

<i>Title:</i> NEON Biorepository: Sample Use Policy		<i>Date:</i> 12/15/2018
<i>NEON Doc. #:</i> NEON.DOC.014015	<i>Authors:</i> D. Tazik, ASU NEON Biorepository staff	<i>Revision:</i> C_DRAFT

# NEON Biorepository: Sample Use Policy

Version 01, December 2018

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## Change Record

REVISION	DATE	ECO #	DESCRIPTION OF CHANGE
A	10/15/2009	NEON.MGMT.NPR.000185.CRE	CCB approved initial release
B	09/26/2011	ECO-00283	Update to new document number's/template throughout document.
C	10/25/2017	ECO-	Significant updates to the entire document

<i>Title:</i> NEON Biorepository: Sample Use Policy		<i>Date:</i> 12/15/2018
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**TABLE OF CONTENTS**

**1 DESCRIPTION.....2**

1.1 Scope.....2

1.2 Background .....2

1.3 Guiding Principles .....3

**2 RELATED DOCUMENTS, ACRONYMS AND DEFINITIONS.....3**

2.1 Applicable Documents .....3

2.2 Reference Documents .....3

2.3 Acronyms .....3

2.4 Definitions.....4

**3 GENERAL LOAN POLICIES .....4**

3.1 Care and Handling.....5

**4 DESTRUCTIVE & INVASIVE SAMPLING.....5**

**5 IMAGE REPRODUCTION AND PHOTOGRAPHY POLICY .....7**

5.1 Image Reproduction .....7

5.2 Use Fees .....6

5.3 Permission to Photograph .....7

**6 REQUEST SUBMISSION AND EVALUATION PROCESS .....7**

6.1 Sample Use Agreement .....10

**7 DATA REPORTING & CITATION .....10**

Title: NEON Biorepository: Sample Use Policy		Date: 12/15/2018
NEON Doc. #: NEON.DOC.014015	Authors: D. Tazik, ASU NEON Biorepository staff	Revision: C_DRAFT

## 1 DESCRIPTION

The purpose of this document is to detail plans and policies regarding the use of samples and specimens (referred to below simply as *samples*) acquired and held by the NEON Biorepository. This policy is intended to provide a structured and consistent process to maintain sample integrity and to allow necessary sample discoverability, access, and use by the scientific research community. The loan policies described here are based in part on those of applied by the University of Colorado Museum of Natural History (ED[01]).

**Note for Version 01.** Since August, 2018, the primary NEON Biorepository is being developed at Arizona State University. It is reasonable to expect that its full functionality at that location will emerge gradually over a number of years, and that in the process and commensurate with the overall goals for the NEON Biorepository, this early Sample Use Policy *version* (# 01, December 2018) will require explicit additions and emendations. The version is nevertheless published in its current state in order to rapidly facilitate frequent and diverse justified uses of NEON Biorepository samples.

We recognize and expect that it is not feasible to account for all future sample uses and circumstances in this document; indeed, a certain degree of pragmatism and flexibility is built in to serve its broad function. We commit to handling special cases openly, fairly, and with a focus on balancing short- and long-term benefits for the greater NEON research community.

### 1.1 Scope

This document applies to all samples collected by NEON at all extant terrestrial and aquatic sites during the 30-year life cycle of the observatory. This includes those associated with the Aquatic Observation System (AOS), Terrestrial Observation System (TOS), Aquatic Instrument System (AIS), and Terrestrial Instrument System (TIS).

### 1.2 Background

A key feature of NEON’s science design is to establish a “...curated collection of organisms, key body parts of organisms, and substrates... open to researchers for analysis, both now and in the future as new technologies emerge.” [AD[01], p. 31]. The NEON Biorepository encompasses aquatic and terrestrial samples) collected during annual sampling at NEON sites – i.e. voucher specimens, whole or partial organisms, tissues, and samples processed for chemistry, disease and genetics.

The overarching goal of the biorepository is to make reference material and replicate samples available to the science and education communities for future research and retrospective studies. The collected samples provide a rich resource for future research efforts, enabling scientists to identify organisms, analyze archived blood and tissue samples for viruses and other pathogens, and perform new isotopic, biogeochemical and microbial analyses on water and soil samples. The concept of operations for the biorepository is detailed in a companion document (AD[02]).

Title: NEON Biorepository: Sample Use Policy		Date: 12/15/2018
NEON Doc. #: NEON.DOC.014015	Authors: D. Tazik, ASU NEON Biorepository staff	Revision: C_DRAFT

### 1.3 Guiding Principles

1. The NEON Biorepository is one means for effective interaction and engagement with the research community to foster continental-scale ecology; as such the NEON Biorepository should be receptive and responsive to investigator requests. Close collaboration with the requesting Principal Investigator(s) will be a key to success.
2. While providing for the research needs of requestors, a balance will be struck between the immediate needs of an individual investigator and the desire to reserve a suite or subset/portion of samples to allow for decadal and broad geographic scale analyses.
3. Data handling and distribution resulting from the use of NEON samples will proceed in conformance with NEON’s data use policy (RD[03]).
4. Cost of shipping will be handled on a case-by-case basis. At present, the NEON Biorepository foresees retaining the ability to cover shipping costs for small-scale or exploratory studies when no other funding is available. Larger-scale and/or long-term sample shipping needs will typically have to be financed by the corresponding external research team and project.
5. When there are conflicting sample requests, the priority for loans will generally be as follows:
  - a. NSF-BIO sponsored research
  - b. Other NSF sponsored research
  - c. Other, non-NSF funding sources
6. The internal evaluation and approval of sample requests will focus on technical and logistical criteria as well as scientific justification. The latter is not intended to subsume the scientific merit review that may have been conducted for the sponsoring agency; but rather is a means to ensure the highest and best use of this valuable but limited resource, as well as transparency and accountability to the greater research and collections communities.

## 2 RELATED DOCUMENTS, ACRONYMS AND DEFINITIONS

### 2.1 Applicable Documents

AD [01]	NEON.DOC.000001	NEON Observatory Design
AD [02]	NEON.DOC.004525	NEON Bioarchive: Concept of Operations

### 2.2 Reference Documents

RD [01]	NEON.DOC.000008	NEON Acronym List
RD [02]	NEON.DOC.000243	NEON Glossary of Terms
RD [03]	NEON.DOC.000019	NEON Data Use Policy

### 2.3 External Documents

ED [01]	CU-Boulder Museum of Natural History Loan Policies
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Title: NEON Biorepository: Sample Use Policy		Date: 12/15/2018
NEON Doc. #: NEON.DOC.014015	Authors: D. Tazik, ASU NEON Biorepository staff	Revision: C_DRAFT

## 2.4 Acronyms

Acronym	Definition
DOT	Department of Transportation
IATA	International Air Transport Association
SEM	Scanning Electron Microscopy

## 2.5 Definitions

Term	Definition
Destructive sampling	Any procedure performed on a sample that results in partial or complete destruction of a sample, such that the sample may no longer be suitable for future research.
Consumptive sampling	Any procedure performed on a sample that results in partial consumption of a sample, such that the remaining sample is expected to be suitable for future research.
Invasive sampling	Any procedure performed on a sample that may result in the alteration of the condition of that sample without actually consuming or destroying the sample.
Sample	Material acquired at one sampling location (such as a plot) during an individual sampling event.

## 3 GENERAL LOAN POLICIES

NEON Biorepository samples may be loaned for scientific and educational purposes only. Samples may be made available to established institutions, and requests are only considered from permanent staff or faculty members of universities, museums, and scientific organizations. Requests from students, postdoctoral fellows, or visiting researchers must be cosigned by a sponsor such as a faculty advisor or resident curator/collection manager affiliated with the borrowing institution.

Ultimate responsibility of the samples is assumed by the institution to which the samples are provided. Samples may not be transferred or moved to another institution without prior written permission from the NEON Biorepository.

Loans for non-destructive uses are typically granted for a 6-12 month period; a longer period of time may be accommodated if properly justified. Extensions should be requested *before* the current loan period expires. Delinquent loans may delay the processing of new requests and/or prevent future loan requests by the individual borrower or affiliated institution.

Ordinarily, not more than one-half of a sample or series of samples from a NEON site may be borrowed at any one time for non-destructive uses. The remainder may be requested upon the return of the first loan. Loans for destructive, consumptive or invasive sampling are subject to policies outlined in Section 4 below.

Title: NEON Biorepository: Sample Use Policy		Date: 12/15/2018
NEON Doc. #: NEON.DOC.014015	Authors: D. Tazik, ASU NEON Biorepository staff	Revision: C_DRAFT

All loan requests, no matter the quantity, are considered on a case-by-case basis. Endangered taxa, fragile specimens, or samples which are deemed to be in limited supply are generally not considered for loans. However, researchers are strongly encouraged to inquire and to visit the NEON Biorepository to access these directly on site at Arizona State University, where collections and laboratory facilities are available for visiting researchers.

### 3.1 Care and Handling

Loaned material should be handled with great care. All labels, tags, and accompanying data are to be kept associated with samples. Loaned material should be stored in secure cabinetry in a secure, climate-controlled facility for the duration of the loan. Fluid-preserved specimens should be maintained in the proper fluid and kept moist in that fluid during examination (never transferred to water, even briefly). Do not subject loaned material to any mechanical or chemical treatments or other destructive, consumptive or invasive uses without prior approval.

Loan recipients are expected to have or acquire any needed permits to receive and ship samples – e.g., USDA-APHIS permits for soil samples. Some restrictions to sample access and use may apply, such as in the case of samples acquired on National Park Service (NPS) lands; i.e., NPS retains ownership of those samples.

Specimens may not be altered in any way without express written permission from the NEON Biorepository. Final disposition of any products of preparation by the researcher(s), such as DNA samples, SEM stubs, histological or karyotypic slides, etc., shall be at the discretion of the investigator unless otherwise stipulated in writing.

All loans, and any agreed upon material being returned to the NEON Biorepository, shall be returned via UPS, FedEx, DHL, USPS priority mail or other such high-quality carriers with tracking capability. Loan materials should be carefully packed in a manner consistent with archiving needs (as specified in applicable loan agreements), adhering to all applicable IATA/DOT Dangerous Goods regulations.

**Deposition of types.** The ASU Natural History Collections house numerous type specimens of diverse organismal lineages. Holotypes and (where available) reasonably sized and varied series of paratypes being newly described or designated from NEON Biorepository samples should be deposited with Arizona State University. The specific collection coden will vary with sample type.

## 4 DESTRUCTIVE, CONSUMPTIVE & INVASIVE SAMPLING

Permission must be granted to perform any type of destructive, consumptive or invasive sampling on NEON Biorepository samples. This can include: dissection, preparation for SEM photography, removal of tissues, DNA extraction or sequencing, pathogen analysis, clearing and staining, hair sampling, chemical analysis, or any similar procedure.

Title: NEON Biorepository: Sample Use Policy		Date: 12/15/2018
NEON Doc. #: NEON.DOC.014015	Authors: D. Tazik, ASU NEON Biorepository staff	Revision: C_DRAFT

In order to balance the need to preserve NEON Biorepository samples for future use with the demand to conduct valuable near-term research, the following guidelines will be used:

1. To the extent possible, samples will be kept in their original condition during such procedures.
2. Any physical material remaining after the analysis will be returned to the NEON Biorepository unless otherwise agreed upon in writing. This may include, but is not be limited to:
  - Specimens and dissected parts (including stomach contents). Detached parts retained should be reboxed in vials or an appropriate container, and labeled with the associated NEON sample identifiers, determination and identification of contents.
  - SEM stubs.
  - Histology and karyotypic slides (slides should be labeled with NEON sample identifiers and determination).
  - Unused tissues and samples (dry, frozen, or ethanol-preserved).
  - DNA and other nucleic acid extracts.

If permission is granted in writing, any material retained by the researcher(s) should be labeled with the associated NEON identifiers. The investigator shall notify the NEON Biorepository staff if s/he plans to discard any of these materials.

3. Decisions to grant or not grant permission for destructive/consumptive/invasive sampling will be based on:
  - Rarity of the species or sample and its representation within the NEON Biorepository collections. Procedures that will fully destroy an endangered species specimen or associated sample should be scrutinized for alternative, information-preserving solutions.
  - Degree of destruction/consumption/invasiveness.
  - Physical condition of the specimen(s).
  - Significance of the proposed research – i.e., relative to NEON’s mission to enable continental-scale ecology.
  - Qualifications of the investigators.

For large or complicated requests of material, researchers will be encouraged to visit the NEON Biorepository using their own funds, to select specimens for sampling or to study them directly on site where suitable. Removal of material from samples selected by the researcher will be made with approval by appropriate NEON Biorepository staff. Not only does a personal visit reduce the work required of our staff, it allows the investigator to make more precise selections of material to be used, or even accomplish an entire research task on site.



## 5 IMAGE REPRODUCTION AND PHOTOGRAPHY POLICY

### 5.1 Image Reproduction

The Image Reproduction Policy of the NEON Biorepository pertains to original photography of collection objects, analog or digital, and derivative images made from existing transparencies, negatives, prints, and electronic media in the NEON Biorepository data portal (to be developed). Typically, these images will be made available under the Creative Commons license CC0 1.0 Universal (<https://creativecommons.org/publicdomain/zero/1.0/>), with exceptions clearly indicated. The NEON Biorepository and/or individual author(s) should be acknowledged when using or reproducing these images. Note that this policy applies strictly to the NEON Biorepository; not the overall NEON Project and its media. This policy is subject to change.

### 5.2 Image Creation

Photographers creating images of NEON Biorepository samples are strongly encouraged to share these through the NEON Biorepository data portal under the aforementioned CC0 1.0 Universal license. This policy is subject to special arrangements in change.

## 6 REQUEST SUBMISSION AND EVALUATION PROCESS

Requests for NEON Biorepository samples can be submitted at any time with sufficient lead time to allow for evaluation, sample preparation, and shipping.

### 6.1 Request Template

All requests for samples will be made in writing, and will contain the following information:

1. Full name of requestor (and sponsor, if applicable), institutional affiliation, mailing address, email, and phone number.
2. Sponsoring/funding agency and program.
3. NEON (Biorepository) sample identifiers and complete taxonomic information (if applicable) of requested samples.
4. Proposed activities to be conducted using the loaned samples:
  - a. Non-destructive: e.g., types of measurements to be taken.
  - b. Destructive/Consumptive/Invasive Sampling:
    - i. Proposed study and research methods.
    - ii. Specific techniques to be used, including previous experience and success of the researcher using such techniques. This includes the specific genes to be sequenced and the type of sequencing to be performed, if applicable.

Title: NEON Biorepository: Sample Use Policy		Date: 12/15/2018
NEON Doc. #: NEON.DOC.014015	Authors: D. Tazik, ASU NEON Biorepository staff	Revision: C_DRAFT

iii. Quantity of tissue or sample requested.

5. Justification for the project, including why archived material as opposed to freshly collected field material is required (if applicable).
6. Why, in particular, NEON Biorepository samples are required (as opposed or in addition to material from other institutions).
7. Summary of previous work with the sample types requested.
8. Summary of samples requested from other institutions.
9. Scientific merit of the proposed study and indication that the results will be published in a peer-reviewed publication (primarily applicable to destructive, consumptive and invasive sampling).
10. Requested borrowing period of material (generally 6-12 months, but may be extended by the NEON Biorepository personnel).

Send requests to [nico.franz@asu.edu](mailto:nico.franz@asu.edu) (for this Version 01)

## 6.2 General Steps in the Request Process

**Step 1.** The Principal Investigator(s) submit(s) an initial sample use request to the NEON Biorepository; currently to this contact address:

Nico M. Franz  
 NEON Biorepository / ASU Natural History Collections  
 Arizona State University  
 P.O. Box 874108  
 Tempe, AZ 85287-4108, U.S.A.

Phone: (480) 965-2036

Fax: (480) 727-2203

E-mail: [nico.franz@asu.edu](mailto:nico.franz@asu.edu)

- a. If this request is submitted prior to having been awarded funds, go to Step 2.
- b. If this requested by an investigator that is already funded, go to Step 4.

**Step 2.** The NEON Biorepository staff makes an initial evaluation to assess feasibility and scientific justification, where appropriate with input for the NEON Biorepository Review Committee; and, if approved, provides an initial cost estimate to fulfill the request.

**Step 3.** If approved, the researcher(s) submit(s) a proposal with a NEON (Biorepository) Letter of Collaboration (or similar) to the respective funding agency.

**Step 4.** Upon award, the researcher(s) submit(s) a formal sample use request for access to and use of samples.

**Step 5.** The NEON Biorepository staff reviews and reconfirms its approval of the formal request; typically within a period of two weeks.

Title: NEON Biorepository: Sample Use Policy		Date: 12/15/2018
NEON Doc. #: NEON.DOC.014015	Authors: D. Tazik, ASU NEON Biorepository staff	Revision: C_DRAFT

**Step 6.** If approved, the NEON Biorepository staff prepares a Sample Use Agreement with a final estimate of the cost to package and ship the requisite samples.

**Step 7.** Once the agreement is signed by both parties, necessary funds and/or other resources are provided to cover shipment costs, either by the NEON Biorepository (small and exploratory samples) or by the research team or project (larger and complex samples).

**Step 8.** Upon receipt of funds/resources, NEON Biorepository staff prepare and ship the requisite samples as agreed upon. (see above)

### 6.3 Roles and Responsibilities

**NEON Biorepository PI (Principal Investigator – Nico Franz):** Responsible for overall management of the NEON Biorepository including oversight of loan request and processing.

**NEON Biorepository Project Manager (TBD):** Responsible in particular for researcher engagement with the NEON Biorepository and creation and coordination of sample-based research, data practices, and products.

**NEON Biorepository Collections Managers:** Process owners and leads for loan request evaluations; seeking input from the NEON Biorepository Review Committee in the evaluation of individual requests. Ensure that all loan requests and transactions are fully documented and tracked.

**NEON Biorepository Informaticians:** Create, maintain, and further develop services through the NEON Biorepository data portal.

**NEON Biorepository Review Committee:** Consists of designated NEON technical staff, members of the Biorepository Technical Working Group, and other external subject matter experts, as deemed appropriate by the corresponding Collections Manager.

#### Operational Considerations

For most simple requests – a limited number of samples from a limited number of sites – the researcher(s) should plan on a 4-6 week turn-around time. Larger, more complicated requests may require 6-8 weeks or more, depending upon level of complexity, sample preparation requirements, and competing priorities. While our intent is to be as responsive as possible, requesters should plan sufficiently far in advance of an actual need. Quicker turnaround times may be possible under favorable circumstances.

It is presumed that the agency sponsoring the proposed research will have performed a scientific merit review as part of the researchers' formal proposal to that sponsoring agency, e.g., the U.S. National Science Foundation (NSF). Scientific merit review of proposals planning to make use of NEON Biorepository samples remains the purview of the funding agency. As such, researchers should obtain a

Title: NEON Biorepository: Sample Use Policy		Date: 12/15/2018
NEON Doc. #: NEON.DOC.014015	Authors: D. Tazik, ASU NEON Biorepository staff	Revision: C_DRAFT

Letter of Collaboration for their proposed use of any such samples prior to submission of research proposals to the responsible funding agency.

Please note that the NEON Biorepository is an NSF asset, and all requests for use of NEON samples may be subject to NSF concurrence.

#### 6.4 Sample Use Agreement

A standard Sample Use Agreement will be agreed upon by the NEON Biorepository and the researchers' institution prior to shipping. This agreement will define the roles and responsibilities of each party; terms and conditions of the loan; processing and delivery procedures and schedules; funding requirements; and other resourcing needs as appropriate. The Agreement will also specify funds needed to cover sample shipments, including the cost of supplies, materials, shipping and any special preparation or handling requirements.

#### Data Reporting & Citation

NEON encourages investigators utilizing NEON Biorepository samples to make their research data freely and openly available as soon as possible, in accordance with NSF guidelines, and requires data sets so collected to be registered with an established data repository. This includes, but is not limited to copies of any ancillary data generated from loans such as images, CT scans, measurements, scale counts, sex and reproductive data, genetic sequences, etc. Any sequence data extracted from NEON Biorepository samples should be provided to GenBank, with GenBank accession numbers reported back to NEON for cross-referencing in the sample record. Subject to further revision, associated metadata shall be in conformance with the model provided by the Ecological Society of America for Data Papers (please note that NEON does not publish Data Papers): [http://esapubs.org/archive/instruct\\_d.htm#data](http://esapubs.org/archive/instruct_d.htm#data).

NEON's Data Use Policy is available at: <http://data.neonscience.org/data-policy>

In certain cases, data access may be restricted for a period not exceeding two years from the end-of-use date for data collected by investigators using NEON Biorepository samples. At the end of the restricted access period, all data will be freely and openly available. The restricted period may be extended under exceptional circumstances, but only by agreement between the researchers and the NEON Project.

Data that has already become public cannot be made proprietary under any circumstances. Data which has been published in whole or part becomes publicly available at the time of publication.

A copy of publications resulting from work on material loaned must be sent to the NEON Biorepository. Credit must be attributed to the "NEON Biorepository" citing all the relevant sample identifiers.