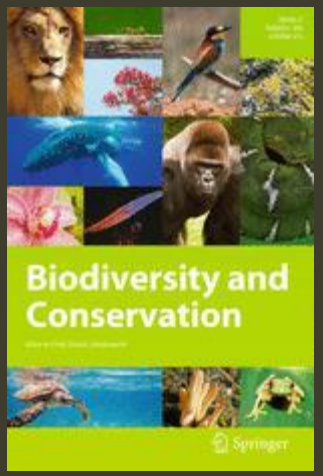
RAPID ENHANCEMENT OF BIODIVERSITY OCCURRENCE RECORDS USING UNCONVENTIONAL SPECIMEN DATA

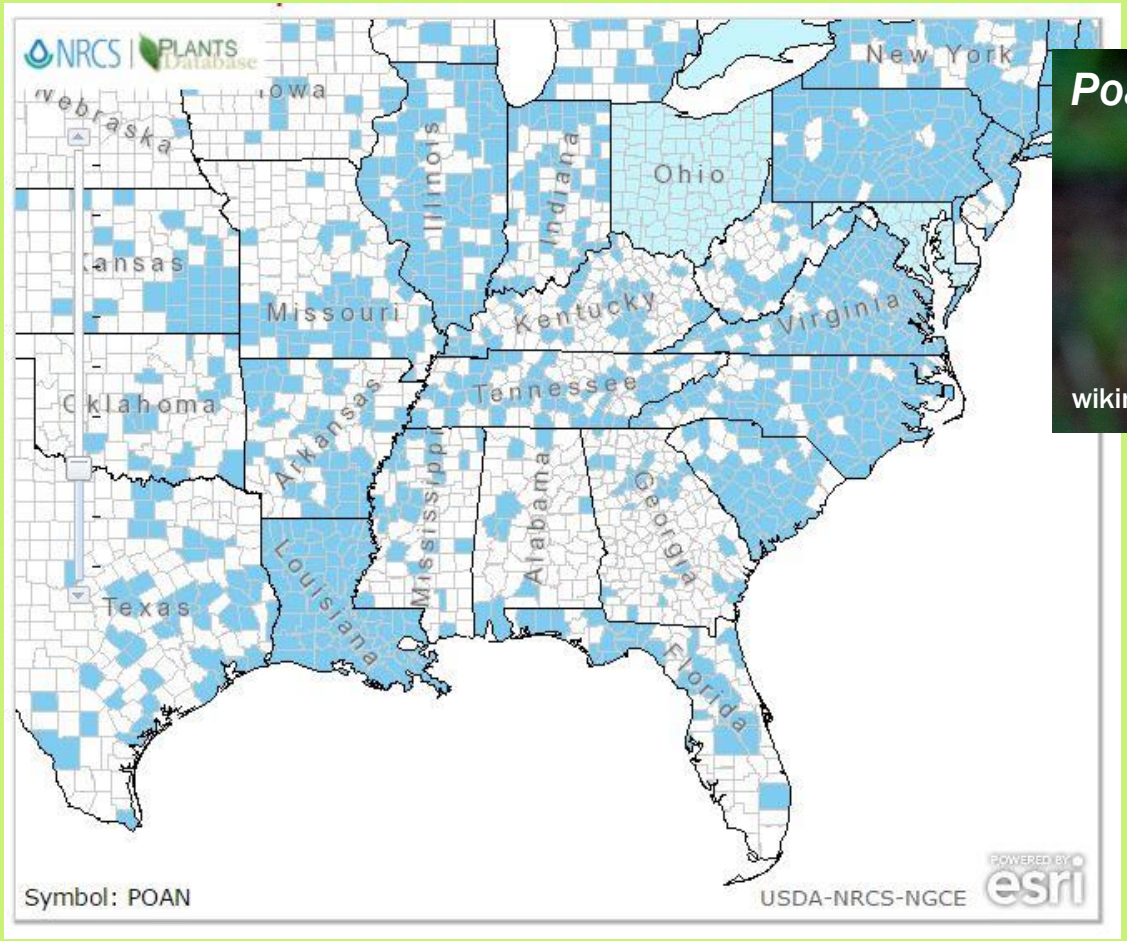
Katelin D. Pearson

Accepted

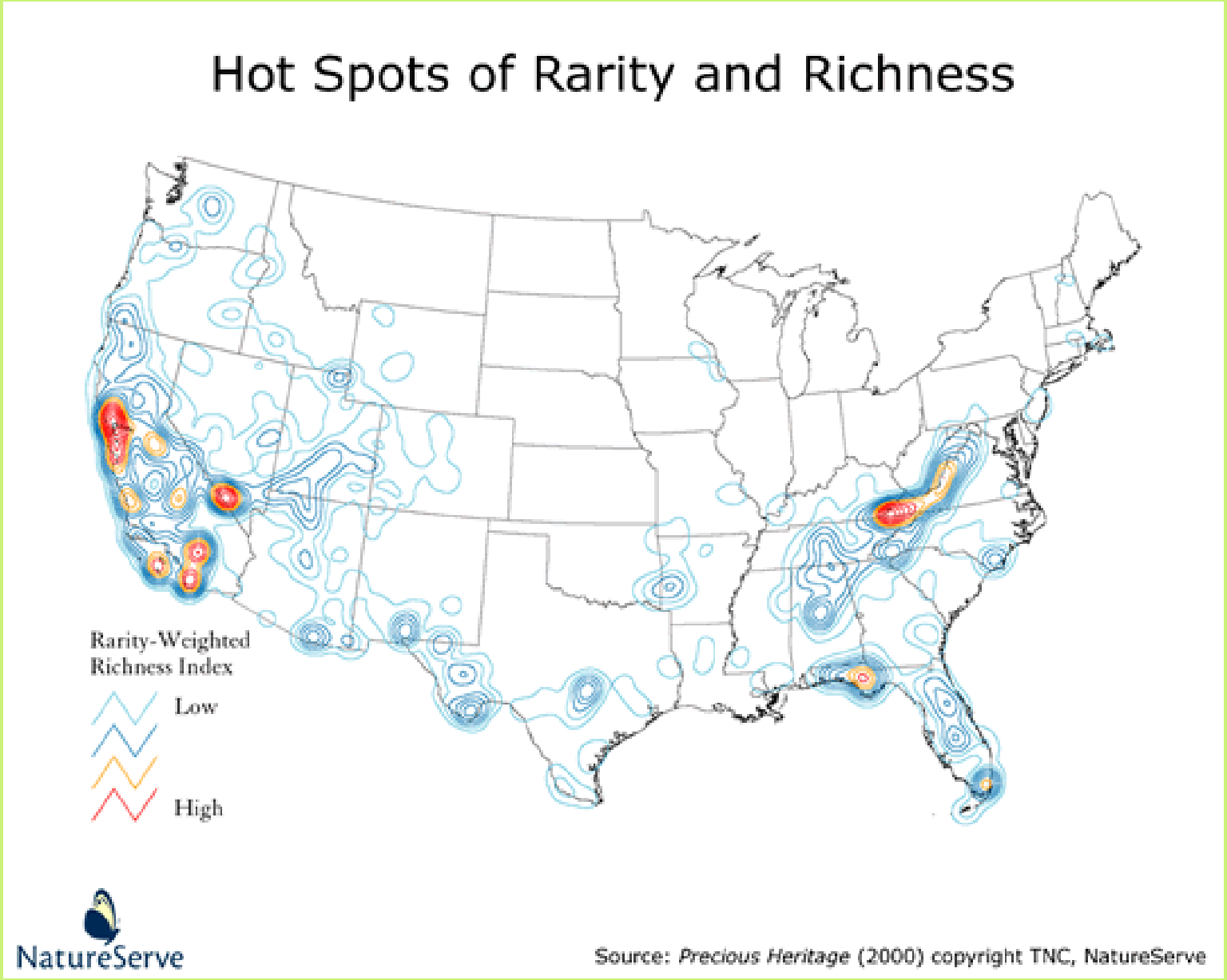


THE PROBLEM

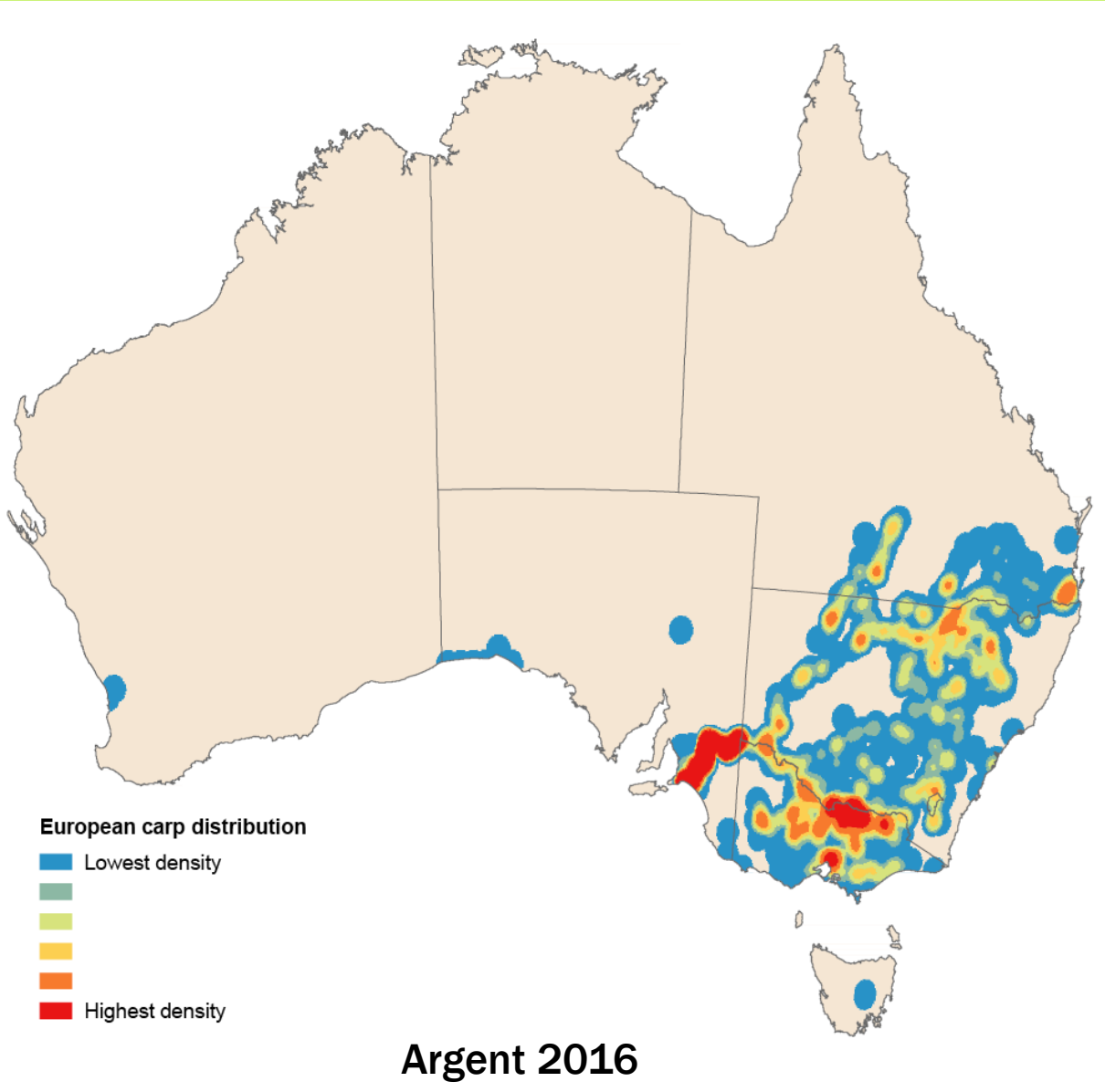
- Our knowledge of species distributions is incomplete



- **Identify natural areas for protection**

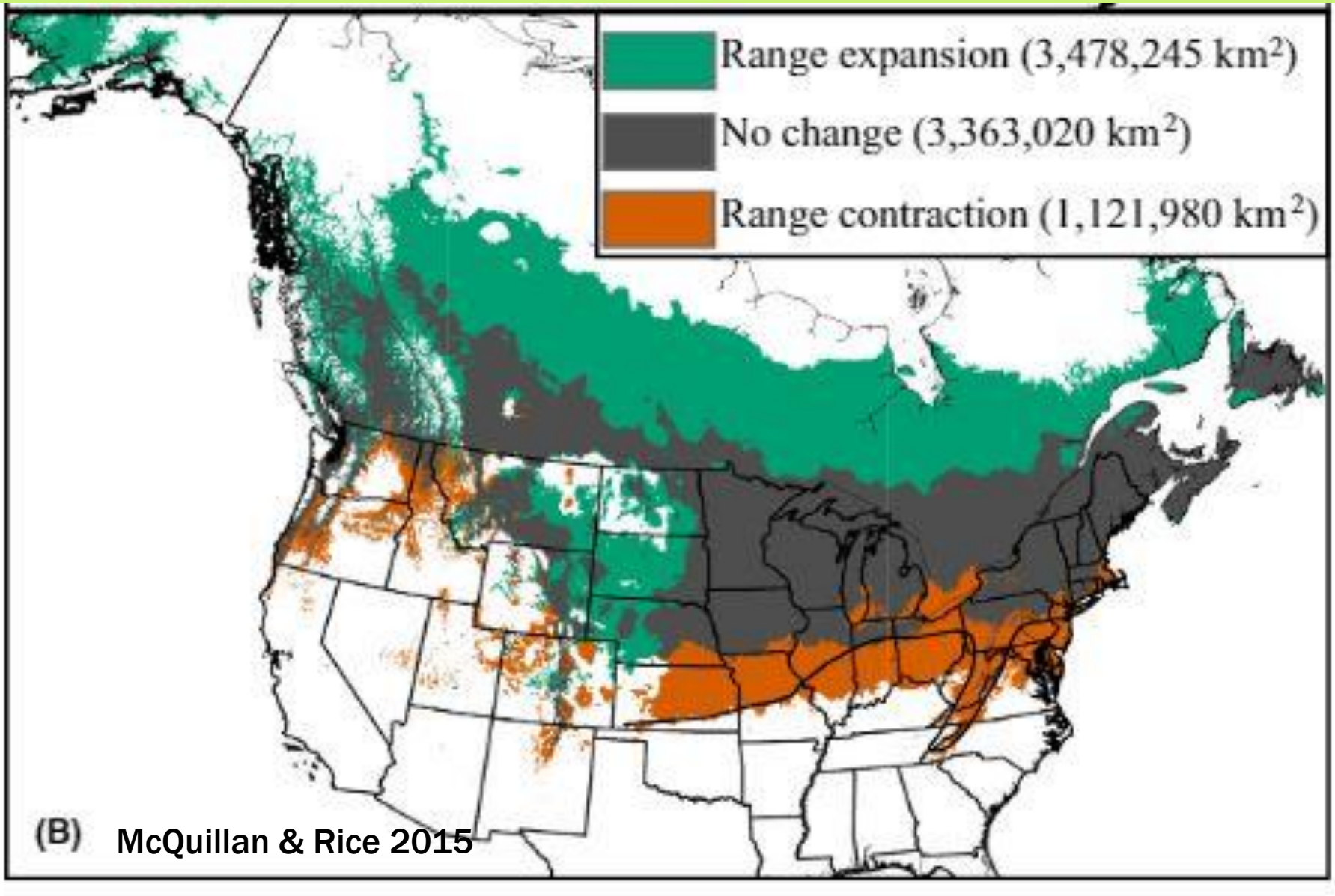


- Plan invasive species management



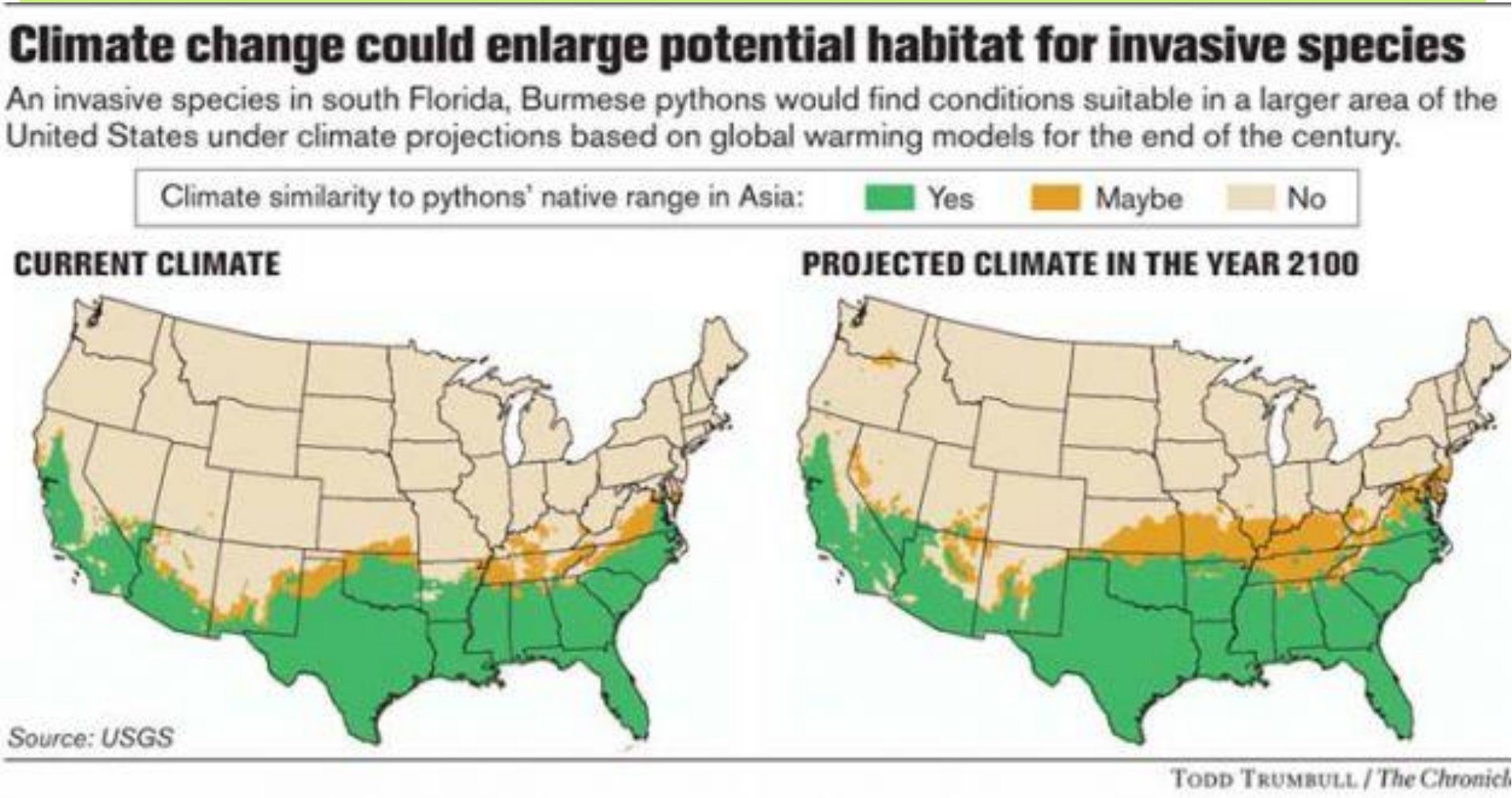
Argent 2016

- Forecast future range shifts



McQuillan & Rice 2015

- Forecast future range shifts



POTENTIAL SOLUTIONS

- Collect more?

POTENTIAL SOLUTIONS

- Collect more?
  - Limited by overcrowding, sustainability, and funding
- Collect observational occurrence data?
  - Cannot provide historical occurrence data

GBIF
Global Biodiversity Information Facility

iNaturalist

EDDMapS
Early Detection & Distribution Mapping System

NARTHECIACEAE

Aletris lutea Small

U.S.A. GEORGIA. Camden County: 30.78598N 81.6492W; Kingsland, E of I-95, S of Hwy GA 40; infrequently mowed meadow adjacent to shopping center, with *Hypericum suffruticosa, H. stans, Juncus, Erigeron, Rhynchospora, Eleocharis tuberculosa, Pinguicula, Drosera, Polygala*; plants locally common, flr golden yellow.

Richard Carter 16562 30 Apr 2006
det. R. Carter

Valdosta State University Herbarium (VSC)

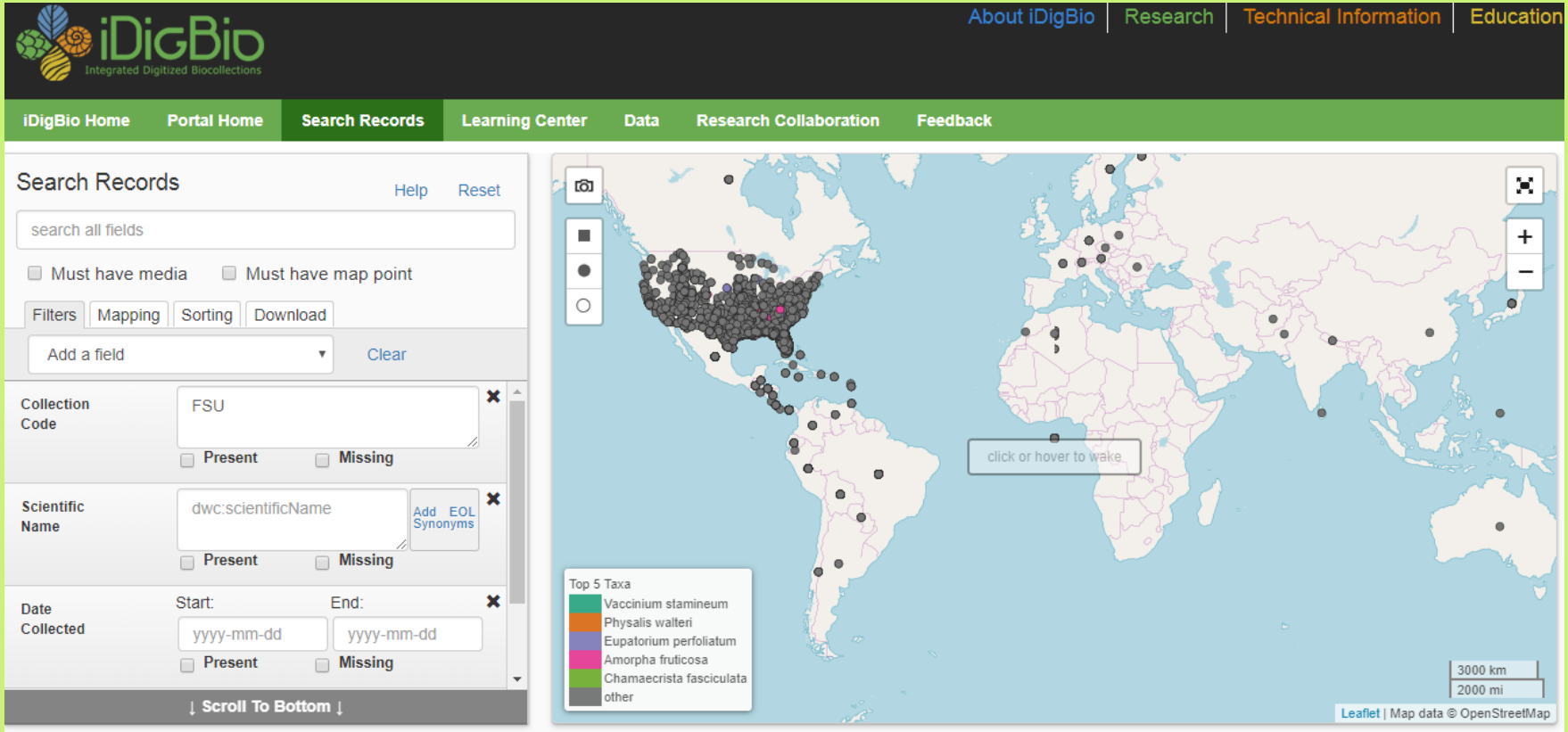
QUESTION

- Can associated taxon records significantly improve our understanding of taxon distributions?

METHODS

- 84,328 digitized herbarium specimen records

THE FLORIDA STATE UNIVERSITY
Biology Department
Robert K. Godfrey Herbarium



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Scientific Names on this Page

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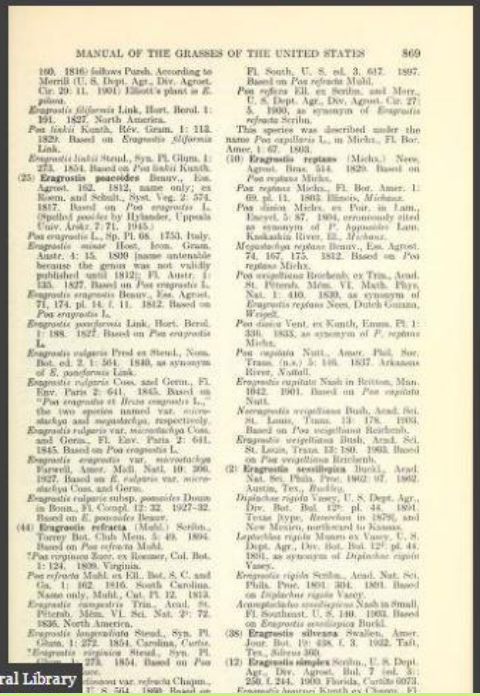
Acamptoclados sessilispicus
Diplachne rigida Vasey
Eragrostis
Eragrostis brownei
Eragrostis campestris
Eragrostis campestris var. refracta Chapm.
Eragrostis capitata (Nutt.) Nash
Eragrostis eragrostis (L.) Beauv.

Fit to Height

Show OCR



MANUAL OF THE GRASSES OF THE UNITED STATES 869

Contributed by U.S. Department of Agriculture, National Agricultural Library

Global Names Recognition and Discovery

gnrd.globalnames.org

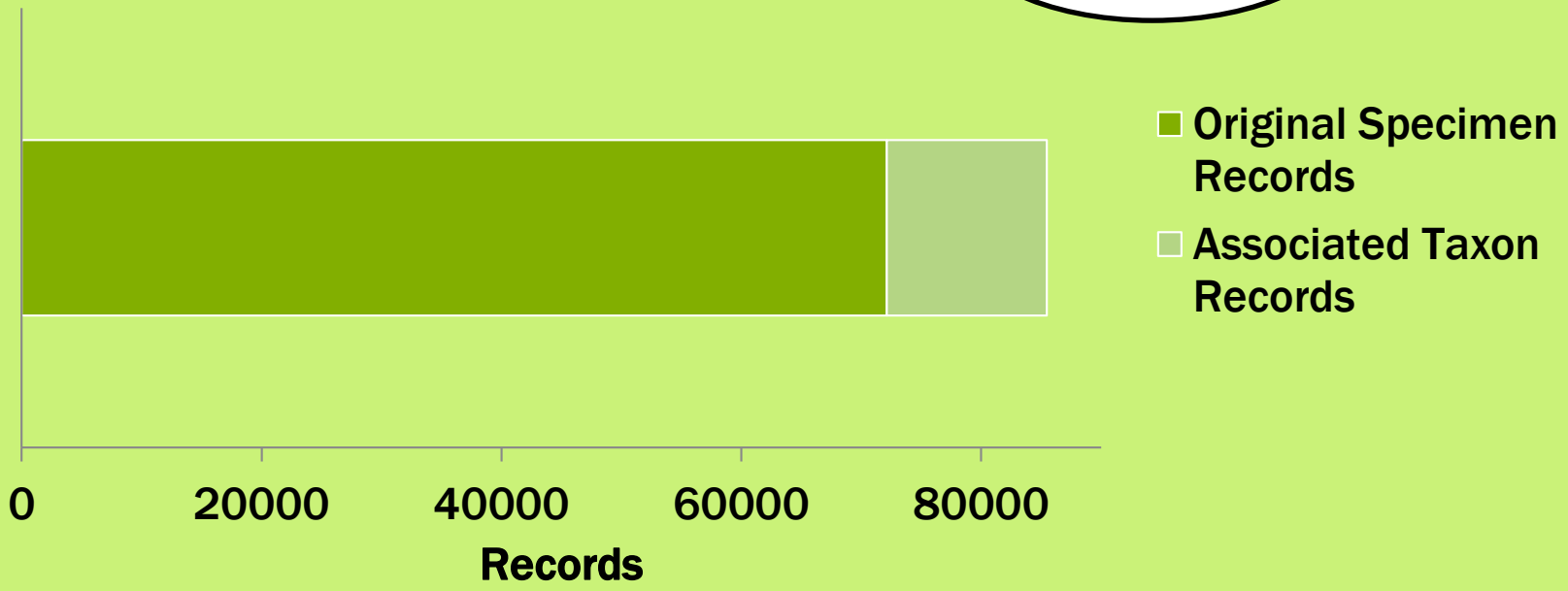
Barcode	Species	Collector	Date	State	County	Locality	Habitat
40097	*Eragrostis virginica*	Bruce and JoAnn Hansen	1975-09-18	FL	Okaloosa	Eglin AFB, 4 1/2 mi. W of Mary Esther.	Around margin of small artificial pond. With *Eragrostis refracta, Juncus abortivus, J. megacephalus, J. debilis, Rhexia virginica...*

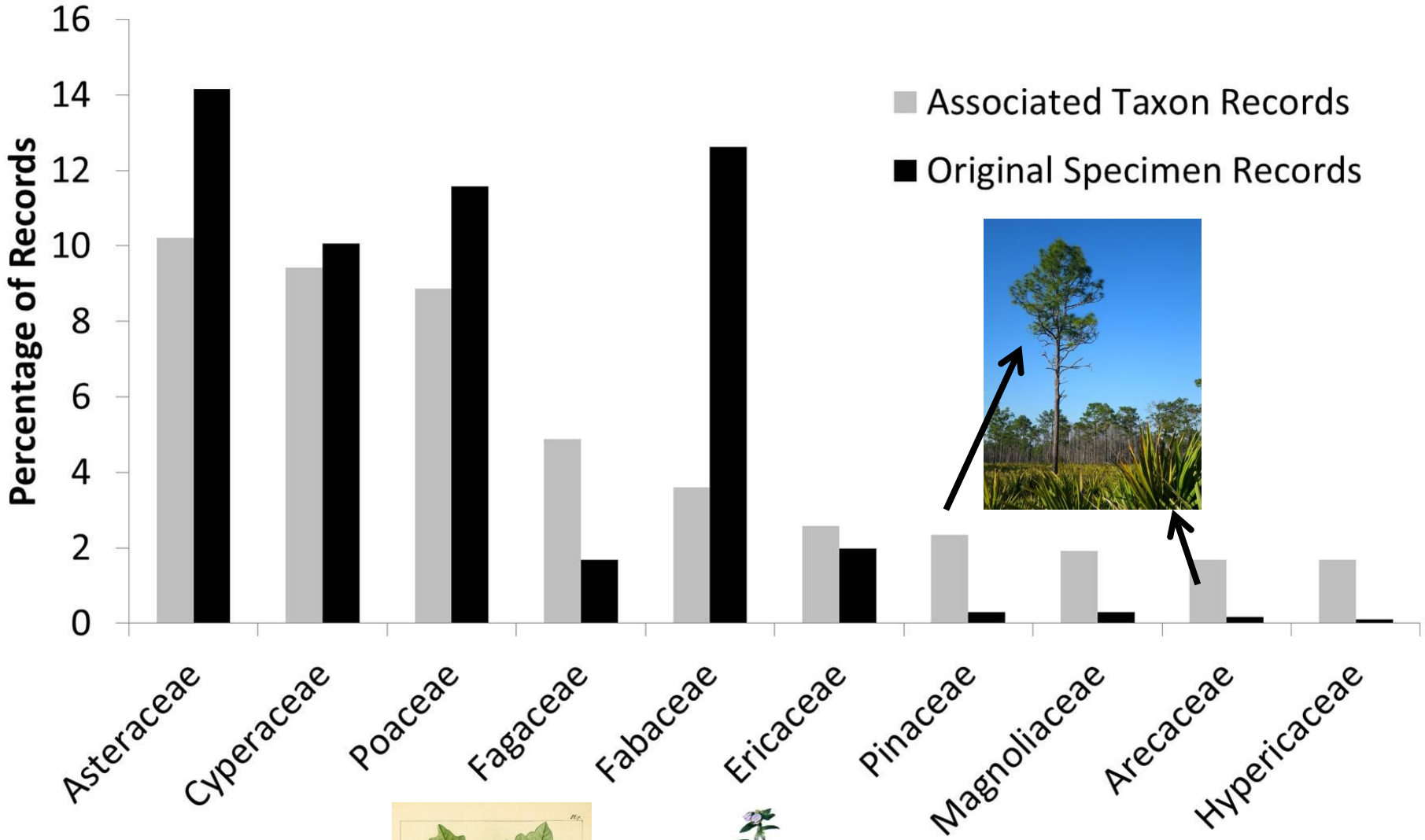
Barcode	Species	Observer	Date	State	County	Locality	Habitat
40097	*Eragrostis virginica*	Bruce and JoAnn Hansen	1975-09-18	FL	Okaloosa	Eglin AFB, 4 1/2 mi. W of Mary Esther.	Around margin of small artificial pond. With *Eragrostis refracta, Juncus abortivus, J. megacephalus, J. debilis, Rhexia virginica...*
40097	*Juncus abortivus*	Bruce and JoAnn Hansen	1975-09-18	FL	Okaloosa	Eglin AFB, 4 1/2 mi. W of Mary Esther.	Around margin of small artificial pond. With *Eragrostis refracta, Juncus abortivus, J. megacephalus, J. debilis, Rhexia virginica...*
40097	*Juncus mega-cephalus*	Bruce and JoAnn Hansen	1975-09-18	FL	Okaloosa	Eglin AFB, 4 1/2 mi. W of Mary Esther.	Around margin of small artificial pond. With *Eragrostis refracta, Juncus abortivus, J. megacephalus, J. debilis, Rhexia virginica...*
40097	*Juncus debilis*	Bruce and JoAnn Hansen	1975-09-18	FL	Okaloosa	Eglin AFB, 4 1/2 mi. W of Mary Esther.	Around margin of small artificial pond. With *Eragrostis refracta, Juncus abortivus, J. megacephalus, J. debilis, Rhexia virginica...*
40097	*Rhexia virginica*	Bruce and JoAnn Hansen	1975-09-18	FL	Okaloosa	Eglin AFB, 4 1/2 mi. W of Mary Esther.	Around margin of small artificial pond. With *Eragrostis refracta, Juncus abortivus, J. megacephalus, J. debilis, Rhexia virginica...*

RESULTS

- 72,120 unique original specimen records
- 13,372 associated taxon records

18.5%




Percentage of Records
16
14
12
10
8
6
4
2
0
Associated Taxon Records
Original Specimen Records
Asteraceae
Cyperaceae
Poaceae
Fagaceae
Fabaceae
Ericaceae
Pinaceae
Magnoliaceae
Arecaceae
Hypericaceae

IMPERILED SPECIES

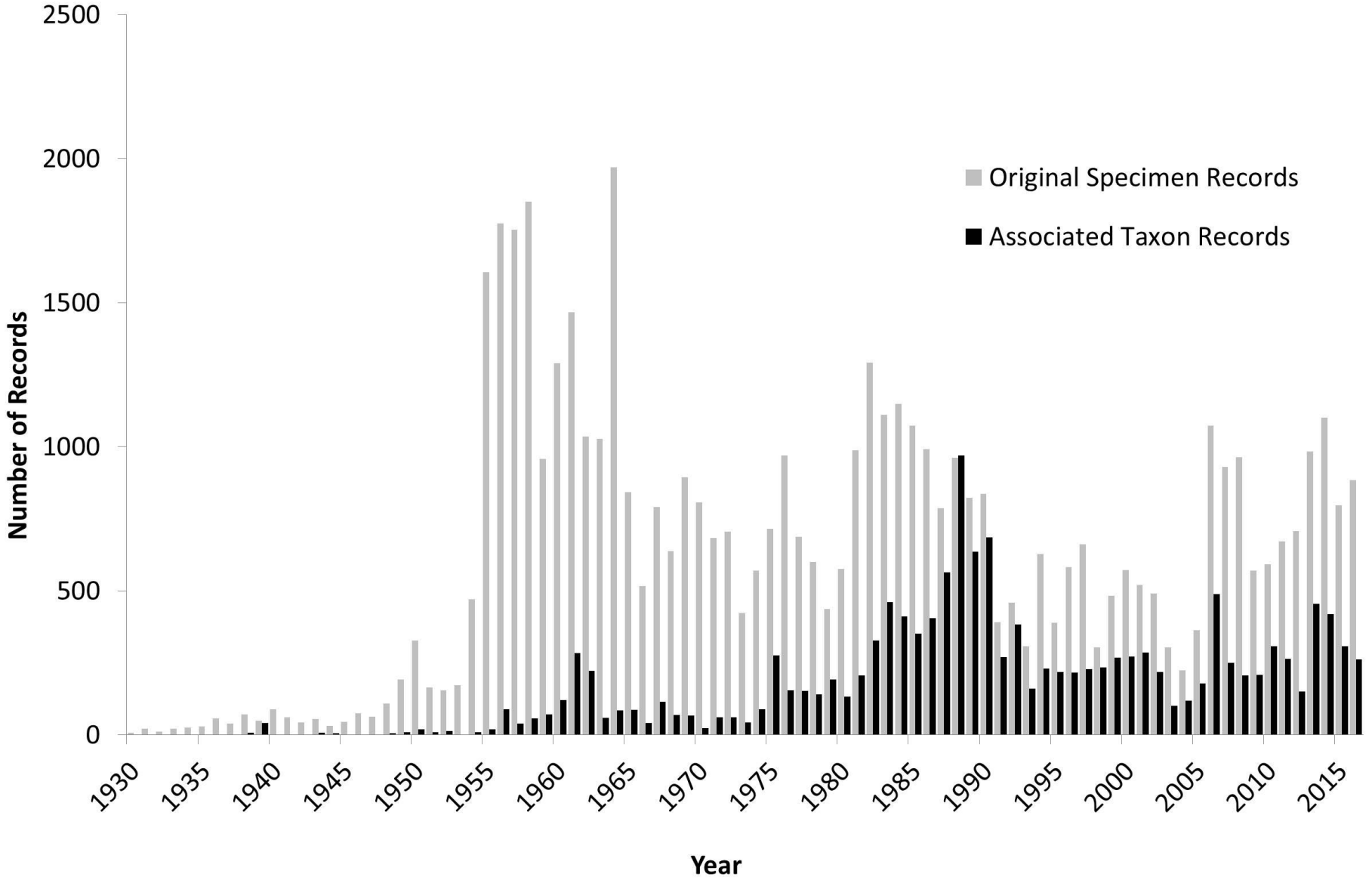
- Federally listed
  - Threatened: 25 records (7 spp.)
  - Endangered: 41 records (14 spp.)

Conradina glabra

Harperocallis flava

IMPERILED SPECIES

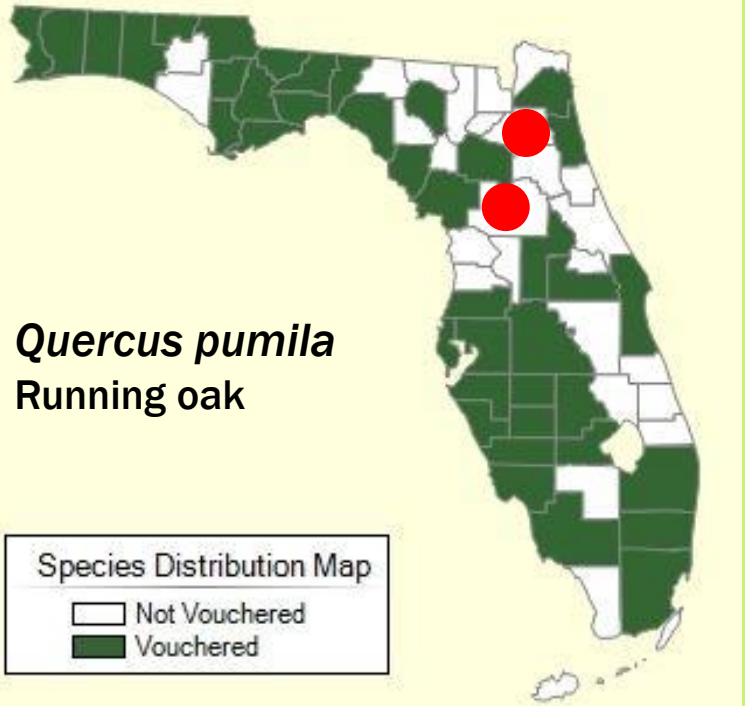
- State listed
  - Threatened: 223 records (52 spp.)
  - Endangered: 326 records (108 spp.)


2500
2000
1500
1000
500
0
Number of Records
Original Specimen Records
Associated Taxon Records
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
Year

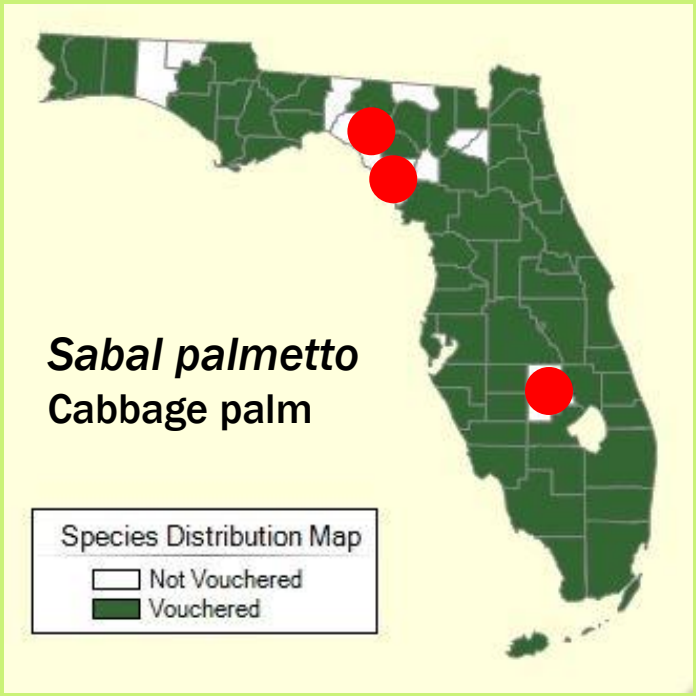
NEW COUNTY RECORDS

- 247 Florida records

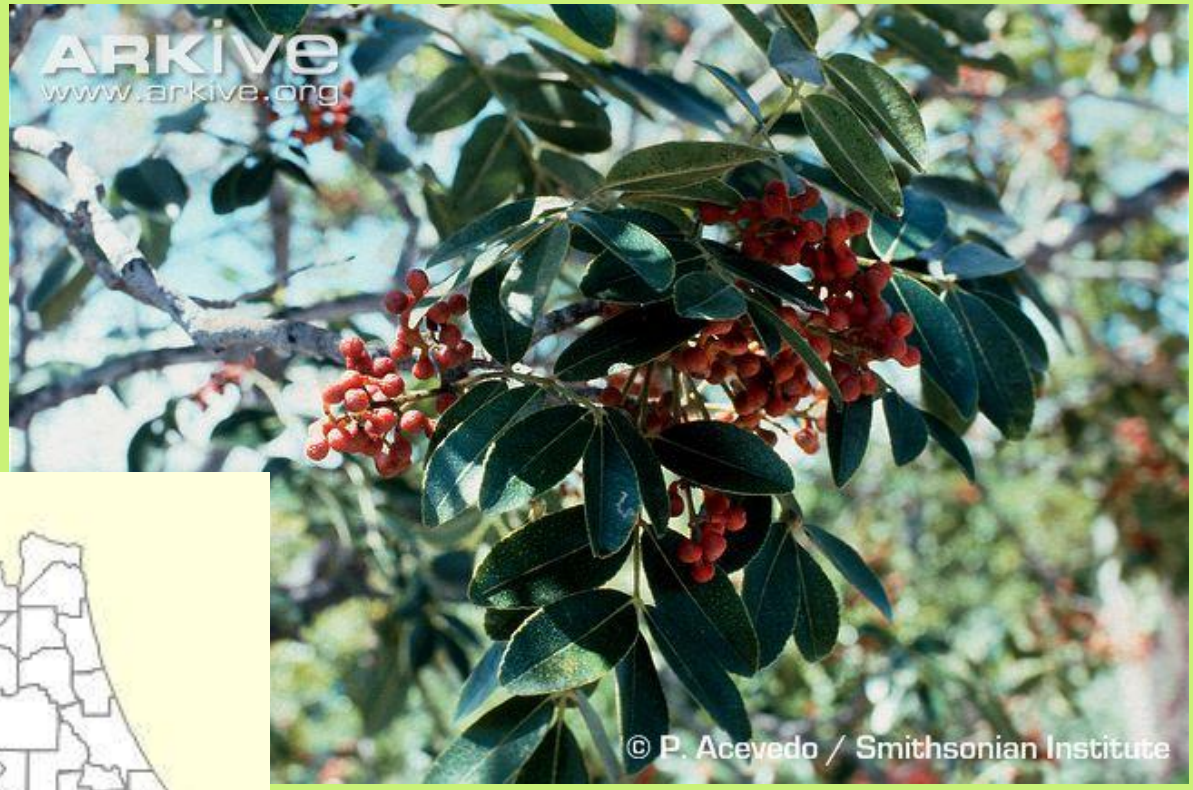
- 900-1500 U.S. records

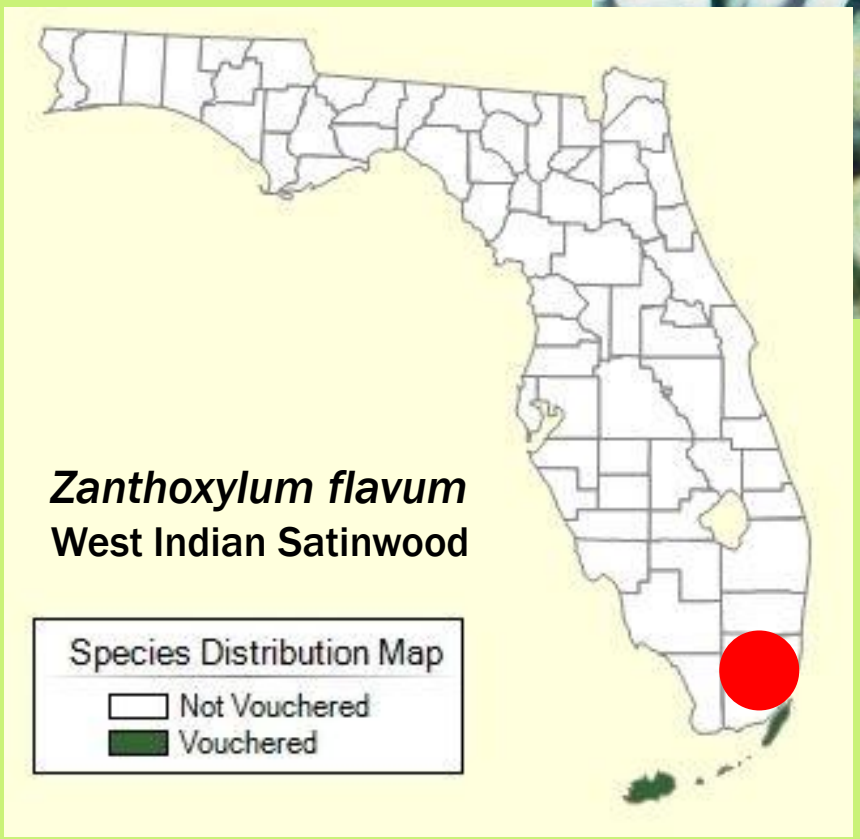


Quercus pumila
Running oak



Sabal palmetto
Cabbage palm



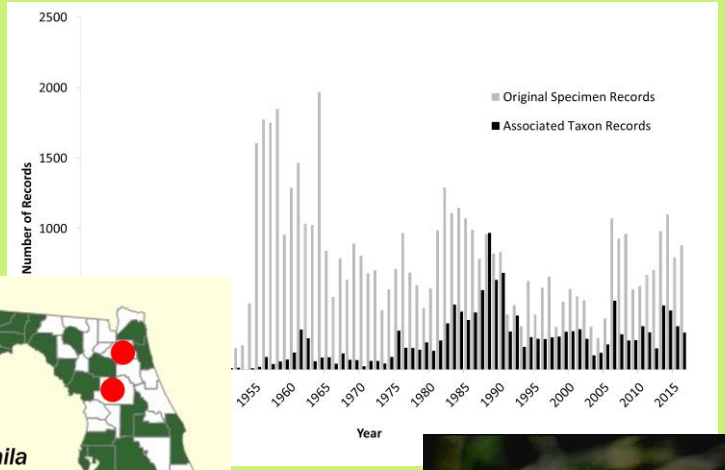


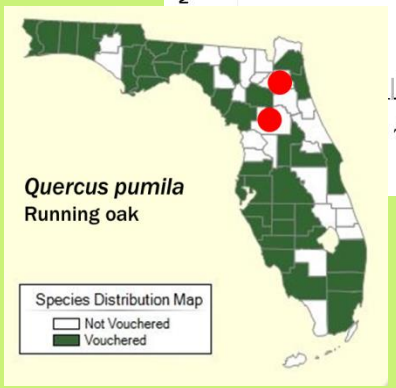
Zanthoxylum flavum
West Indian Satinwood

State-endangered

CONCLUSIONS

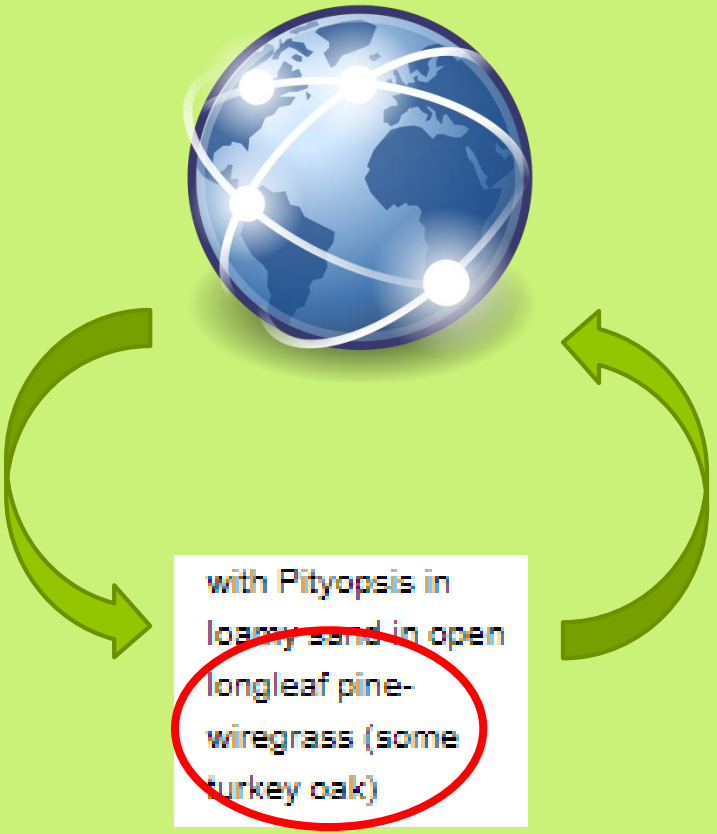
- Associated taxon records can increase sampling in:
  - Time
  - Space
  - Taxonomic diversity
- Strengths:
  - Common species
  - Systematically under-collected species (e.g., protected spp.)
- Limitations:
  - May introduce new biases
  - Not verifiable (possible mis-IDs)





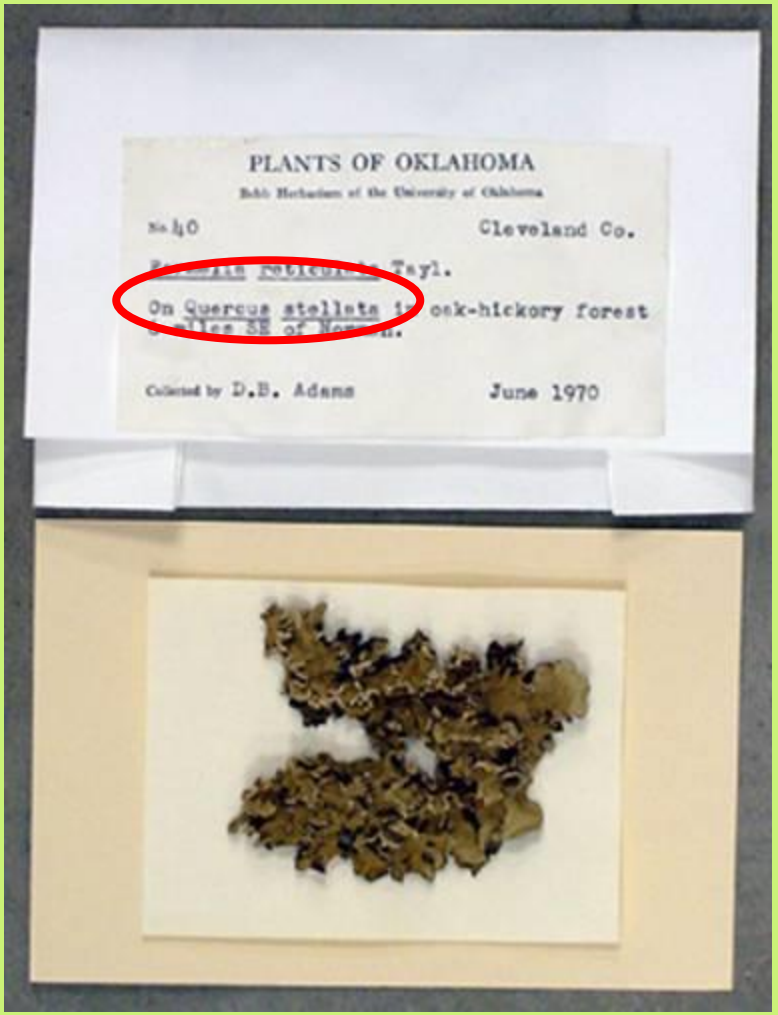
FUTURE DIRECTIONS

- Method improvement
  - Currently 4 seconds per record
  - Common names not recognized



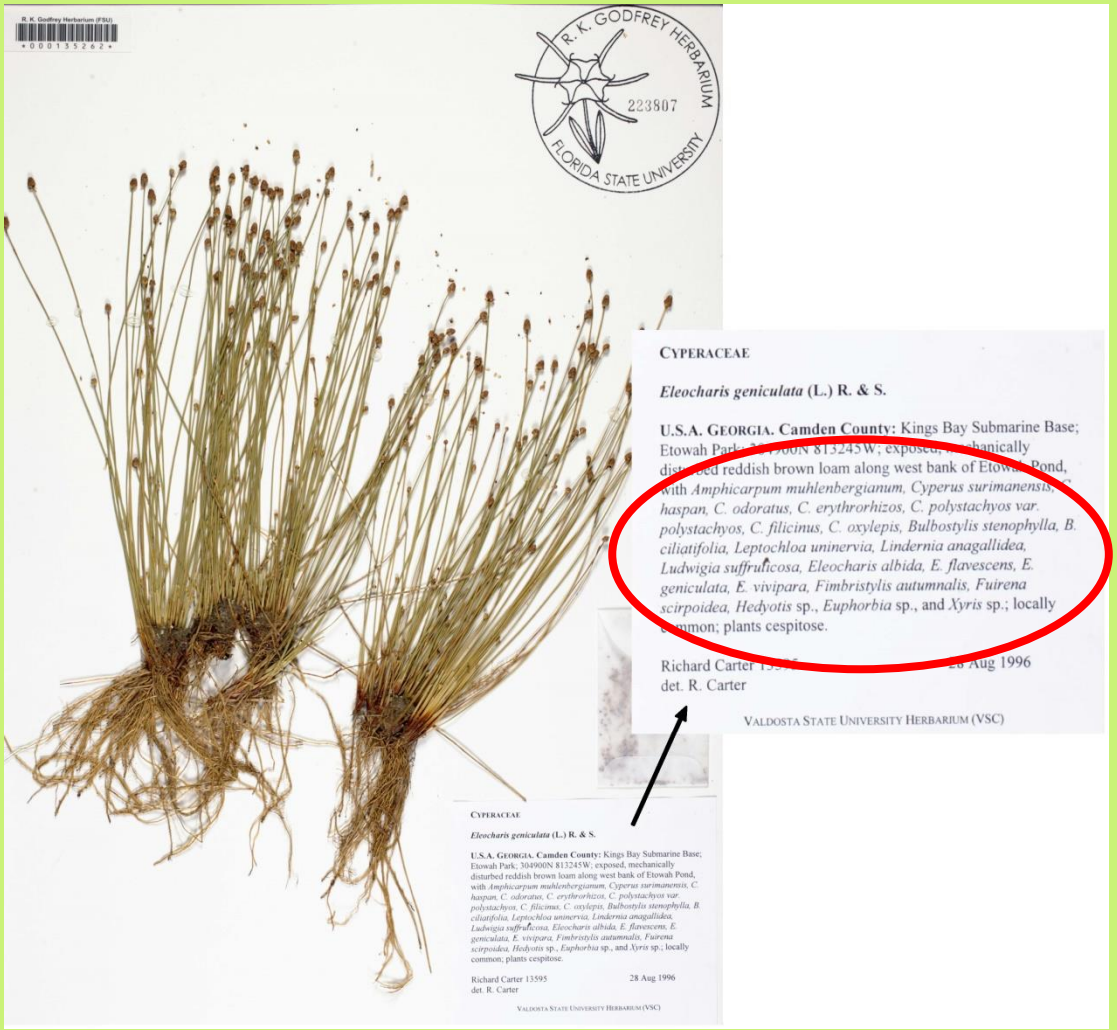
FUTURE DIRECTIONS

- Other specimen types



FUTURE DIRECTIONS

- Informing collection practices



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  - Gil Nelson
  - Scott Burgess
  - Greg Riccardi

Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author and do not necessarily reflect the views of the National Science Foundation.

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