

Introducing the NEON Biorepository Data Portal

ASU Biodiversity Knowledge Integration Center
Arizona State University

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An ecological collection

Sample Type	Volume/Year	Sample Type	Volume/Year
Algae: periphyton, seston, phytoplankton, diatoms		Plant	
DNA extractions (whole) ▲		Aquatic macrophytes - vouchers ■	50
Slides ■	700	Belowground biomass ■	900
Whole sample ●	700	Foliage ■	320
Macroalgae - whole sample ●	250	Tissue ▲	250
Aquatic Lichens, Mosses & Liverworts		Voucher ■	900
Vouchers	55	Vertebrate	
Invertebrate		Fish - DNA extractions ▲	1,100
Carabids - DNA extractions ▲	4,500	Fish - fin clip ●	275
Carabids - pinned/pointed ■	9,000	Fish - voucher ●	275
Carabids - pooled ●	2,500	Herptiles - pitfall bycatch ●	
Macroinvertebrates - pooled ●	800	Small mammal - blood ▲	2,000
Macroinvertebrates - DNA extractions ▲	300	Small mammal - DNA extractions ▲	1,750
Pitfall - pooled ●	3,750	Small mammal - fecal ▲	6,000
Mosquitoes - DNA extractions ▲	1,750	Small mammal - hair/whisker ■	4,000
Mosquitoes - disease pools▲	21,000	Small mammal - ear punch ▲	4,000
Mosquitoes - pinned/pointed ■	3,000	Small mammal - voucher ●◆	750
Mosquitoes - pooled ▲	3,500	Environmental	
Tick - disease pools ▲	4,500	Litterfall ■	125
Zooplankton - DNA extractions ▲	75	Soil - frozen ▲	21,000
Zooplankton - pooled ●	75	Soil - dry ■	375
Microbial		Particulate mass filters (PM10) ■	150
Aquatic microbes - Sterivex filters ▲	850	Wet deposition ■	
Soil microbes - DNA extractions ▲	2,500	Total >104,000 samples per year	

- Arizona State University's Biocollections – located in Tempe, Arizona – are now the primary, long-term Biorepository for the National Ecological Observatory Network (NEON).
- The NEON Biorepository will receive > 105,000 samples annually for 30 years.
- These samples represent 40+ sample categories, and originate from 81 NEON field sites – 47 terrestrial, 34 aquatic – across 20 ecoclimatic domains.

Contact: biorepo@asu.edu
<https://biorepo.neonscience.org>

Monitoring long-term ecological changes at a continental scale

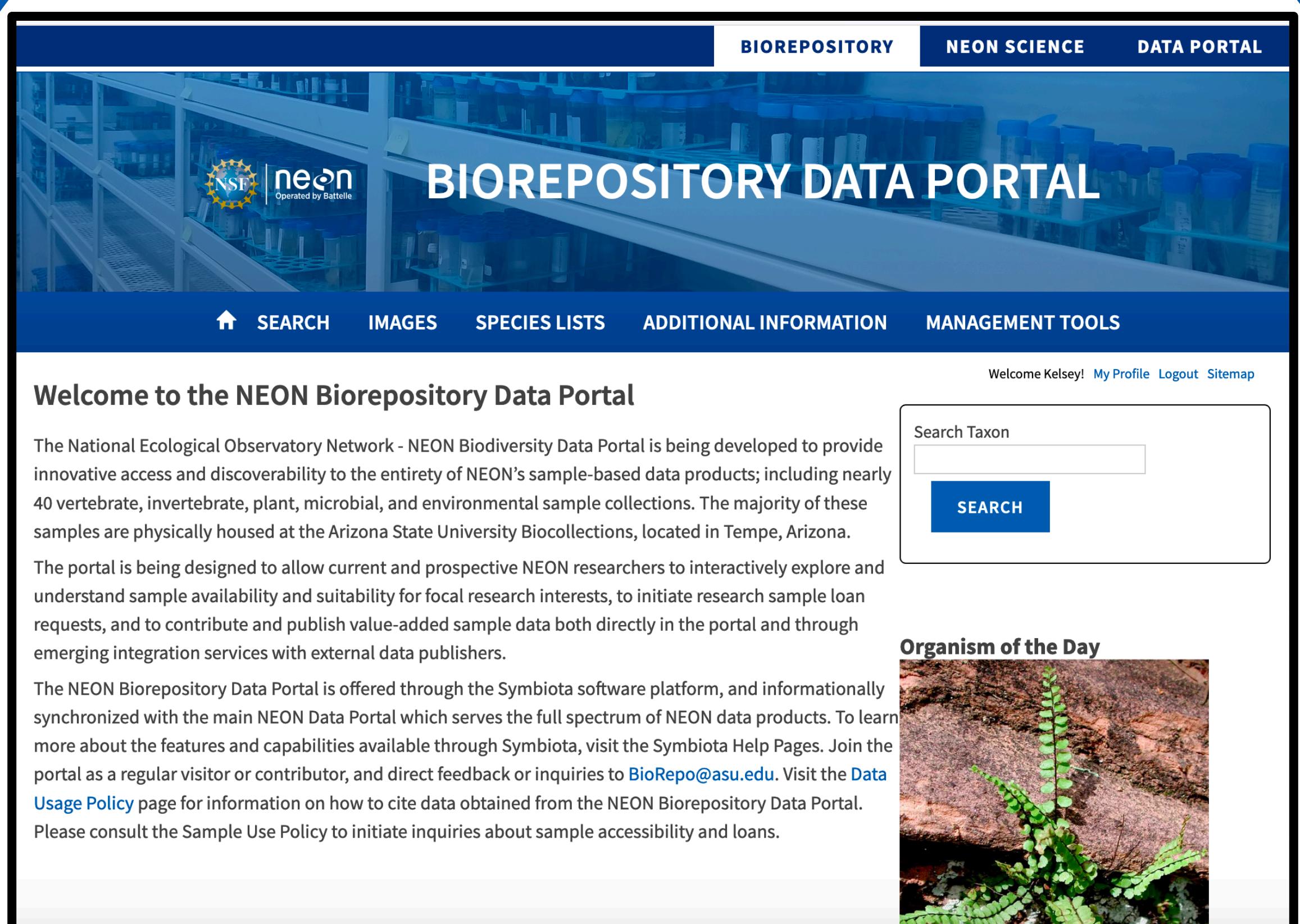


Figure 2. NEON Biorepository data portal homepage.

From discovery to forecasting

- The NEON Biorepository data portal (1) facilitates discovery of all sample-based NEON data as Darwin Core (DwC) occurrence records; and (2) uses the Symbiota software platform for networking biodiversity data collections (Gries et al. 2014) → NEON's unique data signals are made interoperable with those of the greater natural history collections and observational/enthusiast communities.

NEON Biorepository ← Other Collections

Highly structured, self-referential, change-focused.

Expansive taxonomic, geographic, and spatial extent.

- Integration with discovery-focused DwC data from iDigBio/GBIF with the monitoring-focused NEON Biorepository data can lead to synergistic outcomes for continental scale monitoring.
- Are change signals in NEON data reflected in data from less-constrained diversity data?
- How can NEON-external data signals be leveraged to refine or refocus NEON-like efforts?

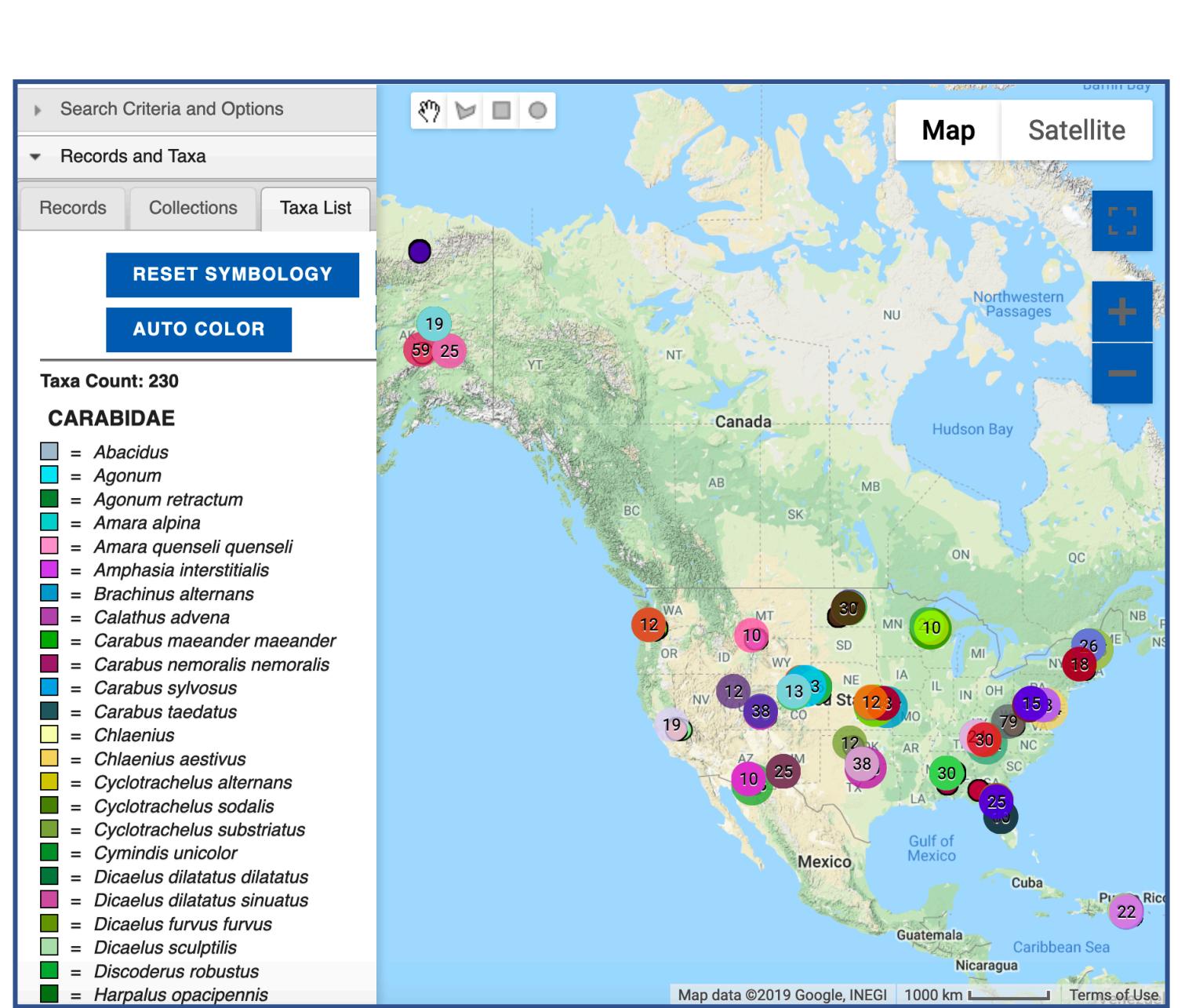
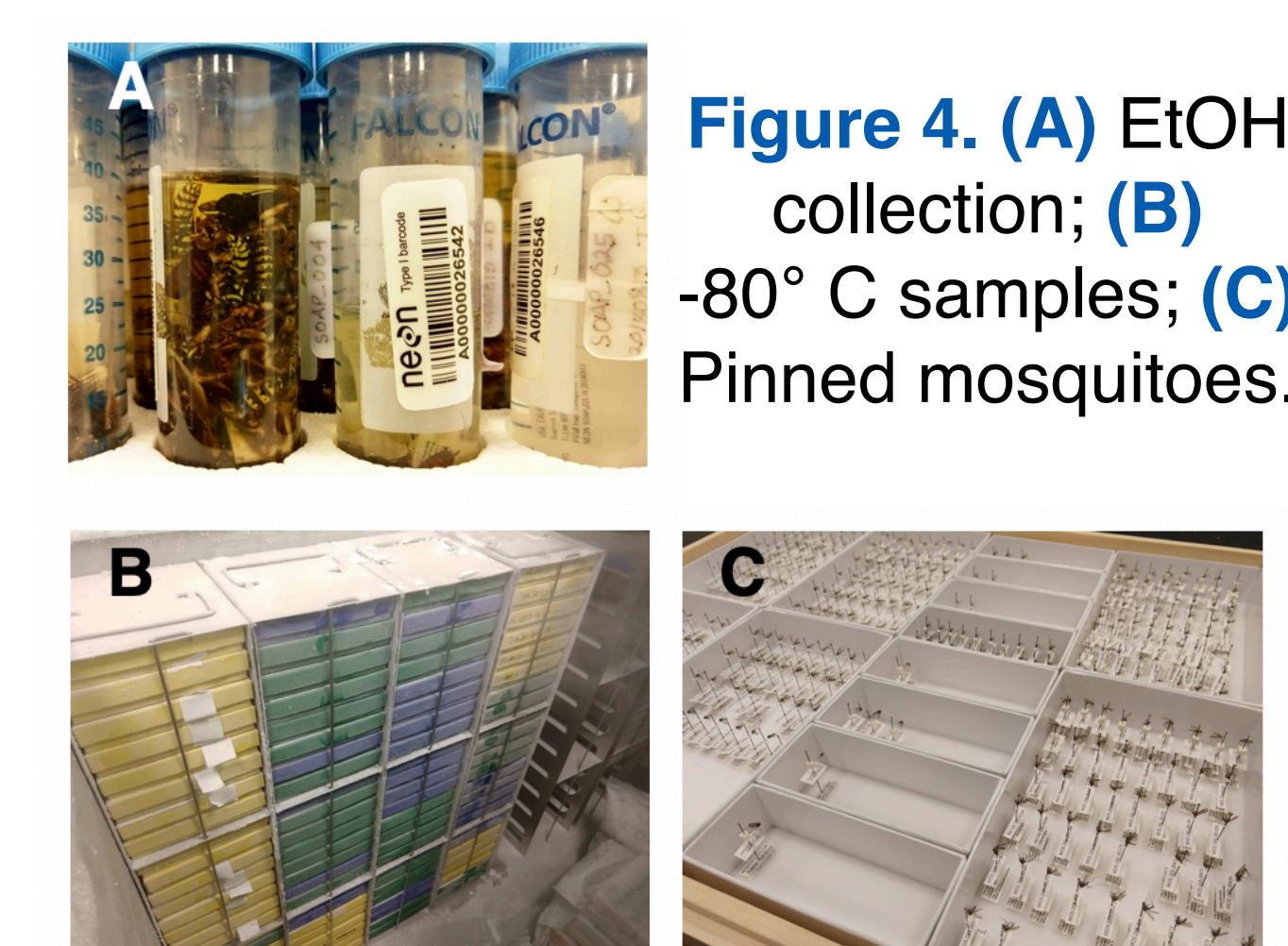


Figure 1. NEON Biorepository data portal map of field sites; showing 3 collections, ~ 230 species, and 8,490 occurrences of bulk carabid and pinned mosquito samples (June 5th, 2019).



Additional information:

Gries, C., E. Gilbert & N. Franz. 2014. Symbiota – A virtual platform for creating voucher-based biodiversity information communities. Biodiversity Data Journal 2: e1114. <https://doi.org/10.3897/BDJ.2.e1114>
NEON Biorepository – Sample Use Policy, Version 01, December 2018. Available at <https://www.neonscience.org/sample-use-policy>

Promoting data publication

- The NEON Biorepository data portal will foster data annotation and data publication: Individual DwC records and research-configured, value-added DwC data packages.
- Value-added data annotations will be assignable to authors → Authorship of high-quality, coherently framed biodiversity datasets incentivized and propagated through the portal.
- Samples will become impactful through use in question-driven research → Portal designed to support post-original data publication sample annotations, ranging from third-party taxonomic identifications to (e.g.) trait-based data additions.

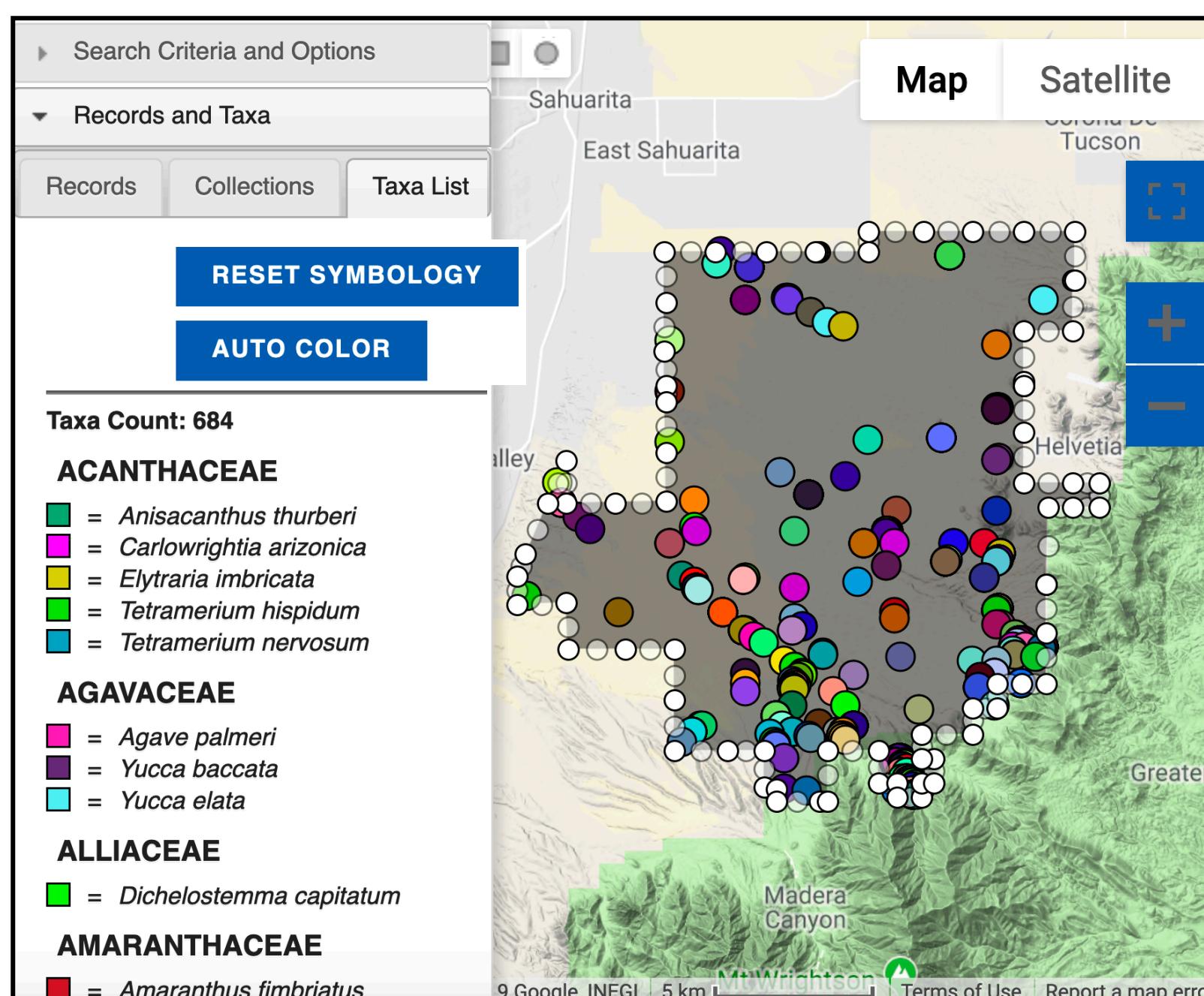


Figure 3. Species checklist map of 1,022 records and 684 taxa imported from the SEINet herbarium portal (1902–2017) for the NEON Santa Rita Experimental Range field site (D14 – Desert Southwest).

How to engage

As of mid 2019, we have received 340 shipments totaling 55,300 samples.

Most abundant among these are:

- 80° C-preserved soil samples (16.4k)
- EtOH-preserved arthropod "bycatch" (15k)
- EtOH-preserved, identified carabids (6.2k)
- Small mammal samples (6k)
- Pinned mosquitoes (5.5k).

- The portal is now public for anyone to explore sample availability and fitness-for-use. Contact us at biorepo@asu.edu to aid in sample discovery and for information to gain physical access to sample on- or off-site via loans (see Sample Use Policy).
- We are interested in engaging prospective graduate students and/or postdoctoral researchers inspired by our unique mission and access to NEON Biorepository samples.