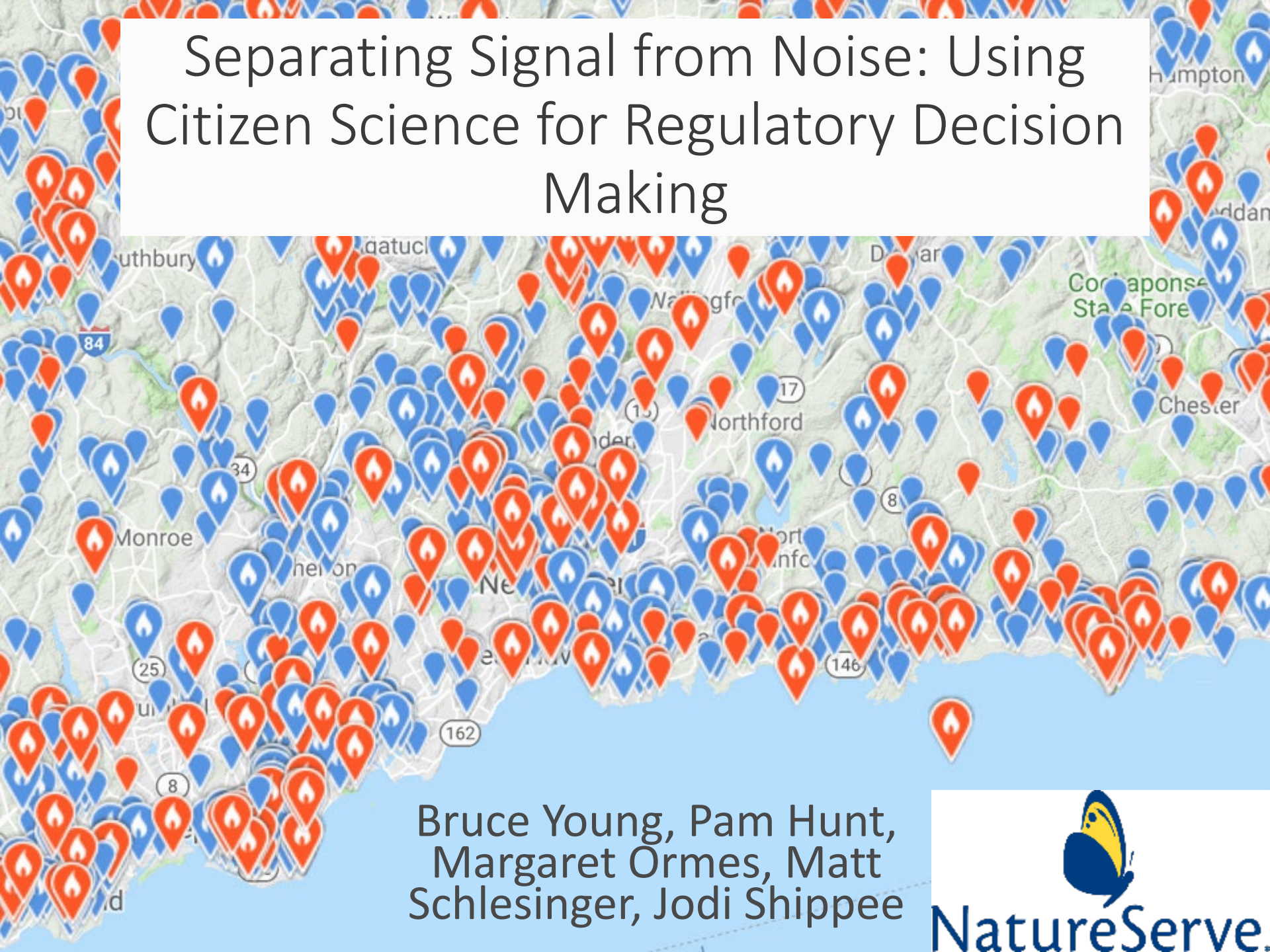
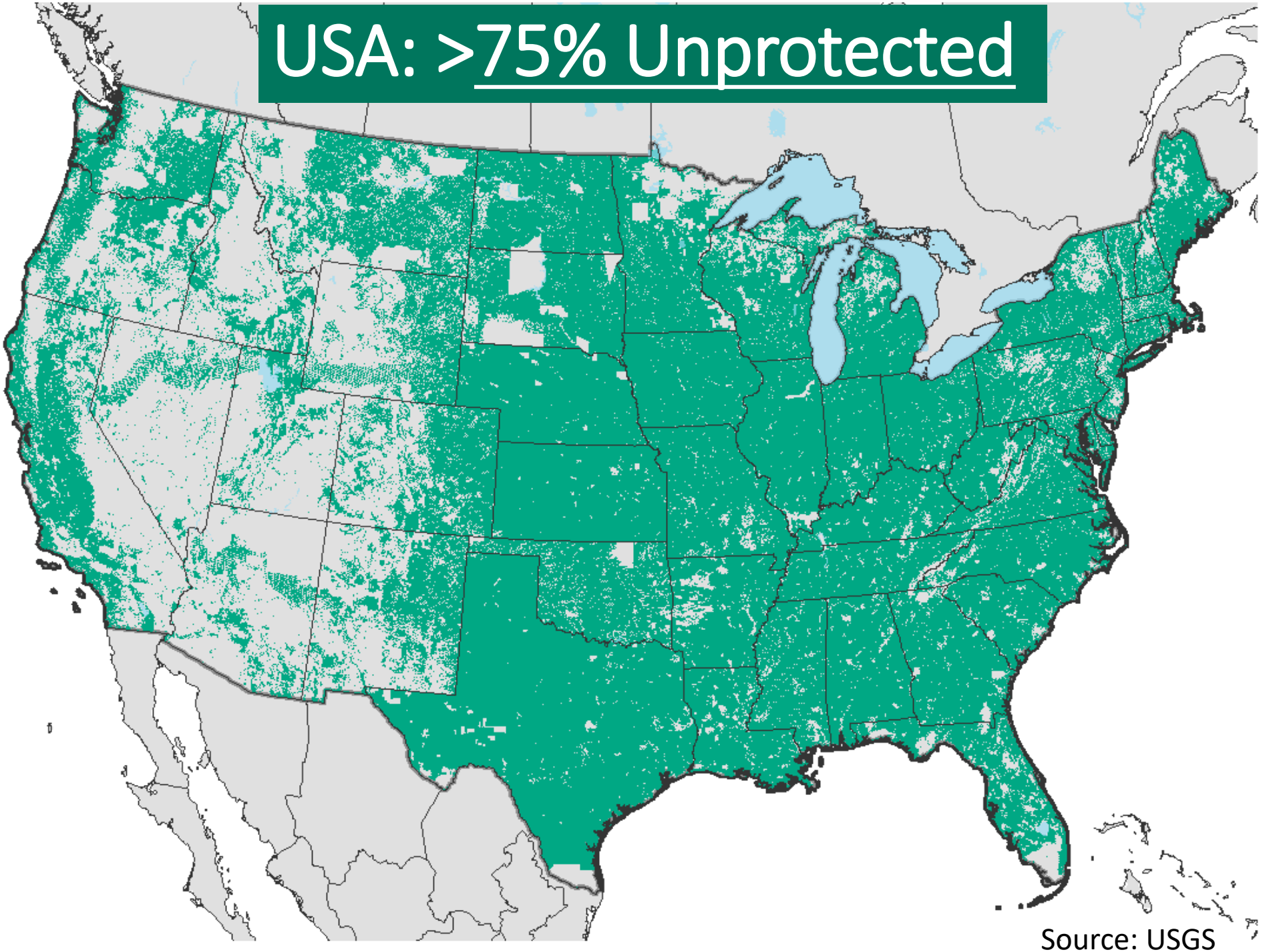
Separating Signal from Noise: Using Citizen Science for Regulatory Decision Making



Bruce Young, Pam Hunt, Margaret Ormes, Matt Schlesinger, Jodi Shippee

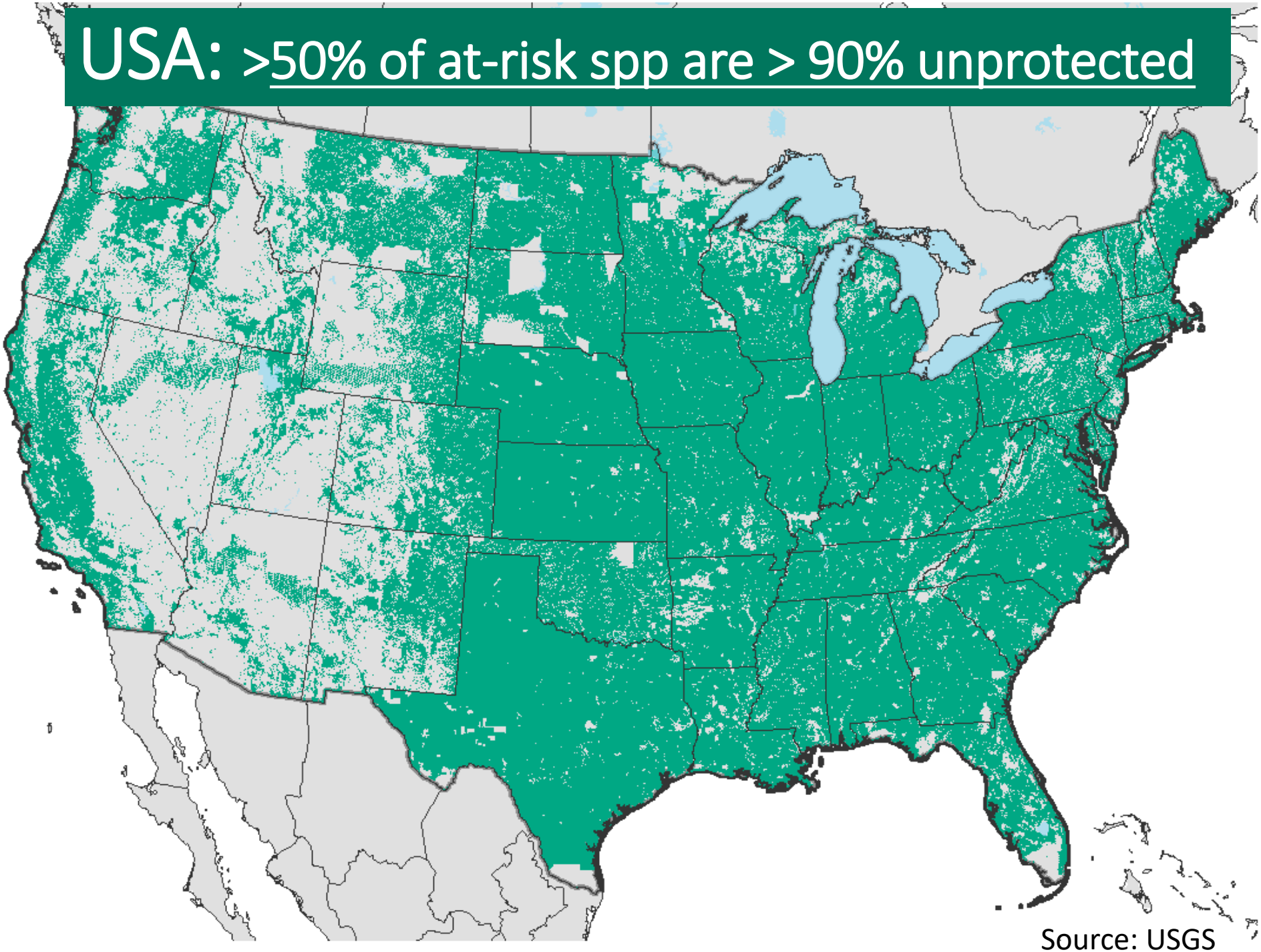
NatureServe

USA: >75% Unprotected



Source: USGS

USA: >50% of at-risk spp are > 90% unprotected

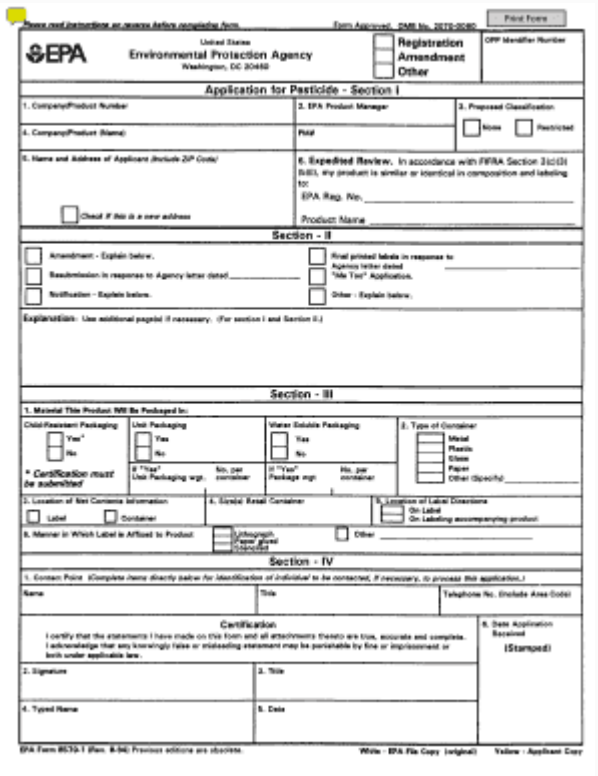


Source: USGS

Environmental Regulation

Examples relevant to at-risk species

- Permit and license applications
- Infrastructure siting
- Extractive activities
- Pesticide use



EPA

United States Environmental Protection Agency
Washington, DC 20460

Registration
Amendment
Other

OPP Identifier Number

Application for Pesticide - Section I

1. Company/Product Number
2. EPA Product Manager
3. Proposed Classification: None / Restricted
4. Company/Product Name(s)
5. Name and Address of Applicant (Include ZIP Code)
Check if this is a new address
6. Expedited Review. In accordance with FIFRA Section 3(c)(3)(B)(i), my product is similar or identical in composition and labeling to:
EPA Reg. No.
Product Name

Section - II

Amendment - Explain below.
Resubmission in response to Agency letter dated
Notification - Explain below.
Final printed labels in response to Agency letter dated "We Test" Application.
Other - Explain below.
Explanation: Use additional page(s) if necessary. (For section I and Section II.)

Section - III

1. Material This Product Will Be Packaged In:
Child-Resistant Packaging: Yes / No
* Certification must be submitted
Unit Packaging: Yes / No
If "Yes" Unit Packaging wgt. / No. per container
Water Soluble Packaging: Yes / No
If "Yes" Package wgt. / No. per container
2. Type of Container: Metal, Plastic, Glass, Paper, Other (Specify)
3. Location of Net Contents Information: Label / Container
4. Sized for Retail Container
5. Location of Label Directions: On Label / On Labeling accompanying product
6. Manner in Which Label is Affixed to Product: Lithograph, Paper glued, Stenciled / Other

Section - IV

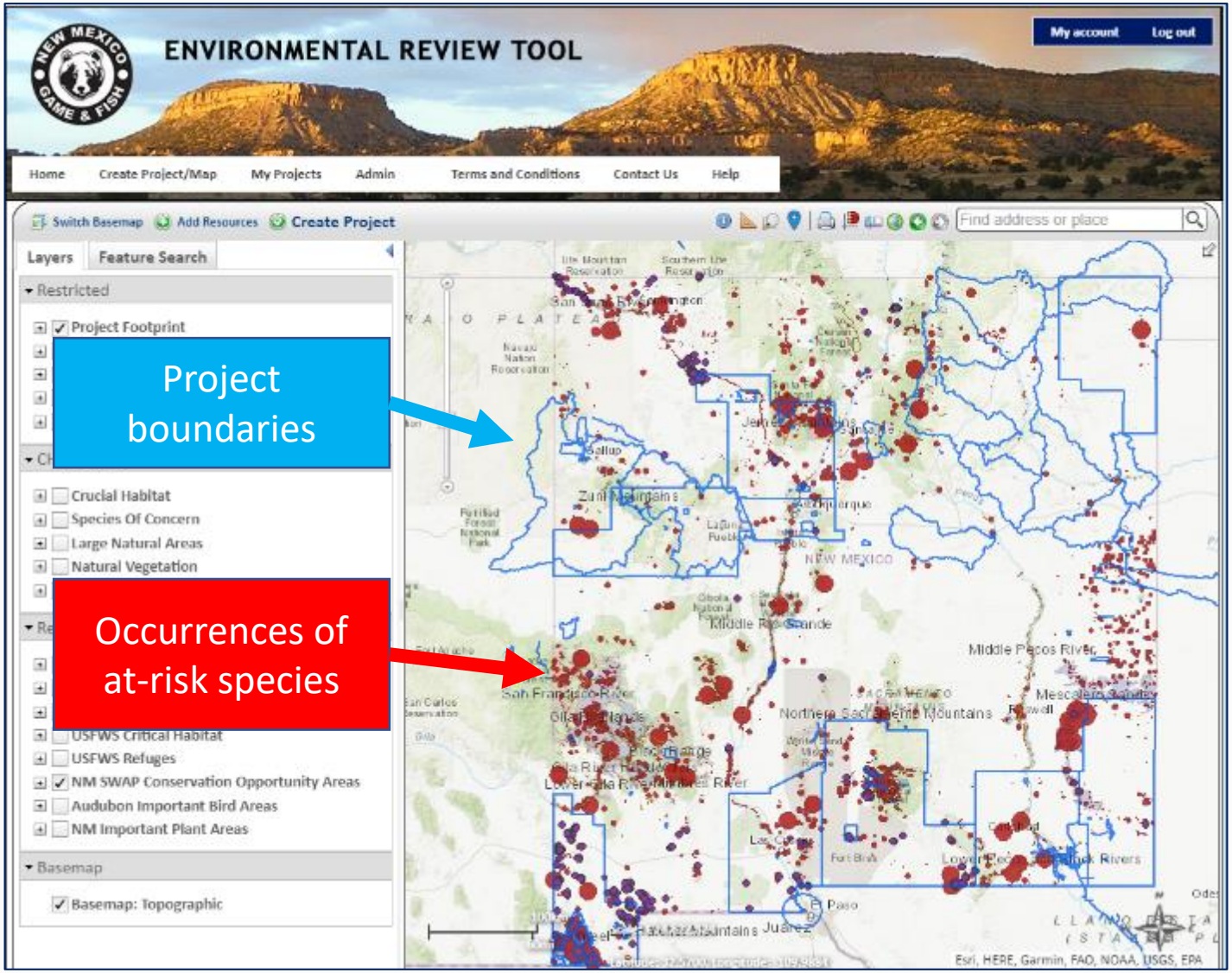
1. Contact Point (Complete items directly below for identification of individual to be contacted, if necessary, to process this application.)
Name
Title
Telephone No. (Include Area Code)

Certification
I certify that the statements I have made on this form and all attachments thereto are true, accurate and complete. I acknowledge that any knowingly false or misleading statement may be punishable by fine or imprisonment or both under applicable law.

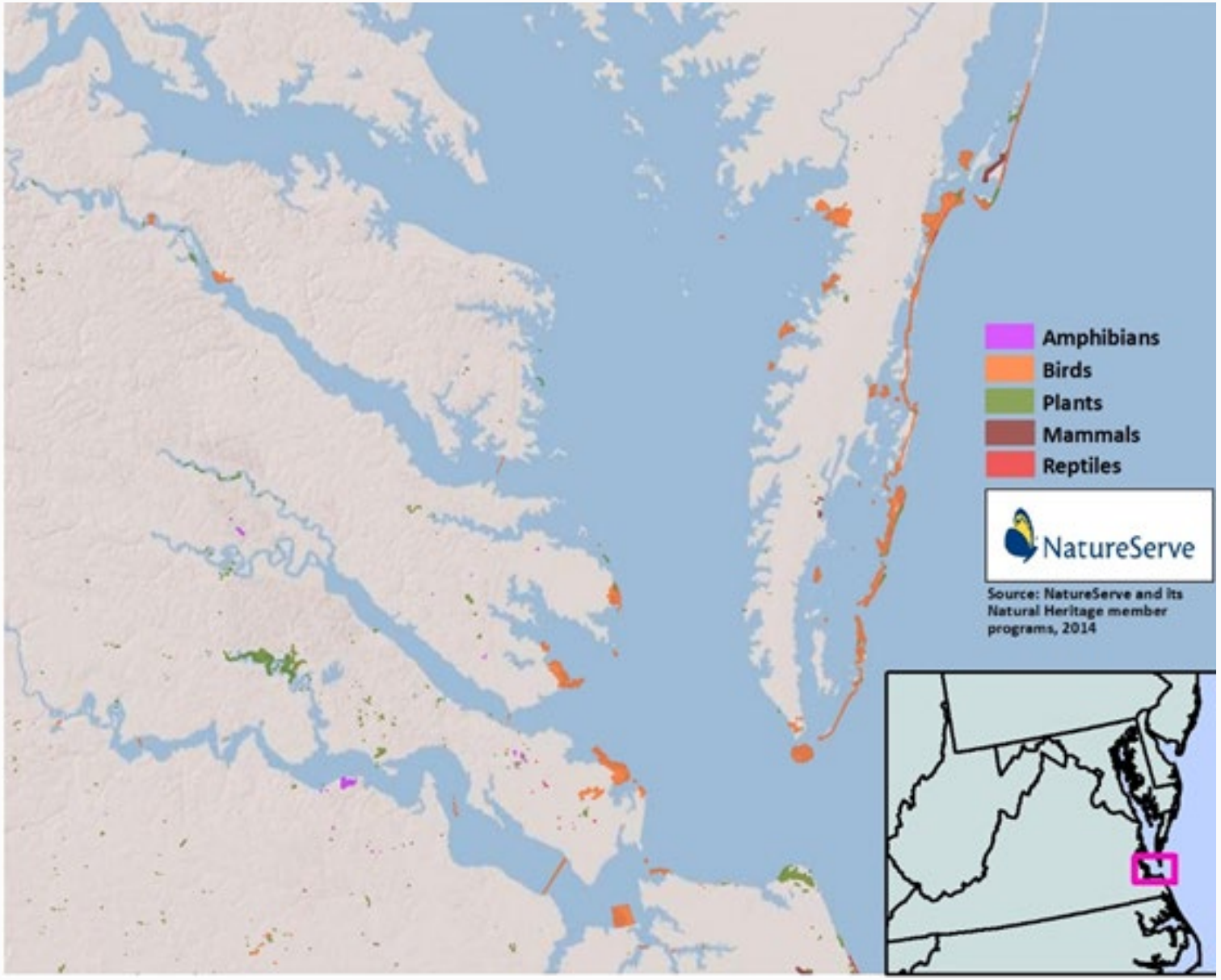
2. Signature
3. Title
4. Typed Name
5. Date
6. Date Application Received (Stamped)

EPA Form 8570-1 (Rev. 8-94) Previous editions are obsolete.
White - EPA File Copy (original)
Yellow - Applicant Copy

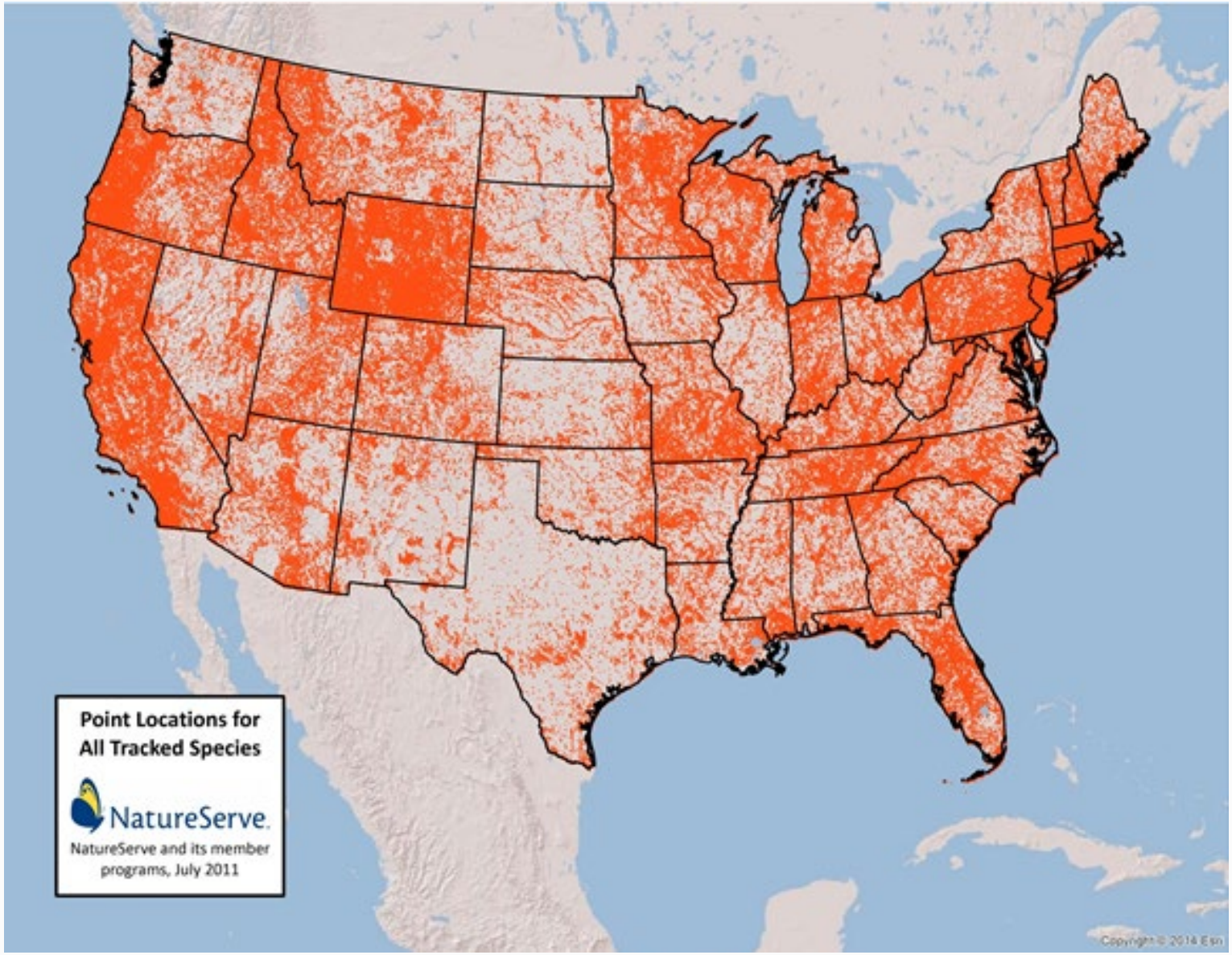
Natural Heritage Program Review



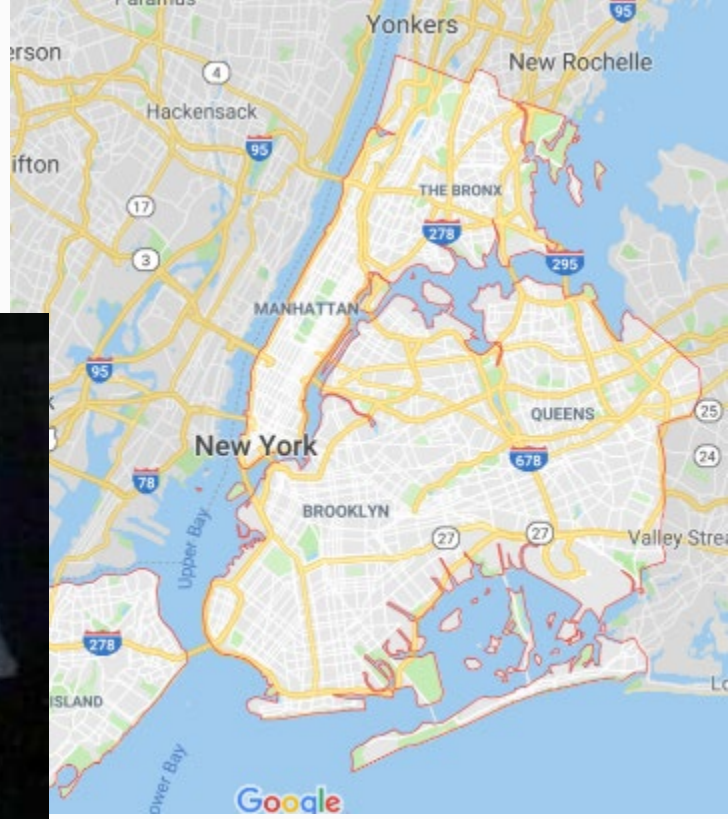
Element Occurrences



US Element Occurrences

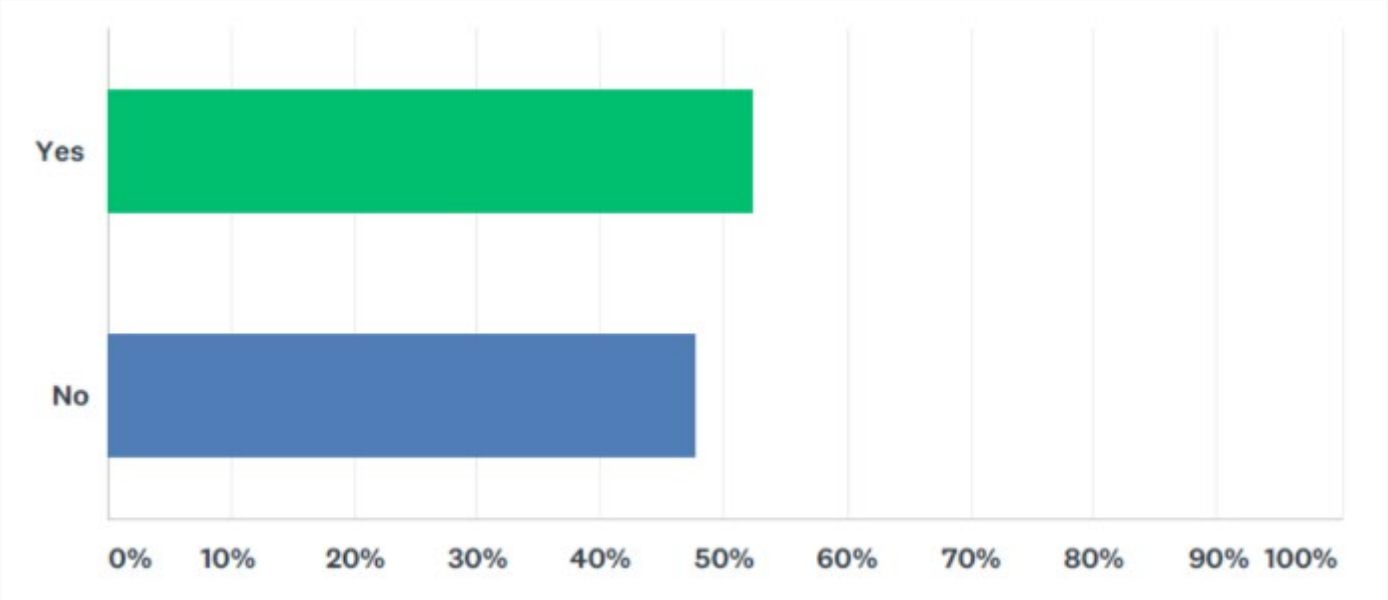


Striped Bass, *Morone saxatilis*



This fish helped sink a proposed multi-billion $ development project in New York City

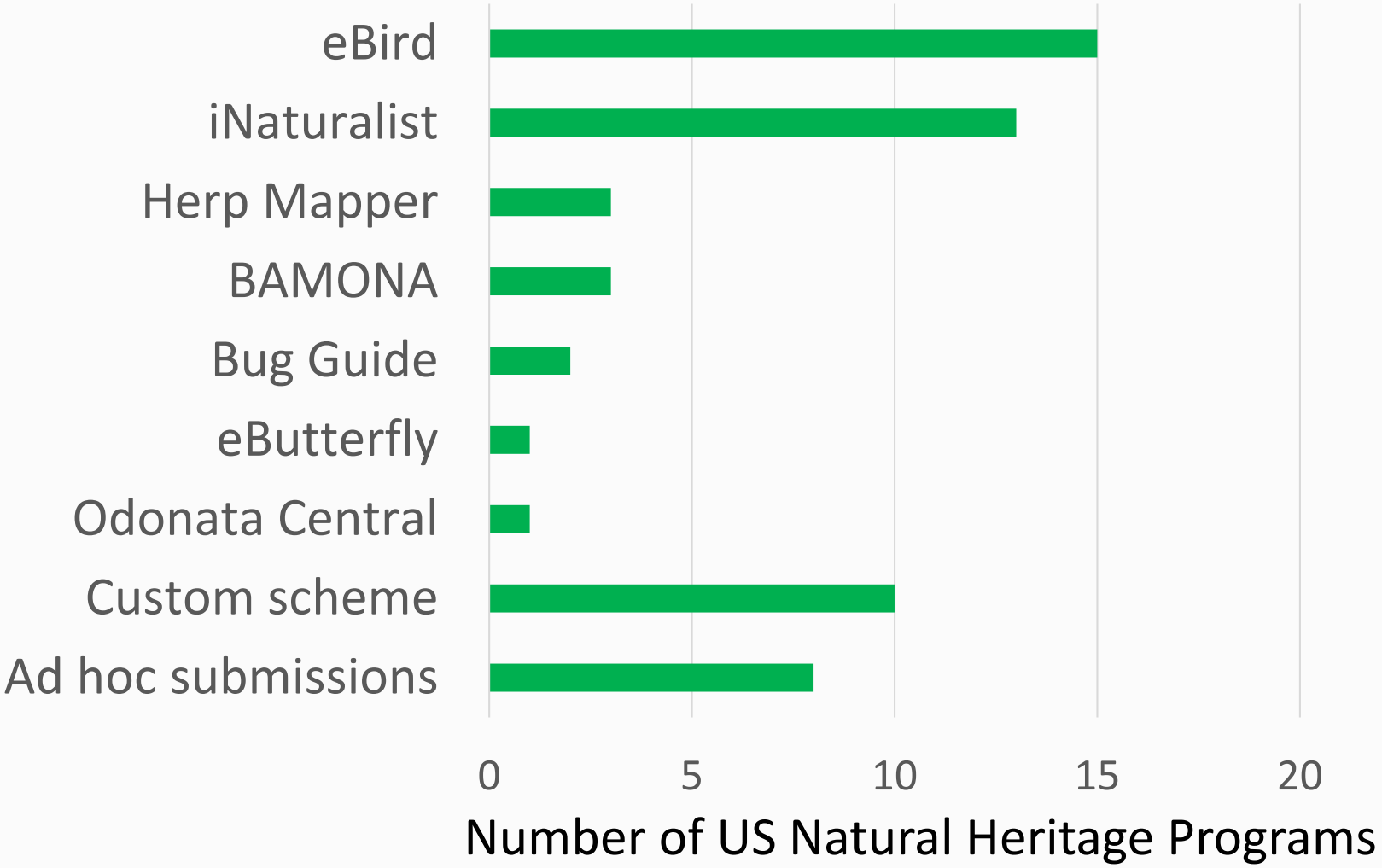
Use of Citizen Science Data in Regulatory Review



% of US Natural Heritage Programs (*N*=50)

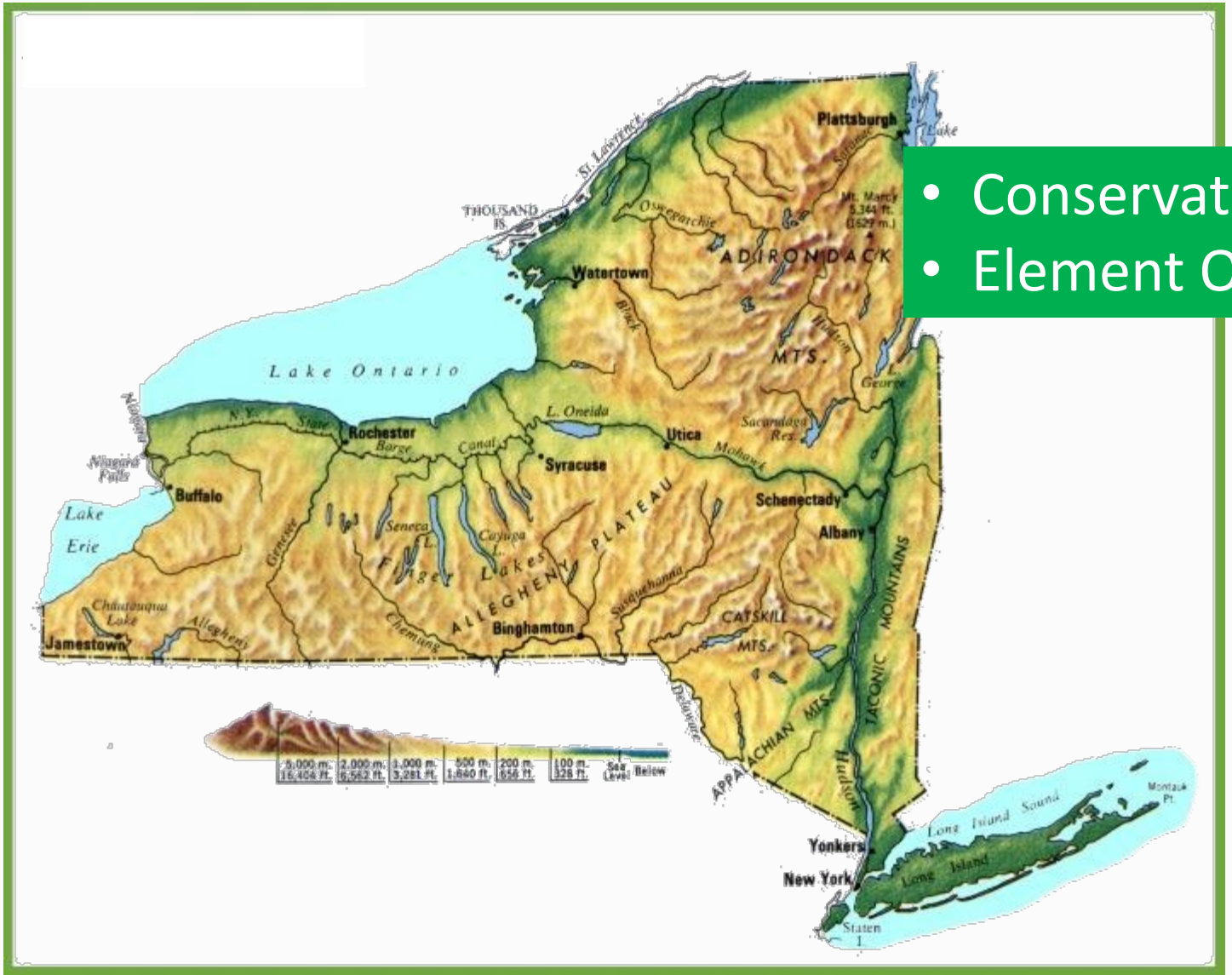
NatureServe Network survey: *Sept 2018*

Citizen Science Schemes Used



NatureServe Network survey: *Sept 2018*

New York Natural Heritage Program Example



- Conservation Status
- Element Occurrences

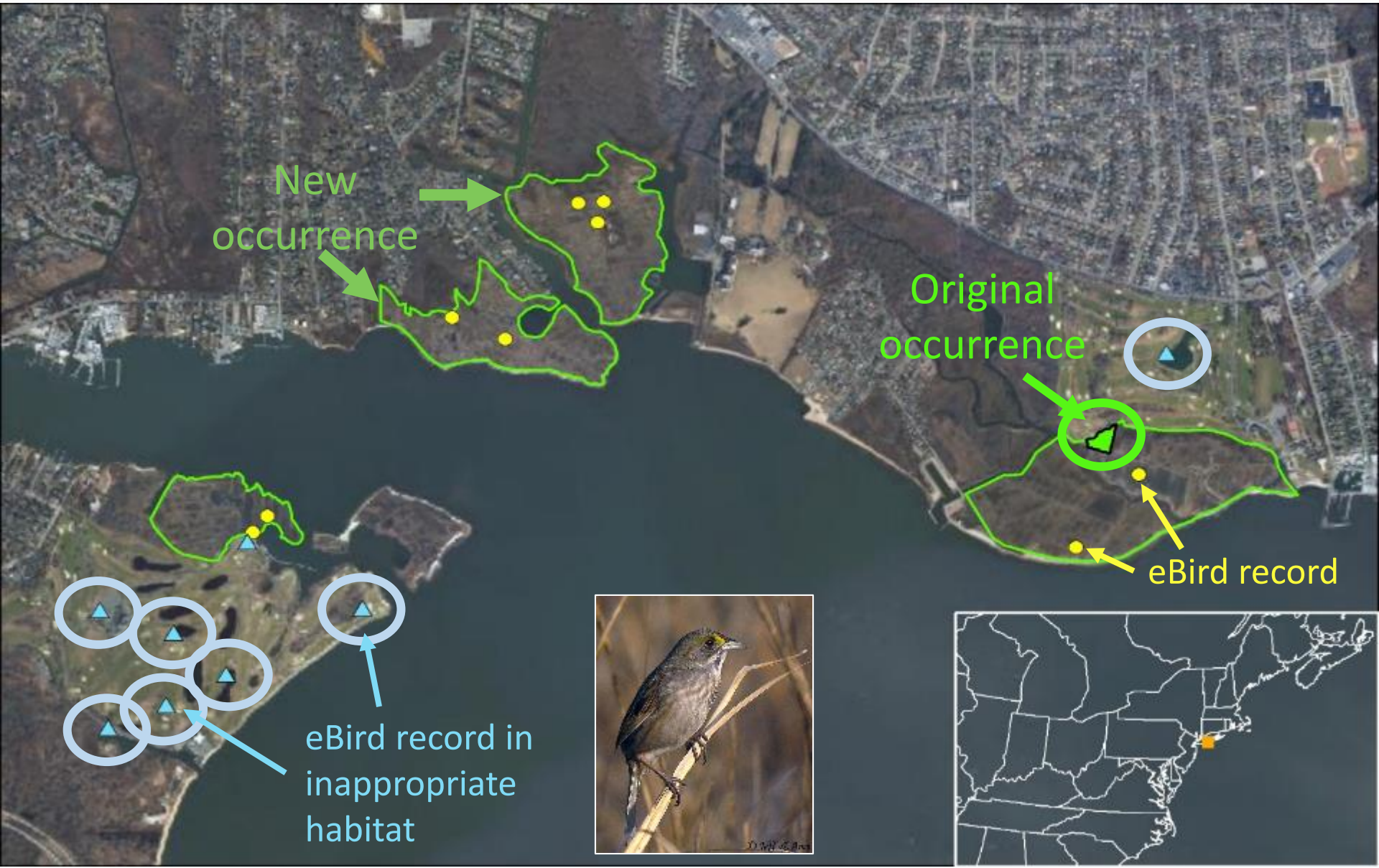
Effect of eBird Data on Ranking Factors

	Pre eBird		Post eBird	
	Range Extent (km^2)	Area of Occupancy (km^2)	Range Extent (km^2)	Area of Occupancy (km^2)
Black Tern	46,147	820	No change	No change
Harlequin Duck	--	--	2,766	176
Red-headed Woodpecker	142,301	412	157,395	564
Seaside Sparrow	3,854	124	4,933	268
Upland Sandpiper	156,026	1,060	156,555	1,268
Yellow-breasted Chat	--	--	4,772	32






New Element Occurrences from eBird Data



New York State:

- Reviewed **27,605** eBird observations for these 6 priority birds

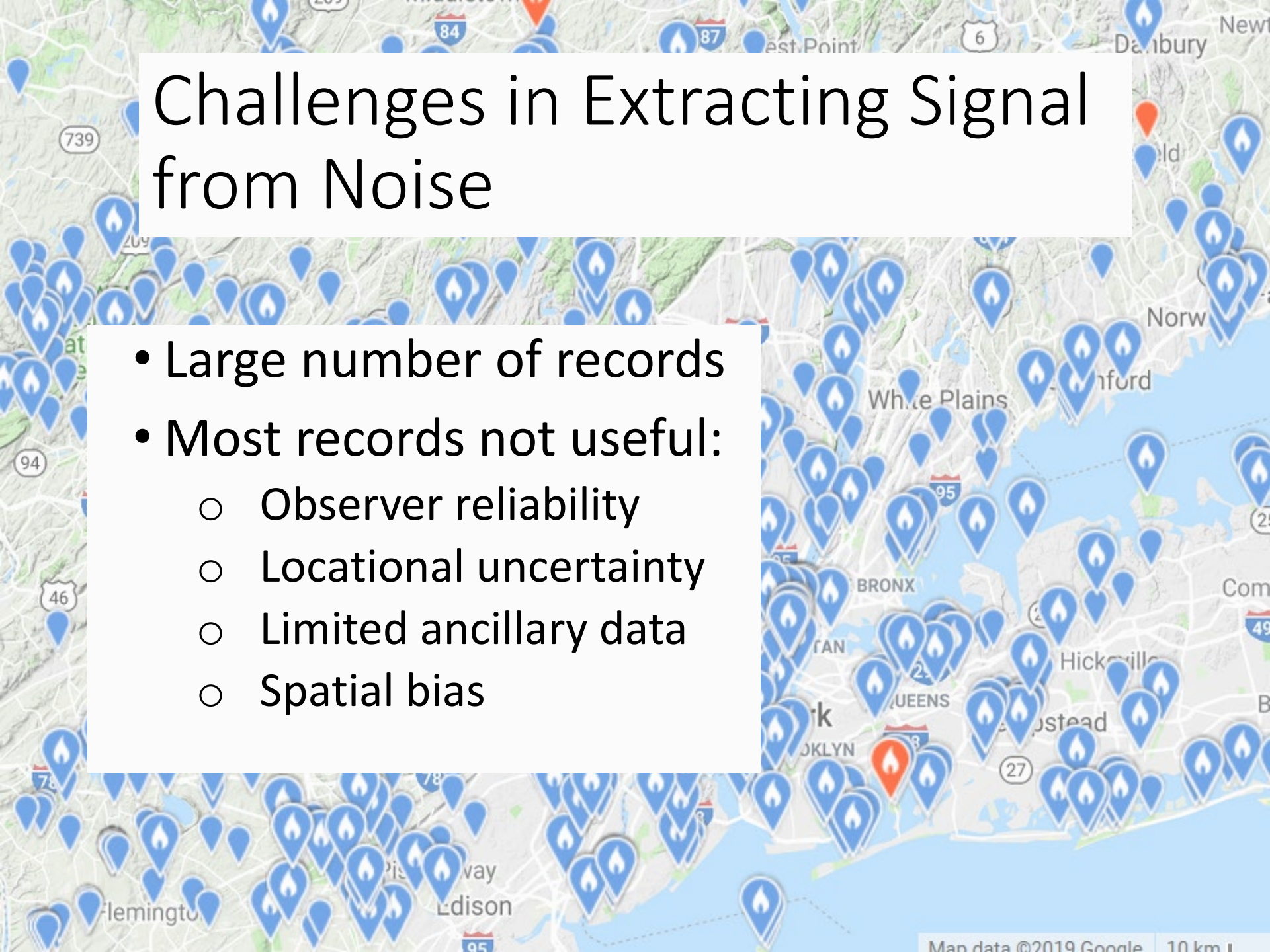
- Added **27** element occurrence records (19% increase)



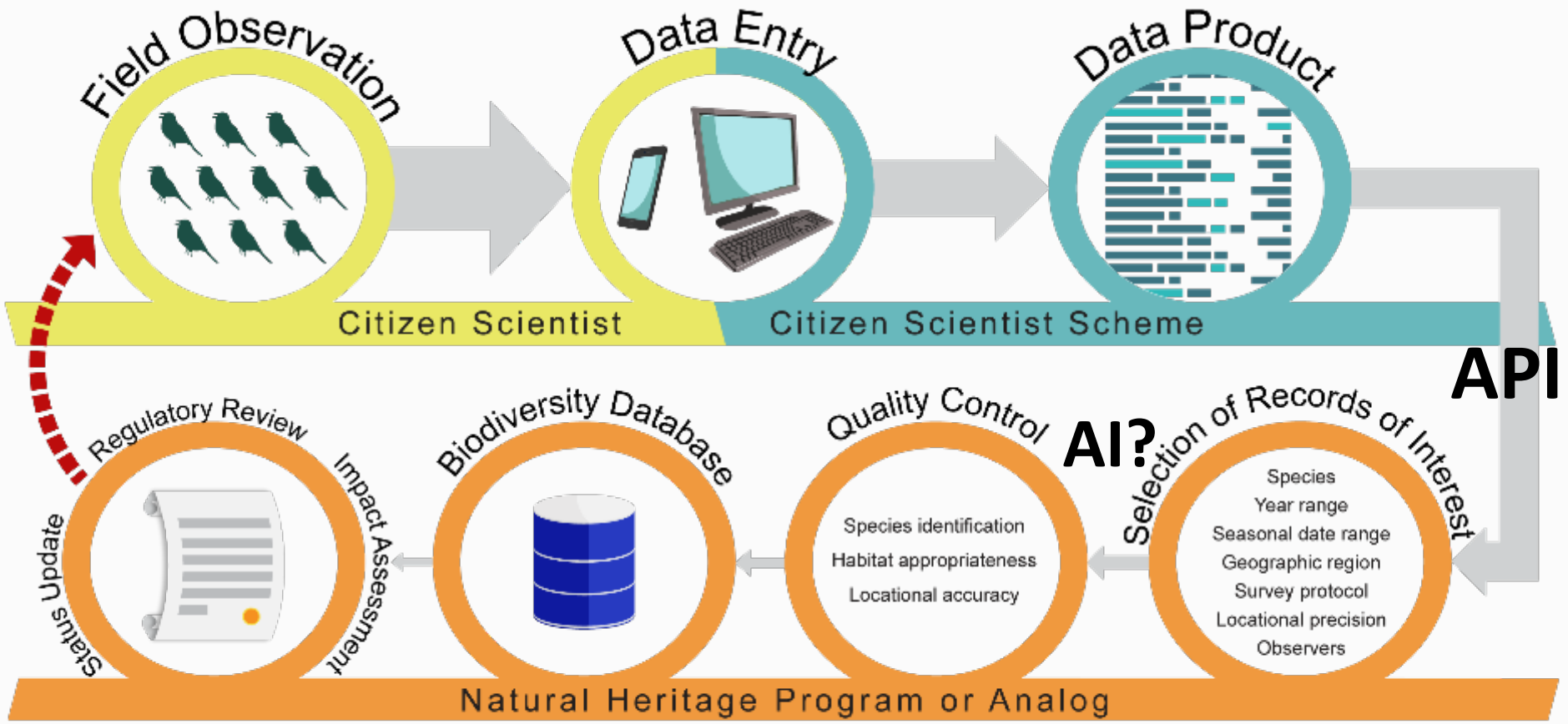



Challenges in Extracting Signal from Noise

- Large number of records
- Most records not useful:
  - Observer reliability
  - Locational uncertainty
  - Limited ancillary data
  - Spatial bias



Data to Decision

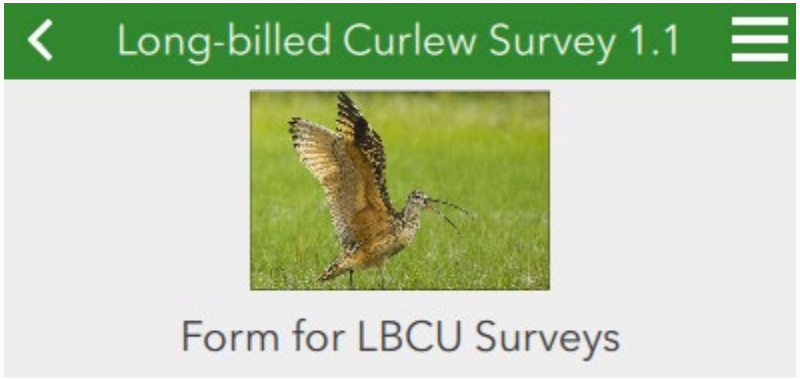


Two Approaches

- Harvest from mass schemes, automate as possible

eBird iNaturalist HerpMapper BugGuide Odonata Central

- Establish bespoke schemes for targeted species



Citizen science data are already influencing regulatory decisions…

… we need to get better at extracting the signal from the noise