

Range Expansions of Introduced Aquatic Plants in the USFWS Southeast Region

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Aquatic plants

- Growth habits

- Submersed, free-floating, floating-rooted, and emergent



Terminology

- Nonindigenous – any species introduced outside of its native range
 - Includes ‘exotics’ and ‘transplants’
 - No claims about invasiveness or value judgments




West Indian marsh grass

West Indian marsh grass
Hymenachne amplexicaulis
Photo by Ann Murray
© 2000 University of Florida



tropical nutrush

Photo by Fabiola Areces
El Verde Virtual Flora



Cuban bulrush

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Nonindigenous Aquatic Species Database

- Over 69,000 records for 90+ nonindigenous plant species in the Southeast U.S. (Region 4)
- Obligate wetland species throughout U.S.
 - USACE National Wetland Plant List (Lichvar et al. 2016)
- Mostly freshwater species

nas.er.usgs.gov



Lichvar, R.W., Banks, D.L., Kirchner, W.N., and Melvin, N.C., 2016, The National Wetland Plant List: 2016 wetland ratings: Phytoneuron, v. 2016, no. 30, p. 1-17, at <http://www.phytoneuron.net/2016Phytoneuron/30PhytoN-WetlandRatings2016.pdf>.

Data sources

- Herbaria
- Peer-reviewed literature
- Federal, state, and regional surveys/reports
- NAS public sighting reports
- Occurrence databases
 - (IPAMS, EDDMapS, iNaturalist)

Gulf and South Atlantic Region Plant Alerts



Waterhyacinth
(*Eichhornia crassipes*) @
Middle Brazos-Lake Whitney



Cape blue waterlily
(*Nymphaea capensis*) @
Liberty County, TX
Pine Island Bayou



Giant salvinia
(*Salvinia molesta*) @
Pearl River County, MS



Water lettuce
(*Pistia stratiotes*) @
Chatham County, GA
Lower Savannah



Gulf and South Atlantic Region Plant Alerts



Tropical nutrush
(*Scleria microcarpa*) @
Osceola County, FL, U.S.
Kissimmee



Crested floating-heart
(*Nymphoides cristata*) @
Indian River County, FL



Red root floater
(*Phyllanthus fluitans*) @
Charlotte County, FL



Tropical American watergrass
(*Luziola subintegra*) @
Brevard County, FL
Upper St. Johns



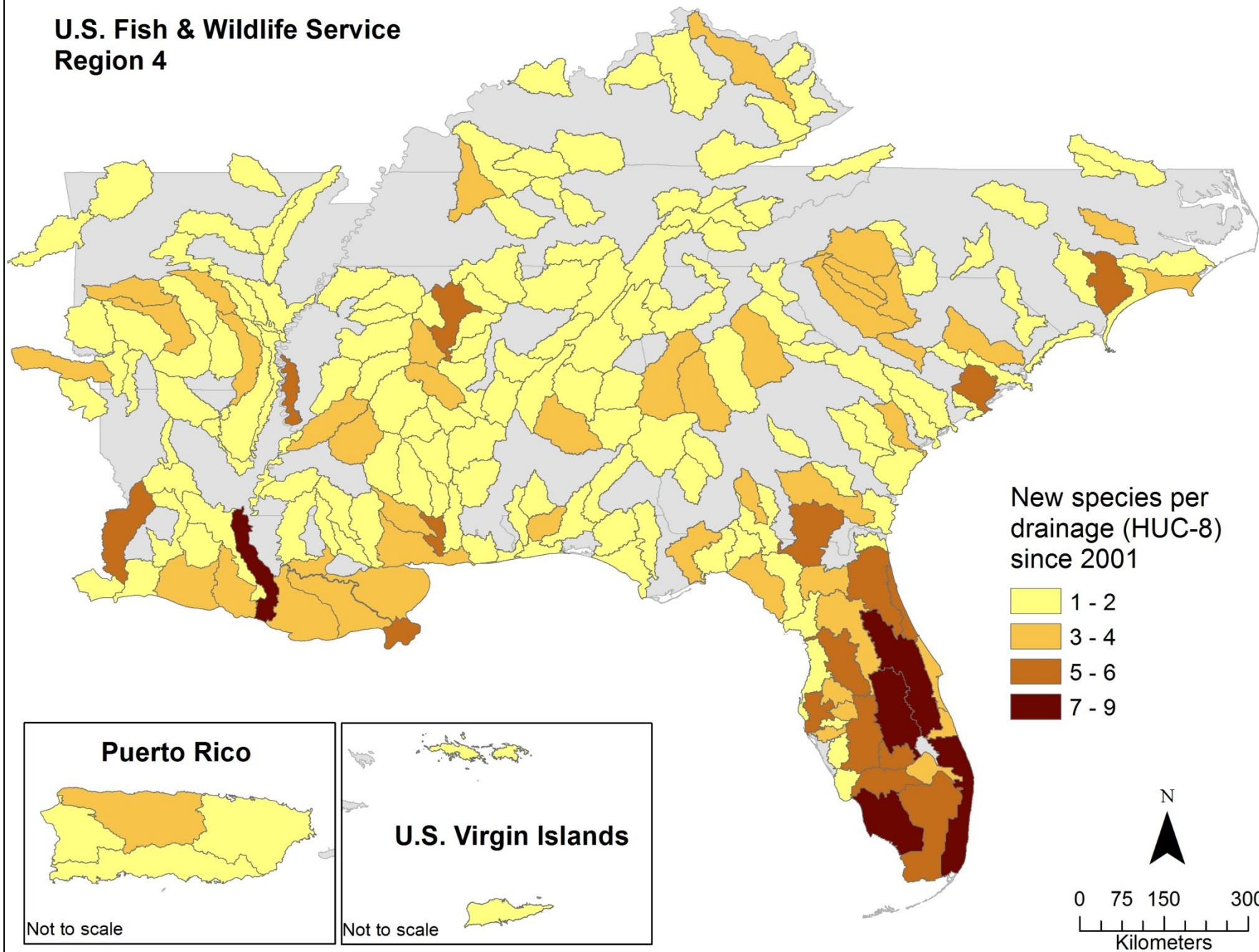
Feathered mosquitofern
(*Azolla pinnata*) @
Martin County, FL

USFWS Region 4: Southeastern U.S.



- Focus is on range expansion since 2001 by HUC-8 drainages
- 14 previously-established plant species
- 9 newly-introduced plant species
- Availability in commercial trade
 - (plantinfo.umn.edu)
- Risk assessments
 - (www.aphis.usda.gov & assessment.ifas.ufl.edu)

U.S. Fish & Wildlife Service Region 4

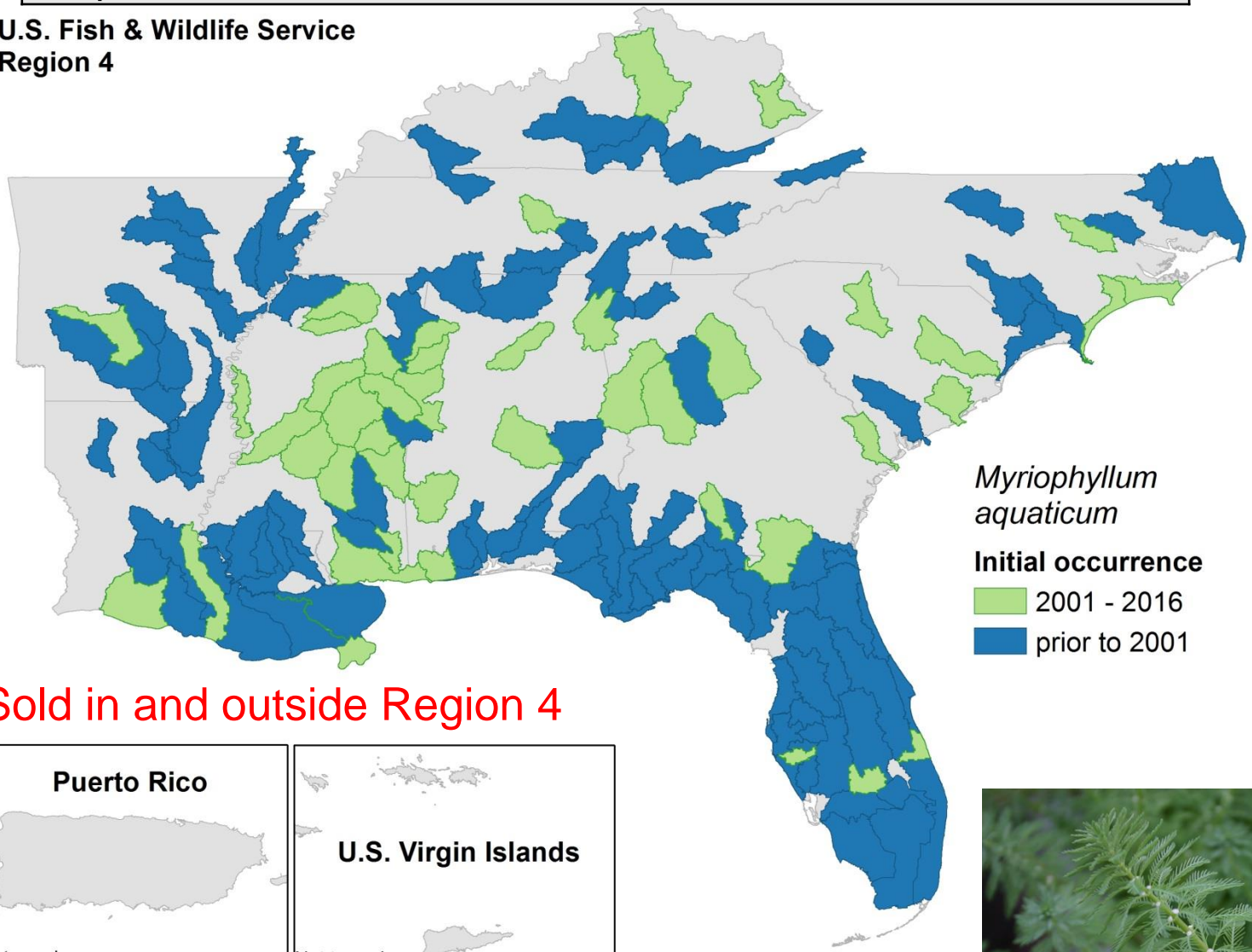


Species found in new drainages since 2001

Scientific name	Common name	# new HUC-8
<i>Myriophyllum aquaticum</i>	parrotfeather milfoil	44
<i>Alternanthera philoxeroides</i>	alligatorweed	41
<i>Hydrilla verticillata</i>	hydrilla	40
<i>Salvinia molesta</i>	giant salvinia	34
<i>Eichhornia crassipes</i>	waterhyacinth	27
<i>Cyperus blepharoleptos</i>	Cuban bulrush	17
<i>Salvinia minima</i>	water spangles	16
<i>Nymphoides cristata</i>	crested floating-heart	15
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil	12
<i>Pistia stratiotes</i>	water lettuce	12
<i>Marsilea mutica</i>	Australian water-clover	11
<i>Najas minor</i>	brittle waternymph	11
<i>Nasturtium officinale</i>	water-cress	10
<i>Egeria densa</i>	Brazilian waterweed	9

State:	AL	AR	FL	GA	KY	LA	MS	NC	PR	SC	TN	VI
1 st reported:	1957	1970	1906	1951	1990	1915	1944	1938		1957	1956	

U.S. Fish & Wildlife Service
Region 4



Myriophyllum aquaticum

Initial occurrence

2001 - 2016

prior to 2001

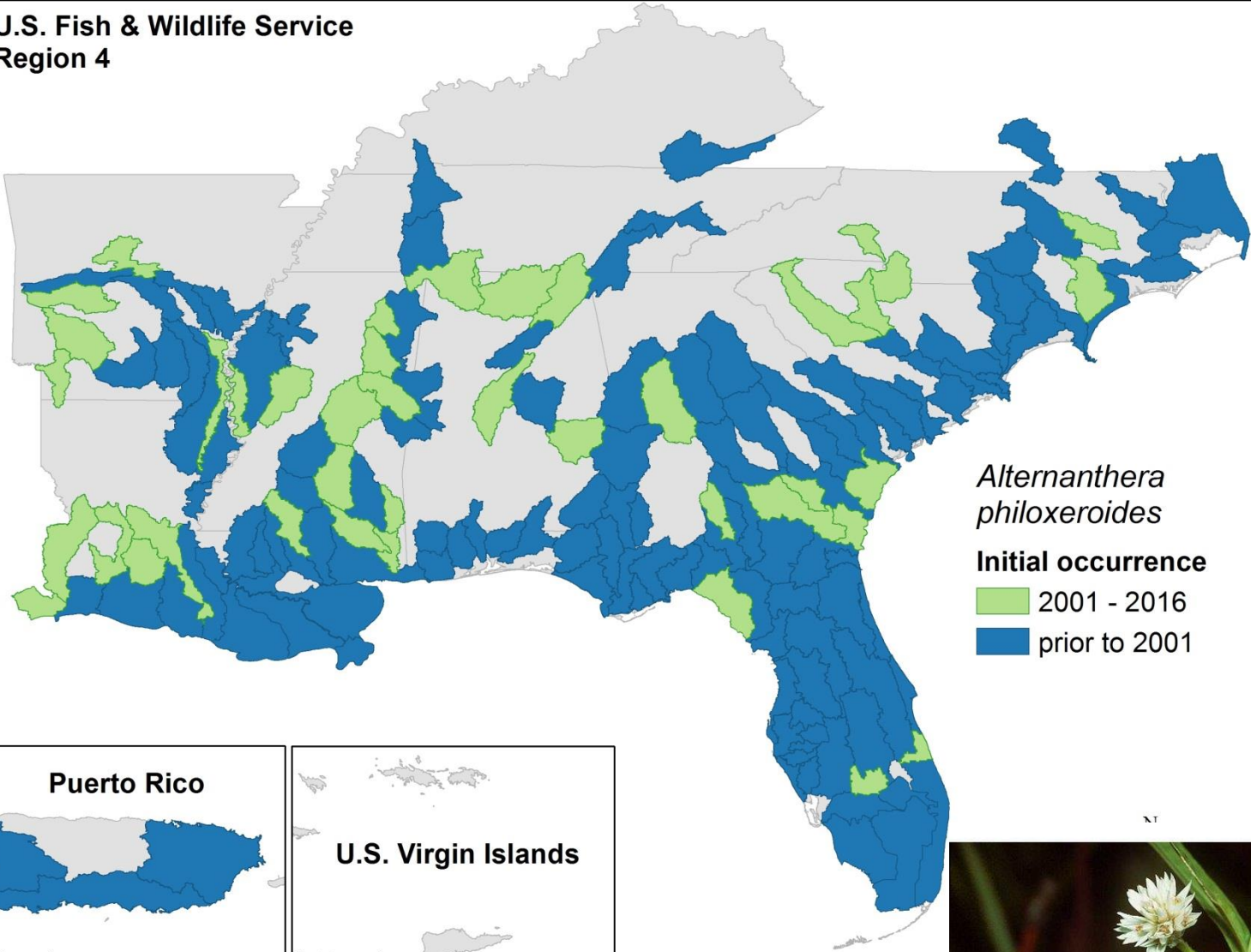
Sold in and outside Region 4



Medium invasion risk in FL
(UF/IFAS)

State:	AL	AR	FL	GA	KY	LA	MS	NC	PR	SC	TN	VI
1 st reported:	1897	1968	1894	1965	1986	1900	1944	1967	1963	1945	1975	

U.S. Fish & Wildlife Service
Region 4

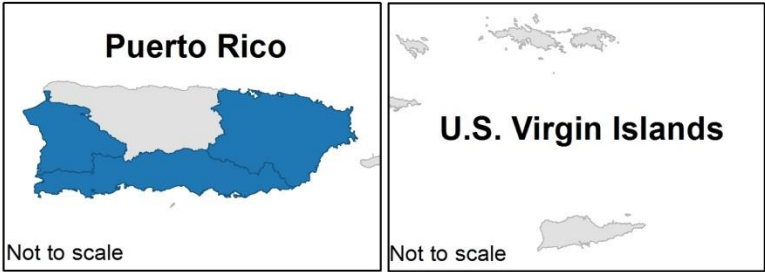


*Alternanthera
philoxeroides*

Initial occurrence

2001 - 2016

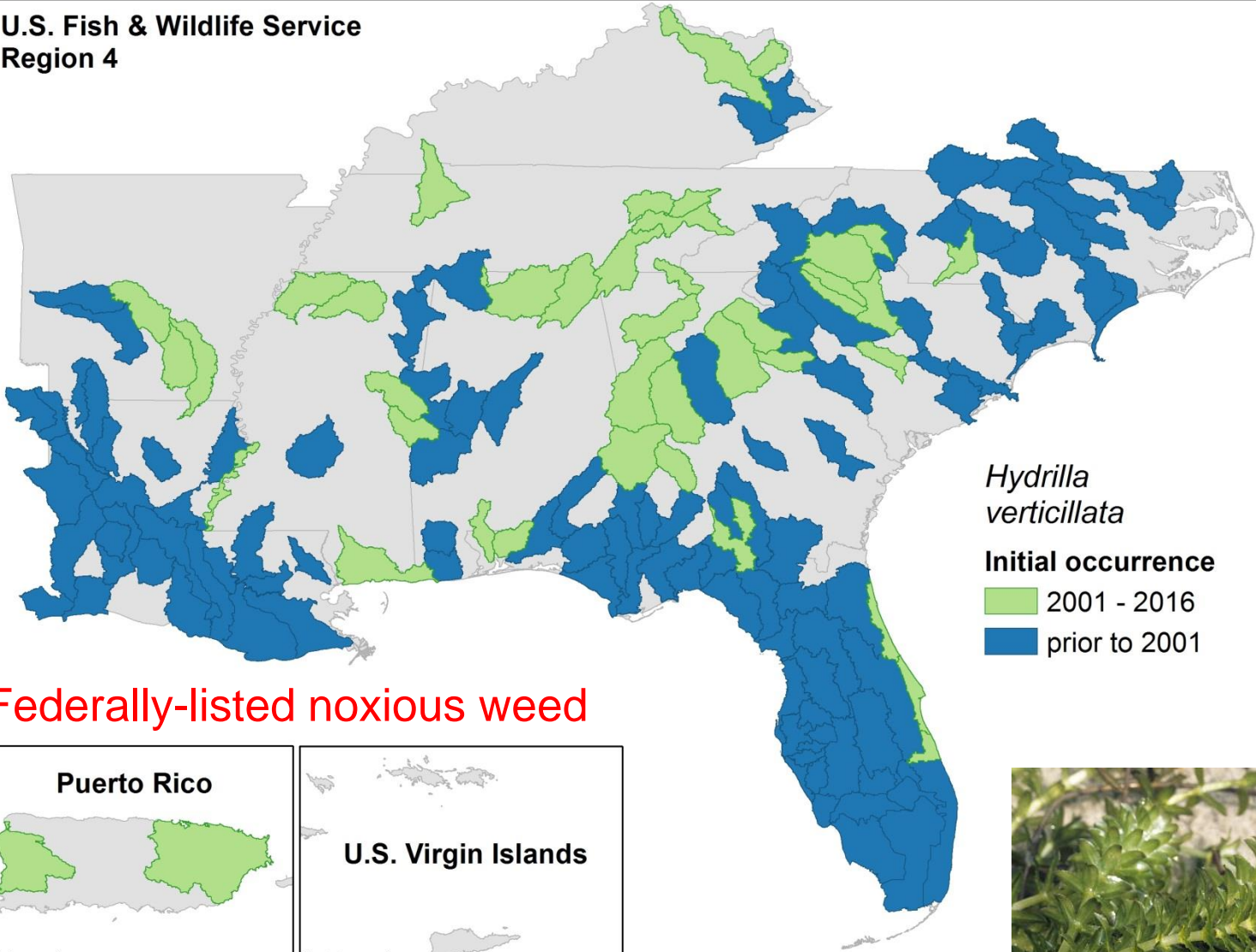
prior to 2001



Robert H. Mohlenbrock - USDA-NRCS

State:	AL	AR	FL	GA	KY	LA	MS	NC	PR	SC	TN	VI
1 st reported:	1978	1994	1952	1978	1999	1973	1980	1980	2007	1976	1988	

U.S. Fish & Wildlife Service Region 4



Hydrilla verticillata

Initial occurrence

- 2001 - 2016
- prior to 2001

Federally-listed noxious weed

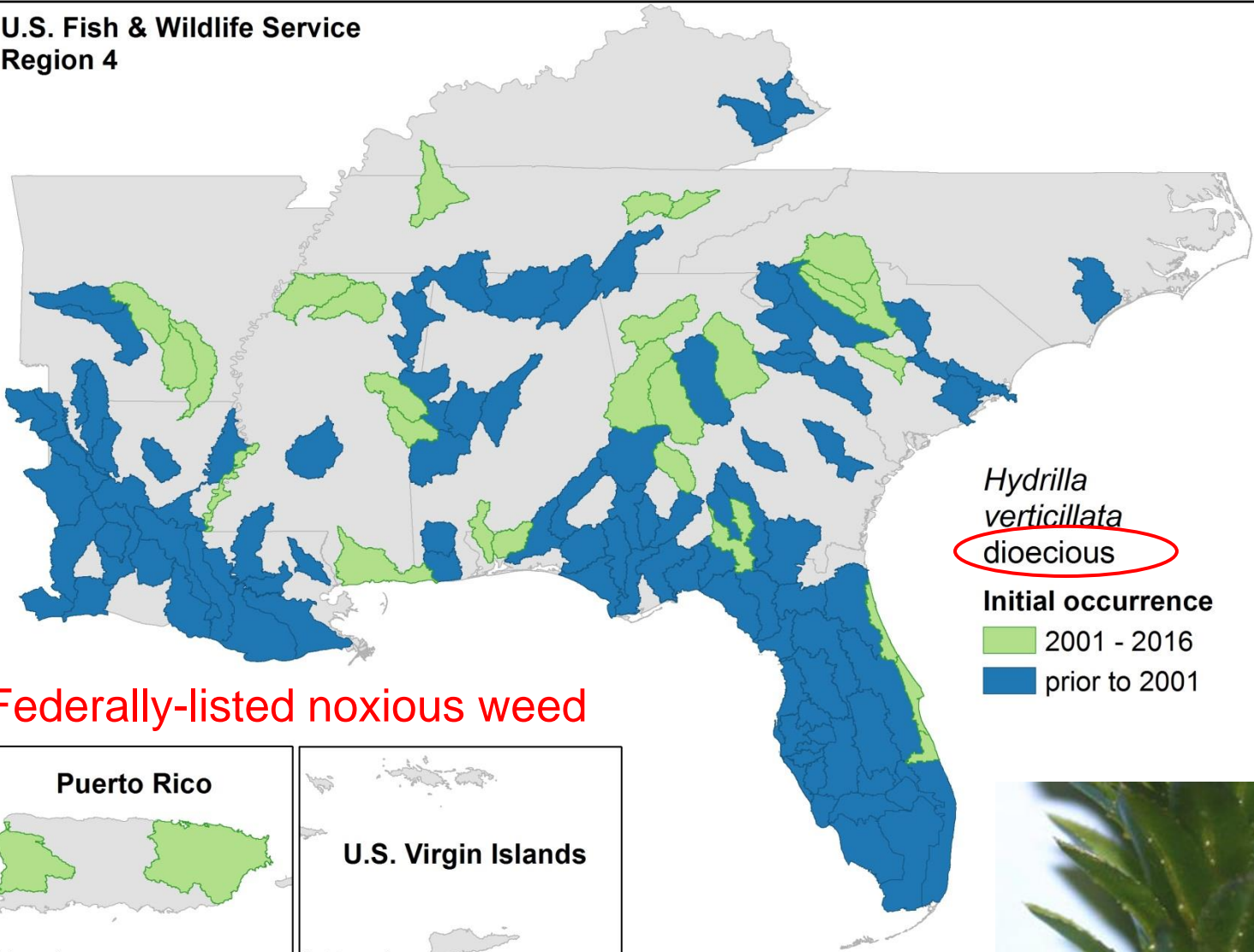


Hydrilla verticillata
Photo by Vic Ramey
© 1999 University of Florida

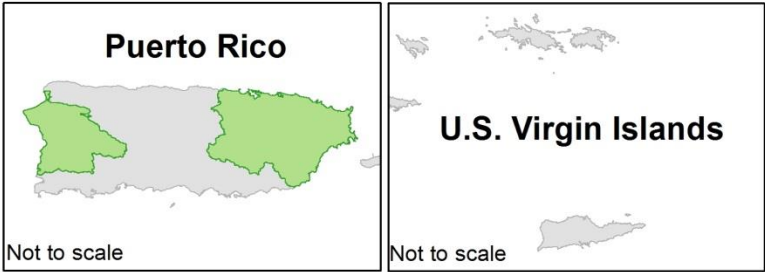
Vic Ramey - University of Florida

State:	AL	AR	FL	GA	KY	LA	MS	NC	PR	SC	TN	VI
1 st reported:	1978	1994	1952	1978	1999	1973	1980	1982	2007	1976	1988	

U.S. Fish & Wildlife Service
Region 4

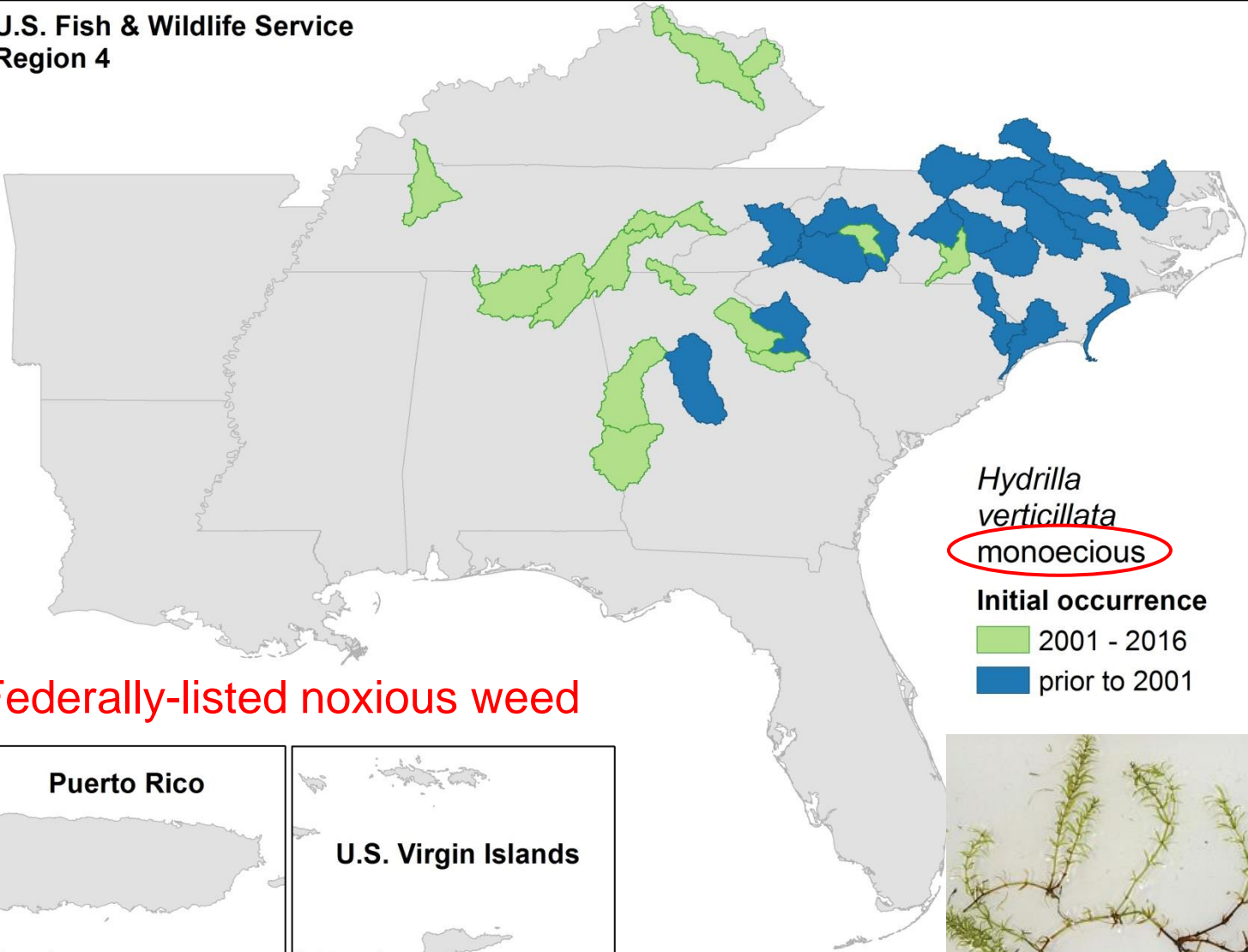


Federally-listed noxious weed



State:	AL	AR	FL	GA	KY	LA	MS	NC	PR	SC	TN	VI
1 st reported:	2007			1995	2008			1980		2011	2005	

U.S. Fish & Wildlife Service
Region 4



Federally-listed noxious weed

Hydrilla
verticillata
monoecious

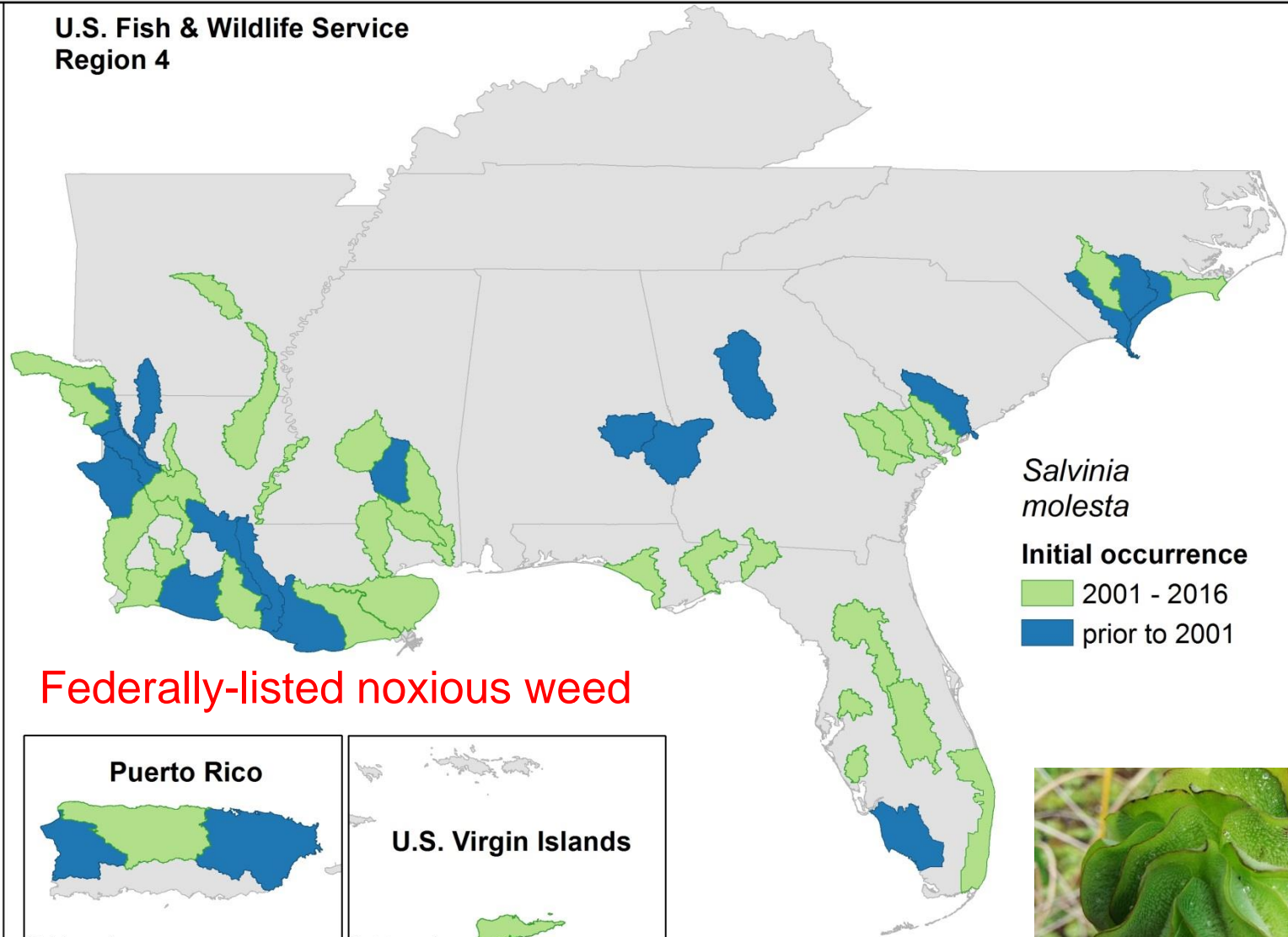
Initial occurrence
2001 - 2016
prior to 2001



Source: Roberta Hill, VLMP © 2007

State:	AL	AR	FL	GA	KY	LA	MS	NC	PR	SC	TN	VI
1 st reported:	1999	2008	1999	1999		1998	1999	2000	2000	1995		2012

U.S. Fish & Wildlife Service
Region 4



Federally-listed noxious weed

Salvinia molesta

Initial occurrence

2001 - 2016

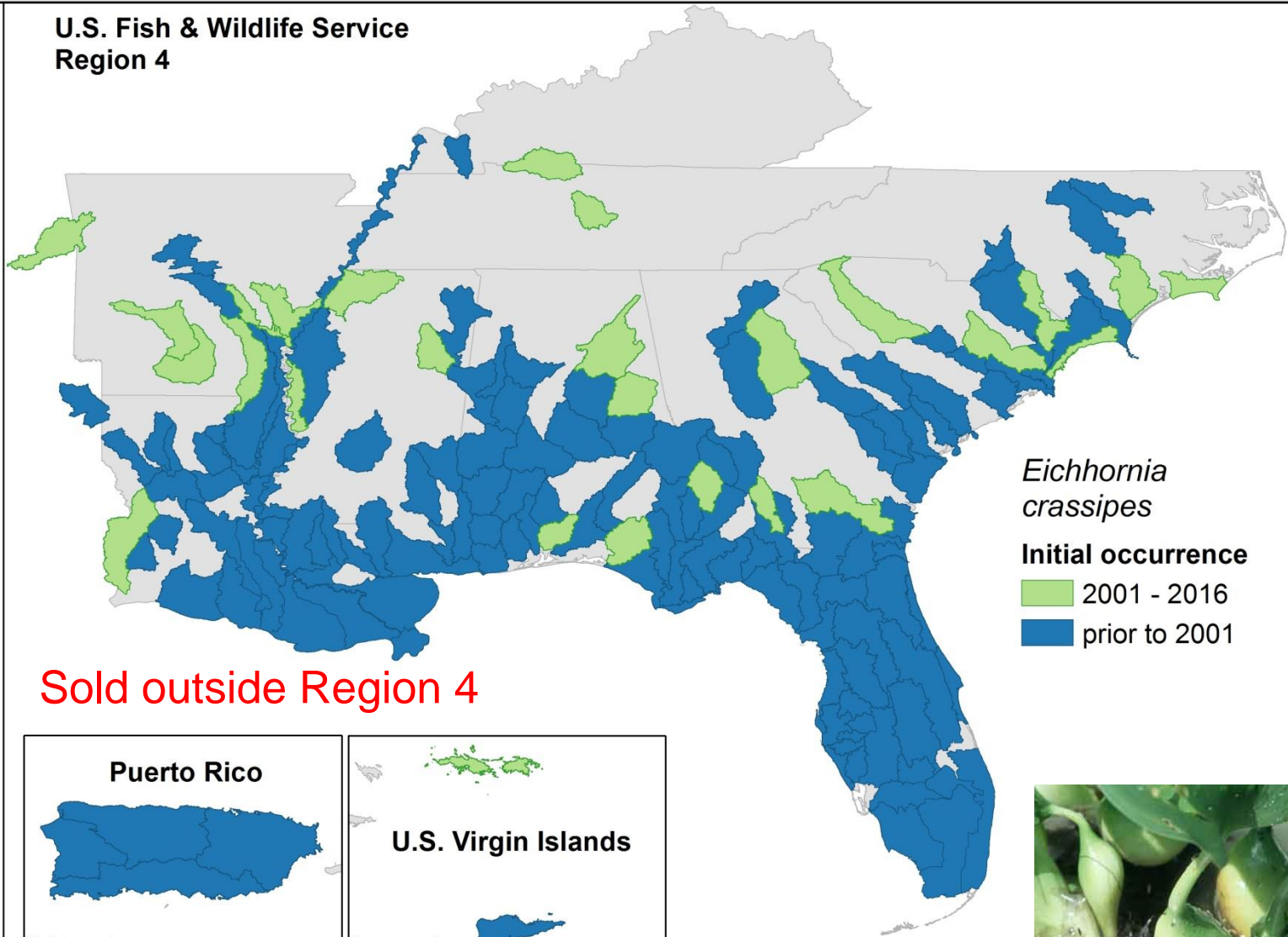
prior to 2001



Ian Pfingsten - USGS

State:	AL	AR	FL	GA	KY	LA	MS	NC	PR	SC	TN	VI
1 st reported:	1971	1934	1890	1902	1986	1884	1916	1949	1884	1952	1972	1895

U.S. Fish & Wildlife Service
Region 4



Eichhornia crassipes

Initial occurrence

2001 - 2016

prior to 2001

Sold outside Region 4

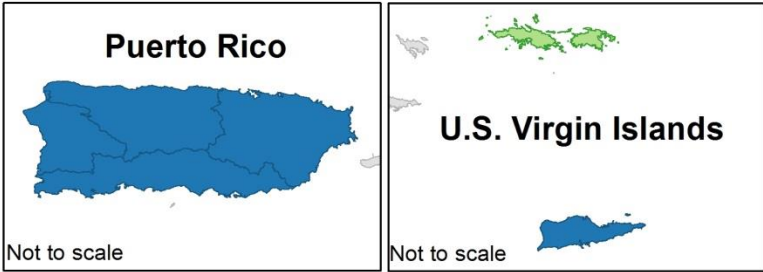
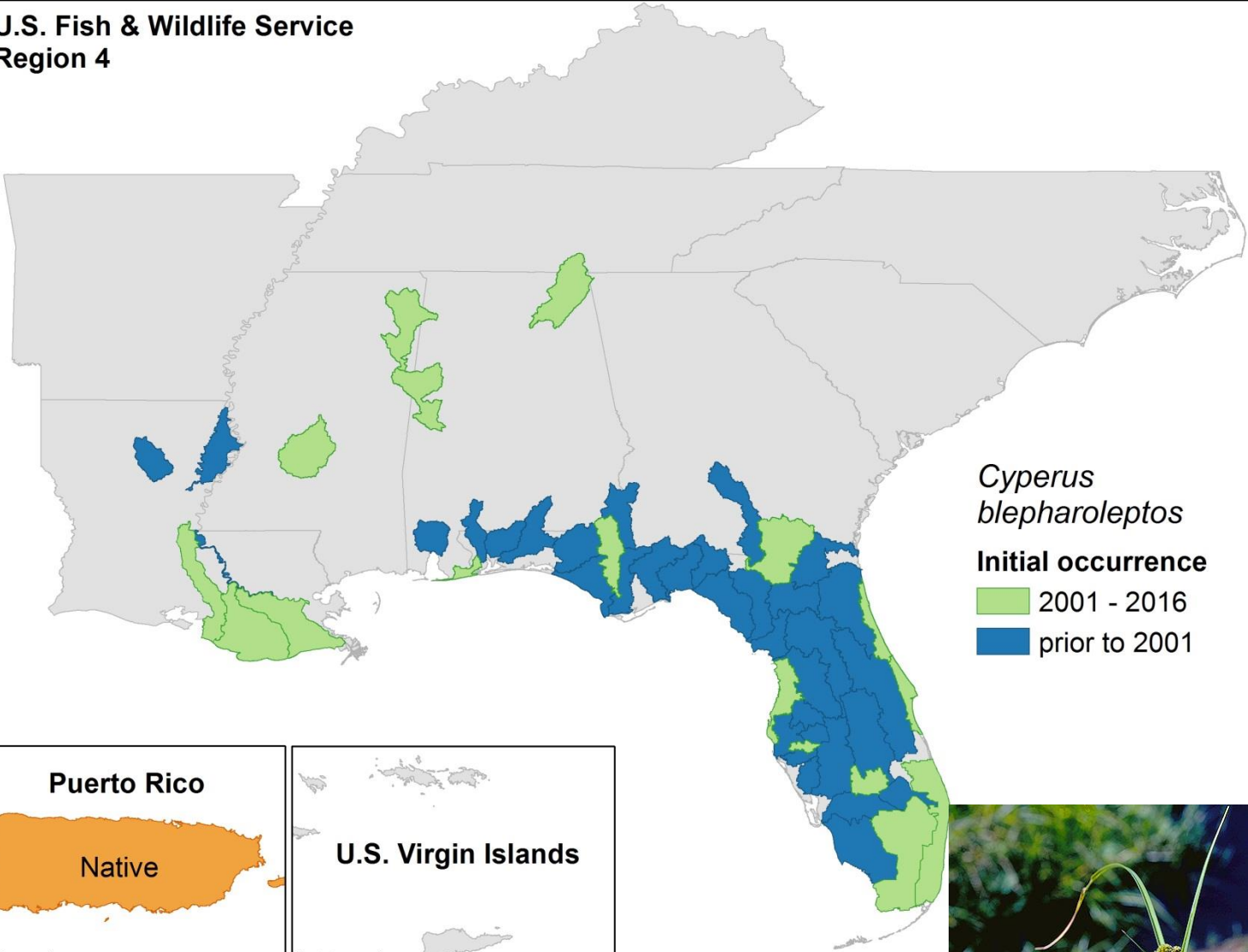


photo credit: C. Jacono

Colette Jacono

State:	AL	AR	FL	GA	KY	LA	MS	NC	PR	SC	TN	VI
1 st reported:	1878		1934	1994		1944	2004					

U.S. Fish & Wildlife Service
Region 4



Cyperus blepharoleptos

Initial occurrence

2001 - 2016

prior to 2001

Puerto Rico

Native

Not to scale

U.S. Virgin Islands

Not to scale



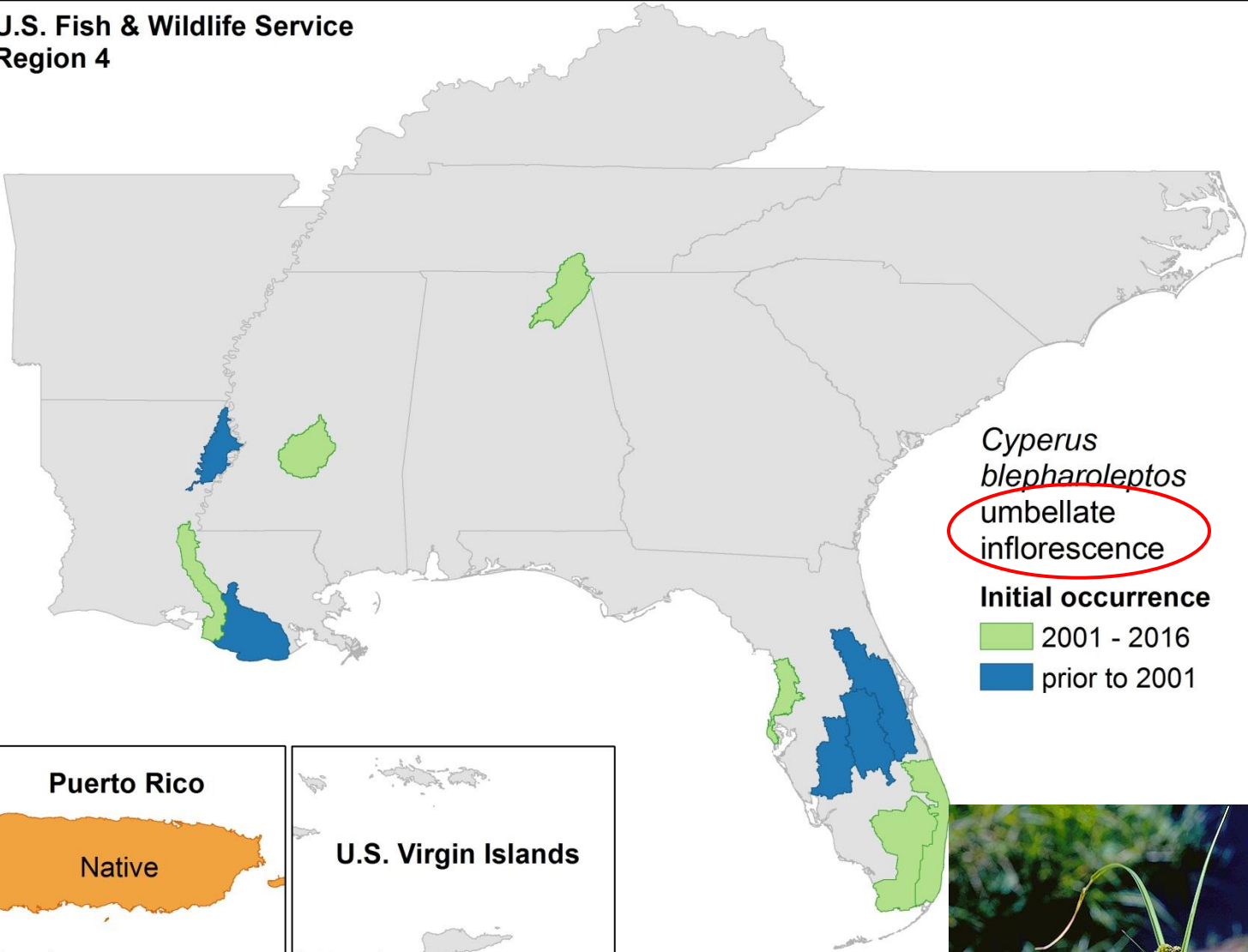
Scirpus cubensis

Copyright 1998 Kerry Dressler

Kerry Dressler

State:	AL	AR	FL	GA	KY	LA	MS	NC	PR	SC	TN	VI
1 st reported:	2009		1934			1983	2009					

U.S. Fish & Wildlife Service
Region 4



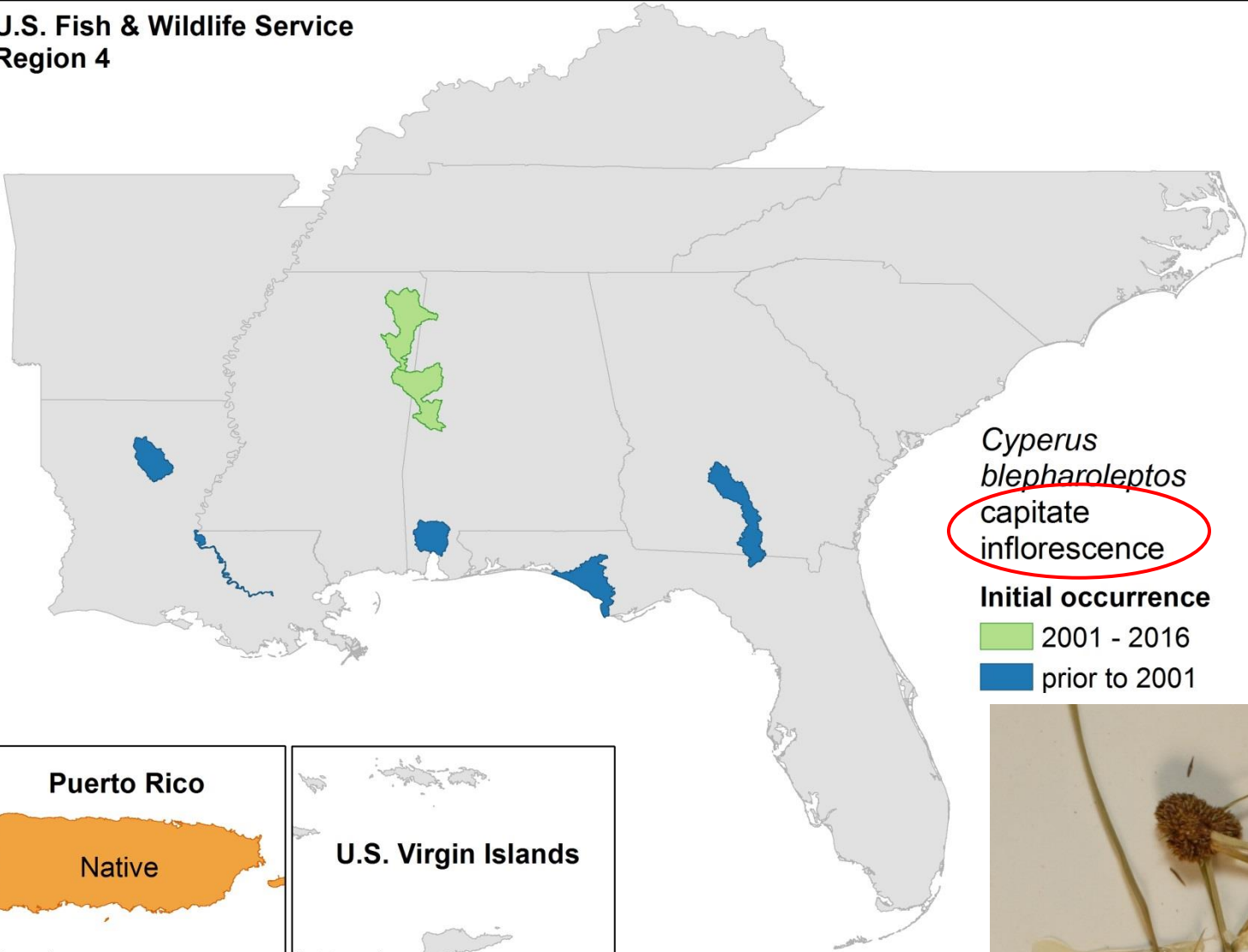
*Cyperus
blepharoleptos*
umbellate
inflorescence

Initial occurrence
 2001 - 2016
 prior to 2001



State:	AL	AR	FL	GA	KY	LA	MS	NC	PR	SC	TN	VI
1 st reported:	1878		1976	1994		1944	2004					

U.S. Fish & Wildlife Service
Region 4



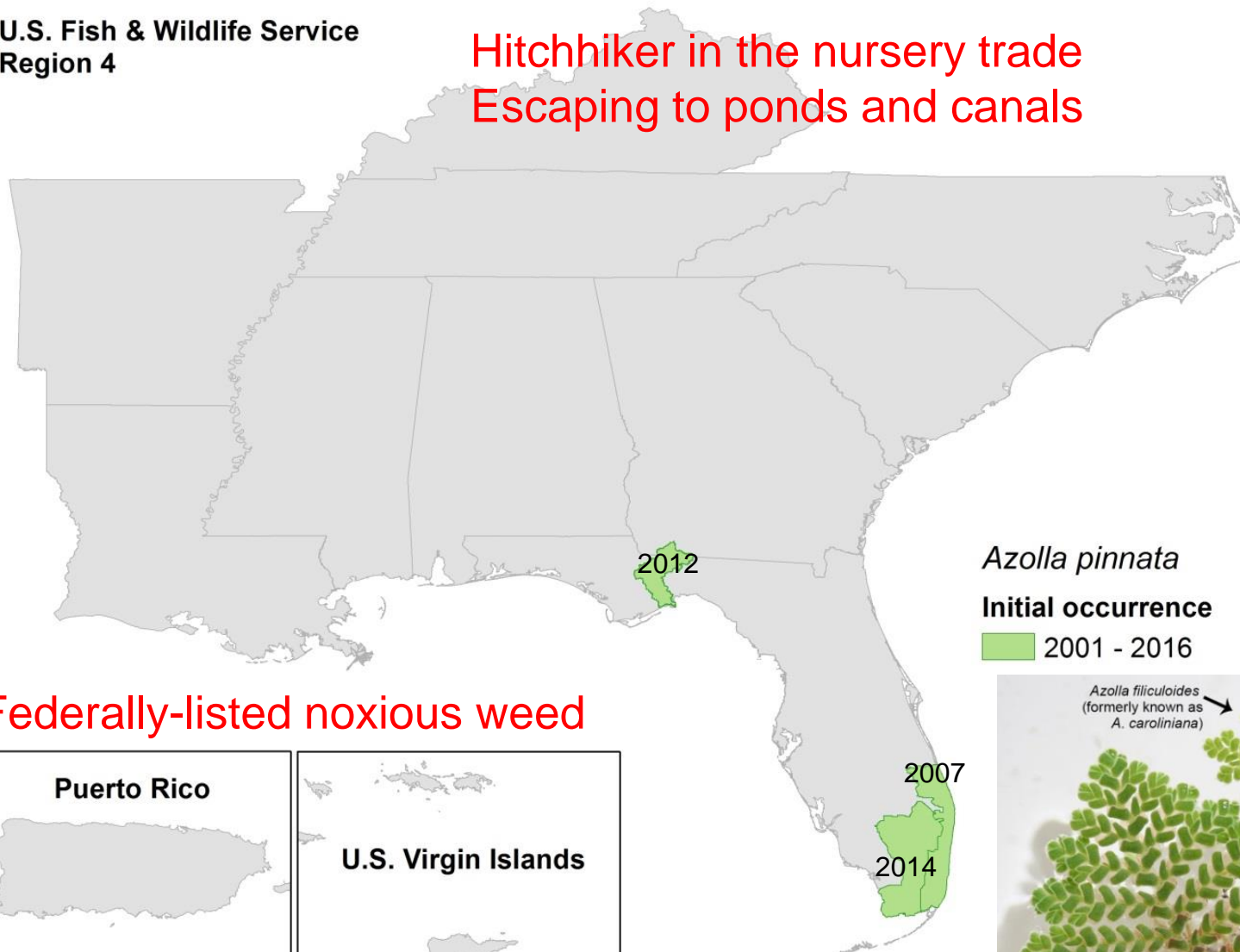
Univ. of Southern Mississippi Herbarium

New species in the Southeastern U.S.

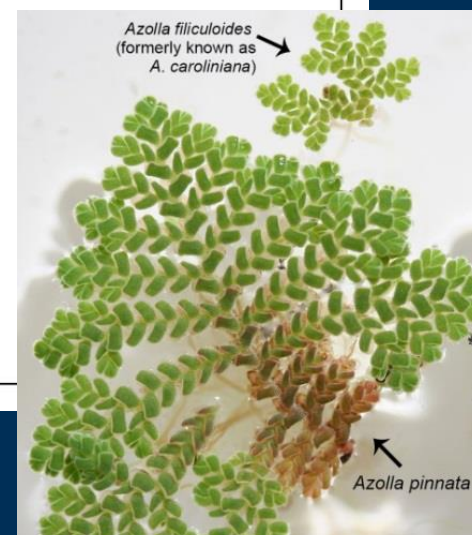
Scientific name	Common name	1 st Year	Status
<i>Aeschynomene fluitans</i>	giant water sensitive plant	2007	<i>Eradicated?</i>
<i>Azolla pinnata</i>	feathered mosquitofern	2007	Established
<i>Luziola subintegra</i>	Tropical American watergrass	2007	Established
<i>Marsilea mutica</i>	Australian water-clover	2001	<i>Extirpated?</i>
<i>Oenanthe javanica</i>	Java waterdropwort	2007	<i>Established?</i>
<i>Philydrum lanuginosum</i>	wooly frogs mouth	2013	Established
<i>Phyllanthus fluitans</i>	red root floater	2010	Established
<i>Scleria microcarpa</i>	tropical nutrush	2016	Established
<i>Veronica beccabunga</i>	European speedwell	2009	<i>Extirpated?</i>

U.S. Fish & Wildlife Service
Region 4

Hitchhiker in the nursery trade
Escaping to ponds and canals



Federally-listed noxious weed



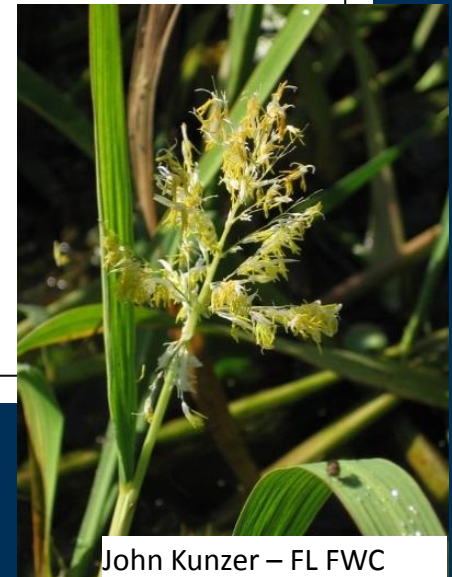
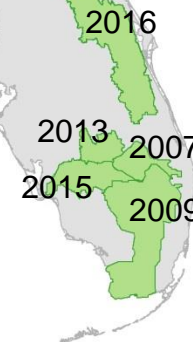
U.S. Fish & Wildlife Service
Region 4

First discovered in Fisheating Bay, Lake Okeechobee. Now at eastern edge of Everglades NP and at Jane Green Creek, near head of St. John's River.

Likely dispersed via waterfowl or by contaminated seed or farm equipment

Luziola subintegra

Initial occurrence
2001 - 2016



John Kunzer – FL FWC



High invasion risk in Region 4,
excluding Tennessee and Kentucky
(USDA APHIS)

U.S. Fish & Wildlife Service
Region 4

First discovered in Holly Shelter Game
Land private borrow pit.

Likely escaped from cultivation.

2013

*Philydrum
lanuginosum*

Initial occurrence

2001 - 2016

Widely available in the international nursery trade

Puerto Rico

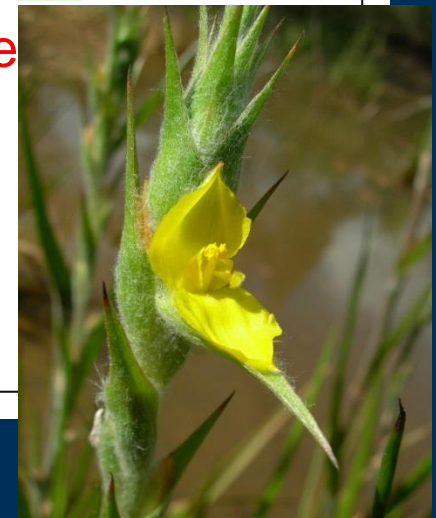
Not to scale

U.S. Virgin Islands

Not to scale



High invasion risk in Region 4,
excluding much of Kentucky
(USDA APHIS)

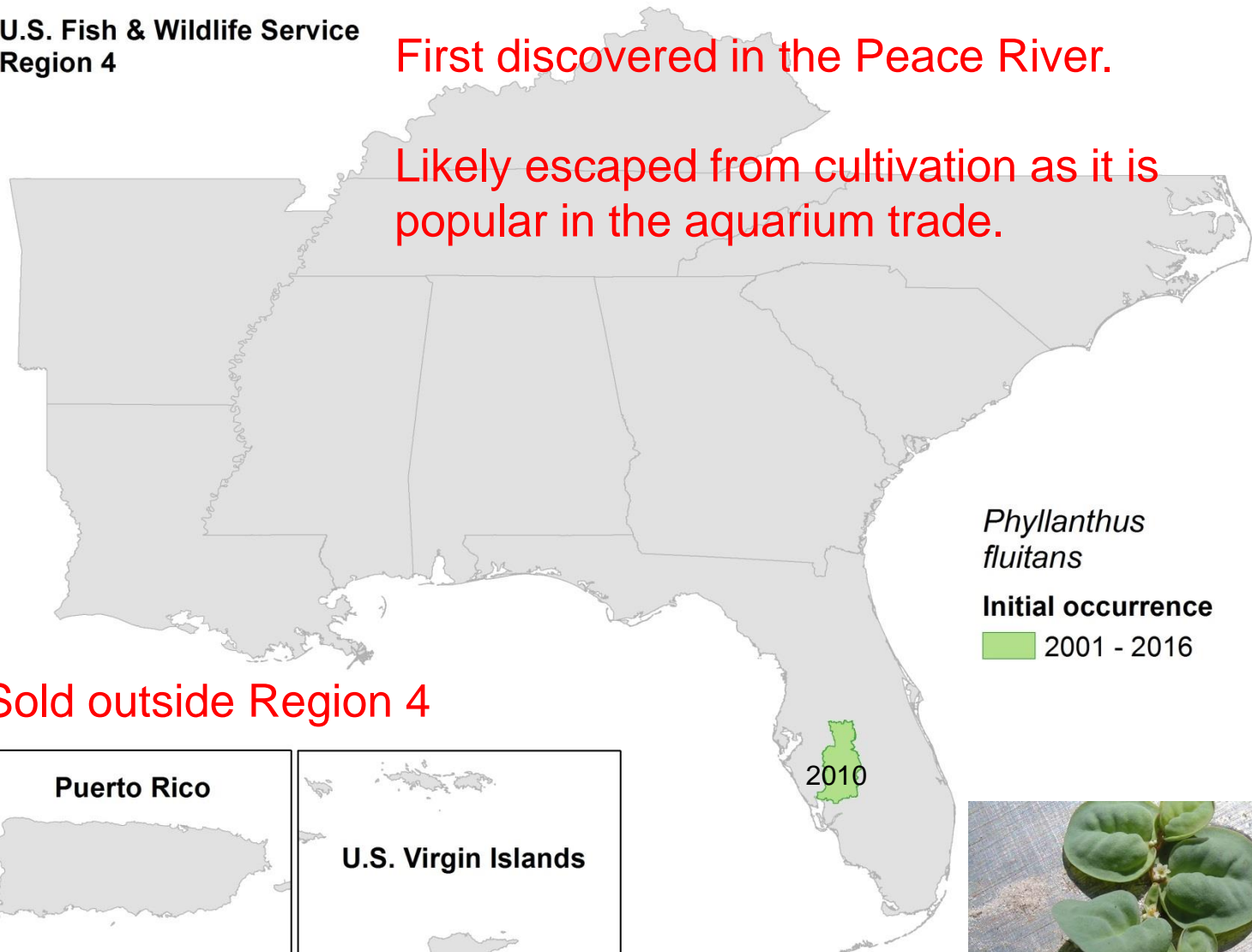


By Schelle (Flickr: 7 January 2009) [CC
BY 2.0], via Wikimedia Commons

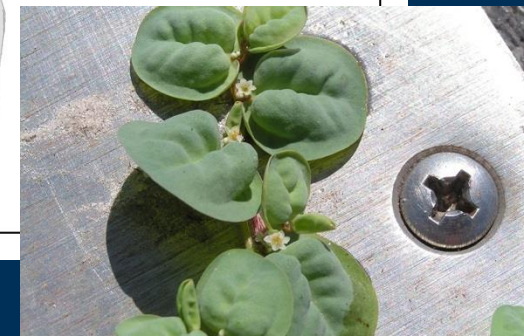
U.S. Fish & Wildlife Service
Region 4

First discovered in the Peace River.

Likely escaped from cultivation as it is
popular in the aquarium trade.



Sold outside Region 4

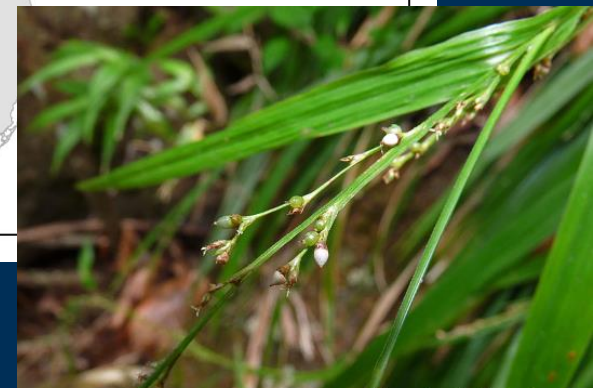


Kelle Sullivan – FL FWC, 2010

U.S. Fish & Wildlife Service
Region 4

First discovered in Lake Hatchineha.

Unknown introduction pathway.



Send us your sightings

- Sighting reports
 - Send photos of specimens with sighting reports
 - usgs.gov/stopANS
- Large datasets can be bulk-uploaded as spreadsheets (e-mail me)
 - ipfingsten@usgs.gov

