Ver 2.0 of a comprehensive list of U.S. non-native species and how it may relate to FICMNEW

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The USGS' recent update of its list of non-native species established in Alaska, Hawaii, and the conterminous United States is a compilation and analysis of authoritative assertions of the nonindigenous status of all taxa in our nation.

Is a subset of this list relevant to weed managers and decision makers? Following the presentation and any resulting questions, join us in a conversation to discuss possible parameters of a potential FICMNEW weed list.

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Information included in the USGS non-native species list

Term	Description
Region:	Alaska, Hawaii, remaining conterminous 48 states
Scientific Name:	Binomial, trinomial, or quadrinomial; virus name as per authority
Authority:	Authoritative reference asserting taxon is non-native in the entire area
TSN:	ITIS Taxonomic Serial Number, where possible
Common Name:	Vernacular name, generally in English
Introduced or invasive:	Descriptor of non-native status of the taxon, generally provided by the authority
Biocontrol/Target Species:	Was the taxon purposely introduced to control a pest species? Y/N
Approx. Introduction Date:	Year of introduction; taken from authority or other reference
Reference/Authority:	A series of columns describing the detail of the authoritative reference

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V2.0: A Comprehensive List of Non-Native Species Established in Three Major Regions

A compilation and analysis of authoritative assertions of the nonindigenous status of taxa in Alaska, Hawaii, and the conterminous United States of America

by Annie Simpson, Meghan C. Eyler, Derek Sikes, Matt Bowser, Elizabeth A. Sellers, Gerald F. Guala, Matthew Cannister, Reko Libby, and Natasha Kozlowski

The list of established[1] non-native[2] species was used to identify occurrence records of non-native species in Biodiversity Information Serving Our Nation (BISON), https://bison.usgs.gov, an all-taxa mapping application that provides public access to more than 465 million native and non-native species occurrence records (as of May 2019).

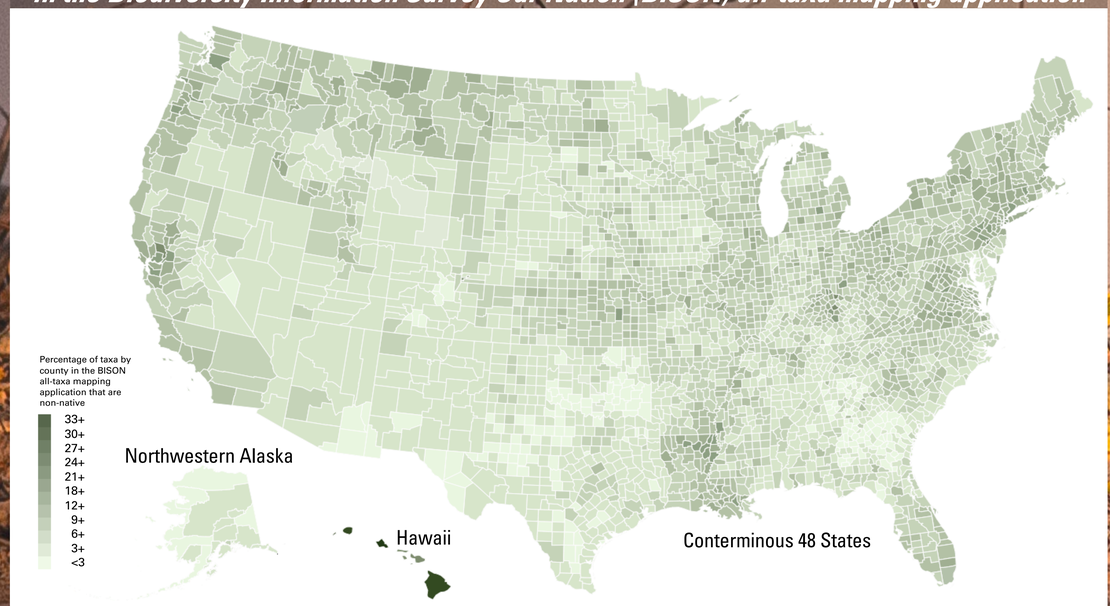
BISON contains 18,264,214 non-native taxa occurrence records, many of which were not labeled as non-native at the time they were collected or observed.

Number of non-native taxa in each region:

Region	Size (km^2)	Taxa
Hawaii	28,311	5,870
Alaska	1,704,219	563
Lower 48	7,898,892	6,553

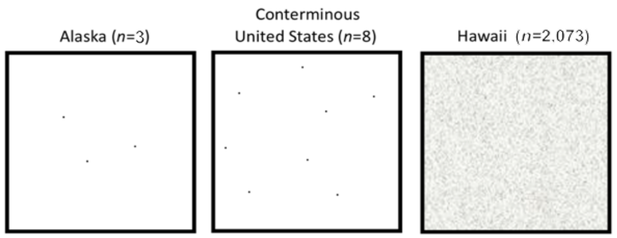
* 11,174 unique taxa (at the species or subspecies level)
* 169 taxa are established in all 3 regions
* 1,276 authoritative sources consulted
* Approximate date of introduction available for 20% of taxa

Percentage of taxa by county that are non-native in the Biodiversity Information Survey Our Nation (BISON) all-taxa mapping application



Estimated relative richness of non-native species and subspecies, as a percentage of total taxa recorded in each county of the United States (data from BISON, https://bison.usgs.gov). Because southeastern Alaska changed city-borough mapping, the area is not shown. Map created by Gerald F. Guala.

Comparative density of non-native species richness by geographic area (per 10,000 square kilometers, where *n* is the number of species).



This Reference:

Simpson, A., Eyler, M.C., Sikes, D., Bowser, M., Sellers, E., Guala, G.F., Cannister, M., Libby, R., and Kozlowski, N., 2019, A comprehensive list of non-native species established in three major regions of the United States: Version 2.0, (ver. 2.0, 2019): U.S. Geological Survey data release, https://doi.org/10.5066/P9E5K160.

Other References:

- Ache, B., 2002, Gulf of Mexico regional panel on aquatic nuisance species annual report 2001—An initial survey of aquatic invasive species issues in the Gulf of Mexico region: EPA 855–R–02–003, U.S. Environmental Protection Agency technical report 200514, 28 p.
- Biodiversity Information Serving Our Nation (BISON) https://bison.usgs.gov (accessed September 12, 2019)
- Devine, Robert, 1998, *Alien Invasion: America's Battle With Non-Native Animals and Plants*, Times Books
- Simpson, A. and Eyler, M.C., 2018, First comprehensive list of non-native species established in three major regions of the United States: U.S. Geological Survey Open-File Report 2018-1156, 15 p., https://doi.org/10.3133/ofr20181156.

[1] Non-native – introduced directly or by human influence to an area where a taxon does not naturally occur; nonindigenous. (Devine, 1998)
[2] Established – naturalized; species with one or more successfully reproducing populations, unlikely to be eliminated by man or natural causes. (Ache, 2002)

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The vascular plants subset of USGS' non-native species list

119 vascular plants are established in all 3 regions (AK-HI-L48)

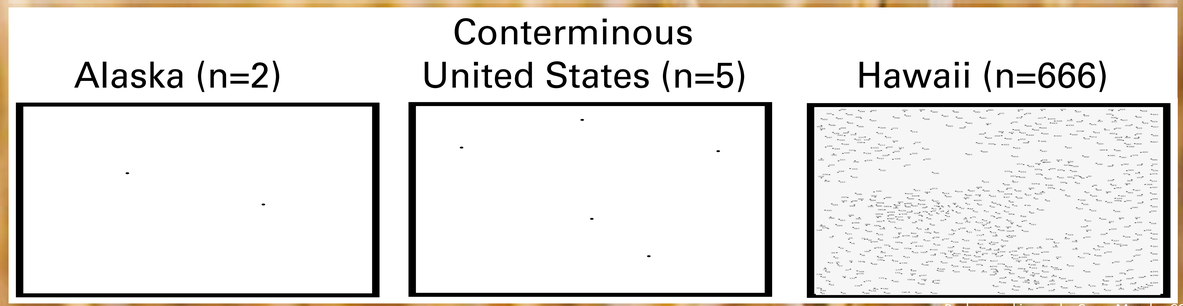
Scientific Name	Common Name
Agrostis capillaris	Colonial bentgrass
Agrostis stolonifera	Creeping bentgrass
Ailanthus altissima	Tree of heaven
Aira caryophyllea	Silver hairgrass
Alopecurus pratensis	Meadow foxtail
Anthemis cotula	Stinking chamomile
Anthoxanthum odoratum	Sweet vernalgrass
Arrhenatherum elatius	Tall oatgrass
Arrhenatherum elatius var. elatius	Tall oatgrass
Artemisia vulgaris	Common wormwood
Avena fatua	Wild oat
Bellis perennis	Lawndaisy
Brassica juncea	Brown mustard
Brassica rapa	Field mustard
Bromus hordeaceus	Soft brome
Bromus hordeaceus ssp. hordeaceus	Soft brome
Bromus secalinus	Rye brome
Bromus secalinus var. secalinus	Rye brome
Bromus tectorum	Cheatgrass
Capsella bursa-pastoris	Shepherd's purse
Centaurea cyanus	Garden cornflower
Centaurea stoebe	Spotted knapweed
Centaurea stoebe ssp. micranthos	Spotted knapweed
Cerastium fontanum	Common mouse-ear chickweed
Cerastium fontanum ssp. vulgare	Big chickweed
Cerastium glomeratum	Sticky chickweed
Chenopodium album	Lambsquarters
Cirsium vulgare	Bull thistle
Convolvulus arvensis	Field bindweed; Creeping Jenny
Crepis capillaris	Smooth hawksbeard
Cytisus scoparius	Scotch broom
Dactylis glomerata	Orchardgrass
Descurainia sophia	Herb sophia
Echinochloa crus-galli	Cockspur; Barnyard grass
Elymus repens	Quackgrass
Erodium cicutarium	Redstem stork's bill
Erodium cicutarium ssp. cicutarium	Redstem stork's bill
Euphorbia peplus	Petty spurge
Fallopia convolvulus	Black bindweed
Geranium pusillum	Small geranium
Hedera helix	English ivy
Holcus lanatus	Common velvetgrass
Hordeum murinum ssp. leporinum	Leporinum barley; hare barley
Hordeum vulgare	Common barley
Hypericum perforatum	St. John's wort
Hypochaeris radicata	Hairy cat's ear
Ilex aquifolium	English holly
Lactuca serriola	Prickly lettuce
Lamium amplexicaule	Henbit deadnettle; Common henbit
Lapsana communis	Common nipplewort
Leontodon autumnalis	Fall dandelion
Lepidium draba	Whitetop
Leucanthemum vulgare	Oxeye daisy
Lolium multiflorum	Annual ryegrass
Malva neglecta	Common mallow
Marrubium vulgare	Horehound
Medicago lupulina	Black medick
Medicago minima	Little bur-clover
Medicago polymorpha	Burclover

Scientific Name	Common Name
Medicago sativa	Alfalfa
Medicago sativa ssp. sativa	Alfalfa
Melilotus officinalis	Sweetclover
Mentha spicata	Spearmint
Misopates orontium	Linearleaf snapdragon
Myriophyllum spicatum	Eurasian watermilfoil
Nasturtium microphyllum	Onerow yellowcress
Persicaria hydropiper	Marshpepper knotweed
Phalaris canariensis	Annual canarygrass
Phalaris minor	Littleseed canarygrass
Phleum pratense	Timothy grass
Plantago lanceolata	Narrowleaf plantain
Plantago major	Common plantain
Poa annua	Annual bluegrass
Poa compressa	Canada bluegrass
Poa pratensis ssp. pratensis	Kentucky bluegrass
Polygonum aviculare ssp. depressum	Oval-leaf knotweed
Polypogon monspeliensis	Annual rabbitsfoot grass
Ranunculus repens	Creeping buttercup
Raphanus sativus	Cultivated radish
Rubus ulmifolius	Elmleaf blackberry
Rumex acetosella	Common sheep sorrel
Rumex crispus	Curly dock
Rumex obtusifolius	Bitter dock
Sagina procumbens	Birdeye pearlwort
Schedonorus arundinaceus	Tall fescue
Schedonorus pratensis	Meadow fescue
Securigera varia	Crown-vetch
Senecio sylvaticus	Woodland ragwort
Senecio vulgaris	Old-man-in-the-spring
Silene armeria	Sweet William silene
Sinapis arvensis	Charlock mustard
Sisymbrium altissimum	Tall tumblemustard
Sisymbrium officinale	Hedgemustard
Solanum lycopersicum	garden tomato
Solanum nigrum	Black nightshade
Sonchus asper	Spiny sowthistle
Sonchus oleraceus	Common sowthistle
Spergula arvensis	Corn spurry
Stellaria media	Common chickweed
Tanacetum vulgare	Common tansy
Taraxacum erythrospermum	Rock dandelion
Taraxacum officinale	Common dandelion
Trifolium campestre	Field clover
Trifolium dubium	Suckling clover
Trifolium hybridum	Alsike clover
Trifolium pratense	Red clover
Trifolium repens	White clover
Triticum aestivum	Common wheat
Urtica urens	Dwarf nettle
Vaccaria hispanica	Cow soapwort
Verbascum thapsus	Common mullein
Veronica arvensis	Corn speedwell
Veronica serpyllifolia	Thymeleaf speedwell
Vicia cracca	Bird vetch
Vicia sativa	Garden vetch
Vicia sativa ssp. nigra	Garden vetch
Vicia villosa	Winter vetch
Vicia villosa var. villosa	Winter vetch
Vulpia myuros	Annual fescue

Number of non-native vascular plants established in each region

Region	Size (km^2)	Taxa
Hawaii	28,311	1,885
Alaska	1,704,219	416
Lower 48	7,898,892	3,948

Comparative density of non-native vascular plant richness by geographic area (per 10,000 square kilometers, where *n* is the number of species)



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The vascular plants subset of USGS' non-native species list

Vascular plant list oddities

- Alaska's list is 74% plants (AKEPPC is keeping very good track of plants there)
- Hawaii's list is 32% plants (being an island, it is especially vulnerable to vertebrate and insect invaders)
- Lower 48's list is 60% plants

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Should we consider creating a FICMNEW plant list?

Beginning ideas:

- Define the list's purpose (How will it be used, and what do stakeholders find useful in a non-regulatory list?)
- Be sure to define list criteria and definitions
- Define geographic scope and appropriate sub-areas
- Define responsibilities for list maintenance
- Keep these separate & well defined: species 'checklists' vs. 'watchlists'
- Encourage input from stakeholders and the general public

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