Introducing the NEON Biorepository Data Portal

ASU Biodiversity Knowledge Integration Center
Arizona State University

Nico Franz, Ed Gilbert, Azhar Husain, Andrew Johnston, Laura Rocha Prado, Laura Steger & Kelsey Yule

NEON Biorepository & Biodiversity Knowledge Integration Center – Arizona State University, Tempe, AZ, USA

NEON National Ecological Observatory Network

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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**	

Table 1. NEON Biorepository sample types and annual volumes.

Storage conditions:

- ● Wet (EtOH / Glutaraldehyde)
- ■ Ambient or 4° C
- ▲ Cryo (LN_2)
- ◆ -80° C / -20° C

- **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

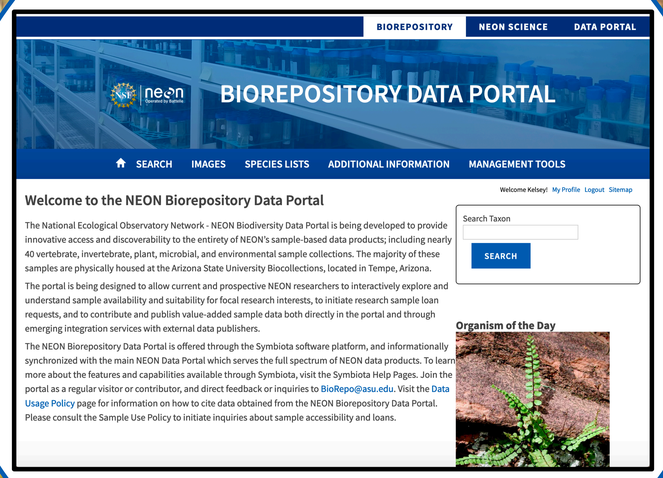

Figure 2. NEON Biorepository data portal homepage.

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.

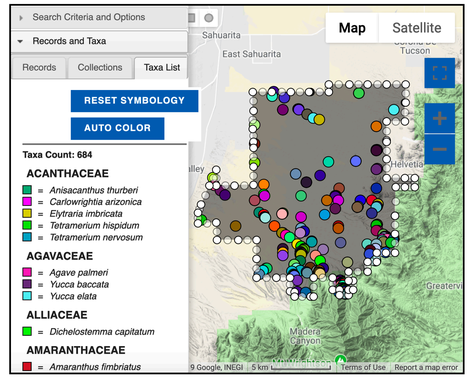

Figure 3. Species checklist map of 1,022 records and 684 taxa imported from the SEINet herbarium portal (1902–2017) for the NEON Santa Rita Experimental Range field site (D14 – Desert Southwest).

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 are reflected in data from less-constrained diversity data?
- How can NEON-external data signals be leveraged to refine or refocus NEON-like efforts?

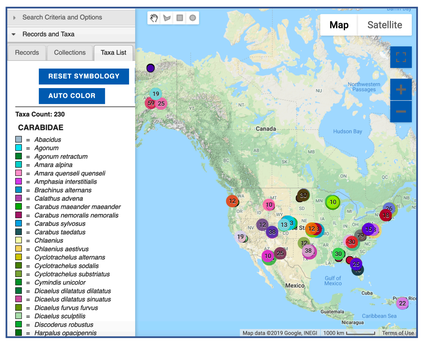

Figure 1. NEON Biorepository data portal map of field sites; showing 3 collections, ~ 230 species, and 8,490 occurrences of bulk carabid and pinned mosquito samples (June 5th, 2019).

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).

Figure 4. (A) EtOH collection; **(B)** -80° C samples; **(C)** Pinned mosquitoes.

- **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.

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