



The California Invasive Species List

Presented on April 21, 2010 by the
California Invasive Species Advisory Committee (CISAC) to the
Invasive Species Council of California (ISCC)

***Note:** The list, including scorecards, source references, and reviewers, can be found online at <http://ice.ucdavis.edu/invasives/>, and will be linked from the ISCC/CISAC webpage at www.iscc.ca.gov.*

Summary

CISAC has created a list of invasive species that threaten California, as mandated by the ISCC Bylaws and the CISAC Charter. The list currently includes over 1,700 species of all taxonomic types—vertebrate, invertebrate, plant, and disease—and includes not only those damaging organisms already in the state but also those that could conceivably be introduced and become problems in the future. CISAC drew from over 80 existing lists from California and beyond, including regulatory lists and lists maintained by universities and NGOs. CISAC designed a website to collect input from area experts, and considers the list to be a living document that will be reviewed and updated continuously. Since March 2010 over 100 experts have created accounts on the website. CISAC developed a “scorecard” template for rating the impacts of a given species and our ability to respond to it, and has used it to assess over 200 species. This list forms the foundation for the strategic action plan CISAC will be developing.

Mandate and Need

The CISAC Charter requires the committee to “Provide advice to the ISCC relating to the ISCC’s role in...[d]eveloping and maintaining a list of invasive species that have a reasonable likelihood of entering or have entered California for which an exclusion, detection, eradication, control or management action by the State might be taken” (Article IIIB).

Also, in 2008, AB 2763 (Laird) mandated that state agencies, led by the California Dept. of Food & Agriculture, undertake advance planning to prepare for future introductions of invasive species. Such planning would review likely response scenarios and address concerns proactively. Implementation is contingent on securing federal funding.

Generating a list of invasive species provides a foundation for setting strategic priorities. As “scorecards” are completed for individual species, we document based on consistent criteria for California how severely the organism damages resources and how able we are to respond. Together with principles laid out in the upcoming strategic action plan, this information will help guide

ongoing programmatic development. In addition, the list can be a valuable public education tool, helping Californians understand the importance of addressing invasive species. It is not appropriate, however, to use this list as a justification for assigning invasive species to regulatory categories for the purpose of banning entry; such classifications should follow detailed evaluation of the species as established in the charter and bylaws of ISCC.

The “Long List” and Scorecards

CISAC created working groups to address each of five taxonomic areas: vertebrates; plants; arthropods; invertebrates other than arthropods; and diseases. Except in rare circumstances, we compiled our “long list” from existing lists—over 80 sources in all. These ranged from state and federal regulatory list to university reports and NGO watch lists, but each is substantiated by an authoritative source. In some cases we included all species from a particular list, but in many cases professional judgment was necessary to distinguish those species. To date there are over 1,700 species on our long list.

CISAC developed a “scorecard” template to provide a consistent framework for assessing species for California (criteria shown at right). To date, CISAC has drafted scorecards for over 200 of the species on our long list. Each scorecard assesses the impact of a particular organism and gauges our ability to respond to the organism. To assess impact, each scorecard totals the following factors: how fast the organism can spread; how much of California can be impacted by the organism; and damage to the environment, agriculture, infrastructure, cultural resources, and public health. Any benefits in those areas are also considered and can lower the impact score. To then gauge our ability to respond, each scorecard totals the following factors: how easy it is to detect the organism; how easy it is to control the organism; and to what extent we have policies and programs already in place for prevention, control, and outreach efforts. Each criteria is scored (0-5) with notes indicating why the score was given.

The two scores can be used to demonstrate program needs. For instance, those organisms with a high impact score and a low score for ability to respond will require a different program than those with low impact and a high score for ability to respond. The scores can also help profile organisms composed for public outreach. CISAC has adjusted the current scorecards based on the first round of comment from outside experts. Drafting scorecards for additional species will be an ongoing task, and will steadily increase our ability to compare species based on consistent criteria.

A “Living” List through Collaborative Online Authoring

Compiling a list such as this requires involvement from a wide range of area experts. Invasive species in many taxonomic areas are still not well understood, and information in all taxonomic areas is

SCORECARD CRITERIA

IMPACT

Damage	
a) Ecological	0-5
b) Agricultural	0-5
c) Infrastructure	0-5
d) Cultural	0-5
e) Health	0-5

Threat	
a) Introduction	0-5
b) Spread rate	0-5
c) Spread amount	0-5

Benefit	
a) Ecological	0-5
b) Agricultural	0-5
c) Infrastructure	0-5
d) Cultural	0-5
e) Health	0-5

Impact = 0-40 with a higher score corresponding to greater impact.
[Damage + Threat – Benefit]

ABILITY TO RESPOND

Ease of Response	
a) Detection	0-5
b) Control	0-5

Tools in Place	
a) Prevent Entry	0-5
b) Control	0-5
c) Outreach	0-5

Ability to Respond = 0-25 with a higher score corresponding to greater ability to respond.
[Ease of Response + Tools in Place]

evolving over time. The list is not static—it is a dynamic, “living” list. By using this approach, the list will properly reflect ongoing research and additions to the scientific record as they occur.

CISAC worked with the Information Center for the Environment (ICE) at UC Davis to design an innovative website to allow for ongoing commenting and editing. In March, CISAC invited experts to the site. Since then over 100 experts, from county agricultural commissioner’s staff to university scientists, have created accounts and reviewed our work. CISAC has responded to comments made by reviewers, and the list has been greatly strengthened by their input. This review and editing through a dialog with the community of invasive species experts will continue, and is an integral part of the list’s design. The biological breadth covered by the list absolutely requires involvement from a large number of contributors, and the evolving nature of invasive species situations (and our knowledge of them) requires that we be able to update information continuously.

The website has a number of features supporting such collaborative authoring. Reviewers create an account on the site, and any comments they submit are tracked to them. Responses to particular comments are tracked in a communication thread. Likewise, any edits to scorecards by individuals with editing permission are tracked, and versions are created to document all decisions. Additional features include email alerts when changes are made to organisms of interest to any given person.

Next Steps

The online list and scorecards will require significant ongoing work, both by experts in the field and by UC Davis web designers, work potentially beyond the scope envisioned for the advisory committee and its members. In the short term, CISAC will continue to refine existing scorecards, soliciting input from colleagues and making appropriate adjustments. To the extent possible, CISAC will also work to generate additional scorecards. CISAC will work with the Information Center for the Environment at UC Davis to add new features to the website to make it more powerful and user-friendly.

CISAC’s second mandate is to draft a strategic action plan for the ISCC. This plan will “detail and recommend performance-oriented goals and objectives and specific measures of success for state agencies’ or departments’ efforts concerning invasive species... [the plan] shall be developed through a public process and in consultation with state agencies and stakeholders.” (from ISCC Bylaws)

This plan will review existing and prospective approaches and authorities for preventing the introduction and spread of invasive species. The list created by CISAC provides a foundation for evaluating the effectiveness of these approaches and authorities, by defining the scope and nature of the problem. By gauging our ability to respond to each organism, the list helps define the need for a variety of programmatic approaches. And by cataloguing impacts, the list also provides justification for diverse stakeholders involvement in a public process to address this issue.

This work requires meeting several key needs for support, described below.

List website – the website developed by the UC Davis Information Center for the Environment is a unique and powerful tool for collecting expert opinion. Ongoing website maintenance and development of new features will cost \$15,000/year.

Scorecards – drafting scorecards for each organism is key to assessing and documenting the invasive species’ importance to California. This requires significant time and expertise. State agency staff has contributed to this effort already, and their availability is critical. Assistance from university and

other personnel is also essential. The cost of organizing this effort for all 1,700 species is estimated at \$300,000 (1,500 remaining species at 4 hours each at \$50), which will leverage extensive in-kind contributions from a range of experts.

Writer and designer – CISAC efforts to generate the upcoming strategic action plan will benefit from the services of a professional writer and designer, costing \$10,000.

Scorecards

The list below shows species for which CISAC has generated scorecards to date, organized by taxonomic group. Each is noted with its current extent in California, its total impact score (spread plus impacts minus benefits), and its total score for our ability to respond (ease of response plus tools in place). For reference, the highest score for impacts is 27 (meaning a very high level of impact), and the highest score for ability to respond is 23 (meaning we are currently very well equipped to respond). Of the 200+ species with scorecards, 36% are not currently found in California, and 51% of these have a high risk for introduction into the state. Scores will continue to be refined with additional expert input, and scorecards will be developed for additional species from the long list.

ARTHROPODS

(current extent in CA, impact score,
ability to respond score)

Ants/bees/wasps

<i>Apis mellifera scutellata</i>	Africanized honeybee	(limited, 11, 7)
<i>Solenopsis geminata</i>	tropical fire ant	(not present, 15, 16)
<i>Solenopsis invicta</i>	red imported fire ant	(limited, 23, 21)
<i>Solenopsis richteri</i> x <i>Solenopsis invicta</i> hybrid	hybrid fire ant	(not present, 22, 14)
<i>Solenopsis saevissima</i>	red imported fire ant	(not present, 21, 15)

Beetles

<i>Acalymma vittatum</i>	striped cucumber beetle	(not present, 11, 18)
<i>Agilus coxalis</i>	golden spotted oak borer	(limited, 19, 8)
<i>Agilus planipennis</i>	emerald ashborer	(not present, 21, 15)
<i>Anomala orientalis</i>	Oriental beetle	(not present, 13, 16)
<i>Anoplophora glabripennis</i>	Asian longhorned beetle	(not present, 26, 15)
<i>Anthonomus grandis grandis</i>	boll weevil	(not present, 11, 18)
<i>Conotrachelus retentus</i>	black walnut curculio	(not present, 13, 18)
<i>Curculio caryae</i>	pecan weevil	(not present, 13, 18)
<i>Cylas formicarius elegantulus</i>	sweetpotato weevil	(not present, 14, 17)
<i>Diabrotica virgifera virgifera</i>	western corn rootworm	(not present, 15, 17)
<i>Diaprepes abbreviatus</i>	diaprepes root weevil	(limited, 22, 18)
<i>Diaprepes</i> sp.	exotic weevil	(not present, 21, 14)
<i>Epilachna varivestis</i>	Mexican bean beetle	(not present, 16, 16)
<i>Leptinotarsa decemlineata</i>	Colorado potato beetle	(not present, 14, 17)
<i>Oulema melanopus</i>	cereal leaf beetle	(not present, 13, 19)
<i>Popillia japonica</i>	Japanese beetle	(not present, 18, 18)
<i>Tomicus piniperda</i>	pine shoot beetle	(not present, 12, 16)
<i>Trogoderma granarium</i>	khapra beetle	(not present, 17, 19)
<i>Xyleborinus andrewesi</i>	Asian ambrosia beetle	(not present, 12, 6)
<i>Xyleborus glabratus</i>	Redbay ambrosia beetle	(not present, 19, 15)

Butterflies/moths

<i>Cactoblastis cactorum</i>	cactus moth	(not present, 20, 17)
<i>Chilo suppressalis</i>	Asiatic rice borer	(not present, 15, 16)
<i>Choristoneura fumiferana</i>	spruce budworm	(not present, 6, 17)
<i>Epiphyas postvittana</i>	light brown apple moth	(limited, 15, 21)
<i>Heliocoverpa armigera</i> (Hübner)	cotton bollworm	(not present, 16, 16)
<i>Laspeyresia</i> spp.	Laspeyresia spp.	(not present, 12, 16)
<i>Lobesia botrana</i>	European grapevine moth	(limited, 14, 21)
<i>Lymantria dispar</i>	Gypsy moth	(not present, 22, 22)
<i>Mamestra brassicae</i>	cabbage moth	(not present, 13, 19)
<i>Ostrinia nubilalis</i>	European corn borer	(not present, 13, 17)
<i>Pectinophora gossypiella</i>	pink bollworm	(limited, 12, 20)

<i>Rhyacionia buoliana</i>	European pine shoot moth	(not present, 12, 16)
<i>Sannina uroceriformis</i>	persimmon borer	(not present, 12, 14)
<i>Spodoptera littoralis</i>	Egyptian cottonworm	(not present, 18, 15)
<i>Thaumatotibia leucotreta</i>	false codling moth	(not present, 16, 17)

Flies

<i>Anastrepha ludens</i>	Mexican fruit fly	(limited, 17, 19)
<i>Anastrepha obliqua</i>	West Indian fruit fly	(not present, 18, 21)
<i>Anastrepha striata</i>	guava fruit fly	(limited, 13, 15)
<i>Anastrepha suspensa</i>	Caribbean fruit fly	(not present, 18, 21)
<i>Bactrocera albistrigata</i>	white striped fruit fly	(not present, 11, 22)
<i>Bactrocera correcta</i>	Guava fruit fly	(not present, 17, 19)
<i>Bactrocera cucurbitae</i>	melon fly	(not present, 18, 20)
<i>Bactrocera dorsalis</i>	Oriental fruit fly	(limited, 18, 22)
<i>Bactrocera scutellata</i>	striped fruit fly	(not present, 12, 18)
<i>Bactrocera zonata</i>	peach fruit fly	(not present, 20, 22)
<i>Ceratitis capitata</i>	Mediterranean fruit fly	(limited, 19, 23)
<i>Cochliomyia hominivorax</i>	screwworm	(not present, 20, 19)
<i>Rhagoletis cerasi</i>	European cherry fruit fly	(not present, 15, 17)

Mites

<i>Tropilaelaps clareae</i>	honeybee mite	(not present, 19, 16)
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Scales/aphids

<i>Acutaspis albopicta</i>	albopicta scale	(not present, 10, 18)
<i>Aspidiotus destructor</i>	coconut scale	(not present, 17, 14)
<i>Bagrada hilaris</i>	bagrada bug	(limited, 14, 11)
<i>Ceroplastes ceriferus</i>	Indian wax scale	(not present, 10, 18)
<i>Diaphorina citri</i>	Asian citrus psyllid	(limited, 18, 21)
<i>Ferrisia gilli</i>	Gill's mealybug	(limited, 13, 20)
<i>Homalodisca vitripennis</i>	glassy-winged sharpshooter	(limited, 18, 21)
<i>Maconellicoccus hirsutus</i>	pink hibiscus mealybug	(limited, 14, 14)
<i>Nilotaspis halli</i>	Hall scale	(not present, 11, 18)
<i>Parlatoria theae</i>	tea parlatoria scale	(not present, 13, 18)
<i>Planococcus ficus</i>	vine mealybug	(limited, 15, 16)
<i>Planococcus minor</i> (Maskell)	passionvine mealybug	(not present, 19, 17)
<i>Toxoptera citricida</i>	brown citrus aphid	(not present, 17, 19)

Thrips

<i>Liothrips oleae</i>	olive thrips	(not present, 9, 17)
<i>Scirtothrips dorsalis</i> (Hood)	Chilli thrips	(not present, 19, 17)
<i>Thrips florum</i>	banana flower thrips	(not present, 12, 17)
<i>Thrips palmi</i>	melon thrips	(not present, 16, 20)

OTHER INVERTEBRATES

Aquatic mollusk, freshwater

<i>Bithynia tentaculata</i>	faucet snail	(unknown, 7, 5)
<i>Corbicula fluminea</i>	Asian clam	(widespread, 10, 4)
<i>Dreissena bugensis</i>	quagga mussels	(limited, 23, 15)
<i>Dreissena polymorpha</i>	zebra mussels	(limited, 23, 15)
<i>Limnoperna fortunei</i>	golden mussel	(not present, 27, 5)
<i>Potamopyrgus antipodarum</i>	New Zealand mudsnail	(limited, 18, 13)

Crustaceans/tunicates

<i>Carcinus maenas</i>	green crab	(limited, 10, 14)
<i>Eriocheir sinensis</i>	Chinese mitten crab	(limited, 14, 14)

<i>Orconectes rusticus</i>	rusty crayfish	(not present, 7, 9)
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Nematodes

<i>Globodera rostochiensis</i>	golden nematode	(not present, 10, 14)
<i>Hemicycliophora arenaria</i>	sheath nematode	(unknown, 12, 17)
<i>Pratylenchus coffeae</i>	root-lesion nematode	(unknown, 10, 7)
<i>Radopholus similis</i>	burrowing nematode	(not present, 12, 17)
<i>Rotylenchulus reniformis</i>	reniform nematode	(unknown, 13, 15)
<i>Tylenchulus semipenetrans</i>	citrus nematode	(widespread, 11, 4)

PLANTS

Algae

<i>Ascophyllum nodosum</i>	common brown algae	(limited, 10, 7)
<i>Caulerpa brachypus</i>	Caulerpa brachypus	(unknown, 10, 7)
<i>Caulerpa racemosa</i>	Caulerpa racemosa	(unknown, 12, 11)
<i>Caulerpa taxifolia</i>	Mediterranean strain Caulerpa	(unknown, 14, 11)
<i>Undaria pinnatifida</i>	wakame	(widespread, 18, 3)

Grasses

<i>Aegilops triuncialis</i>	barb goatgrass	(widespread, 23, 7)
<i>Ammophila arenaria</i>	European beachgrass	(widespread, 14, 10)
<i>Arundo donax</i>	giant reed	(widespread, 15, 9)
<i>Avena barbata</i>	slender wild oat	(widespread, 4, 8)
<i>Avena fatua</i>	wild oat	(widespread, 9, 8)
<i>Bromus diandrus</i>	ripgut brome	(widespread, 18, 8)
<i>Bromus hordeaceus</i>	soft brome	(widespread, 8, 8)
<i>Bromus madritensis</i> ssp. <i>rubens</i>	red brome	(widespread, 17, 7)
<i>Bromus tectorum</i>	downy brome	(widespread, 17, 7)
<i>Cortaderia jubata</i>	jubatagrass	(widespread, 12, 15)
<i>Cortaderia selloana</i>	pampasgrass	(widespread, 9, 14)
<i>Ehrharta calycina</i>	purple veldtgrass	(widespread, 9, 7)
<i>Glyceria declinata</i>	waxy mannagrass	(limited, 13, 3)
<i>Lolium multiflorum</i>	Italian ryegrass	(widespread, 10, 8)
<i>Oryza rufipogon</i>	red rice	(limited, 6, 16)
<i>Pennisetum ciliare</i>	buffelgrass	(limited, 11, 6)
<i>Pennisetum setaceum</i>	crimson fountaingrass	(widespread, 6, 8)
<i>Sorghum halepense</i>	Johnsongrass	(widespread, 6, 8)
<i>Spartina alterniflora</i> x <i>foliosa</i> hybrids	smooth cordgrass and hybrids	(limited, 18, 13)
<i>Taeniatherum caput-medusae</i>	medusahead	(widespread, 25, 8)

Herbaceous

<i>Acroptilon repens</i>	Russian knapweed	(limited, 19, 12)
<i>Allaria petiolata</i>	garlic mustard	(not present, 10, 3)
<i>Alternanthera philoxeroides</i>	alligatorweed	(limited, 16, 16)
<i>Arctotheca calendula</i> (fertile)	fertile capeweed	(limited, 3, 8)
<i>Arctotheca calendula</i> (sterile)	sterile capeweed	(limited, 3, 8)
<i>Brassica nigra</i>	black mustard	(widespread, 9, 4)
<i>Brassica tournefortii</i>	Saharan mustard	(limited, 10, 6)
<i>Cabomba caroliniana</i>	Carolina fanwort	(limited, 16, 1)
<i>Cardaria draba</i>	hoary cress	(widespread, 11, 7)
<i>Carpobrotus edulis</i>	iceplant	(widespread, 9, 16)
<i>Carthamus lanatus</i>	woolly distaff thistle	(widespread, 19, 13)
<i>Centaurea calcitrapa</i>	purple starthistle	(widespread, 18, 13)
<i>Centaurea solstitialis</i>	yellow starthistle	(widespread, 20, 4)
<i>Centaurea stoebe</i> ssp. <i>micranthos</i>	spotted knapweed	(limited, 17, 12)
<i>Cirsium arvense</i>	Canada thistle	(widespread, 20, 12)
<i>Cirsium vulgare</i>	bull thistle	(widespread, 18, 12)

<i>Conium maculatum</i>	poison-hemlock	(widespread, 16, 5)
<i>Convolvulus arvensis</i>	field bindweed	(widespread, 8, 6)
<i>Cuscuta japonica</i>	Japanese dodder	(limited, 18, 21)
<i>Cuscuta</i> spp. (<i>C. reflexa</i> , Australian, <i>monogya</i>)	dodder (non-native spp.)	(limited, 20, 20)
<i>Cynoglossum officinale</i>	houndstongue	(limited, 8, 6)
<i>Cyperus rotundus</i>	purple nutsedge	(widespread, 8, 11)
<i>Delairea odorata</i>	Cape-ivy	(widespread, 12, 14)
<i>Dittrichia graveolens</i>	stinkwort	(limited, 10, 7)
<i>Egeria densa</i>	Brazilian egeria	(widespread, 20, 16)
<i>Eichhornia crassipes</i>	water hyacinth	(widespread, 18, 7)
<i>Euphorbia esula</i>	leafy spurge	(limited, 17, 14)
<i>Foeniculum vulgare</i>	fennel	(widespread, 8, 10)
<i>Halogeton glomeratus</i>	halogeton	(widespread, 11, 10)
<i>Heracleum mantegazzianum</i>	giant hogweed	(not present, 11, 5)
<i>Hydrilla verticillata</i>	hydrilla	(limited, 19, 16)
<i>Hygrophila polysperma</i>	Miramar weed	(not present, 19, 5)
<i>Hypericum perforatum</i>	common St. Johnswort	(widespread, 11, 12)
<i>Ipomoea aquatica</i>	swamp morningglory	(limited, 17, 8)
<i>Isatis tinctoria</i>	dyer's woad	(widespread, 6, 7)
<i>Lagarosiphon major</i>	oxygenweed	(not present, 16, 7)
<i>Lepidium latifolium</i>	perennial pepperweed	(widespread, 18, 11)
<i>Linaria genistifolia</i> ssp. <i>dalmatica</i>	Dalmatian toadflax	(limited, 10, 12)
<i>Lythrum salicaria</i>	purple loosestrife	(limited, 11, 12)
<i>Mentha pulegium</i>	pennyroyal	(limited, 9, 9)
<i>Mesembryanthemum crystallinum</i>	crystalline iceplant	(widespread, 1, 9)
<i>Monochoria vaginalis</i>	heartshape false pickerelweed	(limited, 12, 16)
<i>Myriophyllum aquaticum</i>	parrotfeather	(limited, 17, 11)
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil	(widespread, 17, 11)
<i>Onopordum acanthium</i>	Scotch thistle	(limited, 18, 15)
<i>Orobanche ramosa</i>	branched broomrape	(limited, 10, 12)
<i>Potamogeton crispus</i>	curlyleaf pondweed	(widespread, 19, 16)
<i>Pueraria montana</i> var. <i>lobata</i>	kudzu	(not present, 12, 8)
<i>Raphanus sativus</i>	radish	(widespread, 12, 10)
<i>Ricinus communis</i>	castorbean	(widespread, 9, 9)
<i>Salsola tragus</i>	Russian-thistle	(widespread, 18, 9)
<i>Salvinia molesta</i>	giant salvinia	(limited, 20, 16)
<i>Senecio jacobaea</i>	tansy ragwort	(limited, 11, 8)
<i>Striga asiatica</i>	witchweed	(not present, 16, 15)
<i>Trapa natans</i>	water-chestnut	(not present, 19, 5)
<i>Vinca major</i>	big periwinkle	(widespread, 8, 7)

Woody

<i>Ailanthus altissima</i>	tree-of-heaven	(widespread, 14, 8)
<i>Cytisus scoparius</i>	Scotch broom	(widespread, 18, 14)
<i>Elaeagnus angustifolia</i>	Russian-olive	(limited, 8, 7)
<i>Eucalyptus globulus</i>	Tasmanian blue gum	(widespread, 13, 11)
<i>Genista monspessulana</i>	French broom	(widespread, 18, 10)
<i>Polygonum cuspidatum</i>	Japanese knotweed	(limited, 17, 14)
<i>Rubus armeniacus</i>	Himalaya blackberry	(widespread, 16, 5)
<i>Sapium sebiferum</i>	Chinese tallowtree	(limited, 3, 7)
<i>Schinus molle</i>	Peruvian peppertree	(limited, 3, 8)
<i>Schinus terebinthifolius</i>	Brazilian peppertree	(limited, 2, 8)
<i>Sesbania punicea</i>	red sesbania	(limited, 18, 15)
<i>Tamarix parviflora</i>	smallflower tamarisk	(widespread, 16, 13)
<i>Tamarix ramosissima</i>	saltcedar	(widespread, 16, 13)
<i>Ulex europaeus</i>	gorse	(limited, 12, 9)

VERTEBRATES

Amphibians

<i>Rana catesbeiana</i>	American bullfrog	(widespread, 12, 8)
<i>Xenopus laevis</i>	African clawed frog	(limited, 17, 14)

Birds

<i>Cygnus olor</i>	mute swan	(widespread, 13, 15)
<i>Melagris gallopavo</i>	common turkey	(widespread, 11, 11)
<i>Molothrus ater</i>	brown-headed cowbird	(widespread, 17, 11)
<i>Myiopsitta monachus</i>	monk parakeet	(limited, 16, 15)
<i>Streptopelia decaocto</i>	Eurasian collared dove	(not present, 13, 7)
<i>Sturnus vulgaris</i>	European starling	(widespread, 23, 7)
<i>Zosterops japonica</i>	Japanese white-eye	(not present, 12, 17)

Fish

<i>Channa argus</i>	northern snakehead	(not present, 14, 10)
<i>Esox lucius</i>	northern pike	(not present, 17, 14)
<i>Hypophthalmichthys harmandi</i>	largescale carp	(unknown, 17, 9)
<i>Hypophthalmichthys molitrix</i>	silver carp	(unknown, 17, 9)
<i>Hypophthalmichthys nobilis</i>	bighead carp	(not present, 17, 9)
<i>Lepisosteus osseus</i>	longnose gar	(unknown, 12, 10)
<i>Morone chrysops</i>	white bass	(limited, 14, 19)
<i>Mylopharyngodon piceus</i>	black carp	(unknown, 17, 9)

Mammals

<i>Cervus axis</i>	axis deer	(limited, 18, 10)
<i>Cervus dama</i>	fallow deer	(limited, 22, 10)
<i>Felis catus</i>	feral cat	(widespread, 16, 12)
<i>Mus musculus</i>	house mouse	(widespread, 23, 5)
<i>Mustela putorius</i>	European polecat or ferret	(limited, 14, 14)
<i>Myocastor coypus</i>	nutria	(not present, 24, 14)
<i>Rattus norvegicus</i>	Norway rat	(widespread, 20, 4)
<i>Rattus rattus</i>	ship rat	(widespread, 25, 17)
<i>Sus scrofa</i>	feral pig	(widespread, 13, 21)
<i>Vulpes vulpes</i>	red Fox	(limited, 12, 12)

Reptiles

<i>Boiga irregularis</i>	brown treesnake	(not present, 27, 11)
<i>Chelydra serpentina</i>	snapping turtle	(not present, 10, 5)
<i>Nerodia fasciata</i>	southern watersnake	(unknown, 10, 11)
<i>Nerodia rhombifer</i>	diamondback water snake	(not present, 10, 11)
<i>Trachemys scripta elegans</i>	red-eared slider	(limited, 17, 4)

DISEASES

Bacteria

<i>Candidatus Liberibacter</i> spp.	Huanglongbing disease of citrus	(not present, 18, 17)
<i>Dickeya solani</i>	black leg disease of potato	(not present, 18, 14)
<i>Mycobacterium bovis</i>	bovine tuberculosis	(limited, 12, 21)
<i>Pasteurella multocida</i>	avian cholera	(widespread, 21, 15)
<i>Vibrio cholerae</i>	cholera	(limited, 8, 3)
<i>Xanthomonas ananopodis</i> pv. <i>citri</i>	citrus canker	(not present, 18, 18)
<i>Xylella fastidiosa</i> CVC	citrus/select agent	(not present, 17, 17)
	(citrus variegated chlorosis strain)	(not present, 10, 14)
<i>Xylophilus ampelinus</i>	bacterial blight of grapevine	

Fungi

<i>Ceratocystis fagacearum</i>	oak wilt	(not present, 17, 18)
<i>Entyloma oryzae</i>	leaf smut of rice	(not present, 8, 13)
<i>Geomyces</i> spp.	white-nose syndrome of bats	(not present, 18, 3)
<i>Geosmithia</i> spp.	thousand cankers disease complex	(limited, 16, 7)
<i>Phakopsora pachyrhizi</i>	Asian soybean rust	(not present, 14, 18)
<i>Puccinia horiana</i>	chrysanthemum white rust	(limited, 9, 11)
<i>Raffaelea lauricola</i>	laurel wilt disease	(not present, 22, 13)
<i>Tilletia (neovossia) indica</i>	karnal bunt	(limited, 12, 13)
<i>Uromyces transversalis</i>	gladiolus rust	(limited, 9, 12)

Oomycetes

<i>Phytophthora alni</i>	alder phytophthora	(not present, 16, 10)
<i>Phytophthora ramorum</i>	sudden oak death	(limited, 21, 17)

Protozoa

<i>Myxobolus (Lentospora) cerebralis</i>	protozoic whirling disease	(limited, 15, 16)
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Unknown

Unknown pathogenic virus or prion 2	chronic wasting disease (cervids)	(not present, 19, 14)
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Viruses

<i>Alphavirus</i> (VEEV)	Venezuelan equine encephalitis virus	(not present, 6, 15)
<i>Aphtae epizooticae</i>	hoof and mouth disease	(not present, 24, 19)
<i>Begomovirus</i> (GEM2)	tomato yellow leaf curl virus	(limited, 16, 11)
<i>Begomovirus</i> (ToTV)	tomato Torrado virus (ToTV)	(not present, 17, 16)
<i>Begomovirus</i> (var.)	Begomovirus-caused diseases	(limited, 19, 11)
<i>Bunyavirus</i> (TZSV)	tomato zonate spot virus (TZSV)	(not present, 15, 14)
<i>Flavivirus</i> 1	dengue fever	(limited, 1, 14)
<i>Flavivirus</i> 2	West Nile virus	(widespread, 17, 14)
<i>Novirhadovirus</i> (VHSV)	viral hemorrhagic septicemia	(not present, 12, 11)
<i>Orbivirus</i> btv	bluetongue	(limited, 13, 13)
<i>Paramyxovirus</i> -1 (PMV-1)	exotic Newcastle disease (END)	(not present, 15, 21)
<i>Pestivirus</i> CSFV strain Brescia	classical swine fever virus	(not present, 16, 20)
<i>Porcine herpesvirus</i> 1	swine pseudorabies	(not present, 16, 19)
<i>Potyvirus</i> ppv	plum pox virus	(not present, 18, 15)

Source Lists

Almost all of the organisms on our long list are formally listed elsewhere. Only a few additional organisms were added based on professional opinion, and these were in taxonomic areas where invasive species lists are not yet well developed. The following is a list of source lists used to compile our list. Not all species were taken from each list; professional judgment was used to determine which species were relevant to California.

American Fisheries Society	Noxious Weed List, Arizona
Aquatic Nuisance Species Information System	Noxious Weed List, Colorado
Aquatic Nuisance Species Task Force	Noxious Weed List, Federal
California Agricultural Commissioners, 2009/2010 Survey	Noxious Weed List, Idaho
California Aquatic Invasive Species Management Plan	Noxious Weed List, Montana
California Code of Regulations, Title 14 Sec 671	Noxious Weed List, Nevada
California Fish & Game Code 2118	Noxious Weed List, New Mexico
California Invasive Plant Inventory (Cal-IPC List)	Noxious Weed List, Oregon
California Restricted Species Laws and Regulations - Importation, Transportation and Possession of Wild Animals - Manual 671	Noxious Weed List, Utah
CDFA "A" Rated Vertebrate Pests	Noxious Weed List, Washington
CDFA Animal Health and Food Safety Services Division	Noxious Weed List, Wyoming
CDFA Noxious Weed List	Oregon Invasive Species Council's 100 Most Dangerous Invaders to Keep Out
CDFA Pierce's Disease/Glassy Winged Sharpshooter Program	Ornamental Plants Invasive in Other Mediterranean Regions
CDFA regulated pest list	Report on the Failure of the Lacey Act to Protect U.S. Ecosystems Against Animal Invasions
CDFA report "Protecting California from Biological Pollution"	South Florida Environmental Report , 2010
CDFA/AHFSS Animal Disease List	Univ. of Florida/Florida Dept. of Agriculture & Consumer Services
Center for Infectious Disease Research & Policy	Univ. of Tennessee, Knoxville, Invasive Nerodia Site
Centers for Disease Control and Prevention	US Fish and Wildlife Service
Check-List of the Amphibians, Reptiles, Birds, and Mammals of California	USDA APHIS Offshore Pest Information System (OPIS)
Complete Complete List of Amphibian, Reptile, Bird and Mammal Species in California	USDA APHIS Regulated Plant Pest List
European Food Safety Authority	USDA National Agriculture Library NIS Information Center
European Plant Protection Organization	USDA National Pest Report
Experimental and Applied Acarology	USFWS Lacey Act
Field Guide to Western Reptiles and Amphibians.	Weeds of California and Other Western States (book)
Florida Dept. of Agriculture & Consumer Services	World Health Organization
Florida FWCC List of Non-Natives	
Guide to the Exotic Species of San Francisco Bay	
Harmful Non-Indigenous Species in the United States	
Introduced Amphibians and Reptiles in California	
Invasive Marine and Estuarine Animals of California	
Invasive Species Definition Clarification and Guidance White Paper.	
Iowa State University: Center for Food Security and Public Health	
ISSG 100 of the World's Worst Invasive Alien Species Management of Invasive Vertebrates in the United States: An Overview	
Merck Veterinarian's Manual	
National Institute of Allergy and Infectious Diseases	
National Invasive Species Information Center	
Non-Native & Nuisance Terrestrial Vertebrates	
North American Plant Protection Organization	

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These individuals have created an account on the California Invasive Species List & Scorecards website (<http://ice.ucdavis.edu/invasives>). Not all have commented on the list or scorecards, and their inclusion here does not imply an endorsement of the current scoring. Rather, this list illustrates the diversity of expertise and professional interest engaged by the listing process.

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