



Citizen Science Data Management Challenges and Opportunities

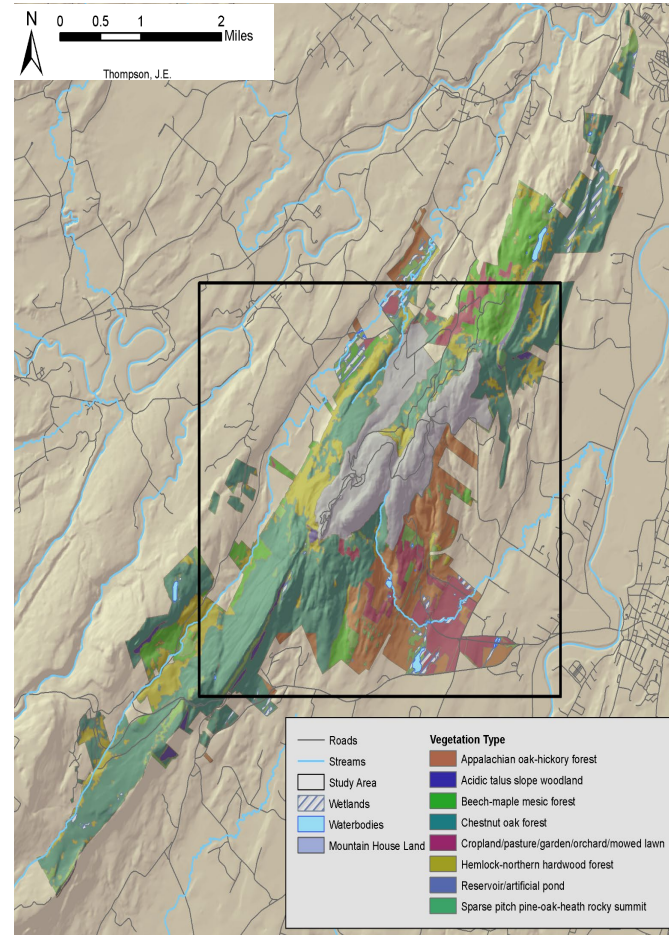
Alexis Garretson |  0000-0002-7260-0131

Outline

- 1) Mohonk Preserve Amphibian Breeding Dataset
 - 1) Description
 - 2) Citizen Science Processes
 - 3) Takeaways
- 2) iNaturalist Occurrence Records and Image Dataset
 - 1) Centennial Bioblitzes
 - 2) Comparison with GBIF
 - 3) Takeaways



Mohonk Preserve Amphibian Breeding



- 11 vernal pools on Preserve lands that vary in size and are distributed across the landscape at a range of elevations (166 - 384 m).
- Monitors the seasonality and reproductive ecology of amphibians and provides holistic environmental context for occurrence records
- Incorporates records from a swamp leading up to drying
- Extends into the 1930s, allowing for investigations into the impacts of climate change, urbanization, and acid rain

Legacy Data Collection



Daniel Smiley (1907 – 1989)



Tesserson Salamander
1 Apr. '61 Bonticou Pool, temp. 25°, snow previous night, rain during day. About 20 seen, mostly in deeper water. One in process of egg laying. Several egg masses seen - one about 1 1/2" long, following a stick. Others less long, but all gave impression of being elongated. D.B.

Wood Frog
5 Apr. '55 A few calling at Slate Bank pool 5 P.M. No eggs or calls at Woodland pool. D.B.
15 Apr. '55 Eggs at Woodland pool. None seen, eggs photographed. D.B.
14 Apr. '56 Many heard calling Humpo, S. of Brook Farm 9 P.M. D.B.
21 Apr. '56 Calling at Humpo. D.B.
27 Apr. '56 Few calling at Humpo. D.B.
5 May '56 None heard at Humpo. D.B.

Spring Peeper
15 Apr. '61 None heard at Bonticou Pool in evening. D.B.
16 Apr. '61 Several heard at Bonticou after all day rain. D.B.
18 Apr. '61 Heard at Bonticou Pool for 1st time. D.B.
22 Apr. '61 Heard from O.C., 1st on mt. of gr. D.B.
22 Apr. '61 Heard abundantly along traps. D.B.
6 Apr. '62 Calling Bonticou Pool, hot on 4/6. V.S. & D.B.
26 Sept. '62 Heard Rhododendron Swamp. D.B.

HARNESSING THE POWER OF THE CROWD
ZOONIVERSE
Learn how you can crowdsource your research at zooniverse.org

Vernal Pool Monitoring

Date:	Vernal Pool Name:		
Time Begin:	Time End:	Participants:	
Sky Code:	Wind Code:	Air Temp:	Previous Day Precip?: Yes / No
Water Depth (m):	Water Level % (circle): 100, 75, 50, 25, 0	Ice %:	
Veg % (on surface):	Veg Species (circle): Grass Sedge Duckweed Algae Other		
Visibility Impaired? Yes / No	Odor (circle): Methane Sulfur None Other	Fairy Shrimp Present?: Yes / No	
Water Temp (°F):	Water pH:	Water Conductivity (µS):	
Water Nitrate (mg/L):	Water Chloride (mg/L):	Water Ammonium (mg/L):	
Water DO (%):	Water Turbidity (cm):	Water Turbidity (ntu):	
White eggs present in JEFF egg masses?: Yes / No	Other:		

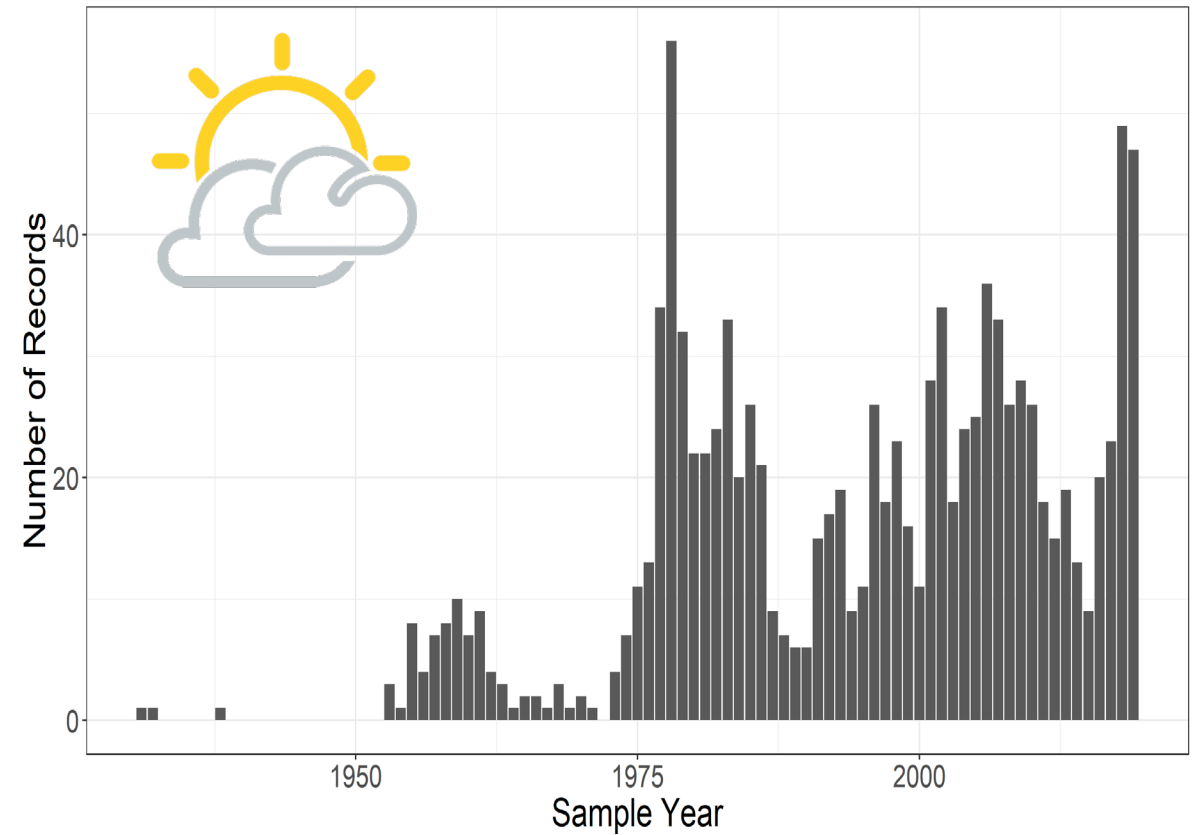
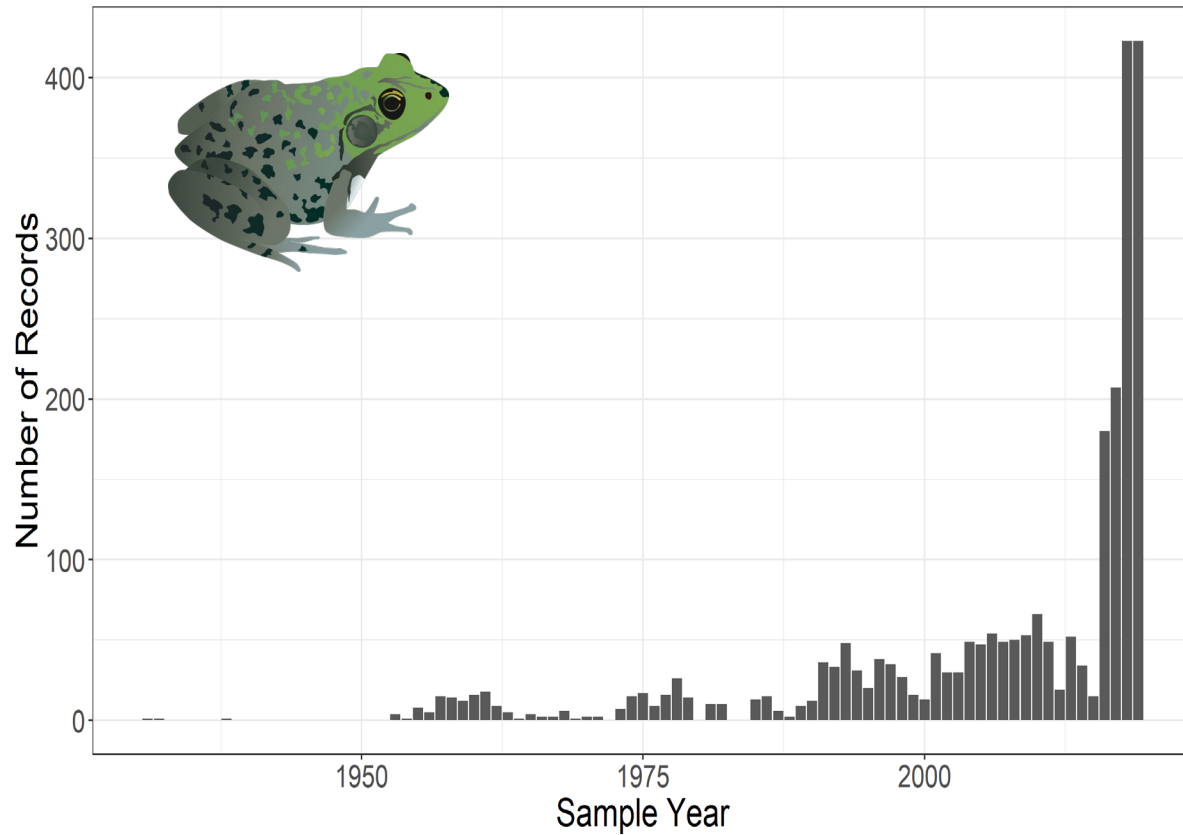
Species	# Adults			# Egg Masses	Chorus Code	Chorus Count	# Juveniles	# Spermato- phores	# Tadpoles/L arvae
	Live	Dead	Amplexus						
Wood Frog									
Spotted Salamander					NA	NA			
Jefferson Salamander					NA	NA			
Marbled Salamander					NA	NA			
Blue-Spotted Salamander					NA	NA			
Red-Spotted Newt					NA	NA			
Spring Peeper									
Green Frog									
Bullfrog									

Additional Tallies:

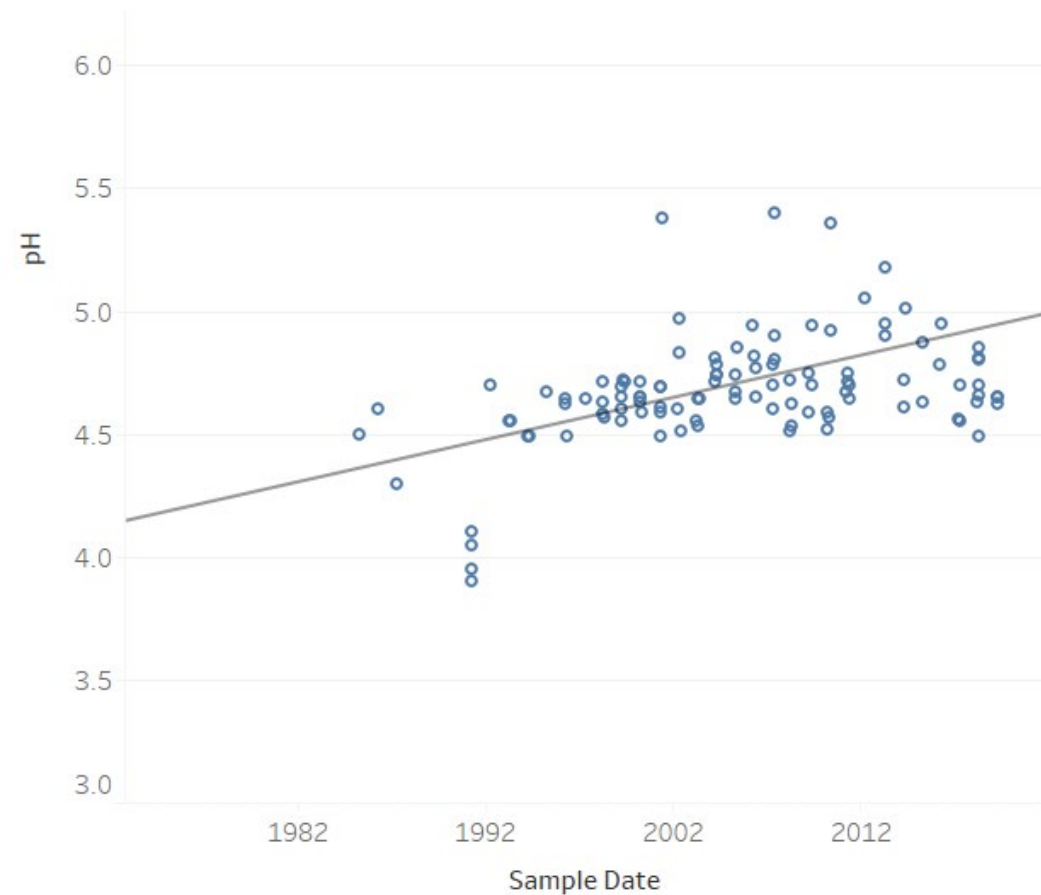
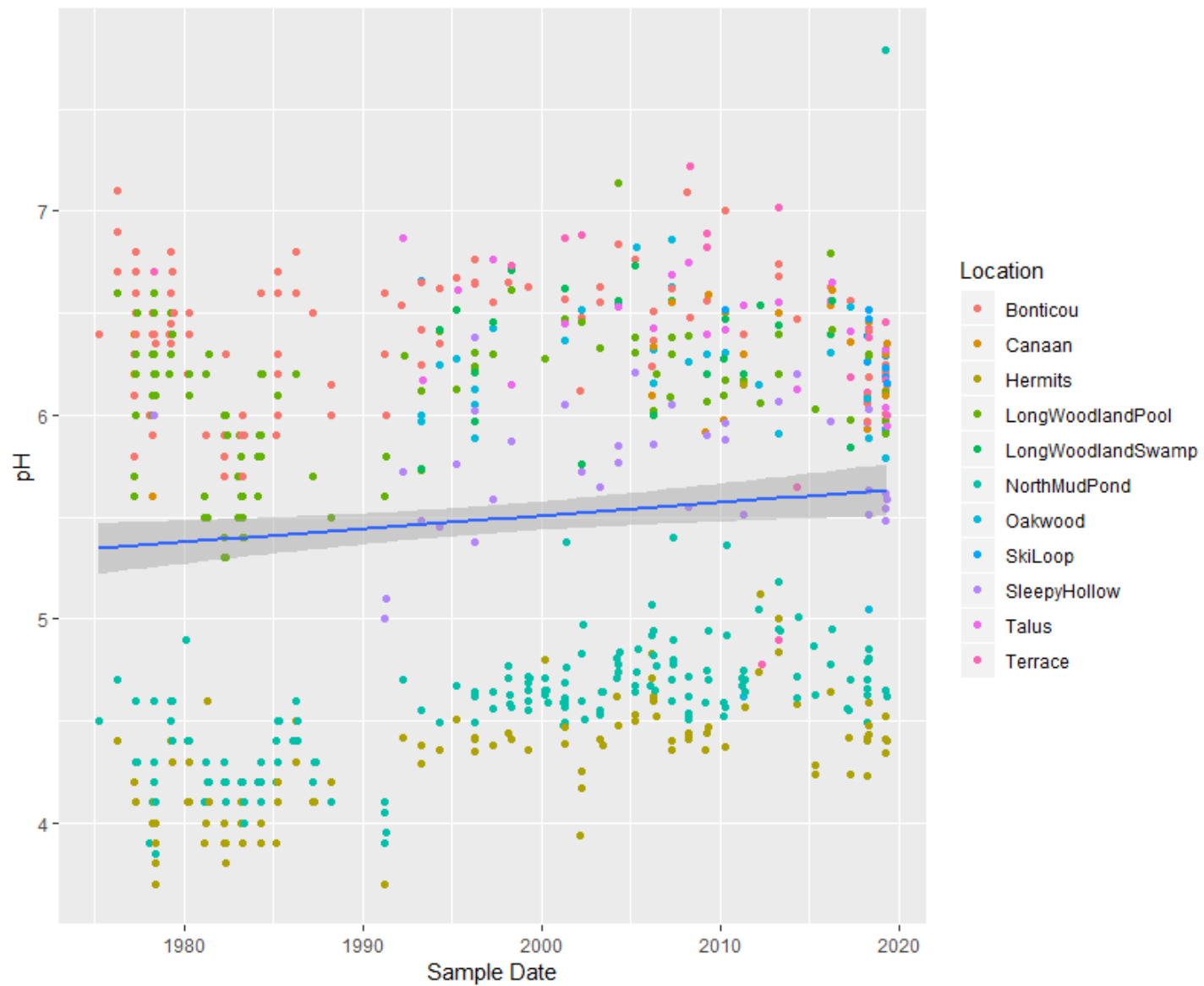
Ongoing Monitoring



Harmonized Dataset



2,480 sampling events and 151,701 individuals across
all 9 species and 11 vernal pools



Data Management Takeaways

Challenges

- Attribution & Ethical Attribution
 - Vulnerability
 - Post-humous consent
- Citation and credit is tricky
- Appropriate process documentation and metadata maintenance

Opportunities

- Diversify science data producers in terms of abilities, age, background etc.
- Provide skill-building opportunities in data management
- Greater depth of data coverage for research reuse
- Data rescue process optimization
- Leveraging community data to monitor community priorities

iNaturalist.org

Common Eastern Bumble Bee (*Bombus impatiens*) Research Grade



stellariagraminea

1,260 observations



Observed:

Sep 7, 2018 · 10:23 AM EDT

Submitted:

Nov 22, 2019 · 1:09 AM EST

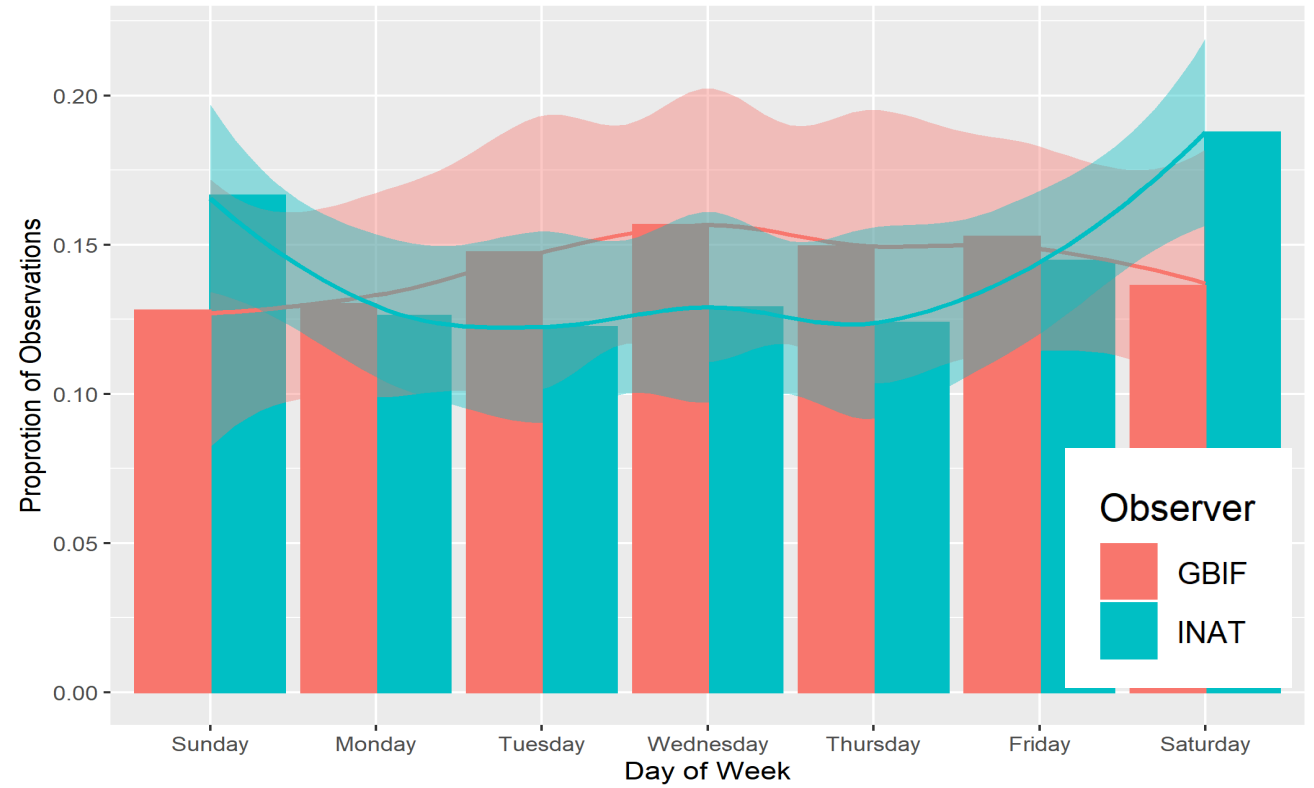


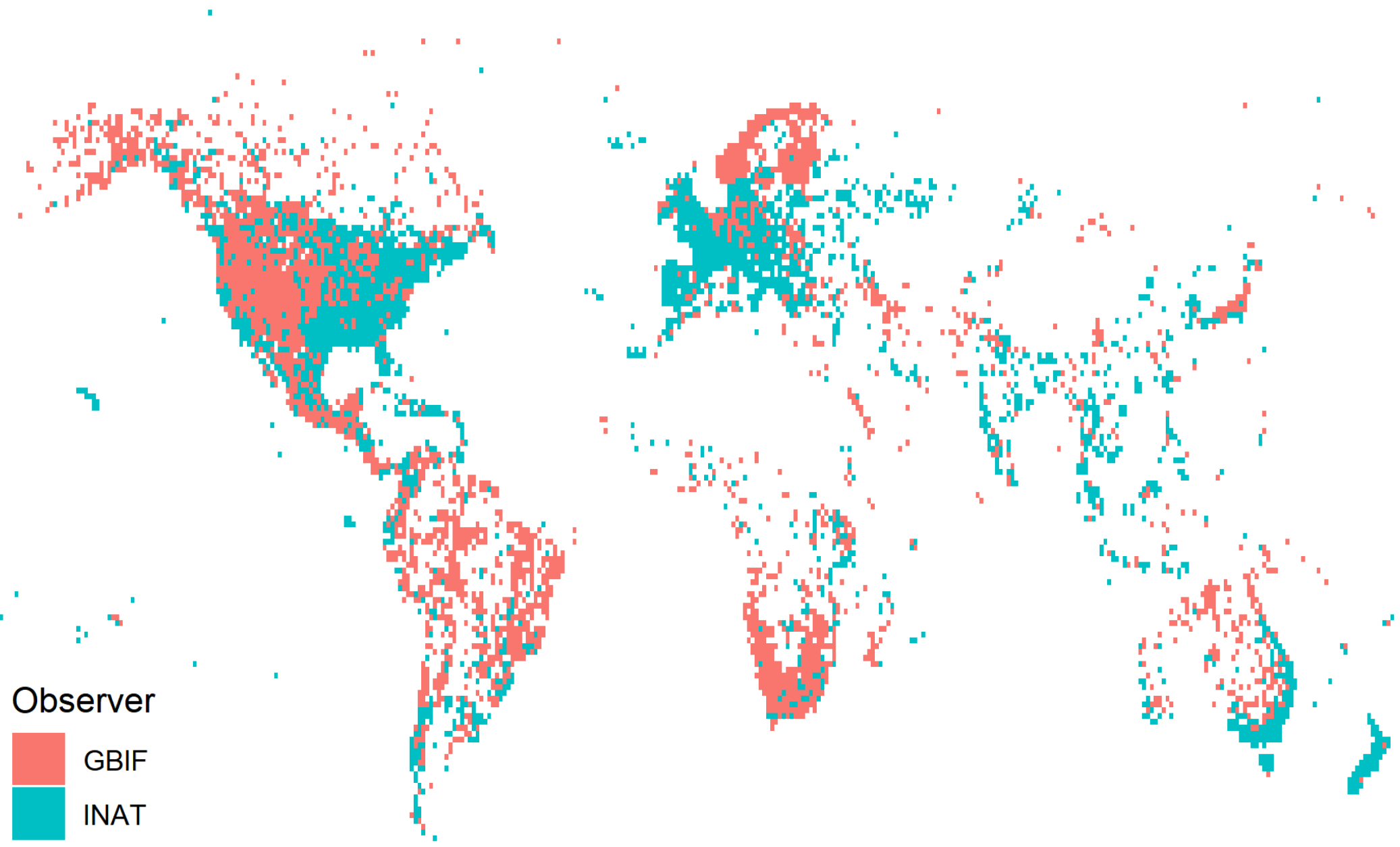


GBIF

Global Biodiversity
Information Facility

Spatial & Temporal Biases





Observer



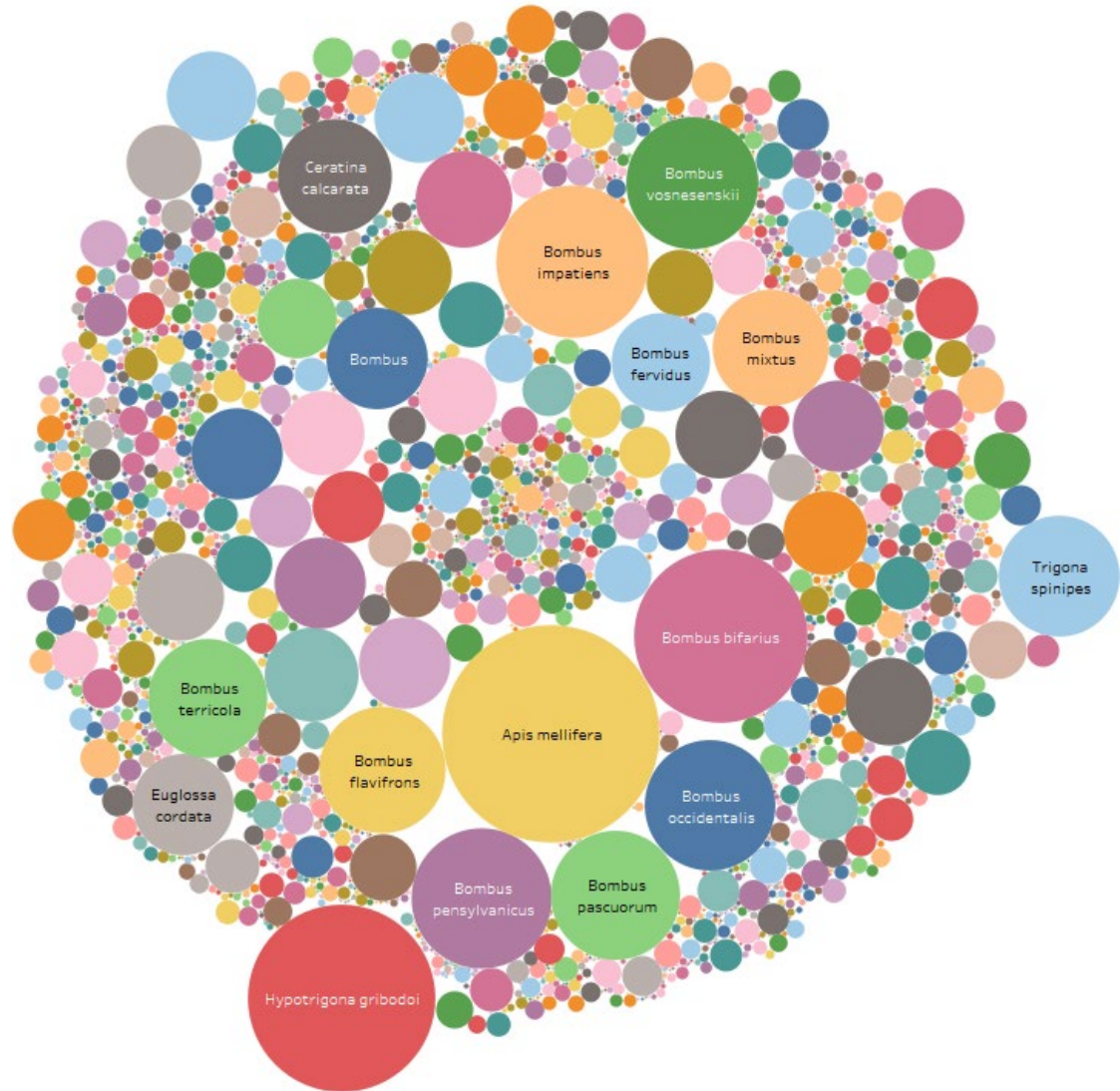
GBIF

INAT

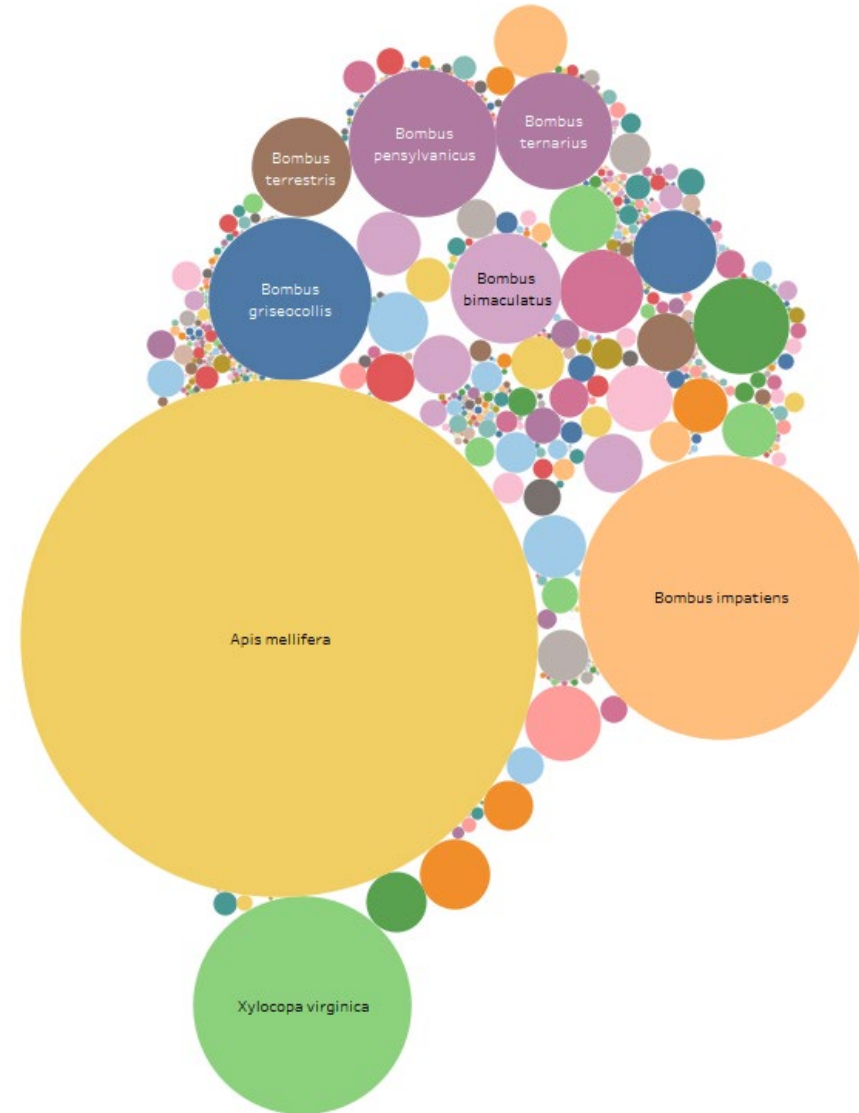


GBIF

Global Biodiversity
Information Facility



iNaturalist.org



Data Management Takeaways

Challenges

- Providing research-relevant collector characteristics and potentially identifying information may not be ethical and may put individuals at risk
- Quality metrics can be tricky and difficult to verify

Opportunities

- Diverse data contributors provide (often) complementary data
 - Both in terms of spatial/temporal extent and type
- Educational opportunities in the classroom for supporting learning goals



VIRTUAL STUDENT FEDERAL SERVICE



Acknowledgements

Mohonk Preserve:

Elizabeth Long

Natalie Feldsine

Megan Napoli

EDI:

Colin Smith

Corinna Gries

ESIP:

Ruth Duerr

Matt Mayernik

Megan Carter

George Mason:

Rebecca Forkner

Lorelei Crerar

Tedra Cuddy



USGS/NSCASC:

Toni Morelli

Elizabeth van Mantgem