# *Thank you for your commitment to green initiatives at the University of Illinois. One of the ongoing requirements listed in the terms of the funding agreement for your project is the submission of semesterly reports with key information about your project. In addition to this form, please provide additional financial documentation and/or progress photos if available.*

# *Please be as accurate as possible in describing the project (including possible setbacks or challenges in meeting the initial goals of the project). Not fully meeting your project's goals will not disqualify you from making future funding requests as long as your reports are as complete and accurate as possible. If you have any questions, please contact the Student Sustainability Committee, at* *sustainability-committee@illinois.edu**.*

**Project Name:** Valorizing Archived Soils: Changes in the Land, Carbon, and Nutrients in the 20th century

**Date of Report Submission:** 9/12/2021

**Project Purpose:**

We proposed to restore, digitize, and make open-access this historical resource for educational and research purposes, reinforcing the University of Illinois' position as a leader in agricultural and environmental sciences. Importantly, we believe that this resource and its lessons should be made accessible to the public. This work will (and is) provide undergraduate students hands-on and practical experience on sustainable agriculture and enable testing of fundamental questions on the sustainability of agriculture in Illinois and the greater US Midwest by having a window back in time to how soil fertility and – in particular – soil carbon has changed over the past century with industrialization of agriculture.

**Detailed Accounting of Expenditures to Date:**

The full sum $75,000 has been used or encumbered through 12/31/2021. Due to COVID-19, there was a delay in the hiring of students (2 instead of 4) due to on-campus restrictions in workplace density. As of August 24, two undergrad students have been hired to assist with this project. Additionally, funds from a separate outside grant (NREC) have been leveraged to hire one full-time research technician, one postdoc, and a part-time research technician to ensure delivering on project goals of the SSC award.

**Project Progress to Date:**

We have made significant progress despite COVID-19 leading to delays and halving of the original student work force for this project.

1. Inventorying and archiving 90% samples identified in a former storage shed that were used for the soil survey of Illinois (1899 – preset day).
2. Discovery of unexpected collection of long-term trials across Illinois, some as early as 1920, and Morrow Plot collections. This expands our inference capacity beyond the world-famous Morrow Plots for experimental treatments (e.g., tillage, fertilization).
3. A second digital database framework has been built along with an app specifically designed for photo inventories of historical labels and jars from the Morrow Plots, in addition to the Illinois state-wide survey.
4. We have leveraged SSC funds *yet again* to bring in an additional 56k (as an addition to the 700k grant) via Illinois NREC to bolster this effort.
5. Outreach activities have gone as scheduled, in virtual and in-person formats. We have **tripled the number of additional presentations** (more than originally planned) for this stage of the project.
6. Additionally, two popular communications (local and national) have been published, and one peer-review paper is about to be submitted.

**Student Involvement and Outreach to Date:**

Thus far, a total of 4 undergraduate students and one graduate student have been involved. Students have also been involved in discussions via a UIUC-hosted conference in which the archive effort was featured in a lighting 5-min talk, with a panel discussion afterwards (please see below for more details).

**Marketing and Promotion Efforts to Date:**

We have leveraged the SSC funds to provide a **$56,000** addition on an already-funded **$698,317** grant from the Illinois Nutrient Research and Education Council (NREC). This grant builds on the student-based effort to restore and curate the archived collection. Importantly, it complements the soil carbon work being supported by the SSC grant, and expands the utility of this archive to test water quality implications of industrialization of agriculture in Illinois. The grant, entitled “Capitalizing on 150 Years of Soil Samples to Determine Legacy P and Improve Water Quality in Illinois”, is led by PI Margenot. The four-year project (2021-2024) will involve the training of 4 undergraduate students and 2 graduate students, including the basis of MS/PhD degrees of the latter. The additional funds are supporting one visiting undergraduate student from Honduras to be involved on the archive work.

This soil archive and its value to UIUC and Illinois agricultural sustainability has been presented at the following outreach events by PI Margenot (in addition to the 4 outreach events from the previous reporting period):

1. As proposed, an on-campus (virtual) event among graduate and undergraduate students to promote discussion:

* **Margenot, A.J.** Changes in – and Being in – the Land. Witnessing and Worlding Beyond the Human. University of Illinois Urbana-Champaign. May 28-29, 2021 (virtual)
* Full recoding of the presentation and the discussion can be found here: <https://mediaspace.illinois.edu/media/t/1_8h56b600>

2. At three [**Illinois Farm Bureau Nutrient Stewardship Field Day**](http://ilfb.org/FieldDays)events in July-August 2021, a preview of this soil archive work was announced to stakeholders (Bureau members and farmers)”

* **Margenot, A.J.** Cover crops for Illinois. Illinois Farm Bureau and LaSalle Co. Farm Bureau Field Day. June 29, 2021. Streator, IL.
* **Margenot, A.J.** Soil Health Considerations of Cover Crops.2021 Nutrient Stewardship Field Day: Carroll/Stevenson Co. July 9, 2021. Pearl City, IL.
* **Margenot, A.J.** Phosphorus Research in Illinois. 2021 Nutrient Stewardship Field Day: Warren/Henderson Co. Kirkwood, IL. Aug 26, 2021.

3. Presentations with diverse agricultural sustainability stakeholders, from policy makers to farmers:

* **Margenot, A.J.** Updates & Future Directions on Soil Phosphorus Testing: the Illinois context Association of Lab Testing Professionals (ALTA). Bloomington, IL. Feb 16, 2021.
* **Margenot, A.J**.Phosphorus Management and Water Quality Implications.Advanced Soil Health Training, SW Indiana Focus Area. July 21, 2021. Vincennes, IN.
* **Margenot, A.J**.Carbon Capture and Programs.Advanced Soil Health Training, SW Indiana Focus Area. July 21, 2021. Vincennes, IN.
* **Margenot, A.J**.Managing phosphorus to reduce nitrogen losses? The curious case of ammonium phosphates. Ewing RDC Field Day. July 22, 2021. Ewing, IL.

4. Featured in the *Champaign Gazette* as “the” prized possession of Crop Sciences Dept:

<https://www.news-gazette.com/coronavirus/around-campus-departments-prized-possessions-from-high-tech-lasers-to-a-homemade-eraser-cleaner/article_f519538e-bf9a-5463-96ac-063a8c2d9722.html>

5. Presented at University of Illinois Agronomy Day, a historic event with farmer stakeholders in Illinois and at a community college (Orr Center, in western Illinois).

* **Margenot, A.J**.What is “subsoil P supply power”? Updating the Illinois Agronomy Handbook. Agronomy Day. July 29, 2021. Baylis, IL.

Additionally, **two publications**, one of which is about to undergo peer-review, have been established:

* Liebig, M.A., A.K. Clemensen, L.M. Durso, J.J. Halvorson, A. Margenot, C.E. Stewart, and R.S. Van Pelt. What can we learn about agricultural practices from soil archives? Soils Matter, Get the Scoop! weblog. Available at <https://soilsmatter.wordpress.com/2021/05/01/what-can-we-learn-about-agricultural-practices-from-soil-archives/>. Accessed, 5/3/21. (popular press)
* Bergh, E.L., Calderon, F., Clemensen, A.K., Durso, L., Eberly, J., Halvorson, J.J., Jin, V., **Margenot, A.J.**, Stewart, C.E., Van Pelt, S., Liebig, M.A. Time in a Bottle: Use of Soil Archives for Understanding Long-term Soil Change. *Soil*. To be submitted 9/31/21.

**Additional Comments:**

We are grateful for the generous and substantial support of SCC. Without this project, a priceless resource unique to our campus would have been lost. Already, the SSC-initiated effort is catalyzing additional research projects and bringing in larger grants, which will further engage students in their undergraduate and graduate training. Thank you!