnation, Barbeton daisy, barley, flax, lupine, Lucerne, tobacco, beans, peas, peaches, radish, willow, rye, potato, clover, wheat, broad bean
Thrips florum	banana flower thrips	not present	L2.3, L1.3	pest of gardenia
Thrips palmi	melon thrips	not present	L2.3, L1.3	pest of avocado, beans, cabbage, cantaloupe, carnation, chili, Chinese cabbage, chrysanthemum, citrus, cotton, cowpea, cucumber, bean, eggplant, hibiscus, lettuce, mango, melon, okra, onion, pea, peach, pepper, plum, potato, pumpkin, soybean, squash, tobacco and watermelon.
Liothrips oleae	olive thrips	not present	L2.3, L1.3	attacks olives

Diseases

Table 5. Results of Disease invasive species pathway risk analysis. Species are listed by taxonomic subcategories and ranked by risk of introduction. Species considered to be a threat to biosecurity were not included in the report. Refer to Tables 1-3 for invasive species pathway codes.

<i>Scientific name</i>	<i>Common Name</i>	<i>Extent</i>	<i>Primary Pathways</i>	<i>Notes for Primary Pathways</i>
Bacteria				
High Risk				
Candidatus Liberibacter asiaticus	Huanglongbing disease of Citrus-Asian Strain	not present	M6; L1.3; L1.3.1.7; L1.3.2; L1.4; L1.3.1.1	
Candidatus Liberibacter sp.	Huanglongbing Disease of Citrus	not present	M6; L1.3; L1.3.1.7; L1.3.2; L1.4; L1.3.1.1	
Xanthomonas anoxopodis pv. citri	Citrus Canker	not present	M6 ; T2.1; L1.3; L1.3.1.1; L1.3.1.7; L2.3; M5	
Moderate Risk				

Candidatus Liberibacter americanus	Huanglongbing disease of Citrus-Americas Strain	not present	M6; L1.3; L1.3.1.7; L1.3.2; L1.4; L1.3.1.1	
Dickeya solani	Black leg disease of potato	not present	L1.3.1.2; L1.3.1.3	
Ehrlichia ruminantium	Heartwater; cowdriosis	not present	L2.2; L3.2; L2.4; T1.3.4	
Xylophilus ampelinus (Xanthomonas ampelina)	Grapevine Bacterial Blight	not present	L1.3; L1.3.1; L1.3.1.1; L1.3.1.7; L1.3.2; L1.4	
Candidatus Liberibacter africanus	Huanglongbing disease of citrus-African strain	not present	M6; L1.3.1.7; L1.3.2; L1.4	
Mycoplasma capricolum capripneumoniae	Contagious Bovine Caprine Pleuropneumonia	not present	L2.2	
Mycoplasma mycoides mycoides	Bovine pleuropneumonia	not present	L2.2	
Xylella fastidiosa CVC	Citrus/Select Agent (citrus variegated chlorosis strain)	not present	L1.3; L1.3.1; L1.3.1.1; L1.3.1.3; L1.3.1.7; L1.3.2; L1.4	
Brenneria salicis	Willow Watermark Disease	VALUE REQUIRED		
Candidatus australiense	Phytoplasma Yellows	VALUE REQUIRED		
Candidatus fragariae	Marginal chlorosis	VALUE REQUIRED		
Candidatus Liberibacter solanacearum	potato zebra chip	not present		
Candidatus Lieberobacter asiaticum	Apple Brown Ringspot Agent	VALUE REQUIRED		
Candidatus Phlomobacter fragariae	Marginal chlorosis	VALUE REQUIRED		
Erwinia salicis	Watermark Disease	VALUE REQUIRED		
Pseudomonas avellanae	Bacterial Canker of Hazelnut	VALUE REQUIRED		

Pseudomonas celebensis	Blood disease bacterium of banana	VALUE REQUIRED		
Pseudomonas celebensis	Freckle	VALUE REQUIRED		
Pseudomonas lignicola	Bacterial Stain	VALUE REQUIRED		
Pseudomonas lignicola	Potato Leaflet Stunt	VALUE REQUIRED		
Ralstonia solanacearum	Bacterial wilt	not present		
Ralstonia solanacearum race 3 biovar 2	Geranium Bacterial Wilt/Select Agent	not present		
Unknown pathogenic bacterium	Wheat Yellowing Stripe Bacterium	VALUE REQUIRED		
Xanthomonas acernea	Cotton small leaf agent	VALUE REQUIRED		
Xanthomonas albilineans	Sugarcane Wilt	VALUE REQUIRED		
Xanthomonas axonopodis manihotis	Cassava Bacterial Blight	VALUE REQUIRED		
Xanthomonas axonopodis pv. Dieffenbachiae	Anthurium Blight	VALUE REQUIRED		
Xanthomonas axonopodis vasculorum	Sugarcane Gumming Disease	VALUE REQUIRED		
Xanthomonas campestris pv vasculorum	Sugarcane Gumming Disease	VALUE REQUIRED		
Xanthomonas oryzae pv. oryzae	Bacterial Leaf Blight of Rice/Select agent	VALUE REQUIRED		
Xanthomonas oryzae pv. oryzicola	Bacterial Leaf Streak of Rice/Select Agent	VALUE REQUIRED		
Xanthomonas populi	Grapevine Infectious Necrosis Bacterium	VALUE REQUIRED		
Xanthomonas populi	Poplar Canker	VALUE REQUIRED		
Xanthomonas vasculorum	Bacterial Blight of Sugarcane	VALUE REQUIRED		

Cryphonectria parasitica	Chestnut blight	not present	L1.3; L1.3.1; L1.3.1.1; L1.3.1.7; L1.3.2	
Geosmithia sp.	Thousand Cankers Disease Complex	unknown		
Phakopsora meibomiaae	soybean rust	not present	L1.3; L1.3.1; L1.3.1.6	
Acremonium (Cephalosporium) diospyri	Persimmon Wilt	not present	L1.2; L1.3; L1.3.1.1; L1.3.1.7; L1.3.2	
Ceratocystis fagacearum	Oak wilt	not present	L1.3; L1.3.1; L1.3.1.4; L1.4	
Ceratocystis (Ophiostoma) ulmi	Dutch elm disease	Limited	M3; L1.3.1.4	
Discula destructiva	Dogwood Anthracnose	not present	L1.3; L1.3.1.7; L1.3.2	
Ophiostoma valdivianum	Blue Stain of Beech	not present	L1.3; L1.3.1; L1.3.1.4	
Phomopsis vaccinii	Phomopsis soft rot	not present	L1.3; L1.3.1; L1.3.1.1; L1.3.1.7; L1.3.2	
Puccinia graminis f. sp. tritici	Wheat stem rust (Uganda 99 strain)/Black rust	not present	L1.3; L1.3.1; L1.3.2; L1.3.1.1; L1.3.1.7; L1.3.1.3; M6	
Raffaelea lauricola	Laurel Wilt Disease	not present	L1.3; L1.3.1.4; L1.4	
Sclerophthora rayssiae var. zaeae	Brown Stripe Downy Mildew of Maize	not present	L1.2; L1.3.1.3	
Tilletia tritici (caries)	Wheat smut	not present	T5; L1.2; L1.3; L1.3.1; L1.3.1.3	
Armillaria novae-zelandiae	Armillaria Root Disease	not present	T3.2.4; T4; L1.3; L1.4	
Colletotrichum coffeanum	Brown Blight	not present	L1.3; L1.3.1.3; L4.4	

<i>Cronartium flaccidum</i>	Scotch Pine Blister Rust	not present	L1.3; L1.3.1; L1.3.1.1; L1.3.1.7; L1.3.2	
<i>Entyloma oryzae</i>	Leaf Smut of rice	not present	L1.3; L1.3.1.3	
<i>Geomyces</i> sp.	White-Nose Syndrome of bats	not present	M3	
<i>Gymnosporangium asiaticum</i>	Rust: Pear and Juniper	Limited	M3	
<i>Microcyclus ulei</i>	South American Leaf Blight	not present	L1.3; L1.3.1; L1.3.1.1; L1.3.1.6; L1.3.2	
<i>Peronosclerospora sacchari</i> (philippinensis)	Sugarcane Downy Mildew	not present	L1.3; L1.3.1.3	
<i>Phakopsora pachyrhizi</i>	Asian soybean Rust	not present	L1.3; L1.3.1; L1.3.1.6	
<i>Phytophthora alni</i>	Alder Phytophthora	not present	L1.3; L1.3.1; L1.3.1.1; L1.3.1.2; L1.3.1.7; L1.3.2	
<i>Sirococcus clavignenti-juglandacearum</i>	Butternut Canker	not present	L1.3; L1.3.1; L1.3.1.3; L1.3.1.4	
<i>Synchytrium endobioticum</i>	Potato Wart/Select Agent	not present	T1.3; L1.2; L1.3; L1.3.1; L1.3.1.2	
<i>Thecaphora (Angiosorus) solani</i>	Potato smut	not present	L1.2; L1.3; L1.3.1.2; L1.3.1.3; L1.3.2	
<i>Aecidium hydrangeae-paniculatae</i>	alt: <i>Puccinia glyceriae</i> / rust on <i>Hydrangea</i> spp. and <i>Glyceria</i> spp.	VALUE REQUIRED		
<i>Aecidium mori</i>	Mulberry Rust	VALUE REQUIRED		
<i>Armillaria limonea</i>	Armillaria Root Disease	VALUE REQUIRED		
<i>Ceratocystis fimbriata</i>	black rot	VALUE REQUIRED		

Ceratocystis moniliformis	Cocoa ceratocystis wilt	VALUE REQUIRED		
Ceratocystis nothogafi	Blue Stain Fungus	VALUE REQUIRED		
Ceratocystis novae-zelandiae	wood-staining	VALUE REQUIRED		
Ceratocystis tenella	Blue Stain	VALUE REQUIRED		
Cercospora pini-densiflorae	Needle blight	VALUE REQUIRED		
Chalara australis	Vascular stain fungus	VALUE REQUIRED		
Chrysomyxa abietis	Spruce Needle Rust	VALUE REQUIRED		
Chrysomyxa himalensis	Spruce Needle Rust	VALUE REQUIRED		
Chrysomyxa ledi var. rhododendri	Rhododendron-spruce Needle Rust	VALUE REQUIRED		
Cochliobolus miyabeanus	Brown Spot of Rice	VALUE REQUIRED		
Coniothyrium spp.	canker in elm	VALUE REQUIRED		
Cordyceps spp.	Fungal Disease of Bees	VALUE REQUIRED		
Cornuvesica falcata	New Zealand wood rot	VALUE REQUIRED		
Crinipellis perniciososa	Witches Broom Fungus in cocoa	VALUE REQUIRED		
Cyclaneusma minus	Cyclaneusma Needle Cast	VALUE REQUIRED		
Diaporthe mali	Leaf, Branch, and Fruit Disease	VALUE REQUIRED		
Elsinoe australis	Sweet Orange Scab	VALUE REQUIRED		
Elsinoe batatas	sweet potato scab	VALUE REQUIRED		
Erythricium salmonicolor	Pink Disease	VALUE REQUIRED		
Fusarium fuliginosporum	Seeding Disease/seedling rot of Deodar cedar	VALUE REQUIRED		
Fusarium oxysporum f.sp. fragariae	Fusarium wilt of strawberry	VALUE REQUIRED		
Ganoderma mastoporum	Artist Conk	VALUE REQUIRED		

Gremmeniella abietina	Scleroderris Canker	VALUE REQUIRED		
Guignardia citricarpa	Citrus Black Spot	VALUE REQUIRED		
Guignardia musae	Freckle disease of Banana	VALUE REQUIRED		
Guignardia piricola	Leaf, Branch, and Fruit Disease	VALUE REQUIRED		
Hemileia vastatrix	Coffee Rust	VALUE REQUIRED		
Ischnoderma rosulata	Wood decay	VALUE REQUIRED		
Junghuhnia vincta	Corm dry rot	VALUE REQUIRED		
Lachnellula willkommii	European larch canker	VALUE REQUIRED		
Leptographium procerum	Leptographium root disease	VALUE REQUIRED		
Leptographium truncatum	Root Disease	VALUE REQUIRED		
Melampsora pinitorqua	Twist Rust	VALUE REQUIRED		
Melanomma glumarum	Glume Blotch	VALUE REQUIRED		
Monilinia fructigena	Brown Rot of Fruit	VALUE REQUIRED		
Moniliophthora roreri	Watery Pod Rot	VALUE REQUIRED		
Mycosphaerella dearnesii	Brown Spot Needle Blight	VALUE REQUIRED		
Mycosphaerella pini	Red Band Needle Blight	VALUE REQUIRED		
Oncobasidium theobromae	Vascular Streak Die-back of cocoa	VALUE REQUIRED		
Oospora oryzae	Blight	VALUE REQUIRED		
Ophiostoma (Ceratocystis) ulmi	Dutch elm disease	VALUE REQUIRED		
Ophiostoma huntii	Blue Stain	VALUE REQUIRED		

<i>Ophiostoma ips</i>	Blue Stain Fungus	VALUE REQUIRED		
<i>Ophiostoma piceae</i>	Blue stain	VALUE REQUIRED		
<i>Ophiostoma piceaperdum</i>	Laural Wilt	VALUE REQUIRED		
<i>Ophiostoma piliferum</i>	Blue stain	VALUE REQUIRED		
<i>Ophiostoma pluriannulatum</i>	Wood stain	VALUE REQUIRED		
<i>Pestalotiopsis disseminata</i>	Parasitic Leaf Fungus	VALUE REQUIRED		
<i>Phacidiopycnis pseudotsuga</i>	Douglas Fir Canker	VALUE REQUIRED		
<i>Phaeoramularia angolensis</i>	Phaeoramularia Fruit and Leaf Spot	VALUE REQUIRED		
<i>Phellinus noxius</i>	Brown root rot	VALUE REQUIRED		
<i>Phellinus senex</i>	Stem decay	VALUE REQUIRED		
<i>Phialophora cinerescens</i>	Phialophora wilt of carnations and strawberries	VALUE REQUIRED		
<i>Phlebia chrysocrea</i>	Wood decay	VALUE REQUIRED		
<i>Phoma tracheiphila</i>	Mal Secco	VALUE REQUIRED		
<i>Phyllosticta colocasiophila</i>	Phyllosticta Leafspot	VALUE REQUIRED		
<i>Physoderma zeaemaydis</i>	Brown Spot of Corn	VALUE REQUIRED		
<i>Pseudocercospora timorensis</i>	Sweet Potato leaf spot	VALUE REQUIRED		
<i>Pseudopezicula tracheiphila</i>	Rotbrenner	VALUE REQUIRED		
<i>Puccinia mccleanii</i>	Rust	VALUE REQUIRED		
<i>Pucciniastrum actinidae</i>	Rust	VALUE REQUIRED		
<i>Pucciniastrum areolatum</i>	Cherry-Spruce Rust	VALUE REQUIRED		

Rhacodiella vitis	Chestnut rot	VALUE REQUIRED		
Rhacodiella vitis	Sterenbergs fungus	VALUE REQUIRED		
Rosellinia necatrix	Dematophora Root Rot	VALUE REQUIRED		
Septoria melanosa	Elenk fungus	VALUE REQUIRED		
Sphaeropsis sapinea	Diplodia Shoot Blight	VALUE REQUIRED		
Stephanoderes hampei	Coffee fungus	VALUE REQUIRED		
Stereum hiugense	White Rot	VALUE REQUIRED		
Stigmina deflectans	Needlecast Disease	VALUE REQUIRED		
Trachysphaera fructigena	Mealy Pod Diseases of Cushy Gall Disease	VALUE REQUIRED		
Trametes versicolor	Wood decay	VALUE REQUIRED		
Triphragmiopsis laricinum	Brown Needle Rust	VALUE REQUIRED		
Uredo dioscoreae- alatae	Graminicolous Rust	VALUE REQUIRED		
Uredo gladioli- buettneri	Graminicolous Rust	VALUE REQUIRED		
Urocystis agropyri	Flag Smut	VALUE REQUIRED		
Urocystis tritici	Flag Smut Agent	VALUE REQUIRED		
Uromyces gladioli	Rust	VALUE REQUIRED		
Uromyces nyikensis	Rust	VALUE REQUIRED		
Uromycladium tepperianum	Rust	VALUE REQUIRED		
<i>Oomycete</i>				
Risk Unknown				
Peronosclerospora maydis	Downy Mildew of Corn/ Select agent	VALUE REQUIRED		

Peronosclerospora philippinensis (aka, sacchari)	Philippine Downy mildew of sorghum/Select Agent	not present		
Phytophthora cinnamomi	Root Rot	VALUE REQUIRED		
Phytophthora fragariae	Red Stele	VALUE REQUIRED		
Phytophthora infestans	Late Blight	VALUE REQUIRED		
Phytophthora kernoviae	Rhododendron Phytophthora disease	VALUE REQUIRED		
Phytophthora quercina	Oak disease	VALUE REQUIRED		
Schlerophthora rayssiae var zeae	Brown Stripe Downy mildew of corn/Select Agent	not present		
Phytoplasma				
Risk Unknown				
Candidatus phytoplasma	Witches broom disease of lime	not present		
Candidatus Phytoplasma australiense	Australian grapevine yellows/Phytoplasma yellows	VALUE REQUIRED		
Candidatus Phytoplasma mali	Apple proliferation	VALUE REQUIRED		
Candidatus phytoplasma spp.	Grapevine Yellows Disease	VALUE REQUIRED		
Phytoplasma bn	Black wood	VALUE REQUIRED		
Phytoplasma eay	European Aster Yellows	VALUE REQUIRED		
Phytoplasma esfy	European Stone Fruit Yellows	VALUE REQUIRED		
Phytoplasma fd	Flavescence doree	VALUE REQUIRED		
Phytoplasma md	Mulberry Dwarf	VALUE REQUIRED		
Phytoplasma parastolbur-mlo	Parastolbur	VALUE REQUIRED		

Phytoplasma rus	Rubus stunt	VALUE REQUIRED		
Phytoplasma ryd-mlo	Rice Yellow Dwarf	VALUE REQUIRED		
Phytoplasma scwl	Sugarcane White Leaf Phytoplasma	VALUE REQUIRED		
Phytoplasma ulmi	Elm yellows	VALUE REQUIRED		
Unknown pathogenic phytoplasma 1	Apple Rubbery Wood Phytoplasma	VALUE REQUIRED		
Unknown pathogenic phytoplasma 10	Sweetpotato witches broom (little leaf)	VALUE REQUIRED		
Unknown pathogenic phytoplasma 11	Texas phoenix palm phytoplasma	not present		
Unknown pathogenic phytoplasma 2	Cotton virescence	VALUE REQUIRED		
Unknown pathogenic phytoplasma 3	Grapevine Vergelbungskrankheit	VALUE REQUIRED		
Unknown pathogenic phytoplasma 4	Groundnut witches broom	VALUE REQUIRED		
Unknown pathogenic phytoplasma 5	Palm Lethal Yellowing Phytoplasma	VALUE REQUIRED		
Unknown pathogenic phytoplasma 6	Potato Marginal Flavescence	VALUE REQUIRED		
Unknown pathogenic phytoplasma 7	Potato Purple Top Roll	VALUE REQUIRED		
Unknown pathogenic phytoplasma 8	Potato witches broom	VALUE REQUIRED		
Unknown pathogenic phytoplasma 9	Stolbur	VALUE REQUIRED		
Protists				
Risk Unknown				
Plasmodium falciparum	Malaria	VALUE REQUIRED		
Plasmodium knowlesi	Malaria	VALUE REQUIRED		
Plasmodium malariae	Malaria	VALUE REQUIRED		
Plasmodium ovale	Malaria	VALUE REQUIRED		
Plasmodium relictum	Avian malaria	VALUE REQUIRED		

Plasmodium vivax	Malaria	VALUE REQUIRED		
Unknown Diseases				
High Risk				
Cilivirus cilv-c	Citrus leprosis virus C	not present	L1.3; L1.3.1.7; L1.4	
Potyvirus ppv	Plum Pox Virus	not present	L1.3; L1.3.1; L1.3.1.1; L1.3.1.7; L1.3.2	
Moderate Risk				
Begomovirus (ToTV)	Tomato Torrado Virus (ToTV)	not present	L1.3; L1.3.2	
Carlavirus	Blueberry Scorch carlavirus	not present	L1.3; L1.3.2; T4; L1.3.1.1	
Novirhadovirus Viral Hemorrhagic Septicemia Virus (VHSV)	Viral Hemorrhagic septicemia	not present	L3.1; L3.3	
Potyviruses: Potyviridae	Plum pox	not present	L1.3; L1.3.1; L1.3.1.1; L1.3.1.7; L1.3.2	
Low Risk				
Alphavirus eeev	Eastern Equine Encephalitis Virus	not present	M6; T1.3.4; T5.3; L3.2; L3.4	
Alphavirus veev	Venezuelan Equine Encephalitis Virus	not present	M6	
Badnavirus cymvr	Citrus yellow mosaic virus	not present	M6; T1.3.4; T5.1	
Birnaviridae fam: unknown	Citrus Chlorotic Dwarf Virus	not present	L1.3.2; L1.3; L1.3.1.1	
Bunyavirus (TZSV)	Tomato zonate spot virus (TZSV)	not present	L1.3.2; L1.3	
Mandarivirus icrsv	Indian citrus ringspot virus	not present	L1.3; L1.3.1; L1.3.1.1; L1.3.1.2; L1.3.2	
Nepovirus gtrsv	Grapevine Tunisian Ringspot Virus	not present	L1.3; L1.3.1; L1.3.1.1; L1.3.1.2; L1.3.1.7; L1.3.2	

Alfamovirus pyv	Potato Yellowing Virus	VALUE REQUIRED		
Apscaviroid 1	Apple scar skin viroid	VALUE REQUIRED		
Apscaviroid 2	Citrus bent leaf viroid	VALUE REQUIRED		
Apscaviroid 3	Grapevine yellow speckle viroid	VALUE REQUIRED		
Apscaviroid pbcvd	Pear Blister Canker Viroid	VALUE REQUIRED		
Asfivirus asfv	African Swine Fever Virus	VALUE REQUIRED		
Avipoxvirus	Bird pox	VALUE REQUIRED		
Babuvirus bbtv	Banana Bunchy Top Virus	VALUE REQUIRED		
Baculovirus BMNV (PjNOB1)	Baculoviral Midgut Gland Necrosis Virus (BMNV) of fish	VALUE REQUIRED		
Baculovirus complex WSBV	White Spot Syndrome Baculovirus Complex of fish	VALUE REQUIRED		
Baculovirus PmSNPV	Mbv-Type Virus of fish	VALUE REQUIRED		
Badnavirus bsv	Banana Streak Virus	VALUE REQUIRED		
Badnavirus cssv	Cocoa Mottle Leaf Virus	VALUE REQUIRED		
Begomovirus bgmv	Bean Golden Mosaic Virus	VALUE REQUIRED		
Begomovirus bymv	Bhendi Yellow Vein Mosaic Virus	VALUE REQUIRED		
Begomovirus clcv	Cotton Leaf Curl Virus	VALUE REQUIRED		
Begomovirus lgmv	Lima Bean Golden Mosaic Virus	VALUE REQUIRED		
Begomovius hgymv	Horsegram Yellow Mosaic Virus	VALUE REQUIRED		

Benyovirus bnyvv	Beet necrotic yellow vein virus (BNYVV)	VALUE REQUIRED		
Bigeminivirus IgmV	Lima Bean Golden Mosaic Virus	VALUE REQUIRED		
Bigeminivirus acmv	Cassava African Mosaic Virus	VALUE REQUIRED		
Bigeminivirus mymv	Mung Bean Yellow Mosaic Virus	VALUE REQUIRED		
Birnaviridae	Groundnut Chlorotic Leaf Streak Virus	VALUE REQUIRED		
Brevidensovirus IHNV	Infectious Hypodermal and Hematopoietic Necrosis Virus of fish	VALUE REQUIRED		
Bymovirus baymv	Barley Yellow Mosaic Virus	VALUE REQUIRED		
Capillovirus of unknown genus	Apple stem grooving virus	not present		
Capripoxvirus lsd	Lumpy Skin Disease of Cattle	VALUE REQUIRED		
Capripoxvirus sppv	Sheep pox virus	VALUE REQUIRED		
Carlavirus casmmv	Cassava Common Mosaic Virus	VALUE REQUIRED		
Carlavirus cpmmv	Cowpea Mild Mottle Virus	VALUE REQUIRED		
Carlavirus pvm	Potato Mop Top Virus	VALUE REQUIRED		
Closteroviridae byvd	Blackberry Yellow Vein Disease	VALUE REQUIRED		
Closterovirus wylv or Prosopis fiebrigii ?	Wheat Yellow Leaf Virus	VALUE REQUIRED		
Cocadviroid cccvd	Coconut Cadang-Cadang Viroid	VALUE REQUIRED		
Cocoa Swollen Shoot Virus	Cocoa Swollen Shoot Virus	VALUE REQUIRED		
Comovirus of unknown genus	Andean Potato Mottle Virus	VALUE REQUIRED		
Comovirus rcmv	Red Clover Mottle Virus	VALUE REQUIRED		
Crinivirus pyvv	Potato Yellow Vein Virus	VALUE REQUIRED		
Crinivirus spcvs	Sweetpotato Chlorotic Stunt Virus	VALUE REQUIRED		

Cytorhabdovirus bysmv	Barley Yellow Striate Mosaic Virus	VALUE REQUIRED		
Cytorhabdovirus ncmv	Northern Cereal Mosaic Virus	VALUE REQUIRED		
Dicistroviridae TSV	Taura syndrome of shrimp; Infectious cuticular epithelial necrosis virus (ICENV)	VALUE REQUIRED		
Enterovirus cv-b5	Swine Vesicular Disease	VALUE REQUIRED		
Fijivirus mrdv	Maize Rough Dwarf Virus	VALUE REQUIRED		
Fijivirus osdv	Oat Sterile Dwarf Virus	VALUE REQUIRED		
Flavivirus 3	Yellow Fever	VALUE REQUIRED		
Flavivirus jev	Japanese Encephalitis Virus	VALUE REQUIRED		
Geminivirus bgmv	Bean Golden Mosaic Virus	VALUE REQUIRED		
Geminiviruses	Misc. viral diseases of cotton, pepper, etc.	VALUE REQUIRED		
Hemileia vastatrix	Yellow ring mosaic agent (assoc. with Jasminum)	VALUE REQUIRED		
Illarvirus apmv	Apple mosaic virus	VALUE REQUIRED		
Influenzavirus hpav	Highly Pathogenic Avian Influenza	VALUE REQUIRED		
Ipomovirus cbsv	Cassava Brown Streak Virus	VALUE REQUIRED		
Isavirus isa	Infectious Salmon Isavirus Anemia (ISA)	VALUE REQUIRED		
Jasmine Variegation Agents	Jasmine Variegation Agents	VALUE REQUIRED		
Ligustrum Mosaic Agents	Ligustrum Mosaic Agents	VALUE REQUIRED		
Llarvirus emov	Elm Mottle Virus	VALUE REQUIRED		
Luteovirus cav	Cotton Anthocyanosis Agent	VALUE REQUIRED		
Luteovirus isdv	Indonesian Soybean Dwarf Virus	VALUE REQUIRED		

Luteovirus of unassigned genus	African Soybean Dwarf Agent	VALUE REQUIRED		
Luteovirus sbdv	Soybean dwarf virus	VALUE REQUIRED		
Maple Mosaic Agent	Maple Mosaic Agent	VALUE REQUIRED		
Maple Variegation Agent	Maple Variegation Agent	VALUE REQUIRED		
Monogeminivirus msv	Maize Streak Virus	VALUE REQUIRED		
Morbillivirus ppr	Peste des Petits Ruminants;	VALUE REQUIRED		
Morbillivirus RBOK	Rinderpest virus	not present		
Mountain Ash Ringspot Mosaic Agent	Mountain Ash Ringspot Mosaic Agent	VALUE REQUIRED		
Mountain Ash Variegation Agent	Mountain Ash Variegation Agent	VALUE REQUIRED		
Mulberry Mosaic Agent	Mulberry Mosaic Agent	VALUE REQUIRED		
n/a Citrus chlorotic dwarf	n/a Citrus chlorotic dwarf	not present		
n/a Citrus leaf blotch virus	n/a Citrus leaf blotch virus	not present		
n/a Citrus vein-enation virus probably Luteovirus	n/a Citrus vein-enation virus probably Luteovirus	not present		
n/a Citrus viroids	n/a Citrus viroids	not present		
n/a Indian citrus ringspot virus	n/a Indian citrus ringspot virus	not present		
Nepovirus ailv	Artichoke Italian Latent Virus	VALUE REQUIRED		
Nepovirus armv	Arabidopsis mosaic virus and its strains	VALUE REQUIRED		
Nepovirus avb	Arracacha Virus B	VALUE REQUIRED		
Nepovirus brv	Black Currant Reversion Virus	VALUE REQUIRED		
Nepovirus cnv	Cocoa Necrosis Virus	VALUE REQUIRED		
Nepovirus csalv	Cassava Latent Virus	VALUE REQUIRED		

Nepovirus gblv	Grapevine Bulgarian Latent Virus	VALUE REQUIRED		
Nepovirus gcmv	Grapevine Chrome Mosaic Virus	VALUE REQUIRED		
Nepovirus lalv	Lucerne Vein Yellowing Virus	VALUE REQUIRED		
Nepovirus lasv	Lucerne Australian Symptomless Virus	VALUE REQUIRED		
Nepovirus pvu	Potato Virus U	VALUE REQUIRED		
Nepovirus rprsv	Raspberry ringspot virus and its strains	VALUE REQUIRED		
Nepovirus slrsv	Strawberry Latent Ringspot Virus	VALUE REQUIRED		
Nepovirus tbrv	Tomato Black Ring Virus	VALUE REQUIRED		
Nepovirus trsv	Tobacco Ringspot Virus	VALUE REQUIRED		
Nucleorhabdovirus ccmv	Cereal Chlorotic Mosaic Virus	VALUE REQUIRED		
Nucleorhabdovirus ccsv	Cynodon Chlorotic Streak Virus	VALUE REQUIRED		
Nucleorhabdovirus immv	Iranian Maize Mosaic Virus	VALUE REQUIRED		
Nucleorhabdovirus lev	Lucerne enation virus	VALUE REQUIRED		
Oat Red Streak Mosaic Virus	Oat Red Streak Mosaic Virus	VALUE REQUIRED		
Okra Mosaic Agents	Okra Mosaic Agents	VALUE REQUIRED		
Okra Yellow Leaf Curl Agent	Okra Yellow Leaf Curl Agent	VALUE REQUIRED		
Orbivirus ahsv	African Horse Sickness Virus	VALUE REQUIRED		
Orthobunyavirus akav	Akabane Virus	VALUE REQUIRED		
Orthopoxvirus cmlv	Camel Pox Virus	VALUE REQUIRED		
Oryzavirus ersv	Echinochloa Ragged Stunt Virus	VALUE REQUIRED		
Paramyxovirus hv	Hendra Virus	VALUE REQUIRED		

Paramyxovirus mv	Menangle Virus	VALUE REQUIRED		
Paramyxovirus nv	Nipah Virus	VALUE REQUIRED		
Pear Bud Drop Agent	Pear Bud Drop Agent	VALUE REQUIRED		
Pecluvirus ipcv	Indian Peanut Clump Virus	VALUE REQUIRED		
Pecluvirus pcv	Peanut Clump Virus	VALUE REQUIRED		
Pestivirus CSFV strain Brescia	Classical swine fever virus (strain Brescia)	not present		
Phlebovirus rvfv	Rift Valley Fever	VALUE REQUIRED		
Phyllody Agent	Phyllody Agent	VALUE REQUIRED		
Phytoreovirus rdv	Rice Dwarf Virus	VALUE REQUIRED		
Phytoreovirus rgdv	Rice Gall Dwarf Virus	VALUE REQUIRED		
Plum Bark Split Virus	Plum Bark Split Virus	VALUE REQUIRED		
Porcine herpesvirus 1	Swine pseudorabies	not present		
Potexvirus (?) or Potyvirus (?)	Potato veinal necrosis virus (PVYN)	VALUE REQUIRED		
Potexvirus gcsv	Groundnut Chlorotic Spotting Virus	VALUE REQUIRED		
Potyvirus bcmv	Azuki bean mosaic virus	VALUE REQUIRED		
Potyvirus cdv	Datura Colombian Virus	VALUE REQUIRED		
Potyvirus ddmv	Datura Distortion Mosaic Virus	VALUE REQUIRED		
Potyvirus demv	Datura Enation Mosaic Virus	VALUE REQUIRED		
Potyvirus pvv	Potato Virus V	VALUE REQUIRED		
Potyvirus pyv	Potato Virus Y	VALUE REQUIRED		
Prosopis fiebrigii or Closterovirus wylv ?	Wheat Yellow Leaf Virus	VALUE REQUIRED		

Quince Sooty Ringspot Agent	Quince Sooty Ringspot Agent	VALUE REQUIRED		
Quince Yellow Blotch Agent	Quince Yellow Blotch Agent	VALUE REQUIRED		
Reoviridae-related pathogenic virus (REO-III, REO-IV)	Reo-like viruses	VALUE REQUIRED		
Rhabdovirus aev	Alfalfa Enation Virus	VALUE REQUIRED		
Rhadinovirus aihv-1	Alcelaphine herpesvirus 1	VALUE REQUIRED		
Rymovirus bstv	Brome Streak Mosaic Virus	VALUE REQUIRED		
Sampaguita Yellow Ringspot Mosaic Agent	Sampaguita Yellow Ringspot Mosaic Agent	VALUE REQUIRED		
Satsuma dwarf virus, Sadwa virus SDV	Satsuma dwarf virus	not present		
Sobemovirus cmmv	Cocksfoot Mild Mosaic Virus	VALUE REQUIRED		
Sobemovirus cnmov	Cynosurus Mottle Virus	VALUE REQUIRED		
Sobemovirus rymv	Rice Yellow Mottle Virus	VALUE REQUIRED		
Soybean Dwarf Virus	Soybean Dwarf Virus	VALUE REQUIRED		
Sweetpotato chlorotic stunt virus	Sweetpotato chlorotic stunt virus	VALUE REQUIRED		
Tenuivirus ewsmv	European Wheat Striate Mosaic Virus	VALUE REQUIRED		
Tenuivirus mmcsv	Maize Mottle/Chlorotic Stunt Virus	VALUE REQUIRED		
Tenuivirus rwsv	Rice Wilted Stunt Virus	VALUE REQUIRED		
Tomato Yellow Leaf Curl Sardinia Virus, TYLCSV	Tomato Yellow Leaf Curl Sardinia Virus	not present		
Tombusviridae of unknown genus	Chlorotic Ringspot Agent	VALUE REQUIRED		
Tombusvirus galv	Grapevine Algerian Latent Virus	VALUE REQUIRED		
Tospovirus cacv	Capsicum chlorosis virus	not present		

Trichovirus aclsv	Apple Chlorotic Leafspot Virus	VALUE REQUIRED		
Trichovirus crmv	Cherry Rusty Mottle Agent	VALUE REQUIRED		
Trichovirus ginv	Grapevine Berry Inner Necrosis Virus	VALUE REQUIRED		
Trichovirus pvt	Potato Virus T	VALUE REQUIRED		
Trichovirus spp	Quince Stunt Agent	VALUE REQUIRED		
Tymovirus (?)	Citrus sudden death n/a probably Tymovirus	not present		
Tymovirus aplv	Andean Potato Latent Virus	VALUE REQUIRED		
Tymovirus cymv	Cocoa Yellow Mosaic Virus	VALUE REQUIRED		
Tymovirus dmv	Dulcamara Mottle Virus	VALUE REQUIRED		
Tymovirus okmv	Okra Mosaic Virus	VALUE REQUIRED		
Umbravirus grv	Groundnut Rosette Viruses	VALUE REQUIRED		
Unknown pathogenic coronavirus- and arterivirus-like virus	Yellowhead disease of shrimp	VALUE REQUIRED		
Unknown pathogenic virus 1	Australian lymphoidal Parvo-Like Virus of fish	VALUE REQUIRED		
Unknown pathogenic virus 10	Hibiscus Leaf Curl Agent	VALUE REQUIRED		
Unknown pathogenic virus 11	Horsechestnut Variegation Agent	VALUE REQUIRED		
Unknown pathogenic virus 12	Horsechestnut Yellow Mosaic Agent	VALUE REQUIRED		
Unknown pathogenic virus 2	Euonymus Mosaic Agents	VALUE REQUIRED		
Unknown pathogenic virus 3	French Bean Mosaic Virus	VALUE REQUIRED		
Unknown pathogenic virus 4	Grapevine Bratislava Mosaic Agent	VALUE REQUIRED		
Unknown pathogenic virus 5	Grapevine Chasselas Latent Agent	VALUE REQUIRED		
Unknown pathogenic virus 6	Grapevine Little Leaf Agent	VALUE REQUIRED		

Unknown pathogenic virus 7	Grapevine Vein Mosaic Agent	VALUE REQUIRED		
Unknown pathogenic virus 8	Grapevine Vein Necrosis Agent	VALUE REQUIRED		
Unknown pathogenic virus 9	Grapevine vein yellow agent	VALUE REQUIRED		
Unknown pathogenic virus ccdv	Citrus chlorotic dwarf virus ccdv	VALUE REQUIRED		
Veinal necrosis virus (PVYN)	Veinal necrosis virus (PVYN)	VALUE REQUIRED		
Viral Hemorrhagic Septicemia Virus	Viral Hemorrhagic Septicemia (VHS)	VALUE REQUIRED		
Waikavirus rtsv	Rice Tungro Virus	VALUE REQUIRED		

Invertebrates

Table 6. Results of Invertebrate invasive species pathway risk analysis. Species are listed by taxonomic subcategories and ranked by risk of introduction. Species considered to be a threat to biosecurity were not included in the report. Refer to Tables 1-3 for invasive species pathway codes.

<i>Scientific name</i>	<i>Common Name</i>	<i>Extent</i>	<i>Primary Pathways</i>	<i>Notes for Primary Pathways</i>
Freshwater Mollusks				
Low Risk				
Limnoperna fortunei	Golden mussel	not present	T1.2.1, T1.2.2, T2, T5, T5.2, L1.3, L1.3.4, L2, L3, L3.1, L3.2, L3.3, M3	ship ballast water and other vessels that hold water; hull/surface fouling, recreational boats and skidus; military travel-ships; travel and tourism; cruise ships, personal boats, fishing gear; aquatics recreation gear; aquatic/pond plants; aquatic propagules; live seafood/estuary food; non-food; bait; pet aquaria-tropical fish (water and live products); koi fish and aquatic plants; aquaculture-fish and shellfish seed; migrating water fowl
Marine Mollusks				
Risk Unknown				
Lydorus pedicellatus	Blacktip shipworm	unknown	T1.2.2	bores into ship hulls
Potamocorbula amurensis	Amur River Corbula Clam	VALUE REQUIRED		
Teredo barstsi	Shipworm	VALUE REQUIRED		

Sphaeroma quoyanum	Isopod	VALUE REQUIRED		
Globodera pallida	Pale cyst nematode	not present		
Radopholus similis	Burrowing Nematode	not present	L1.3.1.7	movement of infected plants (banana, citrus)
Rotylenchulus reniformis	Reniform Nematode	not present	L1.3.1.7	movement of infected plants (Phoenix roeselenii and Cycas sp.)
Globodera rostochiensis	Golden Nematode	not present		
Gyrodactylus elegans	Parasitic flatworm of fish	unknown	L3.3, M3.3	salmonid hatcheries and migration
Ichthyophthirius multifiliis	Parasitic protozoan of fish	unknown	L2.1, L3.2	infects tropical fish, goldfish, and food fish
Oodinium pilularis	Velvet disease	unknown	L3.2	aquarium fish parasite
Cryptocotyle lingua	Black Spot parasite of fish	VALUE REQUIRED		
Mitraspora cyprini Fujita	Parasitic protozoan of fish	VALUE REQUIRED		
Mitraspora cyprini Fujita	Parasitic protozoan of fish	VALUE REQUIRED		
Pleistophora hypessobryconis	Neon-tetra disease of fish	VALUE REQUIRED		
Protopalina symphysodonis	Protopalina symphysodonis infection of fish	VALUE REQUIRED		
Trichodinella epizootica	Protozoic parasite of fish	VALUE REQUIRED		

Plants

Table 7. Results of Plant invasive species pathway risk analysis. Species are listed by taxonomic subcategories and ranked by risk of introduction. Species considered to be a threat to biosecurity were not included in the report. Refer to Tables 1-3 for invasive species pathway codes.

<i>Scientific name</i>	<i>Common Name</i>	<i>Extent</i>	<i>Primary Pathways</i>	<i>Notes for Primary Pathways</i>
Algae				
High Risk				
Caulacanthus ustulatus	red algae	unknown	T 1.2.1, L 3.2	
Caulerpa brachypus	Caulerpa brachypus	unknown	T 1.2.1, L 3.2	
Caulerpa racemosa	Caulerpa racemosa	unknown	T 1.2.1, L 3.2	
Lyngbya spp.	Lyngbya spp.	unknown		
Moderate Risk				
Sargassum horneri	Asian seaweed	limited	-	
Low Risk				
Sargassum muticum	Sargassum muticum	unknown	-	
Grasses				
High Risk				
Urochloa panicoides	liverseed grass	not present	L1.3.1.7	cereal seed contaminant
Moderate Risk				
Digitaria abyssinica	Digitaria abyssinica	not present	MISSING CODE	
Digitaria velutina	velvet fingergrass	not present	MISSING CODE	
Imperata cylindrica	cogongrass	not present	T3.2, L1.3.1.5	packing material, forage, soil stabilization
Leptochloa chinensis	Asian sprangletop	not present	L1.3.1.5, L1.3.1.7	forage, rice contaminant
Nardus stricta	matgrass	not present	L1.3.4, M3.3	seed transported on mud clinging to hooves of grazing animals
Oryza longistaminata	red rice	not present	L1.1, L1.3.1.6	rice breeding research, rice seed contaminant
Oryza punctata	red rice	not present	L1.1, L1.3.1.6	rice breeding research, rice seed contaminant
Rottboellia cochinchinensis	itchgrass	not present	M3.3, M3.2, M3.4,	Seed spread by birds, flood water, rodents, farm machinery

			T1.3.3	
Setaria pumila ssp. pallidefusca	cattail grass	not present	-	
Sorghum alnum	Columbus grass	not present	L3.1, L1.3.1.3	livestock forage
Chrysopogon aciculatus	pilipiliula	not present	MISSING CODE	ag weed of tea, rubber, tobacco farms
Imperata brasiliensis	Brazilian satintail	not present	L 1.3.1.7, L 3.2	
Ischaemum rugosum	murainoglass	not present	MISSING CODE	
Milium vernale	milium	not present	L1.3.1.5	
Nassella trichotoma	serrated tussock	not present	L3.4, M3.3, T1.3.3, T1.3.1, L1.3.1.4,, L1.2	seed transported on mud clinging to hooves of grazing animals, sheep fleece, cultivation equipment, vehicle tires, firewood, moving soil
Paspalum scrobiculatum	Kodo-millet	not present	L2.3, L3.6	medicinal, food (alternative grain)
Pennisetum macrourum	African feathergrass	not present	-	
Pennisetum macrourum	African feathergrass	not present	-	
Pennisetum polystachion	missiongrass	not present	L1.3.1.6, M3.3	hay and grain contaminant, clinging to animals
Saccharum spontaneum	wild sugarcane	not present	L2.3, L3.1, L1.1	medicinal, religious uses, material for sugarcane breeding
Sorghum propinquum	sorghum	not present	L3.1, L1.3.1.3	livestock forage
Allaria petiolata	garlic mustard	not present	L1.3.2, L2.3	
Ambrosia tomentosa	skeletonleaf bursage	not present	L 1.3.2	double-check!
Anthriscus sylvestris	wild chervil	not present	L 1.3.2	wildflower mixes
Butomus umbellatus	flowering rush	not present	L 1.3.2	
Carum carvi	wild caraway	not present	L 2.3, L 1.3.2	culinary herb
Clematis orientalis	Chinese clematis	not present	L 1.3.2	

<i>Dipsacus laciniatus</i>	cutleaf teasel	not present	M 4.1	mowing along highways
<i>Echium vulgare</i>	common viper's bugloss	not present	M 3.2	
<i>Epilobium hirsutum</i>	hairy willow herb	not present	T 1.2.1 , L 1.3.2	
<i>Heracleum mantegazzianum</i>	giant hogweed	not present	L 1.3.1.1	dried flower arrangements
<i>Hieracium aurantiacum</i>	orange hawkweed	not present	L 1.3.1.3, L 1.3.2	
<i>Hieracium caespitosum</i>	yellow hawkweed	not present	L 1.3.1.3, L 1.3.2	
<i>Hygrophila polysperma</i>	Miramar weed	not present	L 1.3.1.4, L 1.3.2	
<i>Lysimachia vulgaris</i>	garden loosestrife	not present	L3.1.1	intentional release (details unknown)
<i>Orobanche minor</i>	small broomrape	not present	L1.3.1.3	seed mixes
<i>Ottelia alismoides</i>	ducklettuce	not present	-	
<i>Peganum harmala</i>	harmel	not present	-	
<i>Peganum harmala</i>	harmel	not present	-	
<i>Sagittaria graminea</i>	grass-leaved arrowhead	not present	L1.3.1.4, L3.2	aquatic gardens, aquarium trade
<i>Salsola collina</i>	spineless Russian thistle	not present	L1.3.1.6	birdseed contaminant
<i>Striga</i> spp.	witchweed	not present	M8	Unknown pathway
<i>Vallisneria</i> spp.	eelgrass	not present		
<i>Aeginetia</i> spp.	aeginetia	not present	L 1.3.1.7	parasite of sugar cane
<i>Alectra</i> spp.	alectra	not present	L 1.3.1.7	parasite of legumes
<i>Alternanthera sessilis</i>	sessile joyweed	not present	L 1.3.2	
<i>Alyssum corsicum</i>	yellowtuft	not present	M 4.2.1	phytomining
<i>Alyssum murale</i>	yellowtuft	not present	M 4.2.1	phytomining
<i>Azolla pinnata</i>	mosquito fern	not present	L 3.2, L 3.3	

<i>Bryonia alba</i>	white bryony	not present	L 3.6	homeopathy
<i>Carthamus leucocaulos</i>	whitestem distaff thistle	not present	MISSING CODE	
<i>Centaurea macrocephala</i>	bighead knapweed	not present	L 1.3.1.3, L 1.3.2	
<i>Chaenorhinum minus</i>	dwarf snapdragon	not present	L1.3, 1.3.1.3	ornamental
<i>Drymaria arenarioides</i>	lightening weed	not present	MISSING CODE	
<i>Euphorbia serrata</i>	serrate spurge	not present	MISSING CODE	
<i>Galega officinalis</i>	goatsrue	not present	L 1.3.1.5, L 1.3.2	forage crop
<i>Hieracium pilosella</i>	mouseear hawkweed	not present	L 1.3.1.3, L 1.3.2	
<i>Hieracium piloselloides</i>	king devil hawkweed	not present	L 1.3.1.3, L 1.3.2	
<i>Hieracium x floribundum</i>	yellow devil hawkweed	not present	L 1.3.1.3, L 1.3.2	
<i>Hydrocharis morsus-ranae</i>	European frog-bit	not present	L 1.3.1.4, L 1.3.2	
<i>Impatiens glandulifera</i>	policeman's helmet	not present	L 1.3.2	
<i>Lagarosiphon major</i>	oxygenweed	not present	L1.3.1.4	aquatic gardens
<i>Lespedeza cuneata</i>	sericea lespedeza	not present	L1.3.1.5, L3.6, L1.1	crop research
<i>Limnophila indica</i>	ambulia	not present	L3.2, M3.2	
<i>Limnophila sessiliflora</i>	blume (ambulia)	not present	L3.2, M3.2	
<i>Ludwigia peruviana</i>	water primrose	not present	L1.3, L3.2	
<i>Murdannia keisak</i>	marsh dew flower	not present	L1.3.1.6	Rice seed contaminant
<i>Myosoton aquaticum</i>	giant chickweed	not present	M8, L1.3	
<i>Najas minor</i>	slender-leaved naiad	not present	L3.11, L3.2, T1.2.1	
<i>Physalis longifolia</i>	long-leaf groundcherry	not present	-	
<i>Picris hieracioides</i>	hawkweed oxtongue	not present	L1.3	nursery
<i>Polygonum x bohemicum</i>	Bohemian knotweed	not present	L1.3	nursery

<i>Pontederia cordata</i>	pickerelweed	not present	-	
<i>Pueraria montana</i> var. <i>lobata</i>	kudzu	not present	L1.3, L1.3.1.5, M4.2, L3.6	Livestock fodder, erosion control, folk art, medicinal
<i>Salvia pratensis</i>	meadow clary	not present	-	
<i>Salvia sclarea</i>	clary sage	not present	L2.3	essential oil
<i>Salvia virgata</i>	southern meadow sage	not present	-	
<i>Senecio madagascariensis</i>	Madagascar ragwort	not present	L1.3.1.6	contaminated hydromulch seed
<i>Striga asiatica</i>	witchweed	not present	M8	Unknown pathway
<i>Tagetes minuta</i>	wild marigold	not present		
<i>Thymelaea passerina</i>	spurge flax	not present	L1.3.1.6	Grain contaminant
<i>Trapa natans</i>	water-chestnut	not present	L3.2, M3.2	Farm dams, fish ponds, water features, ponded or slow moving water bodies near towns
<i>Tussilago farfara</i>	coltsfoot	not present	M4.2.1, L2.3	Gravel contaminant, medicinal
<i>Utricularia inflata</i>	swollen bladderwort	not present	L1.3.1.4, L3.2	aquatic gardens, aquarium trade
<i>Cirsium japonicum</i>	Japanese thistle	not present	L 3.6	
<i>Crassula helmsii</i>	Australian swamp stonecrop	not present	L 1.3.2, L 3.2	
<i>Cuscuta australis</i>	Australian dodder	not present	MISSING CODE	
<i>Cuscuta monogyna</i>	Eastern Dodder	not present	MISSING CODE	
<i>Cuscuta reflexa</i>	giant dodder	not present	MISSING CODE	
<i>Eichhornia azurea</i>	anchored water hyacinth	not present	L 3.3	
<i>Glossostigma diandrum</i>	mud mat	not present	L 3.2, M 3.4	migrating geese, waterfowl
<i>Hieracium atratum</i>	polar hawkweed	not present	L 1.3.1.3, L 1.3.2	
<i>Hieracium glomeratum</i>	queen devil hawkweed	not present	L 1.3.1.3, L 1.3.2	

Hieracium laevigatum	smooth hawkweed	not present	L 1.3.1.3, L 1.3.2	
Homeria spp.	cape tulip	not present	L 1.3.1.2, L 1.3.2	
Lepyrodiclis holosteoides	false jagged-chickweed	not present	MISSING CODE	
Lythrum virgatum	purple loosestrife	not present	L1.3	
Mikania cordata	mile-a-minute	not present	MISSING CODE	
Mikania micrantha	bittervine	not present	MISSING CODE	
Monochoria hastata	arrowleaf falsepickerelweed	not present	-	
Opuntia aurantiaca	jointed prickly pear	not present	L1.3	Grown for cochineal insect that creates scarlet dye
Sagittaria sagittifolia	arrowhead	not present	L1.3.1.4, L3.2	aquatic gardens, aquarium trade
Salsola vermiculata	wormleaf salsola	not present	-	
Salvinia auriculata	giant salvinia	not present	L1.3.1.4, T1.2.2	aquatic gardens, boat propellers, docking lines, boating equipment, fishing gear
Senecio linearifolius	narrowleaf ragwort	not present	-	
Senecio squalidus	Oxford ragwort	not present	-	
Solanum cardiophyllum	heartleaf nightshade	not present		
Solanum viarum	tropical soda apple	not present	M8	Unknown pathway
Spermacoce alata	winged false buttonweed	not present	MISSING CODE	
Trapa bicornis	water caltrap	not present	L3.2, M3.2	Farm dams, fish ponds, water features, ponded or slow moving water bodies near towns
Tridax procumbens	coat buttons	not present	M1.3.2, L1.3.1.6	found by railroad spur in TX, contaminant in coffee imported from Mexico
Tripleurospermum perforatum	scentless false mayweed	not present	L1.3.1.5, L1.3.1.6	Contaminated forage, grain and grass seed
Euryops multifidus	hawk's eye	not present	L 1.3.1.3, L 1.3.2	

Hedera hibernica	English ivy	not present	L 1.3.2	
Halimodendron halodendron	Russian salttree	not present	M 4.2.2	
Prosopis strombulifera	creeping mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
Melastoma malabathricum	Malabar melastome	not present	L1.3.1.1	dried flower arrangements
Mimosa diplotricha	giant sensitive plant	not present	L1.3, L1.3.1.5	cover crop, animal forage
Mimosa invisia	giant sensitive plant	not present	L1.3, L1.3.1.5	cover crop, animal forage
Mimosa pellita	lollipop mimosa	not present	M3.2, L1.3	water, horticultural
Mimosa pigra	catclaw mimosa	not present	M3.2, L1.3	water, horticultural
Prosopis alpacato	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
Prosopis argentina	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
Prosopis articulata	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
Prosopis burkartii	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
Prosopis caldenia	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
Prosopis calingastana	cusqui	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
Prosopis campestris	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock

<i>Prosopis castellanosii</i>	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
<i>Prosopis denudans</i>	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
<i>Prosopis elata</i>	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
<i>Prosopis farcta</i>	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
<i>Prosopis ferox</i>	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
<i>Prosopis fiebrigii</i>	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
<i>Prosopis hassleri</i>	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
<i>Prosopis humilis</i>	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
<i>Prosopis kuntzei</i>	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
<i>Prosopis pallida</i>	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
<i>Prosopis palmeria</i>	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
<i>Prosopis reptans</i>	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
<i>Prosopis rojasiana</i>	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock

Prosopis ruizlealii	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
Prosopis ruscifolia	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
Prosopis sericantha	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
Prosopis torquata	mesquite	not present	L1.3, L1.3.1.5, L1.3.1.4, M4.2	Fodder, fuelwood, shade, soil stabilization, soil improvement and hedgerows to contain livestock
Rubus moluccanus	wild raspberry	not present	L1.3, L2.3	Nursery, culinary, medicinal
Senecio inaequidens	South African ragwort	not present	L4.3	wool contaminant
Solanum tampicense	wetland nightshade	not present	M8, M3.3	Unknown pathway, possibly accidental release or bird dispersal
Solanum torvum	turkeyberry	not present	L2.3	cultivated for fruit

Vertebrates

Table 8. Results of Vertebrate invasive species pathway risk analysis. Species are listed by taxonomic subcategories and ranked by risk of introduction. Species considered to be a threat to biosecurity were not included in the report. Refer to Tables 1-3 for invasive species pathway codes.

Bufo marinus	Giant toad	notpresent	L3.7, L3.4	
Eleutherodactylus coqui	Coqui frog	notpresent	L1.3.1.7, L3.2, L3.4	
Eleutherodactylus planirostris	Greenhouse frog	notpresent	L1.3.1.7	stowaway on tropical plants and landscaping materials (esp. from FL & HI)
Dendrobates auratus	Green-and-black poison dartfrog	notpresent	M1	biocontrol of mosquitos

Glandirana rugosa	Japanese wrinkled frog	notpresent	M1	insect control
Osteopilus septentrionalis	Cuban treefrog	notpresent	T1.2.3, T3.1 , L1.2, L1.3.1.7	
Rana clamitans	Green frog	notpresent	L2.2, L3.3	frogs legs for culinary uses
Birds				
High Risk				
Porphyrio porphyrio	Purple Swamphen	notpresent	L3.4, L3.10	
Streptopelia decaocto	Eurasian collared dove	notpresent	L3.2, L3.8	pet escapes, intro for hunting
Threskiornis aethiopicus	Sacred Ibis	notpresent	L3.10	zoo escape (allowed to fly away)
Zosterops japonica	Japanese White-eye	notpresent	L3.10	zoo escape (eradicated in San Diego in 1980's)
Low Risk				
Acridotheres cristatellus	Crested mynah	notpresent	L3.4, L3.11	
Aerodramus bartschi	Mariana swiftlet	notpresent	L3.4, L3.11	Small population introduced to Oahu but now threatened
Aerodramus fuciphagus	Edible-nest swiftlet	notpresent	L3.4	Swiftlet farming for "edible nest" products, an Asian delicacy
Alectoris barbara	Barbary partridge	notpresent	L3.4	aviculture
Padda oryzivora	Java sparrow	notpresent	L3.2, L3.5	
Quelea quelea	Red-billed quelea	notpresent	L3.2	
Risk Unknown				
Acridotheres tristis	Common mynah	notpresent	L3.4, L3.11	
Fishes				
High Risk				
Amia calva	Bowfin	notpresent		
Cichlasoma spilurum	Blue-eyed cichlid	notpresent	L3.2	
Esox lucius	Northern Pike	notpresent	L3.8	Illegal stocking
Hypophthalmichthys nobilis	Bighead Carp	notpresent	L3.3, L3.4	
Lepstosteus lucius	Longnose Gar	notpresent	MISSING CODE	
Mylopharyngodon piceus	Black Carp	notpresent	L3.2, L3.4	

Scardinius erythrophthalmus	Rudd	notpresent	L3.1, L3.3	bait, aquaculture
Serrasalminae	Piranha	notpresent	L3.2, L3.8, L3.10, L3.11	aquarium releases, intentional stocking
Channa argus	Northern Snakehead	notpresent	L2.1	
Clarias batrachus	Walking catfish	notpresent	L3.2, L3.3	
Gymnocephalus cernuus	Ruffe	notpresent	T1.2.1	
Hypophthalmichthys harmandi	Largescale Carp	notpresent	L3.3, L3.4	
Hypophthalmichthys molitrix	Silver Carp	notpresent	L3.3, L3.4	
Lepisosteus osseus	Longnose Gar	notpresent	MISSING CODE	
Neogobius melanostomus	Round goby	notpresent	T1.2.1	
Cichlasoma salvini	Yellowbelly cichlid	notpresent	L3.2	
Dorosoma cepedianum	Gizzard shad	notpresent	L3.8	
Monopterus albus	Asian swamp eel	notpresent	L3.2, L3.4	
Dasyus novemcinctus	Nine-banded armadillo	notpresent	L3.2, L3.4	zoos
Meriones unguiculatus	Mongolian gerbil	notpresent	L3.2, L3.9	
Cricetomys gambianus	Gambian giantpouched rat	notpresent	L3.2	
Cynomys ludovicianus	Prairie dog	notpresent		
Erinaceus europaeus	European hedgehog	notpresent	L3.4	fur farms
Mastomys spp.	Multimammate rator mouse	notpresent	T1.2.3, L3.9	
Myocastor coypus	Nutria	notpresent	L3.4	fur farms

Pteropus spp.	Flying fox	notpresent	MISSING CODE	
Trichosurus vulpecula	Brush-tailed possum	notpresent	L3.4	fur farms
Anolis equestris	Knight anole	notpresent	L3.2	
Anolis sagrei	Brown anole	notpresent	T1.3.1, T1.2.3, L1.3.1.7, L3.2	
Boiga irregularis	Brown treesnake	notpresent	T1.1, T1.2.3, T3.1	
Caiman crocodilus	Spectacled caiman	notpresent	L3.2	
Ctenosaura similis	Black spinytail iguana	notpresent	L3.2, L3.4	zoos
Gekko gekko	Tokay gecko	notpresent	L3.2	
Nerodia rhombifer	Diamondback water snake	notpresent	L3.2	
Tupinambis merianae	Argentina giant tegu	notpresent	L3.2	
Ctenosaura pectinata	Mexican spinytail iguana	notpresent	L3.2, L3.4	zoos
Python molurus	Burmese python	notpresent	L3.2	
Varanus niloticus	Nile monitor	notpresent	L3.2, L3.11	
Agkistrodon spp.	Copperhead snake	notpresent	L3.2, L3.7	

Invasive Species Pathway Risk Analysis Results by Pathway Code

Results by Main Pathway Types

Figure 2. Number of species in each main pathway type

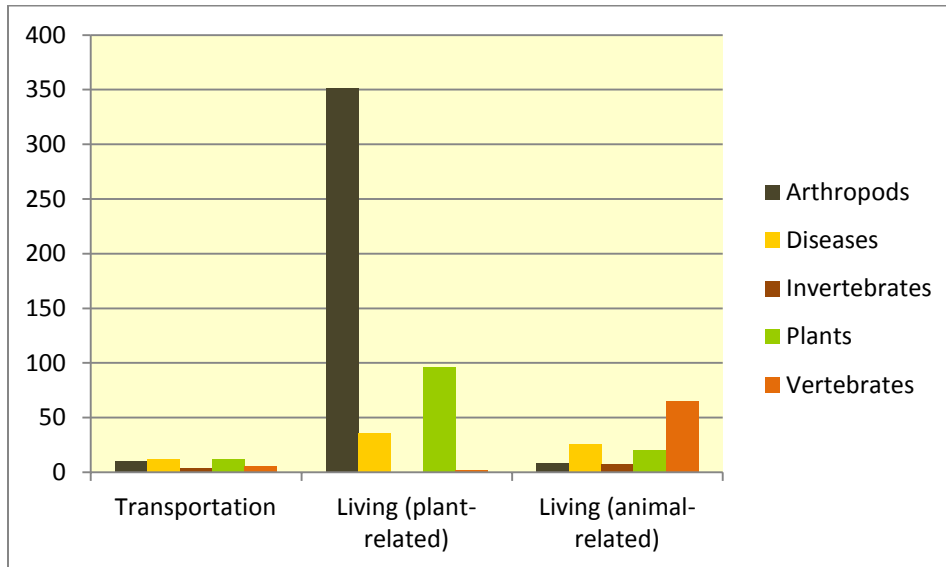
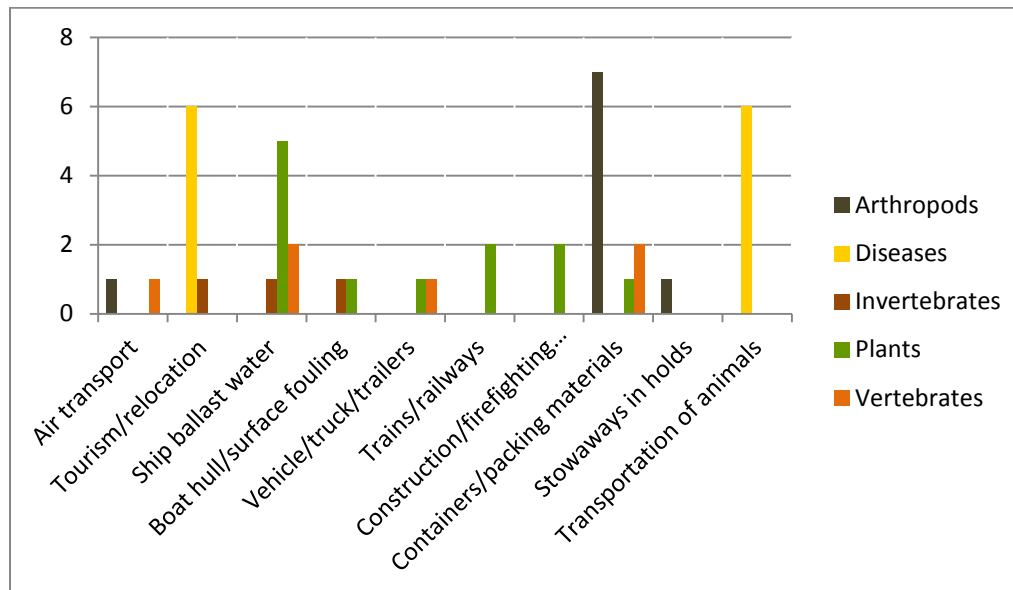


Table 9. Number of species in each main pathway type

Main Pathway	Arthropods	Diseases	Invertebrates	Plants	Vertebrates
Transportation	10	12	4	12	6
Living (plant-related)	351	36	0	96	2
Living (animal-related)	8	26	7	20	65

Results of Transportation Pathways Invasive Species Risk Analysis

Figure 3. Number of species in each transportation pathway



Air Travel

Table 10. Species that could enter California through air travel

Type	Subtype	Scientific name	Common Name
Arthropod	Beetle	<i>Popillia lewisi</i>	Scarab beetle
Vertebrate	Reptile	<i>Boiga irregularis</i>	Brown treesnake

Tourism & Relocation

Table 11. Species that could enter California through tourism and human relocation

Type	Subtype	Scientific name	Common Name
Disease	Bacterium	<i>Xanthomonas anoxopodis</i> pv. <i>citri</i>	Citrus Canker
	Fungus	<i>Tilletia tritici (caries)</i>	Wheat smut
	Virus	<i>Aphtae epizooticae</i>	Hoof and mouth disease
		<i>Avian Influenza A (H5N1)</i>	Avian influenza
		<i>Badnavirus cymvr</i>	Citrus yellow mosaic virus
Invertebrate	Aquatic mollusk, freshwater	<i>Limnoperna fortunei</i>	Golden mussel

Ship Ballast Water

Table 12. Species that could enter California through ship ballast water

Type	Subtype	Scientific name	Common Name
Invertebrate	Aquatic mollusk, freshwater	<i>Limnoperna fortunei</i>	Golden mussel
Plant	Algae	<i>Caulacanthus ustulatus</i>	Red algae
		<i>Caulerpa brachypus</i>	Caulerpa brachypus
		<i>Caulerpa racemosa</i>	Caulerpa racemosa
	Herbaceous	<i>Epilobium hirsutum</i>	Hairy willow herb
		<i>Najas minor</i>	Slender-leaved naiad
Vertebrate	Fish	<i>Gymnocephalus cernuus</i>	Ruffe
		<i>Neogobius melanostomus</i>	Round goby

Boat Hull or Surface Fouling

Table 13. Species that could enter California through boat hull or surface fouling

Type	Subtype	Scientific name	Common Name
Invertebrate	Aquatic mollusk, freshwater	<i>Limnoperna fortunei</i>	Golden mussel
Plant	Herbaceous	<i>Salvinia auriculata</i>	Giant salvinia

Cars, Buses, Trucks, ATVs, Boat Trailers

Table 14. Species that could enter California through terrestrial vehicles

Type	Subtype	Scientific name	Common Name
Plant	Grass	<i>Nassella trichotoma</i>	Serrated tussock
Vertebrate	Reptile	<i>Anolis sagrei</i>	Brown anole

Trains & other Railways

Table 15. Species that could enter California through trains and other railways

Type	Subtype	Scientific name	Common Name
Plant	Herbaceous	<i>Epilobium hirsutum</i>	Hairy willow herb
		<i>Tridax procumbens</i>	Coat buttons

Construction & Firefighting Vehicles

Table 16. Species that could enter California through construction and firefighting vehicles

Type	Subtype	Scientific name	Common Name
Plant	Grass	<i>Nassella trichotoma</i>	Serrated tussock
		<i>Rottboellia cochinchinensis</i>	Itchgrass

Shipping & Packing Materials

Table 17. Species that could enter California through shipping and packing materials

Arthropod	Bee, wasp	<i>Diprion similis</i>	Introduced pine sawfly
		<i>Sirex noctilio</i>	Sirex woodwasp
	Beetle	<i>Agrilus biguttatus</i>	Oak splendour beetle
		<i>Anoplophora glabripennis</i>	Asian longhorned beetle
		<i>Agrilus planipennis</i>	Emerald ashborer
	Butterfly, moth	<i>Sinoxylon anale</i>	Dunnage beetle
<i>Lymantria dispar</i>		Gypsy moth	
Plant	Grass	<i>Imperata cylindrica</i>	Cogongrass
Vertebrate	Amphibian	<i>Osteopilus septentrionalis</i>	Cuban treefrog
	Reptile	<i>Boiga irregularis</i>	Brown treesnake

Stowaways in Holds

Table 18. Species that could enter California as stowaways in holds

Type	Subtype	Scientific name	Common Name
Arthropod	Butterfly, moth	<i>Lymantria dispar</i>	Gypsy moth

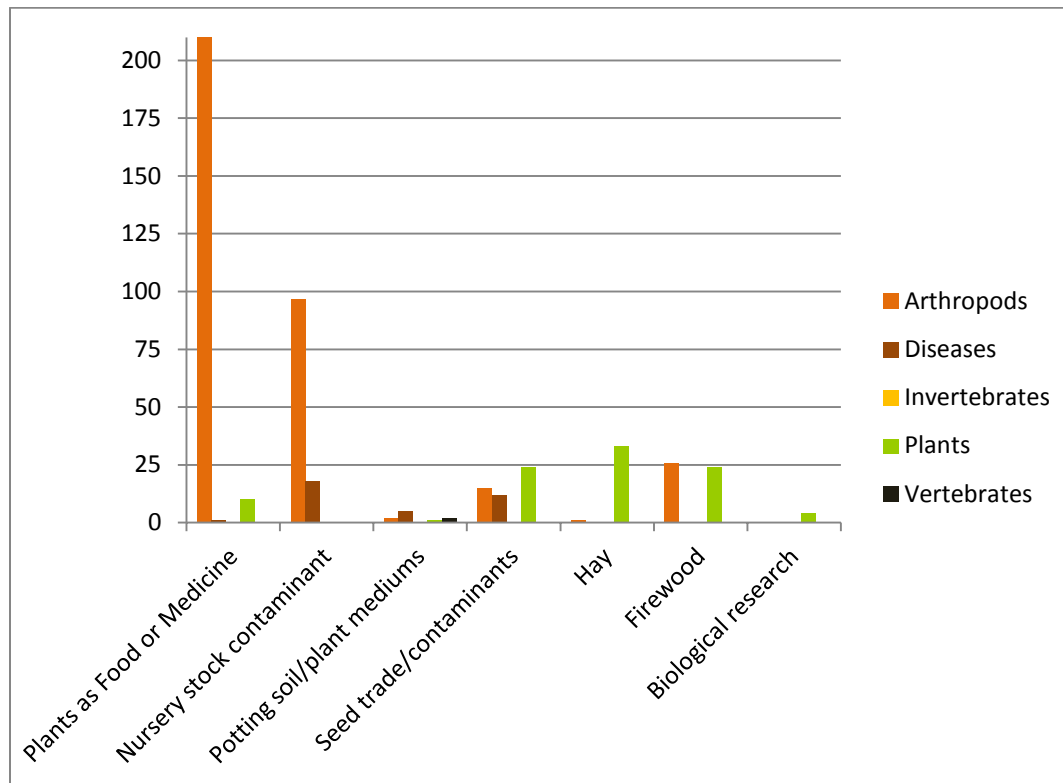
Transportation of Animals

Table 19. Species that could enter California through the transportation of animals

Type	Subtype	Scientific name	Common Name
Disease	Bacterium	<i>Bacillus anthracis</i>	Anthrax
		<i>Ehrlichia ruminantium</i>	Heartwater; cowdriosis
	Virus	<i>Alphavirus eeev</i>	Eastern Equine Encephalitis Virus
		<i>Aphtaepizooticae</i>	Hoof and mouth disease
		<i>Avian Influenza A (H5N1)</i>	Avian influenza
		<i>Badnavirus cymvr</i>	Citrus yellow mosaic virus

Results of Plant-Related Living Industry Pathways Invasive Species Risk Analysis

Figure 4. Number of species in each plant-related living industry pathway



Plants as Food or Medicine

Table 20. Species that could enter California through plants imported as food or medicine

Type	Subtype	Scientific name	Common Name
Arthropod	Bee, wasp	<i>Dryocosmus kuriphilus</i>	Chestnut gall wasp
	Beetle	<i>Leptocybe invasa</i>	Blue gum chalcid
		<i>Acalymma vittatum</i>	Striped cucumber beetle
		<i>Anomala foraminosa</i>	Scarab beetle
		<i>Anomala inositiva</i>	Scarab beetle
		<i>Anomala orientalis</i>	Oriental beetle
		<i>Brachycerus spp.</i>	Garlic beetles
		<i>Cathartus quadricollis</i>	Squarenecked grain beetle
		<i>Cerotoma trifurcata</i>	Bean leaf beetle
		<i>Chalcodermus aeneus</i>	Cowpea curculio
		<i>Coccotorus scutellaris</i>	Plum gouger
		<i>Conotrachelus aguacatae</i>	Small avocado seed weevil
		<i>Conotrachelus juglandis</i>	Butternut curculio
		<i>Conotrachelus nenuphar</i>	Plum curculio
		<i>Conotrachelus perseae</i>	Small seed weevil
		<i>Conotrachelus retentus</i>	Black walnut curculio
		<i>Copturus aguacatae</i>	Avocado stem weevil

	<i>Cryptorhynchus mangiferae</i>	Mango seed weevil
	<i>Curculio caryae</i>	Pecan weevil
	<i>Curculio elephas</i>	Chestnut weevil
	<i>Curculio nucum</i>	Hazelnut weevil
	<i>Cylas formicarius elegantulus</i>	Sweetpotato weevil
	<i>Cylas spp.</i>	Exotic weevil
	<i>Diabrotica barberi</i>	Northern corn rootworm
	<i>Diabrotica undecimpunctata howardi</i>	Spotted cucumber beetle
	<i>Diabrotica virgifera virgifera</i>	Western corn rootworm
	<i>Diabrotica virgifera zea</i>	Mexican corn rootworm
	<i>Diaprepes sp.</i>	Exotic weevil
	<i>Diocalandra spp.</i>	Coconut weevils
	<i>Diocalandra taitensis</i>	Tahitian coconut weevil
	<i>Elytroteinus subtruncatus</i>	Fijian ginger weevil
	<i>Epilachna borealis</i>	Squash beetle
	<i>Epilachna tridecimnotata</i>	Ladybird beetle
	<i>Epilachna varivestis</i>	Mexican bean beetle
	<i>Euscepes postfasciatus</i>	Indian sweetpotato weevil
	<i>Heilipus lauri</i>	Avocado seed weevil
	<i>Hesperophanes campestris</i>	Chinese longhorned beetle
	<i>Hypothenemus hampei</i>	Coffee berry borer
	<i>Leptinotarsa decemlineata</i>	Colorado potato beetle
	<i>Listroderes subcinctus</i>	Chilean vegetable weevil
	<i>Lophocateres pusillus</i>	Siamese grain borer
	<i>Naupactus xanthographus</i>	South American fruit tree weevil
	<i>Omphisa anastomosalis</i>	Sweetpotato vine borer
	<i>Oulema melanopus</i>	Cereal leaf beetle
	<i>Phloeotribus liminarius</i>	Peach bark beetle
	<i>Phyllophaga congrua</i>	May beetle
	<i>Prostephanus truncatus</i>	Larger grain borer
	<i>Protaetia fusca</i>	Mango flower beetle
	<i>Protaetia orientalis</i>	Oriental flower beetle
	<i>Rhabdoscelus obscurus</i>	New Guinea sugarcane weevil
	<i>Sphenophorus maidis</i>	Maize billbug
	<i>Sternochetus mangiferae</i>	Mango seed weevil
	<i>Typophorus nigrinus viridicyaneus</i>	Sweetpotato leaf beetle
	<i>Zygogramma exclamationis</i>	Sunflower beetle
Butterfly, moth	<i>Acrobasis juglandis</i>	Pecan leaf casebearer
	<i>Acrobasis nuxvorella</i>	Pecan nut casebearer
	<i>Acrolepia assectella</i>	Leek moth

<i>Acrolepiopsis assectella</i>	Leek moth
<i>Adoxophyes orana</i>	Summer fruit tortrix moth
<i>Antaeotricha leucillana</i>	Stenomine oecophorid
<i>Apamea apamiformis</i>	Riceworm
<i>Argyrotaenia pulchellana</i>	Grey red-barred twist
<i>Argyrotaenia velutinana</i>	Redbanded leafroller
<i>Carposina niponensis</i>	Peach fruit moth
<i>Celama sorghiella</i>	Sorghum webworm
<i>Chilo plejadellus</i>	Rice stalk borer
<i>Chilo suppressalis</i>	Asiatic rice borer
<i>Chrysodeixis chalcites</i>	Golden twin spot moth
<i>Chrysodeixis eriosoma</i>	Green garden looper
<i>Conogethes punctiferalis</i>	Yellow peach moth
<i>Conopomorpha cramerella</i>	Cocoa pod borer
<i>Conopomorpha litchiella</i>	Lychee leaf miner
<i>Corcyra cephalonica</i>	Rice moth
<i>Cryptophlebia leucotreta</i>	False codling moth
<i>Cydia caryana</i>	Hickory shuckworm
<i>Cydia funebrana</i>	Red plum maggot
<i>Cydia splendana</i>	Chestnut moth
<i>Darna pallivitta</i>	Limacodid moth
<i>Diaphania hyalinata</i>	Melonworm
<i>Diatraea crambidoides</i>	Southern corn stalk borer
<i>Diatraea grandiosella</i>	Southwestern corn borer
<i>Diatraea saccharalis</i>	Sugarcane borer
<i>Dyspessa ulula</i>	Onion carpenter worm
<i>Earias fabia</i>	Spotted bollworm
<i>Endopiza viteana</i>	Grape berry moth
<i>Euproctis chrysorrhoea</i>	Browntail moth
<i>Gonodonta pyrgo</i>	Citrus fruitpiercing moth
<i>Harrisina americana</i>	Grapeleaf skeletonizer
<i>Heliocoverpa armigera</i>	Cotton bollworm
<i>Hemimene juliana</i>	Nut fruit tortrix
<i>Leucinodes orbonalis</i>	Eggplant fruit borer
<i>Leucoptera malifoliella</i>	Pear leaf blister moth
<i>Lymire edwardsii</i>	Edwards' wasp moth
<i>Malacosoma americanum</i>	Eastern tent caterpillar
<i>Maruca testulalis</i>	Bean pod borer
<i>Melittia calabaza</i>	Southwestern squash vine borer
<i>Melittia cucurbitae</i>	Squash vine borer
<i>Opogona sacchari</i>	Banana moth
<i>Ostrinia nubilalis</i>	European corn borer
<i>Pammene fasciana</i>	Chestnut leaf roller
<i>Papaipema nebris</i>	Stalk borer

	<i>Papilio demoleus</i>	Lime swallowtail
	<i>Pectinophora scutigera</i>	Pink-spotted bollworm
	<i>Phyllocnistis citrella</i>	Citrus leafminer
	<i>Plathypena scabra</i>	Green cloverworm
	<i>Prays endocarpa</i>	Citrus pock caterpillar
	<i>Proeulia spp.</i>	Proeulia spp.
	<i>Sannina uroceriformis</i>	Persimmon borer
	<i>Scrobipalpa ocellatella</i>	Sugarbeet crown borer
	<i>Sesamia cretica</i>	Durra stalk borer
	<i>Spodoptera eridania</i>	Southern armyworm
	<i>Stenoma catenifer</i>	Avocado seed moth
	<i>Thaumatotibia leucotreta</i>	False codling moth
	<i>Zeuzera pyrina</i>	Leopard moth
	<i>Zophodia convolutella</i>	Gooseberry fruitworm
Fly	<i>Anastrepha fraterculus</i>	South American fruit fly
	<i>Anastrepha grandis</i>	South American cucurbit fruit fly
	<i>Anastrepha ludens complex</i>	Mexican fruit fly complex
	<i>Anastrepha obliqua</i>	West Indian fruit fly
	<i>Anastrepha sp.</i>	Exotic fruit fly
	<i>Anastrepha striata</i>	Guava fruit fly
	<i>Anastrepha suspensa</i>	Caribbean fruit fly
	<i>Bactrocera albistrigata</i>	White Striped Fruit Fly
	<i>Bactrocera correcta</i>	Guava fruit fly
	<i>Bactrocera cucurbitae</i>	Melon fly
	<i>Bactrocera irvingiae</i>	Irvinge fruit fly
	<i>Bactrocera latifrons</i>	Solanaceous fruit fly
	<i>Bactrocera scutellata</i>	Striped fruit fly
	<i>Bactrocera tryoni</i>	Queensland fruit fly
	<i>Bactrocera zonata</i>	Peach fruit fly
	<i>Ceratitis capitata</i>	Mediterranean fruit fly
	<i>Ceratitis rosa</i>	Natal fruit fly
	<i>Contarinia johnsoni</i>	Grape blossom midge
	<i>Dacus bivittatus</i>	African pumpkin fly
	<i>Dacus cucurbitae</i>	Melon fruit fly
	<i>Dacus sp.</i>	Exotic fruit fly
	<i>Horidiplosis ficifolii</i>	Ornamental fig pest
	<i>Ophiomyia phaseoli</i>	Bean fly
	<i>Rhagoletis boycei</i>	Walnut husk fly
	<i>Rhagoletis cerasi</i>	European cherry fruit fly
	<i>Rhagoletis cingulata</i>	Cherry fruit fly
	<i>Rhagoletis fausta</i>	Black cherry fruit fly
	<i>Rhagoletis juglandis</i>	Walnut husk fly
	<i>Rhagoletis mendax</i>	Blueberry maggot
	<i>Rhagoletis spp.</i>	Exotic fruit fly

	<i>Rhagoletis suavis</i>	Walnut husk fly
	<i>Tipula oleracea</i>	Common crane fly
	<i>Toxotrypana curvicauda</i>	Papaya fruit fly
	<i>Zonosemata electa</i>	Pepper maggot
Mite	<i>Amphitetranychus viennensis</i>	Fruit tree spider mite
	<i>Brevipalpus chilensis</i>	False grape mite
	<i>Eriophyes litchii</i>	Lychee erinose mite
	<i>Euvarroa sinhai</i>	Euvarroa sinhai
	<i>Raoiella indica</i>	Red palm mite
	<i>Steneotarsonemus spinki</i>	Panicle rice mite
	<i>Tropilaelaps clareae</i>	Honeybee mite
Scale, aphid	<i>Abgrallaspis aguacatae</i>	Armored scale
	<i>Abgrallaspis palmae</i>	Tropical palm scale
	<i>Acutaspis albopicta</i>	Albopicta scale
	<i>Acutaspis tingi</i>	Ting scale
	<i>Aleurocanthus spiniferus</i>	Orange spiny whitefly
	<i>Aleurocanthus woglumi</i>	Citrus blackfly
	<i>Aonidiella orientalis</i>	Oriental scale
	<i>Aphis glycines</i>	Soybean aphid
	<i>Aspidiotus destructor</i>	Coconut scale
	<i>Ceroplastes ceriferus</i>	Indian wax scale
	<i>Ceroplastes floridensis</i>	Florida wax scale
	<i>Ceroplastes rubens</i>	Red wax scale
	<i>Ceroplastes rusci</i>	Fig wax scale
	<i>Coccus viridis</i>	Green scale
	<i>Dysmicoccus alazon</i>	Alazon mealybug
	<i>Fiorinia theae</i>	Tea scale
	<i>Furcaspis oceanica</i>	Coconut red scale
	<i>Howardia biclavis</i>	Mining scale
	<i>Ischnaspis longirostris</i>	Black thread scale
	<i>Kilifia acuminata</i>	Acuminate scale
	<i>Leptocorisa acuta</i>	Rice seed bug
	<i>Mesolecanium nigrofasciatum</i>	Terrapin scale
	<i>Morganella longispina</i>	Plumose scale
	<i>Myndus crudus</i>	American palm cixiid
	<i>Oebalus pugnax</i>	Rice stink bug
	<i>Parlatoria blanchardi</i>	Parlatoria date scale
	<i>Parlatoria ziziphi</i>	Black citrus scale
	<i>Phenacoccus aceris</i>	Apple mealybug
	<i>Phenacoccus manihoti</i>	Cassava mealybug
	<i>Phylloxera devastatrix</i>	Pecan phylloxera
	<i>Pinnaspis buxi</i>	Boxwood scale
	<i>Pinnaspis strachani</i>	Lesser snow scale
	<i>Planococcus lilacinus</i>	Coffee mealybug

		<i>Planococcus minor</i> (Maskell)	Passionvine mealybug
		<i>Pseudaulacaspis pentagona</i>	White peach scale
		<i>Pseudococcus cryptus</i>	Citriculus mealybug
		<i>Pseudococcus elisae</i>	Banana mealybug
		<i>Quadraspidiotus ostreaeformis</i>	European fruit scale
		<i>Saccharicoccus sacchari</i>	Pink sugarcane mealybug
		<i>Scotinophara lurida</i>	Rice stinkbug
		<i>Singhiella simplex</i>	Fig whitefly
		<i>Sogatodes orizicola</i>	Rice delphacid
		<i>Toxoptera citricida</i>	Brown citrus aphid
		<i>Trialeurodes floridensis</i>	Avocado whitefly
		<i>Trioza tripunctata</i>	Blackberry psyllid
		<i>Unaspis citri</i>	Citrus snow scale
	Springtail	<i>Sminthurus viridus</i>	Lucerne flea
	Thrips	<i>Danothrips trifasciatus</i>	Thrips
		<i>Liothrips oleae</i>	Olive thrips
		<i>Scirtothrips dorsalis</i> (Hood)	Chilli thrips
		<i>Selenothrips rubrocinctus</i>	Redbanded thrips
		<i>Thrips angusticeps</i>	Cabbage thrips
		<i>Thrips florum</i>	Banana flower thrips
		<i>Thrips palmi</i>	Melon thrips
Disease	Bacterium	<i>Xanthomonas anoxopodis</i> pv. <i>citri</i>	Citrus Canker
Plant	Grass	<i>Oryza longistaminata</i>	Red rice
		<i>Oryza punctata</i>	Red rice
		<i>Paspalum scrobiculatum</i>	Kodo-millet
		<i>Saccharum spontaneum</i>	Wild sugarcane
	Herbaceous	<i>Allaria petiolata</i>	Garlic mustard
		<i>Carum carvi</i>	Wild caraway
		<i>Salvia sclarea</i>	Clary sage
		<i>Solanum torvum</i>	Turkeyberry
		<i>Tussilago farfara</i>	Coltsfoot
	Woody	<i>Rubus moluccanus</i>	Wild raspberry

Nursery Stock Contaminant

Table 21. Species that could enter California as nursery stock contaminants

Type	Subtype	Scientific name	Common Name
Arthropod	Bee, wasp	<i>Diastrophus radicum</i>	Raspberry root gall wasp
		<i>Diprion similis</i>	Introduced pine sawfly
		<i>Leptocybe invasa</i>	Blue gum chalcid
	Beetle	<i>Adoretus sinicus</i>	Chinese rose beetle
		<i>Adoretus</i> spp.	Adoretus spp.
		<i>Agrilus ruficollis</i>	Rednecked cane borer

	<i>Anomala foraminosa</i>	Scarab beetle
	<i>Anomala insitiva</i>	Scarab beetle
	<i>Anomala orientalis</i>	Oriental beetle
	<i>Anomala sulcatula</i>	Anomala sulcatula
	<i>Anoplophora chinensis</i>	Citrus longhorned beetle
	<i>Cathartus quadricollis</i>	Squarenecked grain beetle
	<i>Cerotoma trifurcata</i>	Bean leaf beetle
	<i>Chalcodermus aeneus</i>	Cowpea curculio
	<i>Chlorophorous annularis</i>	Bamboo longhorned beetle
	<i>Coccotorus scutellaris</i>	Plum gouger
	<i>Conotrachelus aguacatae</i>	Small avocado seed weevil
	<i>Conotrachelus juglandis</i>	Butternut curculio
	<i>Conotrachelus nenuphar</i>	Plum curculio
	<i>Conotrachelus perseae</i>	Small seed weevil
	<i>Conotrachelus retentus</i>	Black walnut curculio
	<i>Copturus aguacatae</i>	Avocado stem weevil
	<i>Cylas formicarius elegantulus</i>	Sweetpotato weevil
	<i>Cylas spp.</i>	Exotic weevil
	<i>Diabrotica barberi</i>	Northern corn rootworm
	<i>Diabrotica undecimpunctata howardi</i>	Spotted cucumber beetle
	<i>Diabrotica virgifera virgifera</i>	Western corn rootworm
	<i>Diabrotica virgifera zea</i>	Mexican corn rootworm
	<i>Diabrotica barberi</i>	Northern corn rootworm
	<i>Diabrotica undecimpunctata howardi</i>	Spotted cucumber beetle
	<i>Diabrotica virgifera virgifera</i>	Western corn rootworm
	<i>Diabrotica virgifera zea</i>	Mexican corn rootworm
	<i>Diaprepes sp.</i>	Exotic weevil
	<i>Maladera castanea</i>	Asiatic garden beetle
	<i>Phloeotribus liminarius</i>	Peach bark beetle
	<i>Phyllophaga congrua</i>	May beetle
Butterfly, moth	<i>Adoxophyes orana</i>	Summer fruit tortrix moth
	<i>Apamea apamiformis</i>	Riceworm
	<i>Argyrotaenia pulchellana</i>	Grey red-barred twist
	<i>Argyrotaenia velutinana</i>	Redbanded leafroller
	<i>Carpocapsa niponensis</i>	Peach fruit moth
	<i>Celama sorghiella</i>	Sorghum webworm
	<i>Chilo plejadellus</i>	Rice stalk borer
	<i>Chilo suppressalis</i>	Asiatic rice borer
	<i>Choristoneura fumiferana</i>	Spruce budworm
	<i>Chrysodeixis chalcites</i>	Golden twin spot moth
	<i>Chrysodeixis eriosoma</i>	Green garden looper

	<i>Conogethes punctiferalis</i>	Yellow peach moth
	<i>Conopomorpha cramerella</i>	Cocoa pod borer
	<i>Conopomorpha litchiella</i>	Lychee leaf miner
	<i>Corcyra cephalonica</i>	Rice moth
	<i>Cryptophlebia leucotreta</i>	False codling moth
	<i>Cydia caryana</i>	Hickory shuckworm
	<i>Cydia funebrana</i>	Red plum maggot
	<i>Darna pallivitta</i>	Limacodid moth
	<i>Dendrolimus superans sibiricus</i>	Siberian silk moth
	<i>Diaphania hyalinata</i>	Melonworm
	<i>Hemimene juliana</i>	Nut fruit tortrix
Fly	<i>Anastrepha fraterculus</i>	South American fruit fly
	<i>Anastrepha grandis</i>	South American cucurbit fruit fly
	<i>Anastrepha ludens complex</i>	Mexican fruit fly complex
	<i>Anastrepha obliqua</i>	West Indian fruit fly
	<i>Anastrepha sp.</i>	Exotic fruit fly
	<i>Anastrepha striata</i>	Guava fruit fly
	<i>Anastrepha suspensa</i>	Caribbean fruit fly
	<i>Bactrocera albistrigata</i>	White striped fruit fly
	<i>Bactrocera correcta</i>	Guava fruit fly
	<i>Bactrocera cucurbitae</i>	Melon fly
	<i>Bactrocera dorsalis</i>	Oriental fruit fly
	<i>Bactrocera latifrons</i>	Solanaceous fruit fly
	<i>Bactrocera scutellata</i>	Striped fruit fly
	<i>Bactrocera tryoni</i>	Queensland fruit fly
	<i>Bactrocera zonata</i>	Peach fruit fly
	<i>Ceratitis capitata</i>	Mediterranean fruit fly
	<i>Ceratitis rosa</i>	Natal fruit fly
	<i>Contarinia johnsoni</i>	Grape blossom midge
Mite	<i>Amphitetranychus viennensis</i>	Fruit tree spider mite
	<i>Brevipalpus chilensis</i>	False grape mite
Scale, aphid	<i>Acutaspis tingi</i>	Ting scale
	<i>Aleurocanthus spiniferus</i>	Orange spiny whitefly
	<i>Aleurocanthus woglumi</i>	Citrus blackfly
	<i>Aonidiella orientalis</i>	Oriental scale
	<i>Aphis glycines</i>	Soybean aphid
	<i>Aspidiotus destructor</i>	Coconut scale
	<i>Asterolecanium epidendri</i>	Orchard scale
	<i>Aulacaspis yasumatsui</i>	Cycad aulacaspis scale
	<i>Ceroplastes ceriferus</i>	Indian wax scale
	<i>Ceroplastes floridensis</i>	Florida wax scale
	<i>Ceroplastes rubens</i>	Red wax scale
	<i>Ceroplastes rusci</i>	Fig wax scale

		<i>Chionaspis furfura</i>	Scurfy scale
		<i>Coccus viridis</i>	Green scale
		<i>Crisicoccus azaleae</i>	Azalea mealybug
		<i>Dysmicoccus alazon</i>	Alazon mealybug
		<i>Fiorinia theae</i>	Tea scale
		<i>Icerya aegyptiaca</i>	Egyptian fluted scale
	Thrips	<i>Danotrips trifasciatus</i>	Thrips
Disease	Bacterium	<i>Candidatus Liberibacter africanus</i>	Huanglongbing disease of citrus-African strain
		<i>Candidatus Liberibacter americanus</i>	Huanglongbing disease of Citrus-Americas strain
		<i>Candidatus Liberibacter asiaticus</i>	Huanglongbing disease of Citrus-Asian strain
		<i>Candidatus Liberibacter sp.</i>	Huanglongbing Disease of Citrus
		<i>Xanthomonas anoxopodis</i> pv. <i>citri</i>	Citrus canker
	Fungus	<i>Xylella fastidiosa</i> CVC	Citrus/Select agent (citrus variegated chlorosis strain)
		<i>Xylophilus ampelinus</i> (<i>Xanthomonas ampelina</i>)	Grapevine bacterial blight
		<i>Acremonium</i> (<i>Cephalosporium</i>) <i>diospyri</i>	Persimmon wilt
		<i>Cronartium flaccidum</i>	Scotch pine blister rust
		<i>Cryphonectria parasitica</i>	Chestnut blight
		<i>Discula destructiva</i>	Dogwood Anthracnose
		<i>Phomopsis vaccinii</i>	Phomopsis soft rot
		<i>Phytophthora alni</i>	Alder Phytophthora
		<i>Puccinia graminis</i> f. sp. <i>tritici</i>	Wheat stem rust (Uganda 99 strain)/Black rust
		Virus	<i>Cilivirus cilv-c</i>
<i>Nepovirus gtrsv</i>	Grapevine Tunisian ringspot virus		
<i>Potyvirus ppv</i>	Plum pox virus		
<i>Potyvirus</i> : <i>Potyviridae</i>	Plum pox		
Invertebrate	Nematode	<i>Radopholus similis</i>	Burrowing nematode
		<i>Rotylenchulus reniformis</i>	Reniform nematode
Plant	Herbaceous	<i>Aeginetia</i> spp.	Aeginetia
		<i>Alectra</i> spp.	Alectra
	Grass	<i>Imperata brasiliensis</i>	Brazilian satintail
		<i>Leptochloa chinensis</i>	Asian sprangletop
		<i>Urochloa panicoides</i>	Liverseed grass

Vertebrate	Amphibian	<i>Anolis sagrei</i>	Brown anole
		<i>Eleutherodactylus coqui</i>	Coqui frog
		<i>Osteopilus septentrionalis</i>	Cuban treefrog
		<i>Eleutherodactylus planirostris</i>	Greenhouse frog

Potting Soils & Planting Mediums

Table 22. Species that could enter California through potting soils and planting mediums

Arthropod	Beetle	<i>Adoretus spp.</i>	Adoretus spp.
		<i>Adoretus sinicus</i>	Chinese rose beetle
Disease	Fungus	<i>Acremonium</i> <i>(Cephalosporium) diospyri</i>	Persimmon wilt
		<i>Sclerophthora rayssiae var. zea</i>	Brown stripe downy mildew of maize
		<i>Synchytrium endobioticum</i>	Potato wart/Select agent
		<i>Thecaphora (Angiosorus) solani</i>	Potato smut
		<i>Tilletia tritici (caries)</i>	Wheat smut
Plant	Grass	<i>Nassella trichotoma</i>	Serrated tussock
Vertebrate	Amphibian	<i>Eleutherodactylus coqui</i>	Coqui frog
		<i>Osteopilus septentrionalis</i>	Cuban treefrog

Seed Trade and Seed Contamination

Table 23. Species that could enter California through the seed trade and seed contamination

Type	Subtype	Scientific name	Common Name	
Arthropod	Bee, wasp	<i>Solenopsis geminata</i>	Tropical fire ant	
	Beetle	<i>Atrichonotus taeniatulus</i>	Small lucerne weevil	
		<i>Conotrachelus aguacatae</i>	Small avocado seed weevil	
		<i>Curculio caryae</i>	Pecan weevil	
		<i>Curculio elephas</i>	Chestnut weevil	
		<i>Lophocateres pusillus</i>	Siamese grain borer	
		<i>Oulema melanopus</i>	Cereal leaf beetle	
		Butterfly, moth	<i>Celama sorghiella</i>	Sorghum webworm
			<i>Chilo plejadellus</i>	Rice stalk borer
			<i>Chilo suppressalis</i>	Asiatic rice borer
			<i>Choristoneura fumiferana</i>	Spruce budworm
	<i>Corcyra cephalonica</i>		Rice moth	
		<i>Cydia caryana</i>	Hickory shuckworm	

	Scale, aphid	<i>Hemimene juliana</i> <i>Icerya aegyptiaca</i>	Nut fruit tortrix Egyptian fluted scale
Disease	Bacterium Fungus	<i>Dickeya solani</i> <i>Colletotrichum coffeanum</i> <i>Entyloma oryzae</i> <i>Microcyclus ulei</i> <i>Peronosclerospora sacchari</i> (<i>philippinensis</i>) <i>Phakopsora meibomiaie</i> <i>Phakopsora pachyrhizi</i> <i>Puccinia graminis f. sp. tritici</i> <i>Sclerophthora rayssiae var.</i> <i>zeae</i> <i>Sirococcus clavigignenti-</i> <i>juglandacearum</i> <i>Thecaphora (Angiosorus)</i> <i>solani</i> <i>Tilletia tritici (caries)</i>	Black leg disease of potato Brown blight Leaf smut of rice South American leaf blight Sugarcane downy mildew Soybean rust Asian soybean rust Wheat stem rust (Uganda 99 strain)/Black rust Brown stripe downy mildew of maize Butternut canker Potato smut Wheat smut
Plant	Grass Herbaceous Woody	<i>Oryza longistaminata</i> <i>Oryza punctata</i> <i>Pennisetum polystachion</i> <i>Sorghum almum</i> <i>Sorghum propinquum</i> <i>Centaurea macrocephala</i> <i>Chaenorhinum minus</i> <i>Heracleum mantegazzianum</i> <i>Hieracium atratum</i> <i>Hieracium aurantiacum</i> <i>Hieracium caespitosum</i> <i>Hieracium glomeratum</i> <i>Hieracium laevigatum</i> <i>Hieracium pilosella</i> <i>Hieracium piloselloides</i> <i>Hieracium x floribundum</i> <i>Murdannia keisak</i> <i>Senecio madagascariensis</i> <i>Euryops multifidus</i> <i>Salsola collina</i> <i>Senecio madagascariensis</i> <i>Thymelaea passerina</i> <i>Tridax procumbens</i> <i>Tripleurospermum</i> <i>perforatum</i>	Red rice Red rice Missiongrass Columbus grass Sorghum Bighead knapweed Dwarf snapdragon Giant hogweed Polar hawkweed Orange hawkweed Yellow hawkweed Queen devil hawkweed Smooth hawkweed Mouseear hawkweed King devil hawkweed Yellow devil hawkweed Marsh dew flower Madagascar ragwort Hawk's eye Spineless Russian thistle Madagascar ragwort Spurge flax Coat buttons Scentless false mayweed

Hay

Table 24. Species that could enter California through hay

Type	Subtype	Scientific name	Common Name
Arthropod	Beetle	<i>Atrichonotus taeniatulus</i>	Small lucerne weevil
Plant	Grass	<i>Imperata cylindrica</i>	Cogongrass
		<i>Leptochloa chinensis</i>	Asian sprangletop
		<i>Milium vernale</i>	Milium
	Herbaceous	<i>Galega officinalis</i>	Goatsrue
		<i>Lespedeza cuneata</i>	Sericea lespedeza
		<i>Pueraria montana var. lobata</i>	Kudzu
		<i>Tripleurospermum perforatum</i>	Scentless false mayweed
	Woody	<i>Mimosa diplotricha</i>	Giant sensitive plant
		<i>Mimosa invisa</i>	Giant sensitive plant
		<i>Prosopis alpataco</i>	Mesquite
		<i>Prosopis argentina</i>	Mesquite
		<i>Prosopis articulata</i>	Mesquite
		<i>Prosopis burkartii</i>	Mesquite
		<i>Prosopis caldenia</i>	Mesquite
		<i>Prosopis calingastana</i>	Cusqui
		<i>Prosopis campestris</i>	Mesquite
		<i>Prosopis castellanosi</i>	Mesquite
		<i>Prosopis denudans</i>	Mesquite
		<i>Prosopis elata</i>	Mesquite
		<i>Prosopis farcta</i>	Mesquite
		<i>Prosopis ferox</i>	Mesquite
		<i>Prosopis fiebrigii</i>	Mesquite
		<i>Prosopis hassleri</i>	Mesquite
		<i>Prosopis humilis</i>	Mesquite
		<i>Prosopis kuntzei</i>	Mesquite
		<i>Prosopis pallida</i>	Mesquite
		<i>Prosopis palmeria</i>	Mesquite
		<i>Prosopis reptans</i>	Mesquite
		<i>Prosopis rojasiana</i>	Mesquite
		<i>Prosopis ruizlealii</i>	Mesquite
<i>Prosopis ruscifolia</i>		Mesquite	
<i>Prosopis sericantha</i>		Mesquite	
<i>Prosopis torquata</i>		Mesquite	

Firewood

Table 25. Species that could enter California through firewood

Type	Subtype	Scientific name	Common Name
------	---------	-----------------	-------------

Arthropod	Beetle	<i>Agrilus biguttatus</i>	Oak splendour beetle
		<i>Agrilus planipennis</i>	Emerald ashborer
		<i>Anoplophora chinensis</i>	Citrus longhorned beetle
		<i>Anoplophora glabripennis</i>	Asian longhorned beetle
		<i>Callidiellum rufipenne</i>	Lesser Japanese cedar longhorned beetle
		<i>Hylobius pales</i>	Pales weevil
		<i>Hylotrupes bajulus</i>	Old house borer
		<i>Hylurgus ligniperda</i>	Redhaired pine bark beetle
		<i>Hylurgus palliatus</i>	A bark beetle
		<i>Mononychellus alternatus</i>	Japanese pine sawyer
		<i>Orthotomicus erosus</i>	Mediterranean pine engraver
		<i>Pissodes nemorensis</i>	Eastern pine weevil
		<i>Pityogenes chalcographus</i>	Spruce engraver
		<i>Platypus quercivorus</i>	Oak ambrosia beetle
		<i>Tetropium castaneum</i>	A longhorned beetle
		<i>Tomicus destruens</i>	Pine shoot beetle
		<i>Tomicus minor</i>	Lesser pine shoot beetle
		<i>Tomicus piniperda</i>	Pine shoot beetle
		<i>Urocerus gigas</i>	A horntail
	Butterfly, moth	<i>Antaeotricha leucillana</i>	Stenomine oecophorid
	<i>Choristoneura fumiferana</i>	Spruce budworm	
	<i>Dendrolimus superans sibiricus</i>	Siberian silk moth	
	<i>Lymantria dispar</i>	Gypsy moth	
	<i>Lymantria mathura</i>	Pink gypsy moth	
	<i>Lymantria monacha</i>	Nun moth	
	<i>Rhyacionia buoliana</i>	European pine shoot moth	
Plant	Woody	<i>Prosopis alpataco</i>	Mesquite
		<i>Prosopis argentina</i>	Mesquite
		<i>Prosopis articulata</i>	Mesquite
		<i>Prosopis burkartii</i>	Mesquite
		<i>Prosopis caldenia</i>	Mesquite
		<i>Prosopis calingastana</i>	Cusqui
		<i>Prosopis campestris</i>	Mesquite
		<i>Prosopis castellanosi</i>	Mesquite
		<i>Prosopis denudans</i>	Mesquite
		<i>Prosopis elata</i>	Mesquite
		<i>Prosopis farcta</i>	Mesquite
		<i>Prosopis ferox</i>	Mesquite
		<i>Prosopis fiebrigii</i>	Mesquite
		<i>Prosopis hassleri</i>	Mesquite
		<i>Prosopis humilis</i>	Mesquite

	<i>Prosopis kuntzei</i>	Mesquite
	<i>Prosopis pallida</i>	Mesquite
	<i>Prosopis palmeria</i>	Mesquite
	<i>Prosopis reptans</i>	Mesquite
	<i>Prosopis rojasiana</i>	Mesquite
	<i>Prosopis ruizlealii</i>	Mesquite
	<i>Prosopis ruscifolia</i>	Mesquite
	<i>Prosopis sericantha</i>	Mesquite
	<i>Prosopis torquata</i>	Mesquite

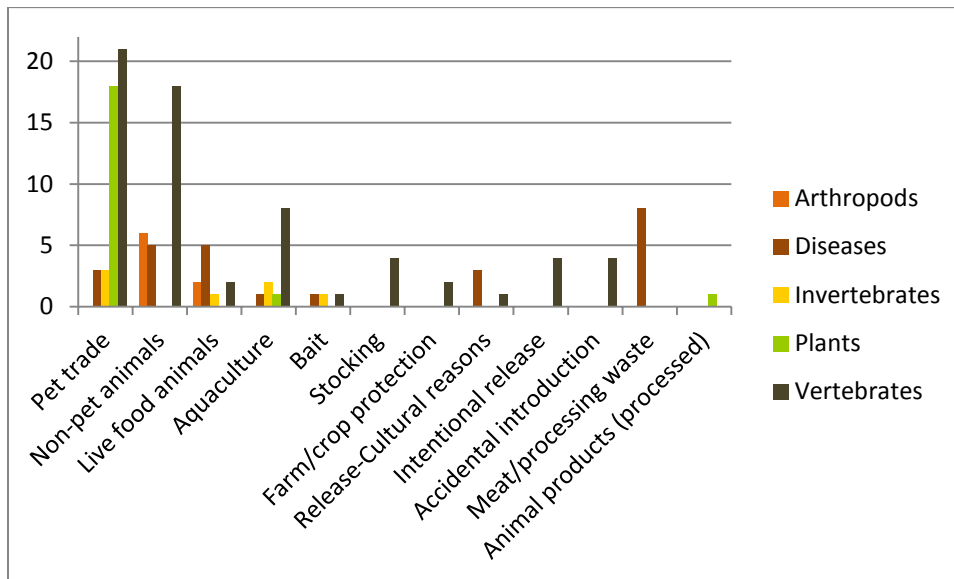
Biological Research

Table 26. Species that could enter California through biological research

Type	Subtype	Scientific name	Common Name
Plant	Grass	<i>Oryza longistaminata</i>	Red rice
		<i>Oryza punctata</i>	Red rice
		<i>Saccharum spontaneum</i>	Wild sugarcane
	Herbaceous	<i>Lespedeza cuneata</i>	Sericea lespedeza

Results of Animal-Related Living Industry Pathways Invasive Species Risk Analysis

Figure 5. Number of species in each animal-related living industry pathway



Pet & Aquarium Trade

Table 27. Species that could enter California through the pet and aquarium trade

Type	Subtype	Scientific name	Common Name
Disease	Bacterium	<i>Ehrlichia ruminantium</i>	Heartwater; cowdriosis
	Virus	<i>Avulavirus ndv</i>	Exotic Newcastle disease
		<i>Paramyxovirus-1 (PMV-1)</i>	Exotic newcastle disease (END)
Invertebrate	Aquatic mollusk, freshwater	<i>Limnoperna fortunei</i>	Golden mussel
	Nematode	<i>Ichthyophthirius multifiliis</i>	Parsitic protozoan of fish
		<i>Oodinium pilularis</i>	Velvet disease
Plant	Algae	<i>Caulacanthus ustulatus</i>	Red algae
		<i>Caulerpa brachypus</i>	Caulerpa brachypus
		<i>Caulerpa racemosa</i>	Caulerpa racemosa
	Herbaceous	<i>Azolla pinnata</i>	Mosquito fern
		<i>Crassula helmsii</i>	Australian swamp stonecrop
		<i>Glossostigma diandrum</i>	Mud mat
		<i>Hygrophila polysperma</i>	Miramar weed
		<i>Impatiens glandulifera</i>	Policeman's helmet
		<i>Imperata brasiliensis</i>	Brazilian satintail
		<i>Limnophila indica</i>	Ambulia
<i>Limnophila sessiliflora</i>	Blume (ambulia)		

		<i>Ludwigia peruviana</i>	Water primrose
		<i>Najas minor</i>	Slender-leaved naiad
		<i>Sagittaria graminea</i>	Grass-leaved arrowhead
		<i>Sagittaria sagittifolia</i>	Arrowhead
		<i>Trapa bicornis</i>	Water caltrap
		<i>Trapa natans</i>	Water-chestnut
		<i>Utricularia inflata</i>	Swollen bladderwort
Vertebrate	Amphibian	<i>Eleutherodactylus coqui</i>	Coqui frog
	Bird	<i>Padda oryzivora</i>	Java sparrow
		<i>Quelea quelea</i>	Red-billed quelea
	Fish	<i>Streptopelia decaocto</i>	Eurasian collared dove
		<i>Cichlasoma salvini</i>	Yellowbelly cichlid
		<i>Cichlasoma spilurum</i>	Blue-eyed cichlid
		<i>Clarias batrachus</i>	Walking catfish
		<i>Monopterus albus</i>	Asian swamp eel
		<i>Mylopharyngodon piceus</i>	Black Carp
		<i>Serrasalminae</i>	Piranha
	Mammal	<i>Cricetomys gambianus</i>	Gambian giant pouched rat
		<i>Dasybus novemcinctus</i>	Nine-banded armadillo
		<i>Meriones unguiculatus</i>	Mongolian gerbil
	Reptile	<i>Anolis equestris</i>	Knight anole
		<i>Anolis sagrei</i>	Brown anole
		<i>Caiman crocodilus</i>	Spectacled caiman
		<i>Chelydra serpentina</i>	Snapping turtle
		<i>Ctenosaura pectinata</i>	Mexican spinytail iguana
<i>Ctenosaura similis</i>		Black spinytail iguana	
<i>Nerodia rhombifer</i>		Diamondback water snake	
	<i>Python molurus</i>	Burmese python	

Non-Pet Animals

Table 28. Species that could enter California through non-pet animals

Type	Subtype	Scientific name	Common Name
Arthropod	Bee, wasp	<i>Apis mellifera capensis</i>	Cape honeybee
	Butterfly, moth	<i>Attacus atlas</i>	Atlas silk moth
		<i>Laspeyresia spp.</i>	Laspeyresia spp.
	Fly	<i>Cochliomyia hominivorax</i>	Screwworm
	Mite	<i>Euvarroa sinhai</i>	Euvarroa sinhai
<i>Tropilaelaps clareae</i>		Honeybee mite	
Vertebrate	Amphibian	<i>Bufo marinus</i>	Giant toad
	Bird	<i>Acridotheres cristatellus</i>	Crested mynah
		<i>Acridotheres tristis</i>	Common mynah

	<i>Aerodramus bartschi</i>	Mariana swiftlet
	<i>Aerodramus fuciphagus</i>	Edible-nest swiftlet
	<i>Alectoris barbara</i>	Barbary partridge
	<i>Porphyrio porphyrio</i>	Purple Swamphen
Fish	<i>Hypophthalmichthys harmandi</i>	Largescale carp
	<i>Hypophthalmichthys molitrix</i>	Silver carp
	<i>Hypophthalmichthys nobilis</i>	Bighead carp
	<i>Monopterus albus</i>	Asian swamp eel
	<i>Mylopharyngodon piceus</i>	Black carp
Mammal	<i>Dasyus novemcinctus</i>	Nine-banded armadillo
	<i>Erinaceus europaeus</i>	European hedgehog
	<i>Myocastor coypus</i>	Nutria
	<i>Trichosurus vulpecula</i>	Brush-tailed possum
Reptile	<i>Ctenosaura pectinata</i>	Mexican spinytail iguana
	<i>Ctenosaura similis</i>	Black spinytail iguana

Live Food Animals

Table 29. Species that could enter California through live food animals

Type	Subtype	Scientific name	Common Name
Arthropod	Bee, wasp	<i>Apis mellifera capensis</i>	Cape honeybee
	Butterfly, moth	<i>Choristoneura fumiferana</i>	Spruce budworm
Disease	Bacterium	<i>Ehrlichia ruminantium</i>	Heartwater; cowdriosis
		<i>Mycoplasma capricolum capripneumoniae</i>	Contagious Bovine Caprine Pleuropneumonia
		<i>Mycoplasma mycoides mycoides</i>	Bovine pleuropneumonia
	Unknown	<i>Unknown pathogenic virus or prion 1</i>	Bovine spongiform encephalopathy (BSE)
		<i>Unknown pathogenic virus or prion 2</i>	Chronic wasting disease (Cervids)
Invertebrate	Nematode	<i>Ichthyophthirius multifiliis</i>	Parasitic protozoan of fish
Vertebrate	Fish	<i>Channa argus</i>	Northern snakehead
	Amphibian	<i>Rana clamitans</i>	Green frog

Aquaculture

Table 30. Species that could enter California through aquaculture

Type	Subtype	Scientific name	Common Name
------	---------	-----------------	-------------

Disease	Virus	<i>Novirhadovirus Viral Hemorrhagic Septicemia Virus (VHSV)</i>	Viral Hemorrhagic septicemia
Invertebrate	Aquatic mollusk, freshwater	<i>Limnoperna fortunei</i>	Golden mussel
	Nematode	<i>Gyrodactylus elegans</i>	Parasitic flatworm of fish
Plant	Herbaceous	<i>Azolla pinnata</i>	mosquito fern
Vertebrate	Amphibian	<i>Rana clamitans</i>	Green frog
	Fish	<i>Clarias batrachus</i>	Walking catfish
		<i>Hypophthalmichthys harmandi</i>	Largescale carp
		<i>Hypophthalmichthys molitrix</i>	Silver carp
	Reptile	<i>Hypophthalmichthys nobilis</i>	Bighead carp
		<i>Scardinius erythrothalmus</i>	Rudd
<i>Tupinambis merianae</i>		Argentina giant tegu	
	<i>Varanus niloticus</i>	Nile monitor	

Bait

Table 31. Species that could enter California through fishing baits

Disease	Virus	<i>Novirhadovirus Viral Hemorrhagic Septicemia Virus (VHSV)</i>	Viral hemorrhagic septicemia
Invertebrate	Aquatic mollusk, freshwater	<i>Limnoperna fortunei</i>	Golden mussel
Vertebrate	Fish	<i>Scardinius erythrothalmus</i>	Rudd

Stocking for Fishing & Hunting

Table 32. Species that could enter California through stocking for fishing and hunting

Vertebrate	Bird	<i>Streptopelia decaocto</i>	Eurasian collared dove
	Fish	<i>Dorosoma cepedianum</i>	Gizzard shad
		<i>Esox lucius</i>	Northern pike
		<i>Serrasalminae</i>	Piranha

Farm & Crop Protection

Table 33. Species that could enter California through animals for farm and crop protection

Type	Subtype	Scientific name	Common Name
------	---------	-----------------	-------------

Vertebrate	Amphibian	<i>Bufo marinus</i>	Giant toad
	Reptile	<i>Agkistrodon spp.</i>	Copperhead snake

Release of Organisms for Cultural Reasons

Table 34. Species that could enter California through the release of animals for cultural reasons

Type	Subtype	Scientific name	Common Name
Vertebrate	Bird	<i>Padda oryzivora</i>	Java sparrow

Intentional Release

Table 35. Species that could enter California through intentional release

Type	Subtype	Scientific name	Common Name
Vertebrate	Bird	<i>Threskiornis aethiopicus</i>	Sacred Ibis
		<i>Zosterops japonica</i>	Japanese white-eye
	Fish	<i>Serrasalminae</i>	Piranha
	Reptile	<i>Varanus niloticus</i>	Nile monitor

Accidental Introduction or Escape from Captivity

Table 36. Species that could enter California through accidental introduction or escape from captivity

Type	Subtype	Scientific name	Common Name
Vertebrate	Bird	<i>Acridotheres cristatellus</i>	Crested mynah
		<i>Acridotheres tristis</i>	Common mynah
		<i>Aerodramus bartschi</i>	Mariana swiftlet
		<i>Porphyrio porphyrio</i>	Purple Swamphen

Minimally Processed Animal Products

Table 37. Species that could enter California through minimally processed animal products

Type	Subtype	Scientific name	Common Name
Plant	Herbaceous	<i>Senecio inaequidens</i>	South African ragwort

RECOMMENDATIONS – NEXT STEPS

- Expert review of pathway analysis
- Address information gaps
- Assign threat levels (human, economic, and ecosystem health)
- Identify risk host organisms and countries of origin for each species
- Identify ISCC agencies responsible for each pathway
- Invasive Species of Highest Concern for California
- High Risk Pathways of Introduction

- Current Program Capacity to Address Each High Risk Pathway

LITERATURE CITED

Links for the references used for the research for the Invasive Species Pathway Risk Analysis will be linked to each species on the CISAC Invasive Species List and Scorecards for California (<http://ice.ucdavis.edu/invasives/>)

Hulme PE (2009) Trade, transport and trouble: managing invasive species pathways in an era of globalization. *JAppEcol* 46:10-18

Levine JM, D'Antonio CM (2003) Forecasting Biological Invasions with Increasing International Trade. *Conservation Biology* 17(1)322-326

National Invasive Species Council (NISC) (2007) Training and Implementation Guide for a Pathway Definition, Risk Analysis and Risk Prioritization. Developed jointly by the Aquatic Nuisance Species Task Force (ANSTF) and The National Invasive Species Council (NISC) Prevention Committee via the Pathways Work Team. USDA-APHIS. Riverdale, MD.